



A Biological Survey of

Permanent Water Sites within the SA Murray Darling Basin Rangelands



SURVEY REPORT 2009



THE NATURE CONSERVATION SOCIETY OF SOUTH AUSTRALIA INC.



edited by Dragos Moise and Tim Milne



Government of South Australia
South Australian Murray-Darling Basin
Natural Resources Management Board



Nature Conservation Society
of South Australia



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A Biological Survey of Permanent Water Sites within the South Australian Murray Darling Basin Rangelands

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About the Nature Conservation Society of South Australia

The Nature Conservation Society of South Australia is a voluntary organisation with members drawn from all parts of the State and all walks of life. One of the primary objectives of the NCSSA is to “*foster the conservation of the State’s wildlife and natural habitats*”, and the Society has taken action on many varied environmental issues since its formation in 1963.

Our activities include:

- ◆ protecting and managing habitats, particularly native vegetation
- ◆ researching threatened species and habitats
- ◆ working to ensure adequate park dedication, management and legislation
- ◆ educating the community and all tiers of government, and
- ◆ cooperating with other conservation groups and land managers

A crucial objective of the NCSSA has been to ensure that South Australia has a comprehensive and representative reserve system. This is a major part of the system needed to ensure that the State’s native plants and animals are conserved in their natural environment.

The Society has sought the addition of new reserves and opposed the resumption of existing reserves when necessary. It has been Society policy to put its case objectively, based on the facts available. Since 1966, in most years, there has been a major biological survey carried out by members and other volunteers to support the case for dedication of a new reserve in a particular area or to promote conservation in an area by a range of landholders.

Promoting conservation more widely

The Society has played a strong role in the formation and development of environmental legislation such as the original *Native Vegetation Management Act* in 1985 and the *Native Vegetation Act 1991*. It is now obvious that conservation reserves alone will not ensure the survival of all of the State’s plants and animals, and that as much native habitat as remains is needed to conserve the biological diversity of South Australia. The Society has played a major role in the promotion of biodiversity conservation on a range of land tenures including Heritage Agreements and in integrating biodiversity objectives into the whole range of land management decisions.

Environment Issues and Research Projects & Publications

The Society conducts scientific research related to environmental protection and management. Studies done by, or on behalf of the Society, are published as reports and made available to the public through sale and distribution to libraries and government institutions. Grant funding supports this work, awarded on scientific merit from a number of grant sources.

Currently there are a number of ongoing NCSSA scientific programs including the Bushland Condition Monitoring project, the Threatened Plant Action Group and Mt Lofty Ranges Woodland Bird Monitoring program.

Education and skill development about ecological matters

The Society is also active in public education through activities such as workshops promoting the understanding of biodiversity protection and management workshops for rural landholders, “Walks with Nature” program, survey skills and ecological knowledge development for landholders, technical officers, volunteers and members; informative meetings open to the public, and through its newsletter *Xanthopus*.

Getting involved with NCSSA activities

An elected Committee handles the Society’s affairs. However it is not necessary to be a Committee member to play an active role in pursuing particular issues or topics of research on behalf of the Society. There are many opportunities to volunteer, such as assist on a survey, help manage a project, lead a “Walk with Nature” group, or promote the organisation activities.

The Society has its offices at 260 Franklin Street, Adelaide, South Australia 5000. The NCSSA is financed by subscriptions, sales of its publications, private donations, and state and federal Government grants. Much of the work is voluntary, while a few part time staff ably supports this volunteer work. Donations are always welcome and fully tax deductible.

For more information please contact the office on (08) 7127 4630 or by email ncssa@ncssa.asn.au.

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Steve Milne, for assistance with maps.

The Nature Conservation Society Survey Steering Committee, who provided technical support for the project including data validation, report formatting and editing.

The people who conducted the surveys and wrote the relevant sections of this report: Sarah Telfer, (standard biological survey for plants), Tim Jury, Robert Bates (opportunistic survey for plants), Gavin Kluske (standard biological survey and opportunistic survey for terrestrial vertebrates), Dragos Moise (standard biological survey for birds), Tom Hands (opportunistic survey for birds), Scotte Wedderburn, Michael Hammer and Karl Hillyard (standard biological survey for fish and aquatic macroinvertebrates).

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Executive Summary

The waterways or ephemeral systems of the South Australian Murray Darling Basin (SA MDB) rangelands are unique to the area and have not been previously studied to create a comprehensive baseline for flora and fauna.

This lack of information greatly increases the risk of poor decision making and limits the decisions regarding management strategies and their impacts within the rangelands. The SA MDB rangelands biological survey has drawn on existing information and newly surveyed information together to provide natural resource managers with a more comprehensive identification of the unique assets of the rangelands. The biological survey focused on collecting baseline biological data including aquatic and terrestrial flora and fauna at eight permanent water sites.

A total of 58 native species and 38 introduced species were found within the standard biological survey sites. Whilst no species were of state or national conservation significance, eight species of regional significance were noted. Two of these, Creeping Brookweed and Streaked Arrowgrass, are water dependent species, and thus it is likely that they are refugia species within the survey area. Evidence of grazing pressure on plants was noted in all but two of the sites, indicating that the permanent/semi-permanent water present at all sites acts as a foci for grazing animals.

Opportune survey for plants in areas adjacent to biological survey sites revealed a total of 374 indigenous plant species and 158 introduced plant species for all sites. Overall 106 species, or 28% of total observed flora, were of some conservation significance. Three plant species found were listed as threatened species at a national level, fifteen rated at the state level and a further 91 plant species found were of regional conservation significance. For most sites we found that steep rocky terrain such as cliffs, gorges and rock outcrops were equally or more significant as refugia for rare or restricted plant species than water bodies, probably owing to the lower accessibility for herbivores.

Twelve species of mammals, 5 native (of which one with conservation significance) and 7 introduced were recorded during the surveys at and around the eight permanent water sites. Ninety-two bird species, 85 native (of which 3 with conservation significance) and 6 introduced species were recorded during the surveys. Eleven bird species were observed breeding in or around the sites. Twelve bird species were identified as possible refugia species, of those, six are waterbirds or are associated with wetland habitats.

The weather conditions during the trapping period were not conducive to trapping reptiles. Nine reptile species were recorded by active searching. Only two species of frogs were trapped.

During the surveys only one alien species of fish was captured, at both sites on Burra Creek. Sampling at the other three waterways failed to detect fish, corresponding to previous attempts. Forty species of macroinvertebrates from 12 main taxonomic groups were identified. Notably, higher diversities were recorded from the smaller catchments, namely Brady Creek and Newkie Creek. Samples from Baldina Creek had the lowest diversity.

It is possible that during the hotter summer months, when this temporary water is unavailable, the permanent water sources of the survey sites support a greater number of animals than was recorded during these surveys.

Introduction

Currently there is only patchy information regarding the state of waterways and ephemeral systems of the rangelands area of the SA MDB. The suite of aquatic flora, amphibian, fish and invertebrate species that are present in the waterways of the South Australian Murray Darling Basin (SA MDB) rangelands are poorly known. This lack of information greatly increases the risk of poor decision making and limits the decisions regarding management strategies and their impacts within the rangelands. This report has drawn on existing information and newly surveyed information together to provide natural resource managers with a more comprehensive identification of the unique assets of the waterways of the SA Murray Darling Basin rangelands.

The survey focused on collecting baseline biological data including aquatic and terrestrial flora and fauna at eight permanent water sites. This would help quantify the habitat value for biodiversity at these sites, but a corollary aim was to examine whether these sites were acting as refugia. 'Refugia' have been defined in many different ways depending on the adopted ecological or evolutionary context (Bennett & Provan 2008). From the classical glacial 'refugia' first expounded by Heusser (1955), the use of the term has been expanded, at times contentiously. In recent decades the term 'refugia' has been used to describe habitats with specific environmental conditions, such as relatively stable microclimates, or those receiving some protection from processes that influence species distributions such as drought and herbivory.

Aridity and drought are of particular influence in shaping species distributions in Australian landscapes (Dodson & Westoby 1984). For Australian refugia Klein *et al.* (2009) distinguished between ecological (i.e. drought) and evolutionary refugia while Morton *et al.* (1995) found arid zone ranges were refugia for significant plant species due to elevated, orographic rainfall and the retention of moisture in rocky gorges. Refugia may also provide niche habitats for plant species with disjunct distributions to extend their range through regions otherwise unfavourable due to aridity or grazing pressure. For the purposes of this survey the adopted refugia concept was ecological, namely the capacity of sites to protect species which otherwise would not persist in the landscape due to factors such as drought and herbivory.

Where possible, the biological survey was undertaken to meet with the biological survey standards of the Department for Environment and Heritage (DEH), to enable sharing of information between state agencies and community groups working towards biodiversity conservation in the rangelands area.

Aims

The aims of this survey were to address knowledge gaps in baseline data of the flora and fauna of waterways, wetlands and ephemeral creek lines of the rangelands area of the South Australian Murray Darling Basin (SA MDB) by:

- compiling existing data on the flora and fauna of the focus survey sites and the surrounding landscape
- undertaking a biological survey of eight permanent water sites within the rangelands of the SA MDB region.
- entering survey data onto relevant state government databases

This would lead to an improved understanding of the community and landholders regarding the species and ecosystems of the rangelands, and improved data for decisions regarding Water Allocation Planning processes, local government development, water affecting activities permits, land management activities and biodiversity conservation, pest and weed control programs and sustainable agriculture programs.

Location of Survey Sites

Survey sites were chosen to represent the best available sites in the western side of the Murray Darling Basin abutting the Northern Mount Lofty Ranges across a wide geographic spread from north to south. Locations of survey sites are shown in Figure 1; basic features are outlined in Table 1

A ‘site’ is chosen to sample a particular habitat. The vegetation and physical description for the survey quadrat therefore represents the habitat of ‘site’ fauna records. Bird observations and active searching for site records take place within the same habitat, although not necessarily within the survey quadrat, so ‘sites’ or areas supporting the same vegetation type should ideally be as large as possible. This was also a consideration during site selection.

Table 1. Location details of the eight survey sites (coordinates in WGS84 datum)

Site_ID	GPS Coordinates		Location
	Easting	Northing	
BSS_01	314937	6237018	Brady Creek Waterholes
BSS_02	313495	6238400	Peppermint Springs
BSS_03	321299	6294600	Newikie Creek, Paradise Hut
BSS_04	319686	6292397	Newikie Creek, Dust Hole Crossing
BSS_05	322043	6272173	Baldina Creek East, Redbanks CP
BSS_06	321571	6272068	Baldina Creek West, Redbanks CP
BSS_07	318279	6254607	Burra Creek Gorge
BSS_08	327633	6251602	Burra Creek, East

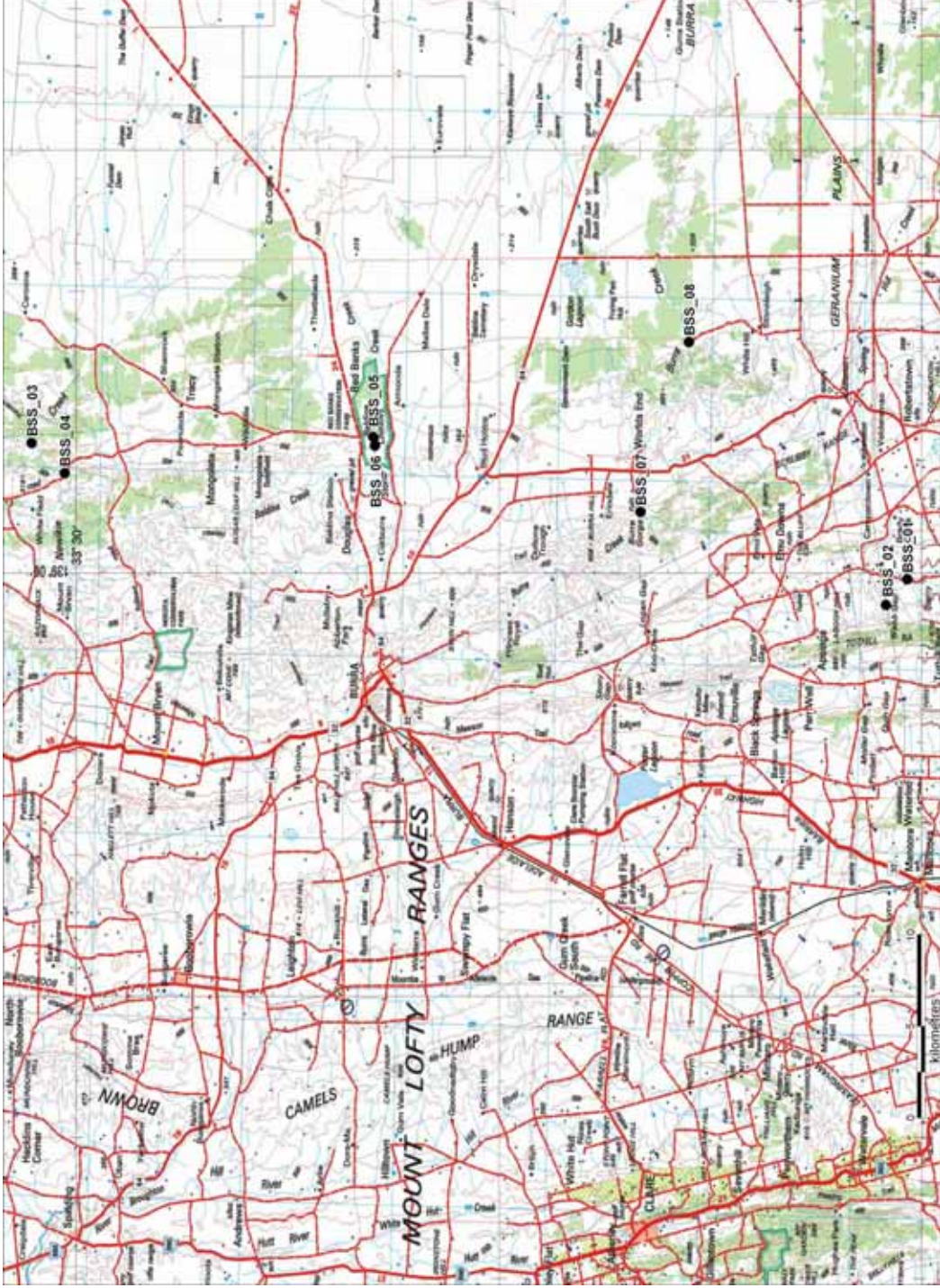


Figure 1. Location of the survey sites within the SA MDB rangelands

Section 1: Vegetation

by Tim Jury, Robert Bates and Sarah Telfer

Methods:

1.1 Collating previous vegetation data

A search was conducted of the Biological Databases of SA (BDBSA) to gather information on species present in the region. The search area was Zone 54 Easting 294 000 to 342 000 and Northing 6217 000 to 6315 000. This corresponded to minimum possible sized rectangular polygon that contained all of the sites plus an additional 20 kilometres in each direction of the compass (i.e. north, south, east and west).

Other information was compiled as available, the source of which is noted in the results.

Conducting Standard DEH Vegetation Survey

Standard vegetation survey was conducted as per Heard and Channon (1997). One standard 30 metre by 30 metre vegetation quadrat was established at each of the survey sites. Where topography and vegetation features did not permit the establishment of a 30 m x 30 m quadrat, a quadrat of different shape, but with the total area of 900 m² was established. At site BSS_08 two 900 m² quadrats were established. At each quadrat vegetation teams recorded species presence, cover and abundance, life stage and an estimate of the dominance of each species. A voucher specimen of each plant species found was collected for verification at the Plant Biodiversity Centre. Plants were also collected opportunistically at each of the survey sites.

Detailed information on the physical environment at each site was also recorded on the 'Biological Survey of South Australia' data sheets. Physical data collected included location, landform type and soil texture class. A photograph was also taken of each site with photographs focussing on a standard range pole located 10 m away from the camera. Data was also collected on grazing pressure within each quadrat following the methodology of Croft et al (2009).

Conducting Opportune Survey for Plants

Opportune flora surveys were undertaken during March and August 2009 to provide a more complete documentation of site floras than quadrat-based methods permit. Annotated lists of indigenous and introduced plant species were compiled for all sites through stratified meander surveys during June and August 2009. All observed indigenous and introduced species were recorded within radial areas around biological survey sites of up to 2 kilometres, including sections of watercourse between paired sites and other areas of suitable contiguous habitat. The time duration of surveys was up to 2 hours per survey area or the non-detection of further species after 20 minutes, whichever occurred first. Specific plant habitats were used to classify species requirements into the following groups or guilds, based on expert opinion.

Wetland species (W) - including hydrophytes, and obligate rheophytes and riverine species.

Saxicolous species (S) - including lithophytes and species primarily occurring on or among rocks.

Refugium species (R) - species for which sites are considered to be acting as some type of ecological or potentially evolutionary refugia.

Results

Collating previous vegetation data

Data from regional searches of the Biological Databases of SA (BDBSA) are shown in Table A.1. A total of 11,294 records represent 935 different species. The number of times a species has been recorded within the search region provides an indication of the abundance of the species in a local context. Data has also been obtained from opportunistic searches (Tables 1.2-, 1.3).

Standard DEH Vegetation Survey

A total of 58 native species and 38 introduced species were found within the standard biological survey sites (Table 1.4). Whilst no species were of state or national conservation significance, eight species of regional significance were noted (Table 1.5). Two of these, Creeping Brookweed and Streaked Arrowgrass, are water dependent species, and thus it is likely that they are refugia species within the survey area.

Evidence of grazing pressure on plants was noted in all but two of the sites, indicating that the permanent/semi-permanent water present at all sites acts as a foci for grazing animals.

Alien plant species that were recorded at 6 quadrats out of the 9 surveyed during the 2009 survey included:

- *Oxalis pes-caprae* (Soursob)
- *Sonchus oleraceus* (Common Sow-thistle)

A further 5 alien species were recorded at 4 or 5 sites. They were:

- *Aster subulatus* (Aster-weed)
- *Cotula coronopifolia* (Water Buttons)
- *Echium plantagineum* (Salvation Jane)
- *Limonium companyonis* (Sea-lavender)

More localised or sparsely distributed species include:

- *Cirsium vulgare* (Spear Thistle)
- *Cynara cardunculus* (Artichoke Thistle)
- *Lycium ferocissimum* (African Boxthorn)
- *Marrubium vulgare* (Horehound)
- *Schinus areira* (Pepper Tree)
- *Solanum nigrum* (Black Nightshade)

Summaries for each of the survey sites are provided on pages 50-76.

Opportune Survey for Plants

Opportune flora surveys revealed a total of 374 indigenous plant species and 158 introduced plant species for all sites. Indigenous plant diversity at survey sites ranged from 276 species at Burra Gorge to 43 species at Brady Creek. All sites showed signs of moderate to high total grazing pressure by cattle and sheep as well as herbivory by feral rabbits, goats, deer and kangaroos.

Thirty five species (9.3 %) of the total observed flora were wetland plant species, those restricted to waterholes or creek lines. Most wetland flora consisted of more common, salt tolerant species. Twenty two species (5.8 % of observed flora) were considered saxicolous, found growing on or amongst rock outcrops, on cliffs, and in rocky areas less accessible to herbivores. Saxicolous flora included the highest proportion of refugium taxa (50%) as well

as refugium species of conservation significance (73.6% of rated refugium flora), and included species known to be sensitive to grazing such as orchids and herbs. The total proportion of observed flora for all sites considered to be refugium species was 8.5%.

Overall 106 species, or 28% of total observed flora, were of some conservation significance. Three plant species are listed threatened species under the *Environmental Protection and Biodiversity Conservation Act 1999*. Fifteen species are listed under the threatened species schedules of the South Australian *National Parks and Wildlife Act 1972*. A further 91 plant species are of regional conservation significance (per Florlist 2009). Species of conservation significance included: *Acacia glandulicarpa*, *Acacia spilleriana*, *Lepidium pseudotasmanicum*, *Olearia pannosa* ssp. *pannosa*, *Olearia picridifolia*, *Cryptandra* sp. Long hypanthium, *Asperula syrticola*, *Daviesia stricta*, *Logania saxitillis*, *Mentha saturoides*, *Austrostipa pilata*, *Austrostipa tuckerii*, *Austrostipa breviglumis*, *Lachnagrostis robusta* and *Arabidella filifolia*.

The South Australian endemic *Senecio megaglossus* and *Swainsona tephrotricha* were seen approximately 4 kilometres west of Dust Hole Crossing (S04) on Sugarloaf Hill. While outside the survey area this site is of high conservation significance and is actively degrading through erosion and livestock grazing.



Figure A. *Olearia picridifolia* near BSS_07 (T. Jury)



Figure B. *Senecio anethifolius* near BSS_04 & BSS_07 (T. Jury)



Figure C. Eroded banks of Newickie Creek near BSS_04. (T. Jury)



Figure D. *Wurmbea diocia* ssp. *brevifolia* near BSS_03 (R. Bates)



Figure E. *Arabidella filifolia* near BSS_04 (T. Jury)



Figure F. *Trymalium wayae* near BSS_08 (T. Jury)



Figure G. *Asperula syrticola* near BSS_07 (T. Jury)



Figure I. *Glycine rubiginosa* near BSS_06 (T. Jury)



Figure H. Cliff habitat near BSS_08 (T. Jury)



Figure J. *Acacia spilleriana* near BSS_07 (T. Jury)

Table 1.1. Number of observations of plant species within Biological Databases of SA search (regional count based upon number of records in the BDBSA for search area Zone 54 Easting 294 000 to 342 000 and Northing 6217 000 to 6315 000). Environment Protection and Biodiversity Conservation (EPBC) Act, National Parks and Wildlife (NPW) Act ratings: R – *Rare*, V – *Vulnerable*, E – *Endangered*.

Species Name	Common Name	EPBC Rating	NPWS Rating	Regional Count*
<i>Abutilon fraseri</i> ssp. <i>fraseri</i>	Dwarf Lantern-bush			1
<i>Abutilon</i> sp.	Lantern-bush			2
<i>Acacia acinacea</i>	Wreath Wattle			31
<i>Acacia ancistrophylla</i> var. <i>lissophylla</i>	Hook-leaf Wattle			2
<i>Acacia aneura</i> var. <i>aneura</i> (NC)	Mulga			1
<i>Acacia argyrophylla</i>	Silver Mulga-bush			2
<i>Acacia brachybotrya</i>	Grey Mulga-bush			7
<i>Acacia calamifolia</i>	Wallowa			3
<i>Acacia calamifolia</i> (NC)	Wallowa			50
<i>Acacia colletioides</i>	Veined Wait-a-while			2
<i>Acacia continua</i>	Thorn Wattle			1
<i>Acacia cupularis</i>	Cup Wattle			3
<i>Acacia genistifolia</i>	Broom Wattle		E	1
<i>Acacia glandulicarpa</i>	Hairy-pod Wattle	V	E	21
<i>Acacia hakeoides</i>	Hakea Wattle			23
<i>Acacia ligulata</i>	Umbrella Bush			1
<i>Acacia menzelii</i>	Menzel's Wattle	V	V	2
<i>Acacia myrtifolia</i> var. <i>myrtifolia</i> (NC)	Myrtle Wattle			1
<i>Acacia notabilis</i>	Notable Wattle			4
<i>Acacia nyssophylla</i>	Spine Bush			12
<i>Acacia oswaldii</i>	Umbrella Wattle			21
<i>Acacia paradoxa</i>	Kangaroo Thorn			33
<i>Acacia pravifolia</i>	Coil-pod Wattle			1
<i>Acacia pycnantha</i>	Golden Wattle			101
<i>Acacia retinodes</i>	Wirilda			1
<i>Acacia rigens</i>	Nealie			1
<i>Acacia</i> sp.	Wattle			1
<i>Acacia spilleriana</i>	Spiller's Wattle		E	34
<i>Acacia trineura</i>	Three-nerve Wattle		E	1
<i>Acacia triquetra</i>	Mallee Wreath Wattle			1
<i>Acacia victoriae</i> ssp.	Elegant Wattle			1
<i>Acacia victoriae</i> ssp. <i>victoriae</i>	Elegant Wattle			1
<i>Acacia wattiana</i>	Dog Wattle			35
<i>Acacia wilhelmiana</i>	Dwarf Nealie			7
<i>Acaena echinata</i>	Sheep's Burr			4
<i>Acaena echinata</i> var. (NC)	Sheep's Burr			15
<i>Acaena echinata</i> var. <i>echinata</i> (NC)	Sheep's Burr			7
<i>Acaena echinata</i> var. <i>retrorsumpilosa</i> (NC)	Sheep's Burr			9
<i>Acaena ovina</i>	Downy Sheep's Burr			1
<i>Acaena</i> sp.	Sheep's Burr			1
<i>Acianthus pusillus</i>	Mosquito Orchid			9
<i>Acrotriche affinis</i>	Ridged Ground-berry			32
<i>Acrotriche patula</i>	Prickly Ground-berry			15
<i>Acrotriche serrulata</i>	Cushion Ground-berry			1

Species Name	Common Name	EPBC Rating	NPWS Rating	Regional Count*
<i>Actinobole uliginosum</i>	Flannel Cudweed			23
<i>Adriana quadripartita (NC)</i>	Rare Bitter-bush			3
<i>Agrostis avenacea</i> var. <i>avenacea (NC)</i>	Common Blown-grass			2
<i>Ajuga australis</i>	Australian Bugle			1
<i>Ajuga australis</i> f. <i>A (A.G.Spooner 9058)</i>	Australian Bugle			1
<i>Alectryon oleifolius</i> ssp. <i>canescens</i>	Bullock Bush			29
<i>Allocasuarina muelleriana</i> ssp.	Common Oak-bush			11
<i>Allocasuarina muelleriana</i> ssp. <i>muelleriana</i>	Common Oak-bush			13
<i>Allocasuarina verticillata</i>	Drooping Sheoak			79
<i>Alternanthera denticulata</i>	Lesser Joyweed			4
<i>Alyogyne huegelii</i>	Native Hibiscus			3
<i>Amphibromus nervosus</i>	Veined Swamp Wallaby-grass			6
<i>Amphipogon caricinus</i> var. <i>caricinus</i>	Long Grey-beard Grass			5
<i>Amphipogon strictus</i> var. <i>setifer</i>	Spreading Grey-beard Grass			4
<i>Amyema miquelii</i>	Box Mistletoe			55
<i>Amyema miraculosa</i> ssp. <i>boormanii</i>	Fleshy Mistletoe			3
<i>Amyema preissii</i>	Wire-leaf Mistletoe			6
<i>Angianthus tomentosus</i>	Hairy Angianthus			1
<i>Aphanes australiana (NC)</i>	Australian Piert			3
<i>Apium prostratum</i> var.	Native Celery			2
<i>Apium prostratum</i> var. <i>prostratum</i>	Native Celery			2
<i>Arabidella filifolia</i>	Thread-leaf Cress			5
<i>Arabidella nasturtium</i>	Yellow Cress			2
<i>Arabidella procumbens</i>	Creeping Cress			1
<i>Arabidella trisecta</i>	Shrubby Cress			5
<i>Aristida behriana</i>	Brush Wire-grass			76
<i>Aristida contorta</i>	Curly Wire-grass			4
<i>Arthropodium fimbriatum</i>	Nodding Vanilla-lily			26
<i>Arthropodium minus</i>	Small Vanilla-lily			9
<i>Arthropodium</i> sp.	Vanilla-lily			5
<i>Arthropodium strictum</i>	Common Vanilla-lily			92
<i>Asperula conferta</i>	Common Woodruff			50
<i>Asperula syrticola</i>	Southern Flinders Woodruff		R	4
<i>Asplenium flabellifolium</i>	Necklace Fern			7
<i>Asteridea athrixioides</i> f. <i>athrixioides</i>	Wirewort			2
<i>Astroloma humifusum</i>	Cranberry Heath			47
<i>Atriplex acutibractea</i> ssp.	Pointed Saltbush			3
<i>Atriplex acutibractea</i> ssp. <i>acutibractea</i>	Pointed Saltbush			5
<i>Atriplex acutiloba</i>				1
<i>Atriplex angulata</i>	Fan Saltbush			4
<i>Atriplex australasica</i>			R	1
<i>Atriplex eardleyae</i>	Eardley's Saltbush			7
<i>Atriplex holocarpa</i>	Pop Saltbush			4
<i>Atriplex leptocarpa</i>	Slender-fruit Saltbush			1
<i>Atriplex lindleyi</i> ssp. <i>inflata</i>	Corky Saltbush			6
<i>Atriplex lindleyi</i> ssp. <i>lindleyi</i>	Baldoo			1
<i>Atriplex muelleri</i>	Mueller's Saltbush			1

Species Name	Common Name	EPBC Rating	NPWS Rating	Regional Count*
<i>Atriplex paludosa</i> ssp.	Marsh Saltbush			1
<i>Atriplex pumilio</i>	Mat Saltbush			2
<i>Atriplex semibaccata</i>	Berry Saltbush			19
<i>Atriplex</i> sp.	Saltbush			18
<i>Atriplex stipitata</i>	Bitter Saltbush			29
<i>Atriplex suberecta</i>	Lagoon Saltbush			2
<i>Atriplex velutinella</i>	Sandhill Saltbush			1
<i>Atriplex vesicaria</i> (NC)				1
<i>Atriplex vesicaria</i> ssp.	Bladder Saltbush			25
<i>Atriplex vesicaria</i> ssp. <i>calcicola</i>	Bladder Saltbush			1
<i>Atriplex vesicaria</i> ssp. <i>macrocystidia</i>	Bladder Saltbush			6
<i>Atriplex vesicaria</i> ssp. <i>variabilis</i>	Bladder Saltbush			4
<i>Austrodanthonia auriculata</i>	Lobed Wallaby-grass			35
<i>Austrodanthonia caespitosa</i>	Common Wallaby-grass			127
<i>Austrodanthonia duttoniana</i>	Brown-back Wallaby-grass			7
<i>Austrodanthonia eriantha</i>	Hill Wallaby-grass			26
<i>Austrodanthonia fulva</i>	Leafy Wallaby-grass			3
<i>Austrodanthonia laevis</i>	Smooth Wallaby-grass		R	1
<i>Austrodanthonia racemosa</i> var. <i>racemosa</i>	Slender Wallaby-grass			13
<i>Austrodanthonia setacea</i>	Small-flower Wallaby-grass			66
<i>Austrodanthonia</i> sp.				4
<i>Austrodanthonia tenuior</i>	Short-awn Wallaby-grass		R	12
<i>Austrostipa acrociliata</i>	Graceful Spear-grass			11
<i>Austrostipa blackii</i>	Crested Spear-grass			77
<i>Austrostipa breviglumis</i>	Cane Spear-grass		R	15
<i>Austrostipa curticomma</i>	Short-crest Spear-grass			1
<i>Austrostipa drummondii</i>	Cottony Spear-grass			12
<i>Austrostipa elegantissima</i>	Feather Spear-grass			69
<i>Austrostipa eremophila</i>	Rusty Spear-grass			48
<i>Austrostipa exilis</i>	Heath Spear-grass			1
<i>Austrostipa flavescens</i>	Coast Spear-grass			2
<i>Austrostipa gibbosa</i>	Swollen Spear-grass		R	10
<i>Austrostipa hemipogon</i>	Half-beard Spear-grass			2
<i>Austrostipa lanata</i>				1
<i>Austrostipa mollis</i>	Soft Spear-grass			11
<i>Austrostipa nitida</i>	Balcarra Spear-grass			62
<i>Austrostipa nodosa</i>	Tall Spear-grass			35
<i>Austrostipa pilata</i>	Prickly Spear-grass		V	4
<i>Austrostipa platychaeta</i>	Flat-awn Spear-grass			7
<i>Austrostipa puberula</i>	Fine-hairy Spear-grass			5
<i>Austrostipa scabra</i> ssp.	Rough Spear-grass			37
<i>Austrostipa scabra</i> ssp. <i>falcata</i>	Slender Spear-grass			25
<i>Austrostipa scabra</i> ssp. <i>scabra</i>	Rough Spear-grass			22
<i>Austrostipa semibarbata</i>	Fibrous Spear-grass			6
<i>Austrostipa setacea</i>	Corkscrew Spear-grass			22
<i>Austrostipa</i> sp.	Spear-grass			41
<i>Austrostipa trichophylla</i>				1
<i>Banksia marginata</i>	Silver Banksia			11

Species Name	Common Name	EPBC Rating	NPWS Rating	Regional Count*
<i>Baumea arthropphylla</i>	Swamp Twig-rush			2
<i>Baumea juncea</i>	Bare Twig-rush			3
<i>Beyeria lechenaultii</i>	Pale Turpentine Bush			24
<i>Billardiera versicolor</i>	Yellow-flower Apple-berry			2
<i>Blennospora drummondii</i>	Dwarf Button-flower			22
<i>Boerhavia dominii</i>	Tar-vine			10
<i>Boerhavia sp.</i>	Tar-vine			2
<i>Bolboschoenus caldwellii</i>	Salt Club-rush			6
<i>Bolboschoenus medianus</i>	Marsh Club-rush			1
<i>Boraginaceae sp.</i>	Borage Family			1
<i>Bossiaea prostrata</i>	Creeping Bossiaea			1
<i>Bothriochloa macra</i>	Red-leg Grass		R	4
<i>Brachyscome ciliaris var.</i>	Variable Daisy			3
<i>Brachyscome ciliaris var. ciliaris</i>	Variable Daisy			13
<i>Brachyscome ciliaris var. lanuginosa</i>	Woolly Variable Daisy			1
<i>Brachyscome ciliaris var. subintegrifolia</i>			R	2
<i>Brachyscome lineariloba</i>	Hard-head Daisy			34
<i>Brachyscome lineariloba/perpusilla</i>				1
<i>Brachyscome perpusilla</i>	Tiny Daisy			20
<i>Brachyscome sp.</i>	Native Daisy			2
<i>Bromus arenarius</i>	Sand Brome			5
<i>Bromus sp.</i>	Brome			3
<i>Brunonia australis</i>	Blue Pincushion			1
<i>Bulbine bulbosa</i>	Bulbine-lily			39
<i>Bulbine semibarbata</i>	Small Leek-lily			2
<i>Bursaria spinosa ssp.</i>	Bursaria			2
<i>Bursaria spinosa ssp. spinosa</i>	Sweet Bursaria			68
<i>Caesia calliantha</i>	Blue Grass-lily			6
<i>Caladenia carnea</i>	Pink Fingers			1
<i>Caladenia carnea complex</i>	Pink Fingers Caladenia			1
<i>Caladenia gladiolata</i>	Bayonet Spider-orchid	E	E	2
<i>Caladenia leptochila</i>	Narrow-lip Spider-orchid			9
<i>Caladenia sp.</i>	Spider-orchid			1
<i>Caladenia tentaculata</i>	King Spider-orchid			1
<i>Caladenia toxochila</i>	Bow-lip Spider-orchid			1
<i>Calandrinia calyptрата</i>	Pink Purslane			25
<i>Calandrinia eremaea</i>	Dryland Purslane			15
<i>Calandrinia granulifera</i>	Pigmy Purslane			2
<i>Calandrinia sp.</i>	Purslane/Parakeelya			2
<i>Calandrinia volubilis</i>	Twining Purslane			6
<i>Callistemon teretifolius</i>	Needle Bottlebrush			2
<i>Callitris glaucophylla</i>	White Cypress-pine			7
<i>Callitris gracilis</i>	Southern Cypress Pine			31
<i>Callitris sp.</i>	Native Pine			1
<i>Calocephalus citreus</i>	Lemon Beauty-heads			32
<i>Calostemma purpureum</i>	Pink Garland-lily			18
<i>Calotis hispidula</i>	Hairy Burr-daisy			25
<i>Calytrix tetragona</i>	Common Fringe-myrtle			31
<i>Carex bichenoviana</i>	Notched Sedge			1
<i>Carex breviculmis</i>	Short-stem Sedge			9

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<i>Carex gaudichaudiana</i>	Fen Sedge			1
<i>Carex inversa</i> var. <i>inversa</i>	Knob Sedge			1
<i>Carex inversa</i> var. <i>major</i>	Knob Sedge			8
<i>Carex tereticaulis</i>	Rush Sedge			2
<i>Carpobrotus rossii</i> (NC)	Native Pigface			2
<i>Cassinia arcuata</i>	Drooping Cassinia			5
<i>Cassinia complanata</i>	Sticky Cassinia			9
<i>Cassinia laevis</i>	Curry Bush			12
<i>Cassinia uncata</i> (NC)	Sticky Cassinia			10
<i>Cassytha melantha</i>	Coarse Dodder-laurel			32
<i>Cassytha pubescens</i>	Downy Dodder-laurel			1
<i>Cassytha</i> sp.	Dodder-laurel			2
<i>Casuarina pauper</i>	Black Oak			1
<i>Centipeda cunninghamii</i> (NC)	Common Sneezeweed			2
<i>Centrolepis aristata</i>	Pointed Centrolepis			6
<i>Centrolepis cephaloformis</i> ssp. <i>cephaloformis</i>	Cushion Centrolepis		R	1
<i>Centrolepis polygyna</i>	Wiry Centrolepis			9
<i>Centrolepis strigosa</i> ssp. <i>strigosa</i>	Hairy Centrolepis			11
<i>Chamaescilla corymbosa</i> var. <i>corymbosa</i>	Blue Squill			18
<i>Chamaesyce australis</i>				1
<i>Chamaesyce drummondii</i>				2
<i>Chamaesyce drummondii</i> (NC)	Caustic Weed			69
<i>Chara</i> sp.				3
<i>Cheilanthes austrotenuifolia</i>	Annual Rock-fern			71
<i>Cheilanthes distans</i>	Bristly Cloak-fern			3
<i>Cheilanthes lasiophylla</i>	Woolly Cloak-fern			13
<i>Cheilanthes sieberi</i> ssp. <i>sieberi</i>	Narrow Rock-fern			7
<i>Cheiranthra alternifolia</i>	Hand-flower			3
<i>Cheiranthra</i> sp.	Finger-flower			1
<i>Chenopodium curvispicatum</i>	Cottony Goosefoot			19
<i>Chenopodium desertorum</i> ssp.	Desert Goosefoot			6
<i>Chenopodium desertorum</i> ssp. <i>desertorum</i>	Frosted Goosefoot			16
<i>Chenopodium desertorum</i> ssp. <i>microphyllum</i>	Small-leaf Goosefoot			30
<i>Chenopodium gaudichaudianum</i>	Scrambling Goosefoot			2
<i>Chenopodium</i> sp.	Goosefoot			3
<i>Chloris truncata</i>	Windmill Grass			1
<i>Choretrum glomeratum</i> var. <i>chrysanthum</i>	Yellow-flower Sour-bush		R	4
<i>Chrysocephalum apiculatum</i>	Common Everlasting			58
<i>Chrysocephalum baxteri</i>	White Everlasting			11
<i>Chrysocephalum semipapposum</i>	Clustered Everlasting			59
<i>Clematis microphylla</i> var. <i>microphylla</i>	Old Man's Beard			29
<i>Codonocarpus pyramidalis</i>	Slender Bell-fruit	V	E	5
<i>Comesperma</i> sp.	Milkwort			1
<i>Comesperma volubile</i>	Love Creeper			6
<i>Compositae</i> sp.	Daisy Family			6
<i>Convolvulus angustissimus</i> ssp. <i>angustissimus</i>	Australian Bindweed			7
<i>Convolvulus angustissimus</i> ssp.	Grassland Bindweed			1

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<i>peninsularum</i>				
<i>Convolvulus erubescens</i> (NC)	Australian Bindweed			60
<i>Convolvulus erubescens/remotus</i> (NC)	Native Bindweed			3
<i>Convolvulus microsepalus</i>	Small-flower Bindweed			4
<i>Convolvulus microsepalus/remotus</i>				4
<i>Convolvulus remotus</i>	Grassy Bindweed			39
<i>Convolvulus sp.</i>	Bindweed			7
<i>Correa decumbens</i>	Spreading Correa			1
<i>Correa glabra</i> (NC)	Rock Correa			10
<i>Correa glabra var.</i>				1
<i>Correa glabra var. turnbullii</i>	Rock Correa			6
<i>Correa sp.</i>	Correa			1
<i>Corybas incurvus</i>	Slaty Helmet-orchid			1
<i>Corybas sp.</i>	Helmet-orchid			2
<i>Cotula australis</i>	Common Cotula			6
<i>Cotula vulgaris var. australasica</i>	Slender Cotula			1
<i>Craspedia glauca</i> (NC)	Billy-buttons			6
<i>Craspedia variabilis</i>	Billy-buttons			3
<i>Crassula closiana</i>	Stalked Crassula			5
<i>Crassula colligata ssp. colligata</i>				11
<i>Crassula colligata ssp. lamprosperma</i>				13
<i>Crassula colorata var.</i>	Dense Crassula			20
<i>Crassula colorata var. acuminata</i>	Dense Crassula			25
<i>Crassula colorata var. colorata</i>	Dense Crassula			2
<i>Crassula colorata/sieberiana complex</i>	Crassula			7
<i>Crassula decumbens var. decumbens</i>	Spreading Crassula			27
<i>Crassula peduncularis</i>	Purple Crassula		R	2
<i>Crassula sieberiana complex</i>	Australian Stonecrop			1
<i>Crassula sieberiana ssp. tetramera</i> (NC)	Australian Stonecrop			40
<i>Crassula sp.</i>	Crassula/Stonecrop			3
<i>Cratystylis conocephala</i>	Bluebush Daisy			7
<i>Cressa australis</i>	Rosinweed			1
<i>Cryptandra amara var.</i>	Cryptandra			1
<i>Cryptandra amara var. amara</i> (NC)	Spiny Cryptandra			2
<i>Cryptandra sp. Long hypanthium</i> (C.R. Alcock 10626)	Long-flower Cryptandra		R	41
<i>Cucurbitaceae sp.</i>	Melon Family			1
<i>Cullen australasicum</i>	Tall Scurf-pea			5
<i>Cullen discolor</i>	Prostrate Scurf-pea			1
<i>Cullen parvum</i>	Small Scurf-pea		V	10
<i>Cymbonotus preissianus</i>	Austral Bear's-ear			22
<i>Cymbopogon ambiguus</i>	Lemon-grass			7
<i>Cynoglossum suaveolens</i>	Sweet Hound's-tongue			15
<i>Cyperus gymnocaulos</i>	Spiny Flat-sedge			18
<i>Cyrtostylis reniformis</i>	Small Gnat-orchid			1
<i>Dactyloctenium radulans</i>	Button-grass			1
<i>Dampiera dysantha</i>	Shrubby Dampiera			3
<i>Dampiera lanceolata var. lanceolata</i>	Grooved Dampiera			1
<i>Dampiera rosmarinifolia</i>	Rosemary Dampiera			1
<i>Danthonia carphoides var.</i> (NC)	Short Wallaby-grass			16
<i>Danthonia carphoides var. carphoides</i>	Short Wallaby-grass		R	19

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(NC)				
<i>Danthonia pilosa</i> var. (NC)	Velvet Wallaby-grass			16
<i>Danthonia pilosa</i> var. <i>paleacea</i> (NC)	Velvet Wallaby-grass			6
<i>Danthonia pilosa</i> var. <i>pilosa</i> (NC)	Velvet Wallaby-grass			2
<i>Danthonia setacea</i> (NC)				1
<i>Danthonia</i> sp. (NC)	Wallaby-grass			30
<i>Daucus glochidiatus</i>	Native Carrot			85
<i>Daviesia benthamii</i> ssp. <i>humilis</i>	Mallee Bitter-pea		R	4
<i>Daviesia leptophylla</i>	Narrow-leaf Bitter-pea			9
<i>Daviesia stricta</i>	Flinders Ranges Bitter-pea		R	1
<i>Derwentia decorosa</i>	Showy Speedwell		R	2
<i>Dianella brevicaulis</i>	Short-stem Flax-lily			1
<i>Dianella brevicaulis/revoluta</i> var.	Black-anther Flax-lily			14
<i>Dianella longifolia</i> var. <i>grandis</i>	Pale Flax-lily		R	1
<i>Dianella revoluta</i> (NC)				5
<i>Dianella revoluta</i> var.				2
<i>Dianella revoluta</i> var. <i>revoluta</i>	Black-anther Flax-lily			73
<i>Dianella</i> sp.	Flax-lily			2
<i>Dichanthium sericeum</i> ssp. <i>sericeum</i>	Silky Blue-grass			2
<i>Dichelachne crinita</i>	Long-hair Plume-grass			5
<i>Dichelachne micrantha</i>	Short-hair Plume-grass			1
<i>Dichondra repens</i>	Kidney Weed			4
<i>Digitaria coenicola</i>	Spider Grass			3
<i>Digitaria</i> sp.	Summer-grass			2
<i>Dillwynia hispida</i>	Red Parrot-pea			8
<i>Disphyma crassifolium</i> ssp. <i>clavellatum</i>	Round-leaf Pigface			3
<i>Dissocarpus biflorus</i> var.	Two-horn Saltbush			1
<i>Dissocarpus biflorus</i> var. <i>biflorus</i>	Two-horn Saltbush			1
<i>Dissocarpus paradoxus</i>	Ball Bindyi			8
<i>Distichlis distichophylla</i>	Emu-grass			6
<i>Diuris behrii</i>	Behr's Cowslip Orchid		V	4
<i>Dodonaea baueri</i>	Crinkled Hop-bush			18
<i>Dodonaea bursariifolia</i>	Small Hop-bush			3
<i>Dodonaea hexandra</i>	Horned Hop-bush			2
<i>Dodonaea lobulata</i>	Lobed-leaf Hop-bush			21
<i>Dodonaea procumbens</i>	Trailing Hop-bush	V	V	34
<i>Dodonaea procumbens</i> X <i>Dodonaea viscosa</i> ssp. <i>spatulata</i>				4
<i>Dodonaea stenozyga</i>	Desert Hop-bush			7
<i>Dodonaea subglandulifera</i>		E	E	7
<i>Dodonaea viscosa</i> ssp.	Sticky Hop-bush			4
<i>Dodonaea viscosa</i> ssp. <i>angustissima</i>	Narrow-leaf Hop-bush			21
<i>Dodonaea viscosa</i> ssp. <i>cuneata</i>	Wedge-leaf Hop-bush			2
<i>Dodonaea viscosa</i> ssp. <i>spatulata</i>	Sticky Hop-bush			19
<i>Drosera auriculata</i>	Tall Sundew			2
<i>Drosera glanduligera</i>	Scarlet Sundew			4
<i>Drosera macrantha</i> ssp. <i>planchonii</i>	Climbing Sundew			30
<i>Drosera peltata</i>	Pale Sundew			2
<i>Drosera whittakeri</i> (NC)	Scented Sundew			4
<i>Drosera whittakeri</i> ssp. <i>whittakeri</i>				12

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<i>Dysphania cristata</i>	Crested Goosefoot			1
<i>Dysphania pumilio</i>	Clammy Goosefoot			5
<i>Echinopogon ovatus</i>	Rough-beard Grass		R	7
<i>Einadia nutans ssp.</i>	Climbing Saltbush			44
<i>Einadia nutans ssp. nutans</i>	Climbing Saltbush			42
<i>Elachanthus pusillus</i>	Elachanth			6
<i>Eleocharis acuta</i>	Common Spike-rush			1
<i>Eleocharis pallens</i>	Pale Spike-rush			1
<i>Elymus scaber var. scaber (NC)</i>	Native Wheat-grass			42
<i>Enchylaena tomentosa var.</i>	Ruby Saltbush			57
<i>Enchylaena tomentosa var. tomentosa</i>	Ruby Saltbush			67
<i>Enneapogon nigricans</i>	Black-head Grass			25
<i>Enteropogon acicularis</i>	Umbrella Grass			1
<i>Epilobium billardierianum ssp. billardierianum</i>	Robust Willow-herb			5
<i>Epilobium hirtigerum</i>	Hairy Willow-herb			2
<i>Eragrostis australasica</i>	Cane-grass			1
<i>Eragrostis basedowii</i>	Neat Love-grass			1
<i>Eragrostis infecunda</i>	Barren Cane-grass		R	4
<i>Eragrostis parviflora</i>	Weeping Love-grass			1
<i>Eremophila alternifolia</i>	Narrow-leaf Emubush			25
<i>Eremophila deserti</i>	Turkey-bush			1
<i>Eremophila glabra (NC)</i>	Tar Bush			3
<i>Eremophila glabra ssp. glabra</i>	Tar Bush			6
<i>Eremophila longifolia</i>	Weeping Emubush			15
<i>Eremophila oppositifolia ssp.</i>	Opposite-leaved Emubush			1
<i>Eremophila oppositifolia ssp. oppositifolia</i>	Opposite-leaved Emubush			4
<i>Eremophila scoparia</i>	Broom Emubush			17
<i>Eremophila serrulata</i>	Green Emubush			4
<i>Eremophila sturtii</i>	Turpentine Bush			1
<i>Eremophila subfloccosa ssp. Glandulosa (R.Bates 32961)</i>	Green-flower Emubush		R	1
<i>Eriochilus cucullatus</i>	Parson's Bands			1
<i>Eriochiton sclerolaenoides</i>	Woolly-fruit Bluebush			15
<i>Eriochloa australiensis</i>	Australian Cupgrass			1
<i>Eriochloa pseudoacrotricha</i>	Perennial Cupgrass			1
<i>Erodiophyllum elderi</i>	Koonamore Daisy			1
<i>Erodium crinitum</i>	Blue Heron's-bill			10
<i>Erodium crinitum/cygnorum/carolinianum/jannzii</i>	Blue Heron's-bill			4
<i>Erodium cygnorum ssp. glandulosum (NC)</i>	Clammy Heron's-bill			2
<i>Erodium sp.</i>	Heron's-bill/Crowfoot			16
<i>Eryngium ovinum</i>	Blue Devil		V	20
<i>Eryngium rostratum/vesiculosum</i>	Blue Devil			1
<i>Eryngium vesiculosum</i>	Prostrate Blue Devil		R	1
<i>Eucalyptus behriana</i>	Broad-leaf Box		R	1
<i>Eucalyptus brachycalyx</i>	Gilja			39
<i>Eucalyptus camaldulensis var.</i>	River Red Gum			3
<i>Eucalyptus camaldulensis var.</i>	River Red Gum			4

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<i>camaldulensis</i>				
<i>Eucalyptus cladocalyx</i>	Sugar Gum			6
<i>Eucalyptus dumosa</i>	White Mallee			1
<i>Eucalyptus globulus ssp. bicostata</i>	Southern Blue Gum		V	1
<i>Eucalyptus goniocalyx (NC)</i>	Long-leaf Box			8
<i>Eucalyptus goniocalyx ssp. goniocalyx</i>	Long-leaf Box			5
<i>Eucalyptus gracilis</i>	Yorrell			66
<i>Eucalyptus largiflorens</i>	River Box			1
<i>Eucalyptus leptophylla</i>	Narrow-leaf Red Mallee			8
<i>Eucalyptus leucoxylon (NC)</i>	South Australian Blue Gum			7
<i>Eucalyptus leucoxylon ssp.</i>	South Australian Blue Gum			2
<i>Eucalyptus leucoxylon ssp. leucoxylon</i>	South Australian Blue Gum			1
<i>Eucalyptus leucoxylon ssp. pruinosa</i>	Inland South Australian Blue Gum			47
<i>Eucalyptus leucoxylon ssp. pruinosa (NC)</i>				1
<i>Eucalyptus leucoxylon ssp. pruinosa X Eucalyptus porosa</i>				1
<i>Eucalyptus microcarpa</i>	Grey Box			4
<i>Eucalyptus microcarpa -- Eucalyptus odorata</i>	Grey Box Intergrade			1
<i>Eucalyptus odorata</i>	Peppermint Box			94
<i>Eucalyptus oleosa (NC)</i>	Red Mallee			42
<i>Eucalyptus phenax ssp. phenax</i>	White Mallee			2
<i>Eucalyptus porosa</i>	Mallee Box			44
<i>Eucalyptus socialis (NC)</i>	Beaked Red Mallee			45
<i>Eucalyptus sp.</i>				1
<i>Euchiton sphaericus</i>	Annual Cudweed			5
<i>Euphorbia australis (NC)</i>	Hairy Caustic Weed			1
<i>Euphorbia tannensis ssp. (NC)</i>	Desert Spurge			1
<i>Euphorbia tannensis ssp. eremophila</i>	Desert Spurge			6
<i>Eutaxia diffusa</i>	Large-leaf Eutaxia			5
<i>Eutaxia microphylla</i>	Common Eutaxia			24
<i>Eutaxia sp.</i>	Eutaxia			1
<i>Exocarpos aphyllus</i>	Leafless Cherry			31
<i>Exocarpos cupressiformis</i>	Native Cherry			31
<i>Festuca benthamiana</i>	Bentham's Fescue		R	4
<i>Frankenia cupularis</i>			R	1
<i>Gahnia lanigera</i>	Black Grass Saw-sedge			10
<i>Gahnia trifida</i>	Cutting Grass			5
<i>Galium gaudichaudii (NC)</i>	Rough Bedstraw			16
<i>Galium migrans (NC)</i>	Loose Bedstraw			12
<i>Galium sp.</i>	Bedstraw			2
<i>Geijera linearifolia</i>	Sheep Bush			21
<i>Genoplesium rufum</i>	Red Midge-orchid			1
<i>Geococcus pusillus</i>	Earth Cress			5
<i>Geranium retrorsum</i>	Grassland Geranium			36
<i>Geranium solanderi var. solanderi</i>	Austral Geranium			9
<i>Geranium sp.</i>	Geranium			4
<i>Glischrocaryon flavescens</i>	Yellow Pennants			8

Species Name	Common Name	EPBC Rating	NPWS Rating	Regional Count*
<i>Glycine clandestina</i> var. (NC)	Twining Glycine			10
<i>Glycine clandestina</i> var. <i>clandestina</i> (NC)	Twining Glycine			2
<i>Glycine rubiginosa</i>	Twining Glycine			27
<i>Gnaphalium indutum</i> ssp. <i>indutum</i>	Tiny Cudweed			1
<i>Gnaphalium</i> sp.	Cudweed			1
<i>Gnephosis eriocarpa</i>	Native Camomile			1
<i>Gnephosis tenuissima</i>	Dwarf Golden-tip			1
<i>Gonocarpus elatus</i>	Hill Raspwort			77
<i>Gonocarpus elatus</i> X <i>Gonocarpus megianus</i>	Hybrid Raspwort			3
<i>Gonocarpus megianus</i>	Broad-leaf Raspwort			28
<i>Gonocarpus</i> sp.	Raspwort			2
<i>Gonocarpus tetragynus</i>	Small-leaf Raspwort			10
<i>Goodenia albiflora</i>	White Goodenia			9
<i>Goodenia blackiana</i>	Native Primrose			46
<i>Goodenia fascicularis</i>	Silky Goodenia			11
<i>Goodenia glauca</i>	Pale Goodenia			2
<i>Goodenia heteromera</i>	Spreading Goodenia		R	5
<i>Goodenia ovata</i>	Hop Goodenia			2
<i>Goodenia pinnatifida</i>	Cut-leaf Goodenia			77
<i>Goodenia pusilliflora</i>	Small-flower Goodenia			30
<i>Goodenia</i> sp.	Goodenia			3
<i>Goodenia varia</i>	Sticky Goodenia			1
<i>Goodenia vernicosa</i>	Wavy Goodenia			1
<i>Goodenia willisiana</i>	Silver Goodenia			3
<i>Gramineae</i> sp.	Grass Family			22
<i>Grevillea huegelii</i>	Comb Grevillea			7
<i>Grevillea ilicifolia</i> var. <i>ilicifolia</i> (NC)	Holly-leaf Grevillea			1
<i>Grevillea lavandulacea</i> var. <i>sericea</i> (NC)	Spider-flower			7
<i>Haeckeria punctulata</i>	Sticky Haeckeria			4
<i>Hakea carinata</i>	Erect Hakea			30
<i>Hakea leucoptera</i> ssp. <i>leucoptera</i>	Silver Needlewood			12
<i>Hakea rostrata</i>	Beaked Hakea			1
<i>Hakea rugosa</i>	Dwarf Hakea			16
<i>Haloragis aspera</i>	Rough Raspwort			12
<i>Halosarcia</i> sp. (NC)	Samphire			1
<i>Hardenbergia violacea</i>	Native Lilac			4
<i>Harmsiodoxa blennodioides</i>	Hairy-pod Cress			1
<i>Helichrysum leucopsidium</i>	Satin Everlasting			33
<i>Helichrysum rutidolepis</i>	Pale Everlasting		E	2
<i>Helichrysum</i> sp.	Everlasting			1
<i>Heliotropium asperrimum</i>	Rough Heliotrope			2
<i>Heliotropium europaeum</i>	Common Heliotrope			4
<i>Herb</i> sp.				2
<i>Hibbertia crinita</i>				17
<i>Hibbertia exutiacies</i>	Prickly Guinea-flower			28
<i>Hibbertia riparia</i>	Bristly Guinea-flower			7
<i>Hibbertia riparia</i> (canescens) (NC)	Grey Guinea-flower			4
<i>Hibbertia riparia</i> (NC)	Guinea-flower			4
<i>Hibbertia</i> sp.	Guinea-flower			1
<i>Hyalosperma demissum</i>	Dwarf Sunray			30

Species Name	Common Name	EPBC Rating	NPWS Rating	Regional Count*
<i>Hyalosperma glutinosum</i> ssp. <i>glutinosum</i>	Golden Sunray			16
<i>Hyalosperma semisterile</i>	Orange Sunray			13
<i>Hybanthus floribundus</i> ssp. <i>floribundus</i>	Shrub Violet			24
<i>Hydrocotyle callicarpa</i>	Tiny Pennywort			24
<i>Hydrocotyle foveolata</i>	Yellow Pennywort			2
<i>Hydrocotyle laxiflora</i>	Stinking Pennywort			26
<i>Hypoxis glabella</i> var. <i>glabella</i>	Tiny Star			27
<i>Indigofera helmsii</i>	Helm's Indigo			1
<i>Isachne globosa</i>	Swamp Millet			1
<i>Iseilema membranaceum</i>	Small Flinders-grass			1
<i>Isoetopsis graminifolia</i>	Grass Cushion			29
<i>Isolepis australiensis</i>	Southern Club-rush			1
<i>Isolepis cernua</i>	Nodding Club-rush			10
<i>Isolepis congrua</i>	Slender Club-rush			2
<i>Isolepis hookeriana</i>	Grassy Club-rush			7
<i>Isolepis platycarpa</i>	Flat-fruit Club-rush			1
<i>Isolepis stellata</i>	Star Club-rush			1
<i>Isotoma petraea</i>	Rock Isotome			3
<i>Ixodia achillaeoides</i> ssp. <i>alata</i>	Hills Daisy			1
<i>Joycea clelandii</i>	Cleland's Wallaby-grass			1
<i>Juncus aridicola</i>	Inland Rush			6
<i>Juncus bufonius</i>	Toad Rush			13
<i>Juncus flavidus</i>	Yellow Rush			11
<i>Juncus kraussii</i>	Sea Rush			14
<i>Juncus radula</i>	Hoary Rush		V	8
<i>Juncus</i> sp.	Rush			2
<i>Juncus subsecundus</i>	Finger Rush			24
<i>Kennedia prostrata</i>	Scarlet Runner			9
<i>Lachnagrostis aemula</i>	Blown-grass			2
<i>Lachnagrostis billardierei</i> ssp. <i>billardierei</i>	Coast Blown-grass			3
<i>Lachnagrostis limitanea</i>	Spalding Blown-grass	E	E	3
<i>Lachnagrostis robusta</i>	Tall Blown-grass		R	2
<i>Lagenophora huegelii</i>	Coarse Bottle-daisy			48
<i>Lasiopetalum baueri</i>	Slender Velvet-bush			1
<i>Lasiopetalum behrii</i>	Pink Velvet-bush			1
<i>Lawrenzia glomerata</i>	Clustered Lawrenzia			1
<i>Lawrenzia squamata</i>	Thorny Lawrenzia			3
<i>Leiocarpa semicalva</i> ssp.	Hill Button-bush			2
<i>Leiocarpa tomentosa/websteri</i>	Plover-daisy			1
<i>Lepidium leptopetalum</i>	Shrubby Peppercross			4
<i>Lepidium oxytrichum</i>	Green Peppercross			1
<i>Lepidium oxytrichum/papillosum</i>				6
<i>Lepidium papillosum</i>	Warty Peppercross			13
<i>Lepidium pseudotasmanicum</i>	Shade Peppercross		V	6
<i>Lepidium</i> sp.	Peppercross			1
<i>Lepidosperma curtisiae</i>	Little Sword-sedge			1
<i>Lepidosperma laterale</i> (NC)	Sharp Sword-sedge			1
<i>Lepidosperma</i> sp.	Sword-sedge/Rapier-sedge			1
<i>Lepidosperma viscidum</i>	Sticky Sword-sedge			41
<i>Lepilaena</i> sp.	Water-mat			1

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<i>Leptorhynchos elongatus</i>	Lanky Buttons		R	2
<i>Leptorhynchos squamatus</i> ssp. <i>squamatus</i>	Scaly Buttons			39
<i>Leptorhynchos tetrachaetus</i>	Little Buttons			27
<i>Leptorhynchos waitzia</i>	Button Immortelle			2
<i>Leucopogon cordifolius</i>	Heart-leaf Beard-heath			1
<i>Levenhookia dubia</i>	Hairy Stylewort			29
<i>Lichen</i> sp.				113
<i>Linum marginale</i>	Native Flax			7
<i>Lissanthe strigosa</i> ssp. <i>subulata</i>	Peach Heath			5
<i>Lobelia anceps</i>	Angled Lobelia			2
<i>Lobelia gibbosa</i>	Tall Lobelia			2
<i>Logania saxatilis</i>	Rock Logania		R	4
<i>Lomandra collina</i>	Sand Mat-rush			6
<i>Lomandra densiflora</i>	Soft Tussock Mat-rush			63
<i>Lomandra effusa</i>	Scented Mat-rush			59
<i>Lomandra micrantha</i> ssp.	Small-flower Mat-rush			6
<i>Lomandra micrantha</i> ssp. <i>micrantha</i>	Small-flower Mat-rush			17
<i>Lomandra multiflora</i> ssp.	Many-flower Mat-rush			2
<i>Lomandra multiflora</i> ssp. <i>dura</i>	Hard Mat-rush			106
<i>Lomandra nana</i>	Small Mat-rush			3
<i>Lomandra sororia</i>	Sword Mat-rush			8
<i>Lomandra</i> sp.	Mat-rush			4
<i>Lotus australis</i>	Austral Trefoil			1
<i>Lotus cruentus</i>	Red-flower Lotus			3
<i>Luzula meridionalis</i>	Common Wood-rush			20
<i>Lycium australe</i>	Australian Boxthorn			10
<i>Lysiana exocarpi</i> ssp. <i>exocarpi</i>	Harlequin Mistletoe			14
<i>Lythrum hyssopifolia</i>	Lesser Loosestrife			13
<i>Maireana aphylla</i>	Cotton-bush			24
<i>Maireana appressa</i>	Pale-fruit Bluebush			1
<i>Maireana brevifolia</i>	Short-leaf Bluebush			66
<i>Maireana enchylaenoides</i>	Wingless Fissure-plant			109
<i>Maireana erioclada</i>	Rosy Bluebush			24
<i>Maireana excavata</i>	Bottle Fissure-plant		V	25
<i>Maireana georgei</i>	Satiny Bluebush			7
<i>Maireana georgei</i> /turbinate	Satiny Bluebush			7
<i>Maireana lobiflora</i>	Lobed Bluebush			4
<i>Maireana pentatropis</i>	Erect Mallee Bluebush			15
<i>Maireana pyramidata</i>	Black Bluebush			58
<i>Maireana radiata</i>	Radiate Bluebush			15
<i>Maireana rohrlachii</i>	Rohrlach's Bluebush		R	12
<i>Maireana sedifolia</i>	Bluebush			45
<i>Maireana</i> sp.	Bluebush/Fissure-plant			14
<i>Maireana trichoptera</i>	Hairy-fruit Bluebush			16
<i>Maireana triptera</i>	Three-wing Bluebush			1
<i>Maireana turbinata</i>	Top-fruit Bluebush			20
<i>Malva preissiana</i>	Australian Hollyhock			2
<i>Marsdenia australis</i>	Native Pear			1
<i>Marsilea costulifera</i>	Narrow-leaf Nardoo			2
<i>Marsilea drummondii</i> (NC)	Common Nardoo			4

Species Name	Common Name	EPBC Rating	NPWS Rating	Regional Count*
<i>Marsilea sp.</i>	Nardoo			2
<i>Melaleuca acuminata ssp. acuminata</i>	Mallee Honey-myrtle			2
<i>Melaleuca lanceolata</i>	Dryland Tea-tree			5
<i>Melaleuca lanceolata ssp. lanceolata (NC)</i>	Dryland Tea-tree			21
<i>Melicytus dentatus</i>	Tree Violet			8
<i>Menkea australis</i>	Fairy Spectacles			1
<i>Mentha satureioides</i>	Native Pennyroyal		R	8
<i>Microlaena stipoides var. stipoides</i>	Weeping Rice-grass			2
<i>Microseris lanceolata</i>	Yam Daisy			23
<i>Microtis arenaria</i>	Notched Onion-orchid			3
<i>Microtis frutetorum</i>				2
<i>Microtis unifolia complex</i>	Onion-orchid			6
<i>Millotia muelleri</i>	Common Bow-flower			5
<i>Millotia myosotidifolia</i>	Broad-leaf Millotia			38
<i>Millotia perpusilla</i>	Tiny Bow-flower			11
<i>Millotia tenuifolia var.</i>	Soft Millotia			5
<i>Millotia tenuifolia var. tenuifolia</i>	Soft Millotia			21
<i>Mimulus repens</i>	Creeping Monkey-flower			8
<i>Minuria cunninghamii</i>	Bush Minuria			1
<i>Minuria leptophylla</i>	Minnie Daisy			44
<i>Minuria sp.</i>	Minuria			2
<i>Mitrasacme paradoxa (NC)</i>	Wiry Mitrewort			5
<i>Moss sp.</i>				102
<i>Muehlenbeckia florulenta</i>	Lignum			10
<i>Myoporum montanum</i>	Native Myrtle			26
<i>Myoporum platycarpum (NC)</i>	False Sandalwood			3
<i>Myoporum platycarpum ssp.</i>	False Sandalwood			10
<i>Myoporum platycarpum ssp. perbellum</i>	Mallee Sandalwood			5
<i>Myoporum platycarpum ssp. platycarpum</i>	False Sandalwood			12
<i>Myosotis australis</i>	Austral Forget-me-not			1
<i>Myriophyllum verrucosum</i>	Red Milfoil			1
<i>Neopaxia australasica</i>	White Purslane		R	1
<i>Neurachne alopecuroidea</i>	Fox-tail Mulga-grass			26
<i>Nicotiana goodspeedii</i>	Small-flower Tobacco			6
<i>Nicotiana maritima</i>	Coast Tobacco			6
<i>Nicotiana sp.</i>	Tobacco			2
<i>Nicotiana velutina</i>	Velvet Tobacco			1
<i>Nitraria billardierei</i>	Nitre-bush			5
<i>Olearia brachyphylla</i>	Short-leaf Daisy-bush			5
<i>Olearia brachyphylla (NC)</i>	Short-leaf Daisy-bush			3
<i>Olearia calcarea</i>	Crinkle-leaf Daisy-bush			3
<i>Olearia decurrens</i>	Winged Daisy-bush			16
<i>Olearia floribunda var. floribunda</i>	Heath Daisy-bush			1
<i>Olearia magniflora</i>	Splendid Daisy-bush			1
<i>Olearia minor</i>	Heath Daisy-bush			3
<i>Olearia muelleri</i>	Mueller's Daisy-bush			12
<i>Olearia pannosa ssp. pannosa</i>	Silver Daisy-bush	V	V	8
<i>Olearia picridifolia</i>	Rasp Daisy-bush		R	2
<i>Olearia pimeleoides ssp.</i>	Pimelea Daisy-bush			5
<i>Olearia pimeleoides ssp. pimeleoides</i>	Pimelea Daisy-bush			10

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<i>Olearia ramulosa</i>	Twiggy Daisy-bush			6
<i>Olearia sp.</i>	Daisy-bush			1
<i>Olearia teretifolia</i>	Cypress Daisy-bush			18
<i>Olearia tubuliflora</i>	Rayless Daisy-bush			6
<i>Omphalolappula concava</i>	Burr Stickseed			7
<i>Opercularia turpis</i>	Twiggy Stinkweed			15
<i>Ophioglossum lusitanicum</i>	Austral Adder's-tongue			10
<i>Osteocarpum salsuginosum</i>	Inland Bonefruit			1
<i>Osteocarpum sp.</i>	Bonefruit			1
<i>Oxalis perennans</i>	Native Sorrel			13
<i>Oxalis perennans (NC)</i>	Native Sorrel			141
<i>Oxalis sp.</i>	Sorrel			1
<i>Ozothamnus retusus</i>	Notched Bush-everlasting			10
<i>Parietaria cardiostegia</i>	Mallee Smooth-nettle			1
<i>Parietaria cardiostegia/debilis</i>	Smooth-nettle			2
<i>Parietaria debilis</i>	Smooth-nettle			4
<i>Parietaria debilis (NC)</i>	Smooth-nettle			21
<i>Persicaria prostrata</i>	Creeping Knotweed			2
<i>Philothea angustifolia ssp. angustifolia</i>	Narrow-leaf Wax-flower		R	2
<i>Philothea linearis</i>	Narrow-leaf Wax-flower			1
<i>Philothea verrucosa</i>	Bendigo Wax-flower		V	17
<i>Phlegmatospermum eremaeum</i>	Spreading Cress		R	1
<i>Phragmites australis</i>	Common Reed			6
<i>Phyllangium divergens</i>	Wiry Mitrewort			5
<i>Phyllanthus saxosus</i>	Rock Spurge			11
<i>Pimelea curviflora var.</i>	Curved Riceflower			1
<i>Pimelea curviflora var. gracilis</i>	Curved Riceflower			12
<i>Pimelea curviflora var. sericea</i>	Curved Riceflower			2
<i>Pimelea glauca</i>	Smooth Riceflower			11
<i>Pimelea humilis</i>	Low Riceflower			5
<i>Pimelea micrantha</i>	Silky Riceflower			17
<i>Pimelea microcephala ssp.</i>	Shrubby Riceflower			2
<i>Pimelea microcephala ssp. microcephala</i>	Shrubby Riceflower			4
<i>Pimelea octophylla</i>	Woolly Riceflower			1
<i>Pimelea phyllicoides</i>	Heath Riceflower			1
<i>Pimelea serpyllifolia ssp. serpyllifolia</i>	Thyme Riceflower			5
<i>Pimelea simplex ssp. continua</i>	Desert Riceflower			2
<i>Pimelea sp.</i>	Riceflower			1
<i>Pimelea stricta</i>	Erect Riceflower			24
<i>Pittosporum angustifolium</i>	Native Apricot			25
<i>Plagiobothrys elachanthus</i>	Hairy Forget-me-not			1
<i>Plagiobothrys plurisepaleus</i>	White Rochelia			5
<i>Plantago drummondii</i>	Dark Plantain			8
<i>Plantago gaudichaudii</i>	Narrow-leaf Plantain			15
<i>Plantago hispida</i>	Hairy Plantain			25
<i>Plantago sp.</i>	Plantain			2
<i>Plantago sp. B (R.Bates 44765)</i>	Little Plantain			15
<i>Plantago varia</i>	Variable Plantain			12
<i>Plantago varia complex</i>	Native Plantain			8
<i>Platysace heterophylla var. heterophylla</i>	Slender Platysace			1

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<i>Pleurosorus rutifolius</i>	Blanket Fern			17
<i>Pleurosorus subglandulosus</i>	Clubbed Blanket Fern			2
<i>Poa clelandii</i>	Matted Tussock-grass			1
<i>Poa crassicaudex</i>	Thick-stem Tussock-grass			44
<i>Poa drummondiana</i>	Knotted Poa		R	1
<i>Poa labillardieri</i> var. <i>labillardieri</i>	Common Tussock-grass			6
<i>Poa poiformis</i> var. <i>poiformis</i>	Coast Tussock-grass			3
<i>Poa</i> sp.	Meadow-grass/Tussock-grass			4
<i>Podolepis capillaris</i>	Wiry Podolepis			2
<i>Podolepis jaceoides</i>	Showy Copper-wire Daisy		R	2
<i>Podolepis tepperi</i>	Delicate Copper-wire Daisy			13
<i>Podotheca angustifolia</i>	Sticky Long-heads			6
<i>Pogonolepis muelleriana</i>	Stiff Cup-flower			22
<i>Pomaderris paniculosa</i> ssp.				1
<i>Pomaderris paniculosa</i> ssp. <i>paniculosa</i>	Mallee Pomaderris			5
<i>Poranthera microphylla</i>	Small Poranthera			1
<i>Poranthera microphylla</i> (NC)	Small Poranthera			8
<i>Poranthera triandra</i>	Three-petal Poranthera			1
<i>Potamogeton pectinatus</i>	Fennel Pondweed			1
<i>Prasophyllum fitzgeraldii</i>	Fitzgerald's Leek-orchid			1
<i>Prasophyllum occidentale</i>	Plains Leek-orchid			1
<i>Prasophyllum odoratum</i> (NC)	Scented Leek-orchid			3
<i>Prasophyllum</i> sp.	Leek-orchid			1
<i>Pratia concolor</i>	Poison Pratia		R	1
<i>Prostanthera behriana</i>	Downy Mintbush			26
<i>Prostanthera striatiflora</i>	Striated Mintbush			3
<i>Pseudognaphalium luteoalbum</i>	Jersey Cudweed			3
<i>Pterostylis biseta</i> (NC)	Two-bristle Greenhood			8
<i>Pterostylis despectans</i>	Mt Bryan Greenhood	E	E	298
<i>Pterostylis excelsa</i> (NC)	Dryland Greenhood			3
<i>Pterostylis mutica</i>	Midget Greenhood			1
<i>Pterostylis pedunculata</i>	Maroon-hood			3
<i>Pterostylis plumosa</i>	Bearded Greenhood			5
<i>Pterostylis pusilla</i>	Small Rusty-hood			2
<i>Pterostylis robusta</i>	Large Shell-orchid			12
<i>Pterostylis sanguinea</i>	Blood Greenhood			4
<i>Pterostylis</i> sp.	Greenhood			8
<i>Ptilotus erubescens</i>	Hairy-tails		R	25
<i>Ptilotus exaltatus</i> var. <i>exaltatus</i>	Pink Mulla Mulla			1
<i>Ptilotus nobilis</i> var. <i>angustifolius</i>	Yellow-tails			4
<i>Ptilotus nobilis</i> var. <i>nobilis</i>	Yellow-tails			1
<i>Ptilotus obovatus</i> var.	Silver Mulla Mulla			3
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	Silver Mulla Mulla			8
<i>Ptilotus seminudus</i>	Rabbit-tails			1
<i>Ptilotus sessilifolius</i> var. <i>sessilifolius</i>	Crimson-tails			1
<i>Ptilotus</i> sp.	Mulla Mulla			2
<i>Ptilotus spathulatus</i> f.	Pussy-tails			55

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<i>Ptilotus spathulatus f. spathulatus</i>	Pussy-tails			46
<i>Puccinellia stricta var. stricta</i>	Australian Saltmarsh-grass			3
<i>Pultenaea kraehenbuehlii</i>	Tothill Bush-pea		R	86
<i>Pultenaea largiflorens</i>	Twiggy Bush-pea			30
<i>Pultenaea laxiflora</i>	Loose-flower Bush-pea			3
<i>Pultenaea pedunculata</i>	Matted Bush-pea			2
<i>Pycnosorus globosus</i>	Drumsticks		V	4
<i>Pycnosorus pleiocephalus</i>	Soft Billy-buttons			2
<i>Quinetia urvillei</i>	Quinetia			1
<i>Ranunculus amphitrichus</i>	Small River Buttercup			1
<i>Ranunculus hamatosetosus</i>	Hill Buttercup			15
<i>Ranunculus lappaceus</i>	Native Buttercup			5
<i>Ranunculus pachycarpus</i>	Thick-fruit Buttercup			12
<i>Ranunculus sessiliflorus var.</i>	Annual Buttercup			3
<i>Ranunculus sessiliflorus var. sessiliflorus</i>	Annual Buttercup			7
<i>Ranunculus sp.</i>	Buttercup			1
<i>Rhagodia candolleana ssp.</i>	Sea-berry Saltbush			2
<i>Rhagodia candolleana ssp. candolleana</i>	Sea-berry Saltbush			1
<i>Rhagodia crassifolia</i>	Fleshy Saltbush			5
<i>Rhagodia parabolica</i>	Mealy Saltbush			68
<i>Rhagodia spinescens</i>	Spiny Saltbush			26
<i>Rhagodia ulicina</i>	Intricate Saltbush			22
<i>Rhodanthe anthemoides</i>	Chamomile Everlasting		E	5
<i>Rhodanthe corymbiflora</i>	Paper Everlasting			3
<i>Rhodanthe floribunda</i>	White Everlasting			1
<i>Rhodanthe laevis</i>	Smooth Daisy			27
<i>Rhodanthe polygalifolia</i>	Milkwort Everlasting			2
<i>Rhodanthe pygmaea</i>	Pigmy Daisy			48
<i>Rhyncharrhena linearis</i>	Bush Bean			2
<i>Rumex brownii</i>	Slender Dock			11
<i>Rumex brownii (NC)</i>	Slender Dock			8
<i>Rumex dumosus var. (NC)</i>	Wiry Dock		R	6
<i>Rumex dumosus var. dumosiformis (NC)</i>	Wiry Dock			2
<i>Rumex dumosus var. dumosus (NC)</i>	Wiry Dock			15
<i>Rumex sp.</i>	Dock			9
<i>Ruppia sp.</i>	Water-tassel			2
<i>Salsola tragus</i>	Buckbush			23
<i>Samolus repens</i>	Creeping Brookweed			10
<i>Santalum acuminatum</i>	Quandong			23
<i>Santalum lanceolatum</i>	Plumbush			1
<i>Santalum murrayanum</i>	Bitter Quandong			1
<i>Sarcocornia blackiana</i>	Thick-head Samphire			1
<i>Sarcocornia quinqueflora</i>	Beaded Samphire			3
<i>Sarcostemma viminale ssp. australe</i>	Caustic Bush			2
<i>Sarcozona praecox</i>	Sarcozona			3
<i>Scaevola albida</i>	Pale Fanflower			1
<i>Scaevola humilis</i>	Inland Fanflower			4
<i>Scaevola parvibarbata</i>	Small-beard Fanflower			1
<i>Scaevola spinescens</i>	Spiny Fanflower			8
<i>Schenkia australis</i>	Spike Centaury			2

Species Name	Common Name	EPBC Rating	NPWS Rating	Regional Count*
<i>Schoenoplectus litoralis</i>	Shore Club-rush			3
<i>Schoenoplectus pungens</i>	Spiky Club-rush			5
<i>Schoenus apogon</i>	Common Bog-rush			21
<i>Schoenus breviculmis</i>	Matted Bog-rush			6
<i>Schoenus nanus</i>	Little Bog-rush			5
<i>Schoenus sp.</i>	Bog-rush			2
<i>Scleranthus pungens</i>	Prickly Knawel			15
<i>Sclerolaena birchii</i>	Galvanised Burr			1
<i>Sclerolaena brachyptera</i>	Short-wing Bindyi			2
<i>Sclerolaena brevifolia</i>	Small-leaf Bindyi			1
<i>Sclerolaena diacantha</i>	Grey Bindyi			40
<i>Sclerolaena diacantha/uniflora</i>	Grey Bindyi			1
<i>Sclerolaena muricata var. villosa</i>	Five-spine Bindyi		R	1
<i>Sclerolaena obliquicuspis</i>	Oblique-spined Bindyi			47
<i>Sclerolaena patenticuspis</i>	Spear-fruit Bindyi			13
<i>Sclerolaena sp.</i>	Bindyi			7
<i>Sclerolaena uniflora</i>	Small-spine Bindyi			7
<i>Sebaea ovata</i>	Yellow Sebaea			6
<i>Senecio anethifolius (NC)</i>	Feathery Groundsel			3
<i>Senecio anethifolius ssp.</i>	Feathery Groundsel			1
<i>Senecio dolichocephalus</i>	Woodland Groundsel			2
<i>Senecio glossanthus (NC)</i>	Annual Groundsel			24
<i>Senecio megaglossus</i>	Large-flower Groundsel	V	E	5
<i>Senecio odoratus var. odoratus (NC)</i>	Scented Groundsel			4
<i>Senecio picridioides</i>	Purple-leaf Groundsel			1
<i>Senecio pinnatifolius (NC)</i>	Variable Groundsel			3
<i>Senecio quadridentatus</i>	Cotton Groundsel			37
<i>Senecio sp.</i>	Groundsel			2
<i>Senecio tenuiflorus (NC)</i>	Woodland Groundsel			8
<i>Senna artemisioides ssp. filifolia</i>	Fine-leaf Desert Senna			4
<i>Senna artemisioides ssp. petiolaris (NC)</i>	Flat-stalk Senna			13
<i>Senna artemisioides ssp. X artemisioides</i>	Silver Senna			3
<i>Senna artemisioides ssp. X coriacea</i>	Broad-leaf Desert Senna			12
<i>Senna artemisioides ssp. zygophylla</i>	Twin-leaf Desert Senna			1
<i>Setaria constricta</i>	Knotty-butt Paspalidium			3
<i>Sida corrugata var.</i>	Corrugated Sida			13
<i>Sida corrugata var. angustifolia</i>	Grassland Sida			15
<i>Sida corrugata var. corrugata</i>	Corrugated Sida			19
<i>Sida intricata</i>	Twiggy Sida			3
<i>Sida petrophila</i>	Rock Sida			5
<i>Sida spodochroma (NC)</i>				1
<i>Sigesbeckia orientalis ssp. orientalis</i>	Oriental Sigesbeckia			1
<i>Siloxerus multiflorus</i>	Small Wrinklewort			15
<i>Solanum ellipticum</i>	Velvet Potato-bush			2
<i>Solanum esuriale</i>	Quena			4
<i>Solanum laciniatum</i>	Cut-leaf Kangaroo-apple			1
<i>Solanum oligacanthum</i>	Desert Nightshade			1
<i>Solanum petrophilum</i>	Rock Nightshade			5
<i>Solanum simile</i>	Kangaroo Apple			3
<i>Solanum sturtianum</i>	Sturt's Nightshade			1

Species Name	Common Name	EPBC Rating	NPWS Rating	Regional Count*
<i>Solenogyne dominii</i>	Smooth Solenogyne			17
<i>Sonchus hydrophilus</i>	Native Sow-thistle			1
<i>Sonchus sp.</i>	Sow-thistle			2
<i>Spergularia marina</i>	Salt Sand-spurrey			1
<i>Sporobolus virginicus</i>	Salt Couch			2
<i>Spyridium bifidum var. bifidum</i>	Forked Spyridium			1
<i>Spyridium parvifolium</i>	Dusty Miller			40
<i>Stackhousia aspericocca ssp.</i>	Bushy Candles			2
<i>Stackhousia monogyna</i>	Creamy Candles			58
<i>Stackhousia sp.</i>	Candles			2
<i>Stenopetalum lineare (NC)</i>	Narrow Thread-petal			20
<i>Stuartina muelleri</i>	Spoon Cudweed			33
<i>Swainsona behriana</i>	Behr's Swainson-pea		V	13
<i>Swainsona colutoides</i>	Bladder Swainson-pea			1
<i>Swainsona formosa</i>	Sturt Pea			1
<i>Swainsona oroboides</i>	Variable Swainson-pea			1
<i>Swainsona oroboides complex</i>	Variable Swainson-pea			1
<i>Swainsona sp.</i>	Swainson-pea			2
<i>Swainsona tephrotricha</i>	Ashy-haired Swainson-pea			7
<i>Tecticornia indica ssp. leiostachya</i>	Brown-head Samphire			3
<i>Tecticornia pergranulata ssp. divaricata</i>	Black-seed Samphire			1
<i>Tecticornia pergranulata ssp. pergranulata</i>	Black-seed Samphire			7
<i>Tecticornia pterygosperma ssp. pterygosperma</i>	Winged-seed Samphire			1
<i>Tecticornia triandra</i>	Desert Glasswort			1
<i>Templetonia aculeata</i>	Spiny Mallee-pea			2
<i>Templetonia egena</i>	Broombush Templetonia			7
<i>Tetragonia eremaea</i>	Desert Spinach			16
<i>Tetragonia eremaea/tetragonoides</i>	Native Spinach			15
<i>Tetragonia implexicoma</i>	Bower Spinach			1
<i>Tetragonia sp.</i>	False Spinach			8
<i>Teucrium albicaule</i>	Scurfy Germander			2
<i>Teucrium racemosum</i>	Grey Germander			10
<i>Teucrium sessiliflorum</i>	Mallee Germander			5
<i>Thelymitra albiflora</i>				1
<i>Thelymitra antennifera</i>	Lemon Sun-orchid			2
<i>Thelymitra aristata</i>	Great Sun-orchid		E*	6
<i>Thelymitra carnea</i>	Small Pink Sun-orchid		R	1
<i>Thelymitra grandiflora</i>	Great Sun-orchid		R	5
<i>Thelymitra luteocilium</i>	Yellow-tuft Sun Orchid			11
<i>Thelymitra nuda</i>	Scented Sun-orchid			1
<i>Thelymitra nuda (NC)</i>	Scented Sun-orchid			5
<i>Thelymitra pauciflora (NC)</i>	Slender Sun-orchid			4
<i>Thelymitra rubra</i>	Salmon Sun-orchid			6
<i>Thelymitra sp.</i>	Sun-orchid			1
<i>Themeda triandra</i>	Kangaroo Grass			30
<i>Thysanotus baueri</i>	Mallee Fringe-lily			11
<i>Thysanotus patersonii</i>	Twining Fringe-lily			48
<i>Thysanotus sp.</i>	Fringe-lily			1

Species Name	Common Name	EPBC Rating	NPWS Rating	Regional Count*
<i>Thysanotus tenellus</i>	Grassy Fringe-lily		R	3
<i>Trichanthodium skirrophorum</i>	Woolly Yellow-heads			1
<i>Tricoryne elatior</i>	Yellow Rush-lily			5
<i>Tricoryne tenella</i>	Tufted Yellow Rush-lily			1
<i>Triglochin centrocarpum (NC)</i>	Dwarf Arrowgrass			3
<i>Triglochin nana</i>	Dwarf Arrowgrass			1
<i>Triglochin striata</i>	Streaked Arrowgrass			14
<i>Triodia bunicola</i>	Flinders Ranges Spinifex			5
<i>Triodia irritans complex</i>	Spinifex			1
<i>Triodia scariosa</i>	Spinifex			1
<i>Triptilodiscus pygmaeus</i>	Small Yellow-heads			48
<i>Trymalium wayi</i>	Grey Trymalium			6
<i>Typha domingensis</i>	Narrow-leaf Bulrush			5
<i>Unidentified sp.</i>				1
<i>'unverified species - nv'</i>				4
<i>Velleia arguta</i>	Toothed Velleia			19
<i>Velleia connata</i>	Cup Velleia			1
<i>Velleia paradoxa</i>	Spur Velleia			29
<i>Veronica plebeia</i>	Trailing Speedwell			13
<i>Villarsia umbricola var. umbricola</i>	Lax Marsh-flower			1
<i>Viola hederacea (NC)</i>	Ivy-leaf Violet			1
<i>Vittadinia australasica var.</i>	Sticky New Holland Daisy			3
<i>Vittadinia australasica var. australasica</i>	Sticky New Holland Daisy			8
<i>Vittadinia australasica var. subglabra</i>	New Holland Daisy			1
<i>Vittadinia blackii</i>	Narrow-leaf New Holland Daisy			42
<i>Vittadinia cervicularis var. cervicularis</i>	Waisted New Holland Daisy			16
<i>Vittadinia condyloides</i>	Club-hair New Holland Daisy			5
<i>Vittadinia cuneata var.</i>	Fuzzy New Holland Daisy			38
<i>Vittadinia cuneata var. cuneata f. cuneata</i>	Fuzzy New Holland Daisy			13
<i>Vittadinia gracilis</i>	Woolly New Holland Daisy			111
<i>Vittadinia megacephala</i>	Giant New Holland Daisy			27
<i>Vittadinia sp.</i>	New Holland Daisy			10
<i>Vittadinia sulcata</i>	Furrowed New Holland Daisy			1
<i>Vulpia bromoides/myuros</i>				18
<i>Wahlenbergia communis</i>	Tufted Bluebell			9
<i>Wahlenbergia gracilentia</i>	Annual Bluebell			37
<i>Wahlenbergia littoricola</i>	Coast Bluebell			3
<i>Wahlenbergia luteola</i>	Yellow-wash Bluebell			94
<i>Wahlenbergia multicaulis</i>	Tadgell's Bluebell			2
<i>Wahlenbergia sp.</i>	Native Bluebell			7
<i>Wahlenbergia stricta ssp. stricta</i>	Tall Bluebell			57
<i>Walwhalleya proluta</i>	Rigid Panic			5

Species Name	Common Name	EPBC Rating	NPWS Rating	Regional Count*
<i>Westringia eremicola</i>	Slender Westringia			1
<i>Westringia rigida</i>	Stiff Westringia			25
<i>Wilsonia rotundifolia</i>	Round-leaf Wilsonia			3
<i>Wurmbea dioica</i> ssp. <i>dioica</i>	Early Nancy			12
<i>Wurmbea dioica</i> ssp. <i>dioica</i> (NC)	Early Nancy			29
<i>Wurmbea</i> sp.	Nancy			1
<i>Xanthorrhoea quadrangulata</i>	Rock Grass-tree			48
<i>Xerochrysum bracteatum</i>	Golden Everlasting			9
Zygophyllaceae sp.	Twinleaf Family			1
<i>Zygophyllum ammophilum</i> (NC)	Sand Twinleaf			6
<i>Zygophyllum angustifolium</i>	Scrambling Twinleaf			2
<i>Zygophyllum apiculatum</i>	Pointed Twinleaf			37
<i>Zygophyllum aurantiacum</i> (NC)	Shrubby Twinleaf			17
<i>Zygophyllum aurantiacum</i> ssp.				3
<i>Zygophyllum aurantiacum</i> ssp. <i>aurantiacum</i> (NC)	Shrubby Twinleaf			10
<i>Zygophyllum aurantiacum</i> ssp. <i>simplicifolium</i>				8
<i>Zygophyllum billardierei</i> (NC)	Coast Twinleaf			1
<i>Zygophyllum crenatum</i>	Notched Twinleaf			19
<i>Zygophyllum eremaeum</i> (NC)	Pale-flower Twinleaf			1
<i>Zygophyllum glaucum</i>	Pale Twinleaf			9
<i>Zygophyllum iodocarpum</i> (NC)	Violet Twinleaf			3
<i>Zygophyllum ovatum</i>	Dwarf Twinleaf			15
<i>Zygophyllum simile</i>	White Twinleaf			2
<i>Zygophyllum</i> sp.	Twinleaf			8

Table 1.2. Previous Survey Data Redbanks Reserve (BSS05/BSS06) Source: Milne 2001, Taplin 2000 (as noted by Milne 2001)

Species Name	Common Name
<i>Acacia calamifolia</i>	wallowa
<i>Acacia calamifolia</i>	wallowa
<i>Acacia oswaldii</i>	umbrella wattle
<i>Acacia pycnantha</i>	golden wattle
<i>Agrostis avenacea</i> var. <i>avenacea</i>	common blown-grass
<i>Alectryon oleifolius</i> ssp. <i>canescens</i>	bullock bush
<i>Amyema miquelii</i>	box mistletoe
<i>Apium prostratum</i> ssp. <i>prostratum</i>	native celery
<i>Arthropodium strictum</i>	common vanilla-lily
<i>Atriplex acutibractea</i> ssp. <i>acutibractea</i>	pointed saltbush
<i>Atriplex angulata</i>	fan saltbush
<i>Atriplex lindleyi</i> ssp. <i>inflata</i>	corky saltbush
<i>Atriplex paludosa</i>	marsh saltbush
<i>Atriplex semibaccata</i>	berry saltbush
<i>Atriplex stipitata</i>	bitter saltbush
<i>Atriplex vesicaria</i>	bladder saltbush
<i>Boerhavia dominii</i>	tar-vine
<i>Bolboschoenus medianus</i>	marsh club-rush
<i>Brachycome ciliaris</i> var. <i>ciliaris</i>	variable daisy
<i>Bromus</i> sp.	brome
<i>Bursaria spinosa</i>	sweet bursaria

Species Name	Common Name
<i>Callitris preissii</i>	southern cypress pine
<i>Calostemma purpureum</i>	pink garland-lily
<i>Carpobrotus rossii</i>	native pigface
<i>Cassytha melantha</i>	coarse dodder-laurel
<i>Casuarina pauper</i>	black oak
<i>Chenopodium curvispicatum</i>	cottony goosefoot
<i>Chenopodium desertorum</i> ssp. <i>desertorum</i>	frosted goosefoot
<i>Convolvulus remotus</i>	grassy bindweed
<i>Cullen australasicum</i>	tall scurf-pea
<i>Cymbopogon ambiguus</i>	lemon-grass
<i>Cyperus gymnocaulos</i>	spiny flat-sedge
<i>Danthonia caespitosa</i>	common wallaby-grass
<i>Danthonia</i> sp.	wallaby-grass
<i>Dianella revoluta</i> var. <i>revoluta</i>	black-anther flax-lily
<i>Dissocarpus paradoxus</i>	ball bindyi
<i>Distichlis distichophylla</i>	emu-grass
<i>Dodonaea lobulata</i>	lobed-leaf hop-bush
<i>Dodonaea viscosa</i> ssp. <i>spatulata</i>	sticky hop-bush
<i>Einadia nutans</i> ssp. <i>nutans</i>	climbing saltbush
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	ruby saltbush
<i>Epilobium billardierianum</i> ssp. <i>billardierianum</i>	robust willow-herb
<i>Epilobium billardierianum</i> ssp. <i>billardierianum</i>	robust willow-herb
<i>Eremophila alternifolia</i>	narrow-leaf emubush
<i>Eremophila longifolia</i>	weeping emubush
<i>Eriochiton sclerolaenoides</i>	woolly-fruit bluebush
<i>Eucalyptus brachycalyx</i>	gilja
<i>Eucalyptus camaldulensis</i> var. <i>camaldulensis</i>	river red gum
<i>Eucalyptus gracilis</i>	yorrell
<i>Eucalyptus leucoxylon</i> ssp. <i>pruinosa</i>	inland South Australian blue gum
<i>Eucalyptus oleosa</i>	red mallee
<i>Eucalyptus porosa</i>	mallee box
<i>Eucalyptus socialis</i>	beaked red mallee
<i>Euphorbia drummondii</i>	caustic weed
<i>Exocarpos aphyllus</i>	leafless cherry
<i>Geijera linearifolia</i>	sheep bush
<i>Glycine clandestina</i> var. <i>sericea</i>	twining glycine
<i>Goodenia pinnatifida</i>	cut-leaf goodenia
<i>Hakea leucoptera</i> ssp. <i>leucoptera</i>	silver needlewood
<i>Halosarcia pergranulata</i>	black-seed samphire
<i>Hypoxis glabella</i> var. <i>glabella</i>	tiny star
<i>Isolepis cernua</i>	nodding club-rush
<i>Juncus kraussii</i>	sea rush
<i>Lobelia alata</i>	angled lobelia
<i>Lomandra effusa</i>	scented mat-rush
<i>Lomandra multiflora</i> ssp. <i>dura</i>	hard mat-rush
<i>Lycium australe</i>	Australian boxthorn
<i>Lysiana exocarpi</i> ssp. <i>exocarpi</i>	harlequin mistletoe
<i>Lythrum hyssopifolia</i>	lesser loosestrife
<i>Maireana aphylla</i>	cotton-bush
<i>Maireana brevifolia</i>	short-leaf bluebush
<i>Maireana enchylaenoides</i>	wingless fissure-plant
<i>Maireana pyramidata</i>	black bluebush
<i>Maireana rohrlachii</i>	Rohrlach's bluebush
<i>Maireana sedifolia</i>	bluebush
<i>Melaleuca lanceolata</i> ssp. <i>lanceolata</i>	dryland tea-tree
<i>Myoporum montanum</i>	native myrtle

Species Name	Common Name
<i>Nitraria billardierei</i>	nitre-bush
<i>Olearia pimeleoides</i> ssp. <i>pimeleoides</i>	pimelea daisy-bush
<i>Osteocarpum salsuginosum</i>	inland bonefruit
<i>Oxalis perennans</i>	native sorrel
<i>Paspalidium constrictum</i>	knotty-butt paspalidium
<i>Phragmites australis</i>	common reed
<i>Pittosporum phylliraeoides</i> var. <i>microcarpa</i>	native apricot
<i>Ptilotus spathulatus</i> forma <i>spathulatus</i>	pussy-tails
<i>Rhagodia parabolica</i>	mealy saltbush
<i>Rhagodia spinescens</i>	spiny saltbush
<i>Salsola kali</i>	buckbush
<i>Schoenoplectus pungens</i>	spiky club-rusf
<i>Sclerolaena brachyptera</i>	short-wing bindyi
<i>Sclerolaena diacantha</i>	grey bindyi
<i>Sclerolaena obliquicuspis</i>	oblique-spined bindyi
<i>Sclerolaena patenticuspis</i>	spear-fruit bindyi
<i>Senecio lautus</i>	variable groundsel
<i>Sida petrophila</i>	rock sida
<i>Sonchus hydrophilus</i>	native sow-thistle
<i>Stipa drummondii</i>	cottony spear-grass
<i>Stipa elegantissima</i>	feather spear-grass
<i>Stipa nodosa</i>	tall spear-grass
<i>Stipa platychaeta</i>	flat-awn spear-grass
<i>Stipa</i> sp.	spear-grass
<i>Threlkeldia diffusa</i>	coast bonefruit
<i>Typha domingensis</i>	narrow-leaf bulrush
<i>Vittadinia blackii</i>	narrow-leaf New Holland daisy
<i>Vittadinia gracilis</i>	woolly New Holland daisy
<i>Wahlenbergia communis</i>	tufted bluebell
<i>Zygophyllum apiculatum</i>	pointed twinleaf
<i>Zygophyllum aurantiacum</i>	(blank)
<i>Zygophyllum crenatum</i>	notched twinleaf

Table 1.3. Previous Survey Data Burra Creek Gorge (BSS07) from surveys undertaken by Taplin, R. and Murfett, D. (1994, 1998, 2000) (unpubl. data)

Species Name	Common Name
<i>Acacia brachybotrya</i>	Grey Mulga-bush
<i>Acacia calamifolia</i>	Wallowa
<i>Acacia cupularis</i>	Cup Wattle
<i>Acacia glandulicarpa</i>	hairy-pod wattle
<i>Acacia hakeoides</i>	Hakea Wattle
<i>Acacia nyssophylla</i>	Spine Bush
<i>Acacia pycnantha</i>	Golden Wattle
<i>Acacia spilleriana</i>	Spiller's Wattle
<i>Acrotriche patula</i>	Prickly Ground-berry
<i>Actinobole uliginosum</i>	Flannel Cudweed
<i>Alectryon oleifolius</i> ssp. <i>canescens</i>	Bullock Bush
<i>Allocasuarina verticillata</i>	Drooping Sheoak
<i>Amyema miquelii</i>	Box Mistletoe
<i>Amyema preissii</i>	Wire-leaf Mistletoe
<i>Arabidella filifolia</i>	Thread-leaf Cress
<i>Arthropodium strictum</i>	Common Vanilla-lily
<i>Atriplex eardleyae</i>	Eardley's Saltbush

Species Name	Common Name
<i>Atriplex semibaccata</i>	Berry Saltbush
<i>Atriplex stipitata</i>	Bitter Saltbush
<i>Azolla filiculoides</i>	Pacific Azolla
<i>Beyeria lechenaultii</i>	Pale Turpentine Bush
<i>Boerhavia dominii</i>	Tar-vine
<i>Bolboschoenus medianus</i>	Marsh Club-rush
<i>Bursaria spinosa</i>	Sweet Bursaria
<i>Calandrinia eremaea</i>	Dryland Purslane
<i>Calandrinia volubilis</i>	Twining Purslane
<i>Calostemma purpureum</i>	Pink Garland-lily
<i>Calotis hispidula</i>	Hairy Burr-daisy
<i>Calytrix tetragona</i>	Common Fringe-myrtle
<i>Cassinia laevis</i>	Curry Bush
<i>Cassytha melantha</i>	Coarse Dodder-laurel
<i>Casuarina pauper</i>	Black Oak
<i>Cheilanthes austrotenuifolia</i>	Annual Rock-fern
<i>Cheilanthes lasiophylla</i>	Woolly Cloak-fern
<i>Chrysocephalum semipapposum</i>	Clustered Everlasting
<i>Convolvulus remotus</i>	Grassy Bindweed
<i>Crassula colorata</i> var. <i>acuminata</i>	Dense Crassula
<i>Cullen australasicum</i>	Tall Scurf-pea
<i>Cymbonotus preissianus</i>	Austral Bear's-ear
<i>Cymbopogon ambiguus</i>	Lemon-grass
<i>Cyperus gymnocaulos</i>	Spiny Flat-sedge
<i>Daucus glochidiatus</i>	Native Carrot
<i>Dianella revoluta</i> var. <i>revoluta</i>	Black-anther Flax-lily
<i>Dodonaea baueri</i>	Crinkled Hop-bush
<i>Dodonaea viscosa</i> ssp. <i>angustissima</i>	Narrow-leaf Hop-bush
<i>Dodonaea viscosa</i> ssp. <i>spatulata</i>	Sticky Hop-bush
<i>Einadia nutans</i> ssp. <i>nutans</i>	Climbing Saltbush
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	Ruby Saltbush
<i>Enneapogon nigricans</i>	Black-head Grass
<i>Eremophila alternifolia</i>	Narrow-leaf Emubush
<i>Eucalyptus brachycalyx</i>	Gilja
<i>Eucalyptus camaldulensis</i> var. <i>camaldulensis</i>	River Red Gum
<i>Eucalyptus leucoxylon</i> ssp. <i>leucoxylon</i>	South Australian Blue Gum
<i>Eucalyptus odorata</i>	Peppermint Box
<i>Eucalyptus porosa</i>	Mallee Box
<i>Eucalyptus socialis</i>	Beaked Red Mallee
<i>Euphorbia tannensis</i> ssp. <i>eremophila</i>	Desert Spurge
<i>Gahnia trifida</i>	Cutting Grass
<i>Galium gaudichaudii</i>	Rough Bedstraw
<i>Geranium retrorsum</i>	Grassland Geranium
<i>Gonocarpus elatus</i>	Hill Raspwort
<i>Goodenia albiflora</i>	White Goodenia
<i>Goodenia pinnatifida</i>	Cut-leaf Goodenia
<i>Grevillea huegelii</i>	Comb Grevillea
<i>Hardenbergia violacea</i>	Native Lilac
<i>Helichrysum leucopsidium</i>	Satin Everlasting
<i>Hybanthus floribundus</i> ssp. <i>floribundus</i>	Shrub Violet
<i>Hypoxis glabella</i> var. <i>glabella</i>	Tiny Star

Species Name	Common Name
<i>Isoetopsis graminifolia</i>	Grass Cushion
<i>Isolepis cernua</i>	Nodding Club-rush
<i>Juncus kraussii</i>	Sea Rush
<i>Lepidium oxytrichum</i>	Green Peppercress
<i>Lomandra effusa</i>	Scented Mat-rush
<i>Lomandra multiflora</i> ssp. <i>dura</i>	Hard Mat-rush
<i>Lycium australe</i>	Australian Boxthorn
<i>Maireana brevifolia</i>	Short-leaf Bluebush
<i>Maireana pyramidata</i>	Black Bluebush
<i>Maireana rohrlachii</i>	Rohrlach's Bluebush
<i>Maireana trichoptera</i>	Hairy-fruit Bluebush
<i>Melaleuca lanceolata</i> ssp. <i>lanceolata</i>	Dryland Tea-tree
<i>Millotia perpusilla</i>	Tiny Bow-flower
<i>Minuria cunninghamii</i>	Bush Minuria
<i>Myoporum montanum</i>	Native Myrtle
<i>Nicotiana goodspeedii</i>	Small-flower Tobacco
<i>Nitraria billardieri</i>	Nitre-bush
<i>Olearia decurrens</i>	Winged Daisy-bush
<i>Olearia muelleri</i>	Mueller's Daisy-bush
<i>Oxalis perennans</i>	Native Sorrel
<i>Phragmites australis</i>	Common Reed
<i>Phyllanthus saxosus</i>	Rock Spurge
<i>Pimelea micrantha</i>	Silky Riceflower
<i>Plagiobothrys plurisepaleus</i>	White Rochelia
<i>Pleurosorus rutifolius</i>	Blanket Fern
<i>Poa labillardieri</i> var. <i>labillardieri</i>	Common Tussock-grass
<i>Podolepis tepperi</i>	Delicate Copper-wire Daisy
<i>Pogonolepis muelleriana</i>	Stiff Cup-flower
<i>Pterostylis robusta</i>	Large Shell-orchid
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	Silver Mulla Mulla
<i>Ptilotus seminudus</i>	Rabbit-tails
<i>Rhagodia parabolica</i>	Mealy Saltbush
<i>Rhagodia spinescens</i>	Spiny Saltbush
<i>Salsola kali</i>	Buckbush
<i>Samolus repens</i>	Creeping Brookweed
<i>Santalum acuminatum</i>	Quandong
<i>Schoenoplectus pungens</i>	Spiky Club-rush
<i>Scleranthus pungens</i>	Prickly Knawel
<i>Sclerolaena diacantha</i>	Grey Bindyi
<i>Sclerolaena obliquispis</i>	Oblique-spined Bindyi
<i>Senecio</i> sp.	Groundsel
<i>Senna artemisioides</i> ssp. <i>petiolaris</i>	Flat-stalk Senna
<i>Sida corrugata</i> var. <i>angustifolia</i>	Grassland Sida
<i>Sida petrophila</i>	Rock Sida
<i>Spyridium bifidum</i> var. <i>bifidum</i>	Forked Spyridium
<i>Stackhousia monogyna</i>	Creamy Candles
<i>Tetragonia eremaea</i>	Desert Spinach
<i>Typha domingensis</i>	Narrow-leaf Bulrush
<i>Velleia arguta</i>	Toothed Velleia
<i>Vittadinia blackii</i>	Narrow-leaf New Holland Daisy
<i>Vittadinia cuneata</i>	Fuzzy New Holland Daisy

Species Name	Common Name
<i>Vittadinia gracilis</i>	Woolly New Holland Daisy
<i>Vittadinia megacephala</i>	Giant New Holland Daisy
<i>Wahlenbergia communis</i>	Tufted Bluebell
<i>Wahlenbergia stricta ssp. stricta</i>	Tall Bluebell
<i>Westringia rigida</i>	Stiff Westringia
<i>Wurmbea dioica ssp. dioica</i>	Early Nancy
<i>Zygophyllum apiculatum</i>	Pointed Twinleaf
<i>Zygophyllum crenatum</i>	Notched Twinleaf

Table 1.4. Plant species identified during the standard DEH vegetation survey at all sites
Regional conservation ratings for plants follow Lang and Kraehenbuehl (2001) and DEH (2001). The regions are as defined by the State Herbarium (Plant Biodiversity Centre): **NL** Northern Lofty, **MU** Murray

Conservation Status:

X Extinct/Presumed extinct: not located despite thorough searching of all known and likely habitats; known to have been eliminated by the loss of localised population(s); or not recorded for more than 50 years from an area where substantial habitat modification has occurred.

E Endangered: rare and in danger of becoming extinct in the wild.

T Threatened: (*Plants only*) likely to be either Endangered or Vulnerable but insufficient data available for more precise assessment.

V Vulnerable: rare and at risk from potential threats or long term threats that could cause the species to become endangered in the future.

K Uncertain: likely to be either Threatened or Rare but insufficient data available for a more precise assessment.

R Rare: has a low overall frequency of occurrence (may be locally common with a very restricted distribution or may be scattered sparsely over a wider area). Not currently exposed to significant or widespread threats, but warrants monitoring and protective measures to prevent reduction of population sizes.

U Uncommon: less common species of interest but not rare enough to warrant special protective measures.

Q Not yet assessed: but flagged as being of possible significance.

N Not of particular significance: also indicated by a blank entry.

SPECIES NAME	CONSERVATION STATUS				QUADRAT								
	AUS	SA	MU	NL	1	2	3	4	5	6	7	8	9
Native Species													
<i>Acacia euthycarpa</i>												Y	Y
<i>Acacia pycnantha</i>												Y	Y
<i>Acaena echinata</i>						Y							
<i>Apium prostratum</i>			K	K				Y	Y	Y			
<i>Atriplex semibaccata</i>								Y	Y		Y		Y
<i>Atriplex suberecta</i>								Y	Y	Y	Y		
<i>Austrodanthonia sp.</i>													Y
<i>Austrodanthonia sp.</i>													Y
<i>Baumea juncea</i>			R	R		Y							
<i>Berula erecta</i>					Y					Y			
<i>Bolboschoenus caldwellii</i>								Y	Y	Y			
<i>Cassinia sp.</i>													Y
<i>Chenopodium desertorum</i> <i>ssp. microphyllum</i>													Y
<i>Clematis microphylla</i> var. <i>microphylla</i>												Y	
<i>Compositae sp.</i>						Y							
<i>Cymbopogon ambiguus</i>			R										Y
<i>Cyperus gymnocaulos</i>					Y								
<i>Cyperus vaginatus</i>					Y	Y	Y	Y	Y	Y		Y	Y
<i>Distichlis distichophylla</i>			U	K			Y	Y	Y	Y			

Table 1.4. (continued)

SPECIES NAME	CONSERVATION STATUS				QUADRAT								
	AUS	SA	MU	NL	1	2	3	4	5	6	7	8	9
Native Species													
<i>Dodonaea lobulata</i>			U	R									Y
<i>Dodonaea viscosa</i> ssp. <i>spatulata</i>												Y	
<i>Einadia nutans</i> ssp. <i>nutans</i>							Y					Y	
<i>Enchylaena tomentosa</i>							Y	Y	Y		Y	Y	Y
<i>Eucalyptus camaldulensis</i> ssp. <i>camaldulensis</i>						Y					Y	Y	Y
<i>Frankenia pauciflora</i> var. <i>fruticulosa</i>							Y						
<i>Geranium retrorsum</i>					Y								
<i>Juncus kraussii</i>					Y	Y	Y	Y	Y	Y	Y	Y	Y
<i>Lachnagrostis aemula</i>						Y							
<i>Lythrum hyssopifolia</i>					Y	Y			Y	Y			
<i>Maireana brevifolia</i>													Y
<i>Maireana erioclada</i>												Y	
<i>Maireana radiata</i>												Y	Y
<i>Maireana</i> sp.													Y
<i>Maireana</i> sp. (hairy)							Y						
<i>Maireana</i> sp. (small round-leaved)							Y						
<i>Mimulus repens</i>							Y						
<i>Myoporum montanum</i>			N				Y	Y	Y	Y	Y	Y	Y
<i>Olearia brachyphylla</i>													Y
<i>Oxalis perennans</i>						Y							Y
<i>Phragmites australis</i>					Y			Y		Y	Y		
<i>Pimelea stricta</i>													Y
<i>Poa labillardieri</i> var. <i>labillardieri</i>						Y					Y	Y	
<i>Ptilotus spathulatus</i>													Y
<i>Rhagodia parabolica</i>												Y	
<i>Samolus repens</i>			R			Y		Y	Y	Y			
<i>Schoenoplectus pungens</i>			U	R	Y	Y							
<i>Sclerolaena obliquicuspis</i>							Y						
<i>Selliera radicans</i>			K	E				Y	Y				
<i>Senna artemisioides</i> ssp. <i>coriacea</i>													Y
<i>Sida petrophylla</i>													Y
<i>Spergularia marina</i>							Y	Y	Y	Y			
<i>Tecticornia halocnemoides</i> ssp. <i>halocnemoides</i>										Y			
<i>Triglochin striatum</i>				V			Y						
<i>Typha domingensis</i>					Y	Y	Y		Y	Y	Y		
<i>Unknown</i>									Y				

Table 1.4. (continued)

SPECIES NAME	CONSERVATION STATUS				QUADRAT								
	AUS	SA	MU	NL	1	2	3	4	5	6	7	8	9
Native Species													
<i>Vittadinia blackii</i>			U	N									Y
<i>Vittadinia gracilis</i>													Y
<i>Zygophyllum apiculatum</i>												Y	
Number of native species					9	13	16	12	14	16	7	16	25
Introduced Species													
* <i>Asphodelus fistulosus</i>												Y	Y
* <i>Aster subulatus</i>						Y	Y		Y	Y	Y		
* <i>Avena barbata</i>						Y							Y
* <i>Carrichtera annua</i>													Y
* <i>Cirsium vulgare</i>					Y	Y			Y				
* <i>Compositae sp.</i>													Y
* <i>Conium maculatum</i>										Y			
* <i>Cotula coronopifolia</i>							Y	Y	Y	Y			
* <i>Cynara cardunculus ssp. flavescens</i>										Y		Y	
* <i>Echium plantagineum</i>					Y	Y	Y					Y	
* <i>Erodium botrys?</i>						Y							
* <i>Fumaria capreolata</i>												Y	Y
* <i>Gramineae sp.</i>					Y							Y	
* <i>Gramineae sp.</i>							Y	Y	Y				Y
* <i>Hypochaeris glabra</i>						Y							Y
* <i>Lactuca serriola</i>					Y			Y		Y			
* <i>Limonium companyonis</i>							Y	Y	Y	Y			
* <i>Lycium ferocissimum</i>							Y					Y	
* <i>Marrubium vulgare</i>													Y
* <i>Medicago minima var. minima</i>								Y				Y	
* <i>Medicago polymorpha ssp. polymorpha</i>					Y				Y				Y
* <i>Nicotiana glauca</i>							Y			Y			
* <i>Oxalis pes-caprae</i>							Y	Y	Y		Y	Y	Y
* <i>Paspalum sp.</i>					Y					Y			
* <i>Phalaris aquatica</i>					Y								
* <i>Phalaris sp.</i>									Y	Y			
* <i>Polypogon monspeliensis</i>					Y	Y							
* <i>Rorippa nasturtium-aquaticum</i>									Y	Y			
* <i>Rosa canina</i>					Y	Y							
* <i>Rumex sp.</i>						Y							
* <i>Rumex sp.</i>												Y	
* <i>Salvia verbenaca var. verbenaca</i>												Y	Y

Table 1.4. (continued)

SPECIES NAME	CONSERVATION STATUS				QUADRAT								
	AUS	SA	MU	NL	1	2	3	4	5	6	7	8	9
Introduced Species													
* <i>Schinus areira</i>												Y	Y
* <i>Solanum nigrum</i>													Y
* <i>Sonchus oleraceus</i>					Y		Y	Y	Y			Y	Y
* <i>Sysimbrium erysimoides</i>							Y					Y	
* <i>Trifolium angustifolium</i>						Y							
* <i>Trifolium arvense</i> var. <i>arvense</i>					Y	Y						Y	
Number of introduced species					11	11	10	7	10	10	2	14	14
TOTAL NUMBER OF SPECIES					20	24	26	19	24	26	9	30	39

Table 1.5. Plants of particular conservation significance identified during the standard DEH vegetation surveys.

Plant taxonomy follows Jessop (1993) but includes recent taxonomic changes in the DEH unpublished *Florlist* database.

The regions are as defined by the State Herbarium (Plant Biodiversity Centre): **NL** Northern Lofty, **MU** Murray

Species Name	Common Name	Conservation Status			
		AUS	SA	MU	NL
<i>Apium prostratum</i>	Native Celery			K	K
<i>Baumea juncea</i>	Bare Twig-rush			R	R
<i>Cymbopogon ambiguus</i>	Lemon Grass			R	
<i>Distichlis distichophylla</i>	Emu-grass			U	K
<i>Dodonaea lobulata</i>	Lobed-leaf Hop-bush			U	R
<i>Samolus repens</i>	Creeping Brookweed			K	E
<i>Troglochin striatum</i>	Streaked Arrowgrass				V
<i>Vittadinia blackii</i>	Narrow-leaf New Holland Daisy			U	N

Species of National Significance: 0

Species of South Australian significance: 0

Species of regional significance: 8

Table 1.6: Opportune indigenous flora species

Scientific name	Common name	AUS	SA	MU	NL	1	2	3	4	5	6	7	8	Species notes
						BC	PS	PA	DC	BE	BW	BG	LB	
1 <i>Acacia calamifolia</i>	Willowa							+	+			+	+	
2 <i>Acacia nyssophylla</i>	Spiky wattle							+				+	+	
3 <i>Acacia cupularis/ligulata</i>	Unnamed wattle							+			+	+	+	R
4 <i>Acacia glandulifcarpa</i>	Hairy-pod wattle	V	E	E	E							+		
5 <i>Acacia hakeoides</i>	Hakea wattle											+	+	
6 <i>Acacia hakeoides x pycnantha</i>	Hybrid wattle												+	
7 <i>Acacia notabilis</i>	Notable wattle			U								+		
8 <i>Acacia oswaldii</i>	Umbrella wattle							+	+	+	+	+	+	
9 <i>Acacia paradoxa</i>	Kangaroo thorn							+	+	+	+	+	+	
10 <i>Acacia pycnantha</i>	Golden wattle						+	+	+	+	+	+	+	
11 <i>Acacia retinodes</i>	Wirilda			Q	Q	+	+							W
12 <i>Acacia salicina</i>	Willow wattle											+		W
13 <i>Acacia spilleriana</i>	Spiller's wattle	E	V	K	K							+		
14 <i>Acacia victoriae ssp. victoriae</i>	Elegant wattle											+		
15 <i>Acacia wattsiiana</i>	Dog wattle			E			+							
16 <i>Acaena echinata</i>	Sheep's burr					+	+					+		
17 <i>Acaena sp. B</i>	Sheep's burr						+							
18 <i>Acrotriche patula</i>	Prickly Ground-berry			R	R							+	+	
19 <i>Actinobole uliginosum</i>	Flannel Cudweed							+	+					
20 <i>Adriana aff. quadripartita</i>	Coast bitter-bush				K							+		
21 <i>Ajuga australis f. A</i>	Austral Bugle											+	+	
22 <i>Alectryon oleifolia ssp. canescens</i>	Bullock bush							+	+	+	+	+	+	
23 <i>Allocasuarina verticillata</i>	Drooping sheoak						+					+	+	
24 <i>Amyema miquellii</i>	Box Mistletoe						+					+	+	
25 <i>Amyema preissii</i>	Wire-leaf Mistletoe											+	+	
26 <i>Aphanes australiana</i>	Austral Pier			R	R		+							
27 <i>Apium prostratum ssp. filifolia</i>	Native Celery						+					+	+	W, R
28 <i>Arabidella filifolia</i>	Thread-leaf Cress			R	K				+			+		S, R
29 <i>Arabidella trisecta</i>	Shrubby Cress							+						
30 <i>Aristida behriana</i>	Brush Wire-grass			R		+	+							
31 <i>Arthropodium fimbriatum</i>	Nodding Vanilla-lily						+			+		+		
32 <i>Arthropodium minus</i>	Tiny vanilla-lily			R	V			+	+	+			+	S, R
33 <i>Arthropodium strictum</i>	Common Vanilla-lily						+	+	+	+	+	+	+	
34 <i>Asperula conferta</i>	Common woodruff						+						+	
35 <i>Asperula synticola</i>	Southern Flinders Woodruff		R	R	-							+		S, R
36 <i>Asteridia athrixoides f. athrixoides</i>	Wire wort											+		

	Scientific name	Common name	AUS	SA	MU	NL	1	2	3	4	5	6	7	8	Species notes
37	<i>Atriplex eardleyae</i>	Eardley's Saltbush								+			+	+	
38	<i>Atriplex leptocarpa</i>	Slender-fruit Saltbush			U	R					+				
39	<i>Atriplex lindleyi</i>	Baldoo							+	+	+			+	
40	<i>Atriplex semibaccata</i>	Berry saltbush							+	+	+		+	+	
41	<i>Atriplex suberecta</i>	Lagoon saltbush							+	+	+		+	+	
42	<i>Atriplex vesicaria</i>	Bladder saltbush												+	
43	<i>Atriplex stipitata</i>	Bitter saltbush							+	+	+				
44	<i>Austrodanthonia auriculata</i>	Lobed Wallaby-grass			U			+							
45	<i>Austrodanthonia caespitosa</i>	Common Wallaby-grass							+	+			+	+	
46	<i>Austrodanthonia racemosa</i> var. <i>racemosa</i>	Slender Wallaby-grass			K	U		+							
47	<i>Austrodanthonia setaceae</i>	Bristly Wallaby-grass						+					+	+	
48	<i>Austrodanthonia</i> sp.	Wallaby-grass					+					+			
49	<i>Austrostipa acroclilata</i>	Graceful spear-grass							+	+			+	+	
50	<i>Austrostipa blackii</i>	Crested spear-grass						+							
51	<i>Austrostipa breviglumis</i>	Cane spear-grass		R	-	R							+		S, R (new for MU)
52	<i>Austrostipa drummondii</i>	Cottony spear-grass							+	+			+	+	
53	<i>Austrostipa elegantissima</i>	Feather spear-grass								+			+	+	
54	<i>Austrostipa eremophila</i>	Rusty spear-grass					+								
55	<i>Austrostipa exilis</i>	Heath Spear-grass				T							+		
56	<i>Austrostipa scabra</i>	Rough Spear-grass					+								
57	<i>Austrostipa nodosa</i>	Tall spear-grass					+						+	+	
58	<i>Austrostipa petraea</i>	Flinders Range spear-grass				R								+	S, R (new for MU)
59	<i>Austrostipa pilata</i>	Prickly spear-grass		V	T	T			+				+	+	
60	<i>Austrostipa platychaeta</i>	Flat-awn spear-grass				R				+					
61	<i>Austrostipa setaceae</i>	Corkscrew spear-grass				R									
62	<i>Austrostipa tuckerii</i>	Tucker's spear-grass		R	K							+			S, R
63	<i>Austrostipa</i> sp.	Spear-grass								+					
64	<i>Baumea juncea</i>	Bare twig-rush				R							+		W, R
65	<i>Beyeria lechenaultii</i>	Pale Turpentine-bush							+	+			+	+	
66	<i>Brachyscome ciliaris</i> var. <i>ciliaris</i>	Variable daisy							+	+			+	+	
67	<i>Brachyscome lineariloba</i>	Hard-head daisy											+	+	
68	<i>Brachyscome perpusilla</i>	Tiny daisy											+	+	
69	<i>Brachyscome</i> sp. 'Saxatilis'	Unnamed daisy							+	+			+	+	S, R
70	<i>Bulbine bulbosa</i>	Bulbine lily											+	+	
71	<i>Bursaria spinosa</i>	Sweet bursaria				R							+	+	
72	<i>Caladenia (Arachnorchis)</i> aff. <i>tensa</i>	Inland Green-comb Spider-orchid											+		
73	<i>Calandrinia eremaea</i>	Dryland Purslane							+	+			+	+	
74	<i>Calandrinia</i> aff. <i>volubilis</i>	Twining Rock Purslane			K	T				+			+	+	S, R
75	<i>Calandrinia</i> sp.	Purslane											+	+	
76	<i>Callitris gracilis</i>	Southern Cypress pine							+	+			+	+	

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77	<i>Calostemma purpureum</i>	Garland lily								+		+	+	+	
78	<i>Calotis hispidula</i>	Hairy Burr-daisy								+			+	+	
79	<i>Calytrix tetragona</i>	Common Fringe-myrtle											+		
80	<i>Carex breviculmis</i>	Short-stem Sedge			R	K	+							+	
81	<i>Carex bichenoviana</i>	Notched Sedge			K	R							+		W
82	<i>Carpobrotus</i> sp. Short calyx (S.T.Blake 20451)	Native Pigface											+		
83	<i>Cassinia arcuata</i>	Curry bush											+	+	
84	<i>Cassinia laevis</i>	Curry bush							+				+		
85	<i>Cassyntha melantha</i>	Coarse Dodder-laurel							+				+		
86	<i>Casuarina pauper</i>	Black oak							+		+				
87	<i>Centella asiatica</i>	Asian Centella			Q		+								W, R
88	Characeae sp. 1	Stonewort algae					+		+	+	+	+	+	+	W
89	Characeae sp. 2	Stonewort algae											+	+	W
90	<i>Chamaesyce drummondii</i>	Mat Spurge						+						+	
91	<i>Cheilanthes austrotenuifolia</i>	Annual rock-fern						+		+			+		S (in arid regions)
92	<i>Cheilanthes lasiophylla</i>	Woolly Cloak-fern			U				+		+		+	+	S
93	<i>Cheilanthes sieberi</i>	Narrow Rock-fern			K			+	+				+		
94	<i>Chenopodium desertorum</i>	Desert Goosefoot						+	+	+			+	+	
95	<i>Chenopodium pumilio</i>	Clammy Goosefoot											+	+	
96	<i>Chrysocephalum apiculatum</i> complex	Everlasting											+	+	
97	<i>Chrysocephalum semipapposum</i>	Clustered Everlasting			U	Q			+	+			+	+	
98	<i>Chrysocephalum</i> sp. 'Sticky'	Sticky Everlasting								+			+		
99	<i>Clematis decipiens</i>	Mallee Clematis											+		
100	<i>Clematis microphylla</i> var. <i>microphylla</i>	Old man's beard						+				+	+	+	
101	<i>Comosperma volubile</i>	Twining Milkwort											+	+	
102	<i>Convolvulus angustissimus</i> ssp. <i>angustissimus</i>	Australian Bindweed						+					+	+	
103	<i>Convolvulus clementii</i>	Bindweed												+	
104	<i>Convolvulus remotus</i>	Grassy Bindweed						+				+	+	+	
105	<i>Convolvulus</i> sp.	Bindweed							+	+					
106	<i>Correa glabra</i> var. <i>turnbullii</i>	Rock correa			U	R				+					
107	<i>Cotula australis</i>	Common cotula								+			+		
108	<i>Craspedia</i> aff. <i>heplorrhiza</i>	Annual Billy-buttons			R	R							+	+	
109	<i>Craespedia variabilis</i> complex	Billy-buttons			R								+		
110	<i>Crassula colligata</i>	Annual Stonecrop						+					+		
111	<i>Crassula colorata</i> ssp. <i>acuminata</i>	Mossy stonecrop							+				+		
112	<i>Crassula colorata</i> ssp. <i>colorata</i>	Dense stonecrop						+		+			+	+	

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113	<i>Crassula decumbens</i> var. <i>decumbens</i>	Spreading Crassula						+					+		
114	<i>Cryptandra</i> sp. <i>Long hypanthium</i>	Long-flower cryptandra		R	K	R				+			+		
115	<i>Cullen australasicum</i>	Tall scurf-pea						+							
116	<i>Cullen parvum</i>	Small scurf-pea		V		E							+		AD collection, not relocated.
117	<i>Cymbopogon obtectus</i>	Silky-head Lemon-grass			V			+	+	+		+	+	+	
118	<i>Cymbonotus preissianus</i>	Austral bear's-ear			K	R		+							
119	<i>Cynodon dactylon</i> var. <i>pulchellus</i>	Native couch							+			+	+		W
120	<i>Cynoglossum suaveolens</i>	Sweet Hound's-tongue			R	R		+							
121	<i>Cyperus gymnocaulis</i>	Spiny Flat-sedge					+	+	+	+	+	+	+	+	W
122	<i>Cyperus vaginatus</i>	Stiff Flat-sedge			K					+		+			W
123	<i>Daucus glochidiatus</i>	Native carrot						+	+	+			+	+	
124	<i>Daviesia stricta</i>	Flinders Ranges Bitter-pea											+		
125	<i>Dianella revoluta</i> var. <i>revoluta</i>	Black anther Flax lily							+	+		+	+	+	
126	<i>Disphyma crassifolium</i> ssp. <i>clavellatum</i>	Round leaf Pigface							+	+					
127	<i>Distichlis distichophylla</i>	Emu-grass								+			+	+	W
128	<i>Dodonaea baueri</i>	Crinkled Hop-bush							+	+			+	+	
129	<i>Dodonaea baueri</i> x <i>stenozyga</i>												+	+	
130	<i>Dodonaea lobulata</i>	Lobed-leaf Hop-bush			U	R			+	+		+	+		(new record for SA)
131	<i>Dodonaea viscosa</i> ssp. <i>spatulata</i>	Spoon-leaf Hop-bush								+		+	+		
132	<i>Dodonaea viscosa</i> ssp. <i>angustissima</i>	Narrow-leaf Hop-bush											+		
133	<i>Dodonaea stenozyga</i>	Desert Hop-bush				K							+		
134	<i>Drosera macrantha</i> ssp. <i>planchonii</i>	Climbing Sundew											+		
135	<i>Dysphania glomulifera</i> ssp. <i>glomulifera</i>	Globular Crumbweed					+								
136	<i>Einadia nutans</i> ssp. <i>nutans</i>	Climbing Saltbush					+	+	+	+		+	+	+	
137	<i>Elymus scaber</i> var. <i>scaber</i>	Native Wheat grass			R		+	+					+		
138	<i>Elymus rectisetus</i>	Wheatgrass					+	+							New MU, NL record
139	<i>Enchylaena tomentosa</i>	Ruby Saltbush					+	+	+	+		+	+	+	
140	<i>Enneapogon nigricans</i>	Black-head grass					+	+					+	+	
141	<i>Epiobium billardierianum</i> ssp. <i>billardierianum</i>	Robust Willow herb			K	R		+			+	+	+	+	W
142	<i>Eremophila alternifolia</i>	Narrow-leaf emu bush							+	+		+	+	+	
143	<i>Eremophila deserti</i>	Turkey-bush													
144	<i>Eremophila glabra</i>	Common emu bush											+		
145	<i>Eremophila longifolia</i>	Weeping emu bush							+	+				+	

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146	<i>Eremophila oppositifolia</i> ssp. <i>oppositifolia</i>	Opposite-leaved Emubush				K								+	
147	<i>Eremophila scoparia</i>	Broom emu bush							+	+			+	+	
148	<i>Eremophila serrulata</i>	Green-flowered emu bush			R				+	+				+	S, R
149	<i>Erodium cicutarium</i>	Blue Heron's-bill							+		+		+	+	
150	<i>Eucalyptus brachycalyx</i>	Gilja							+	+			+	+	
151	<i>Eucalyptus camaldulensis</i> var. <i>camaldulensis</i>	River red gum											+	+	W
152	<i>Eucalyptus gracilis</i>	Yorrell							+	+			+	+	
153	<i>Eucalyptus intertexta</i>	Smooth-barked Coolibah											+		
154	<i>Eucalyptus leucoxylon</i> ssp. <i>leucoxylon</i>	South Australian Blue gum			R			+					+		
155	<i>Eucalyptus leucoxylon</i> ssp. <i>pruinosa</i>	Small-fruit Blue Gum			U		+								
156	<i>Eucalyptus odorata</i>	Peppermint box					+	+					+	+	
157	<i>Eucalyptus oleosa</i> ssp. <i>oleosa</i>	Red Mallee							+	+			+	+	
158	<i>Eucalyptus porosa</i>	Mallee Box							+	+			+	+	
159	<i>Eucalyptus socialis</i>								+	+			+	+	
160	<i>Chamaesyce drummondii</i>	Caustic weed					+								
161	<i>Euphorbia tannensis</i> ssp. <i>eremophila</i>	Desert Spurge				K			?				+	+	S (in South)
162	<i>Eutaxia diffusa</i>	Large-leaf Eutaxia			U	E				+			+		
163	<i>Eutaxia microphylla</i>	Eggs-and-bacon						+					+	+	
164	<i>Exocarpus aphyllus</i>	Leafless cherry							+	+			+	+	
165	<i>Frankenia pauciflora</i> ssp. <i>gunnii</i>	Southern Sea-heath							+	+			+	+	
166	<i>Gahnia filum</i>	Chaffy saw-sedge			-								+		W, R (in North)
167	<i>Galium gaudichaudiana</i>	Rough bedstraw						+							S, R (in North)
168	<i>Galium migrans</i> ssp. <i>inversum</i>	Bedstraw											+	+	
169	<i>Geijera linearifolia</i>	Oil bush												+	
170	<i>Geococcus pusillus</i>	Earth Cress							+	+				+	
171	<i>Geranium potentilloides</i>	Downy Geranium					+	+	+	+			+	+	
172	<i>Geranium solanderi</i>	Austral Geranium					+	+							
173	<i>Geranium</i> sp.	Unnamed Geranium											+	+	
174	<i>Glychrocaryon flavescens</i>	Rock Pennants			R	R							+	+	S, R
175	<i>Glycine rubiginosa</i>	Twinning glycine						+		+			+	+	
176	<i>Gonocarpus elatus</i>	Hill Raspwort						+		+					
177	<i>Gonocarpus mezeianus</i>	Broad-leaf Raspwort			R				+				+		
178	<i>Goodenia albiflora</i>	White goodenia			V	U		+					+	+	
179	<i>Goodenia fascicularis</i>	Silky Goodenia			-				+	+					
180	<i>Goodenia pinnatifida</i>	Cut-leaf Goodenia			U	U	+	+					+	+	
181	<i>Goodenia pusilliflora</i>	Small-flower Goodenia											+	+	

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182	<i>Goodenia</i> aff. <i>vernicaosa</i>	Unnamed Goodenia							+						S, R
183	<i>Goodenia varia</i>	Sticky Goodenia											+		
184	<i>Grevillea huegelii</i>	Comb Spider-flower							+	+				+	
185	<i>Hakea leucoptera</i> ssp. <i>leucoptera</i>	Silver Needlewood							+	+					
186	<i>Hardenbergia violacea</i>	Native Lilac				U		+							
187	<i>Harmsiodoxa brevipes</i> var. <i>brevipes</i>	Short Cress													
188	<i>Halragis aspera</i>	Rough Raspwort			U	U	+								
189	<i>Helichysum rutidolepis</i>	Pale Everlasting	E		E								+		W, R AD collection, not relocated.
190	<i>Heliotropium asperinum</i>	Rough Heliotrope													
191	<i>Hyalosperma demissum</i>	Dwarf Sunray												+	
192	<i>Hyalosperma semisterile</i>	Orange Sunray												+	
193	<i>Hypoxis glabella</i> var. <i>glabella</i>	Tiny Star					+	+		+		+		+	
194	<i>Indigofera</i> aff. <i>australis</i>	Inland Indigo							+	+					S
195	<i>Isoetopsis graminifolia</i>	Grass Buttons							+	+					
196	<i>Isolepis platycarpa</i>	Flat fruit Club			R	R		+				+			W, R (in North)
197	<i>Isotoma petraea</i>	Rock Isotome			R	R		+	+	+					S, R (in South)
198	<i>Juncus kraussii</i>	Sea Rush			R		+	+	+	+					W (Saline)
199	<i>Lagenophora huegelii</i>	Coarse Bottle-daisy			R			+							
200	<i>Lachnagrostis billardierei</i>	Coast blown-grass						+							W (Saline)
201	<i>Lachnagrostis filiformis</i>	Annual blown-grass			-	-							+		W
202	<i>Lachnagrostis robusta</i>	Tall blown-grass		R	-	-		+							W (Saline)
203	<i>Lawrenia squamata</i>	Prickly lawrenia							+	+					
204	<i>Leiocarpa tomentosa</i>	Woolly Plover-daisy					+								
205	<i>Leiocarpa websterii</i>	Narrow Plover-daisy							+	+					R
206	<i>Lepidium papillosum</i>	Warty Peppercress								+		+			
207	<i>Lepidium pseudotasmanicum</i>	Tasmanian peppercress	V		K	E				+					S, R
208	<i>Leptorhynchos squamatus</i> ssp. <i>squamatus</i>	Scaly Buttons			R								+		
209	<i>Leptorhynchos tetrachaetus</i>	Little Buttons			K	U									
210	<i>Leucochrysum molle</i>	Hoary Sunray													
211	<i>Lobelia anceps</i>	Angled lobelia			R	R	+					+			W, R (Inland)
212	<i>Logania saxitilis</i>	Rock logania		R		R									S, R
213	<i>Lomandra densiflora</i>	Soft Tussock Mat			U			+							
214	<i>Lomandra effusa</i>	Scented Mat								+		+			
215	<i>Lomandra multiflora</i> ssp. <i>dura</i>	Hard Mat-rush						+		+					
216	<i>Lomandra sororia</i>	Sword mat-rush			K	V		+							
217	<i>Lycium australe</i>	Australian boxthorn							+	+					
218	<i>Lythrum hyssopifolia</i>	Lesser Loosestrife					+	+				+			W
219	<i>Maireana aphylla</i>	Leafless Bluebush			R	V				+					
220	<i>Maireana brevifolia</i>	Short-leaf Bluebush					+	+	+	+		+			

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221	<i>Maireana enchylaenoides</i>	Wingless Fissure-plant					+		+			+	+	+	
222	<i>Maireana pentatropis</i>	Satiny Bluebush				-			+	+			+	+	
223	<i>Maireana pyramidata</i>	Black Bluebush							+	+		+	+	+	
224	<i>Maireana radiata</i>	Radiate Bluebush							+	+		+	+	+	
225	<i>Maireana sedifolia</i>	Pearl Bluebush							+	+		+	+	+	
226	<i>Maireana erioclada</i>	Rosy Bluebush							+	+					
227	<i>Maireana</i> sp.	Bluebush													
228	<i>Malva behriana</i>	Native hollyhock													
229	<i>Melaleuca lanceolata</i>	Black Tea-tree							+	+		+	+	+	
230	<i>Mentha saturoides</i>	Native Pennyroyal		R		V		+							
231	<i>Microlepidium</i> sp.	Shepherd's Purse											+		
232	<i>Microseris lanceolata</i>	Yam daisy											+		
233	<i>Microtis arenaria</i>	Notched Onion-orchid											+		
234	<i>Millotia macrocarpa</i>	Large-fruit Millotia											+		
235	<i>Millotia myosotidifolia</i>	Broad leaf Millotia											+	+	
236	<i>Millotia perpusilla</i>	Tiny Bow-flower			R	R		+					+	+	
237	<i>Millotia tenuifolia</i> var. <i>tenuifolia</i>	Soft Millotia				R				+					
238	<i>Mimulus repens</i>	Creeping Monkey-flower						+	+				+	+	W
239	<i>Minuria cunninghamii</i>	Bush minuria				T			+			+		+	
240	<i>Minuria leptophylla</i>	Minnie Daisy										+	+		
241	<i>Muehlenbeckia florulenta</i>	Tangled Lignum				K									W
242	<i>Myoporum montanum</i>	Water bush							+	+		+	+	+	W
243	<i>Myoporum platycarpum</i>	Sugarwood										+	+	+	
244	<i>Nicotiana goodspeedii</i>	Small-flower Tobacco							+				+	+	
245	<i>Nicotiana maritima</i>	Coast Tobacco											+		
246	<i>Nicotiana velutina</i>	Velvet Tobacco												+	
247	<i>Nitraria billardiera</i>	Nitre bush							+	+		+	+	+	
248	<i>Olearia brachyphylla</i>	Short leaf Daisy							+	+			+	+	
249	<i>Olearia decurrens</i>	Clammy daisy-bush							+	+			+	+	
250	<i>Olearia muelleri</i>	Mueller's daisy-bush							+	+			+	+	
251	<i>Olearia pannosa</i> ssp. <i>pannosa</i>	Silver daisy-bush	V	V	V	V							+		
252	<i>Olearia picridifolia</i>	Rasp Daisy-bush		R	R	V							+		
253	<i>Olearia pimeleoides</i> ssp. <i>pimeleoides</i>	Pimelea Daisy-bush							+	+		+	+	+	
254	<i>Omphalolappula concava</i>	Burr Stickseed							+				+	+	New in MU?
255	<i>Ophioglossum luisitanicum</i>	Austral Adder's tongue		U	U	U							+		
256	<i>Osteocarpum saisuginosum</i>	Inland Bonefruit		U	U	V			+	+			+	+	
257	<i>Oxalis exilis</i>	Native oxalis						+					+	+	
258	<i>Oxalis perrenans</i>	Native sorrel					+	+	+			+	+	+	
259	<i>Ozothamnus retusus</i>	Notched Bush-everlasting				U							+	+	
260	<i>Parietaria australis</i>	Shade pellitory						+		+		+	+	+	

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261	<i>Parietaria cardiostegia</i>	Mallee Smooth nettle							+	+					
262	<i>Panicum</i> sp.	Panic								+				+	
263	<i>Pelargonium</i> sp. <i>nova</i>	Unnamed Pelargonium				-		+					+		W, R
264	<i>Phragmites australis</i>	Common reed					+		+	+		+	+	+	W
265	<i>Phyllanthus saxosus</i>	Rock spurge			V	R							+	+	S, R
266	<i>Pimelea glauca</i>												+		
267	<i>Pimelea micrantha</i>	Curved rice flower							+	+			+	+	
268	<i>Pimelea stricta</i>	Riceflower								+					
269	<i>Pimelea serpyllifolia</i> ssp. <i>serpyllifolia</i>	Thyme Riceflower											+		
270	<i>Pimelea simplex</i> ssp. <i>continua</i>	Desert Riceflower			Q								+		
271	<i>Pitiosporum angusifolius</i>	Native apricot							+	+		+	+	+	
272	<i>Plagiobothrys elachanthus</i>	Hairy Forget-me-not											+		
273	<i>Plagiobothrys pluriseptatus</i>	White Forget-me-not											+		
274	<i>Plantago hispida</i>	Hairy plantain								+			+		
275	<i>Plantago</i> sp. B (R.Bates 44765)	Annual plantain											+		
276	<i>Pleurosorus rutifolius</i>	Blanket fern			R	U		+		+		+	+	+	S
277	<i>Poa crasicaudex</i>	Thick-stem tussock-grass			U			+		+			+		
278	<i>Poa labillardiera</i>	Common Tussock-grass					+	+							
279	<i>Poa</i> aff. <i>poiformis</i>	Blue Tussock-grass			K		+						+		
280	<i>Podolepis tepperi</i>	Delicate Copper-wire Daisy				R							+		
281	<i>Pogonolepis muelleriana</i>	Stiff Cup flower											+	+	
282	<i>Pomaderris paniculosa</i> ssp. <i>paniculosa</i>	Mallee Pomaderris								+			+	+	
283	<i>Prasophyllum odoratum</i>	Scented Leek-orchid				R							+		
284	<i>Prostanthera striatiflora</i>	Striated Mintbush			R	X			+	+					
285	<i>Pterostylis (Oligochaetochilus) biseta</i> complex	Two-bristle greenhood								+			+	+	R
286	<i>Pterostylis (Hymenochilus) pagpophilus</i>	Greenhood							+	+			+		R
287	<i>Pterostylis (Oligochaetochilus) pusillus</i>	Small Rusty-hood											+		R
288	<i>Pterostylis (Diplodium) robusta</i>	Large Striped Greenhood							+	+			+		R
289	<i>Pterostylis (Oligochaetochilus) sp. 'Caroona Creek'</i>	Caroona Creek Greenhood							+						R
290	<i>Ptilotus spathulatus</i> f. <i>spathulatus</i>	Pussy tails						+		+			+	+	
291	<i>Ptilotus obovatus</i> var. <i>obovatus</i>	Silver Mulla Mulla											+	+	
292	<i>Ranunculus hamatosetosus</i>	Hill buttercup											+		
293	<i>Rhagodia crassifolia</i>	Fleshy Saltbush							+	+			+	+	

	Scientific name	Common name	AUS	SA	MU	NL	1	2	3	4	5	6	7	8	Species notes
294	<i>Rhagodia gaudichaudiana</i>													+	
295	<i>Rhagodia parabolica</i>	Fragrant saltbush							+	+		+	+	+	
296	<i>Rhagodia spinescens</i>	Spiny saltbush				K			+	+			+	+	
297	<i>Rhodanthe laevis</i>	Smooth Daisy											+		
298	<i>Rhodanthe polygalifolia</i>	Milkwort Everlasting												+	
299	<i>Rhodanthe pygmaea</i>	Pigmy Daisy						+					+	+	
300	<i>Rhodanthe stricta</i>	Slender Everlasting					+	+					+	+	
301	<i>Rumex brownii</i>	Slender dock					+	+		+			+	+	
302	<i>Rumex dumosus</i>	Wiry dock		R			+	+							
303	<i>Samolus repens</i>	Creeping Brookweed			R	U	+	+	+	+	+	+	+	+	W
304	<i>Santalum acuminatum</i>	Quandong								+		+	+	+	
305	<i>Sarcococa praecox</i>	Sarcococa							+						
306	<i>Sarcostemma vineale</i> ssp. <i>australis</i>	Caustic Bush											+		
307	<i>Salsola australis</i>	Buckbush tumbleweed						+	+	+		+	+	+	
308	<i>Scaevola spinescens</i>	Spiny Fanflower								+		+	+	+	
309	<i>Schoenoplectus pungens</i>	Spiky Club-rush			U	R	+	+		+		+	+		W
310	<i>Schoenus</i> sp.	Bog-rush											+		
311	<i>Scleranthus pungens</i>	Prickly Knawel								+			+		
312	<i>Sclerolaena diacantha</i>	Grey Bindyi							+	+			+	+	
313	<i>Sclerolaena uniflora</i>	Small-spine Bindyi								+			+	+	
314	<i>Selliera radicans</i>	Shiny Swamp-mat			K	E							+		W
315	<i>Senecio anethifolius</i> ssp. <i>anethifolius</i>	Feathery Groundsel			K	T			+				+		S
316	<i>Senecio dolichocephalus</i>	Narrow Groundsel			R	Q			+	+			+		S
317	<i>Senecio glossanthus</i>	Annual groundsel						+	+	+			+		
318	<i>Senecio quadridentatus</i>	Cotton groundsel							+	+			+		
319	<i>Senna artemisoides</i> ssp. <i>artemisoides</i>	Silver Senna							+	+		+	+	+	
320	<i>Senna artemisoides</i> ssp. <i>petiolaris</i>												+		
321	<i>Setaria constricta</i>	Box Grass							+			+			
322	<i>Sida ammophila</i>	Sand Sida			U								+		
323	<i>Sida petrophila</i>	Rock Sida							+			+	+		
324	<i>Sida corrugata</i> ssp. <i>angustifolia</i>	Grassland Sida							+				+		
325	<i>Solanum sturtianum</i>	Sturt's Nightshade											+		
326	<i>Solenogyne</i> aff. <i>dominii</i>	Smooth solenogyne			R	R		+							
327	<i>Sonchus hydrophilus</i>	Native Sow-thistle				Q	+	+		+		+	+	+	W, R
328	<i>Spergularia marina</i>	Salt Sand-spurrey											+	+	
329	<i>Spergularia</i> sp. <i>Butchers Gap</i> (P. Gibbons 234)	Sand-spurrey											+		
330	<i>Spirogyra</i> sp.	Green filamentous algae							+	+		+	+	+	

	Scientific name	Common name	AUS	SA	MU	NL	1	2	3	4	5	6	7	8	Species notes
331	<i>Sporobolus virginicus</i>	Salt Couch										+			W
332	<i>Stachouisia subterranea</i>	Creamy Candles					+						+		
333	<i>Stellaria filiformis</i>	Thread Starwort											+		
334	<i>Stenopetalum lineare</i>	Narrow Thread-petal				R						+	+	+	
335	<i>Stenopetalum lineare</i> (Perennial form)												+		
336	<i>Suarina muelleri</i>	Spoon Cudweed											+		
337	<i>Tecticornia</i> sp.								+						
338	<i>Tetragonia eremaea</i>	Desert Spinach							+	+			+	+	
339	<i>Themeda triandra</i>	Kangaroo grass					+					+	+	+	
340	<i>Thysanotus bauerii</i>	Mallee fringe-lily				R				+			+	+	
341	<i>Thysanotus patersonii</i>	Twining fringe-lily								+			+		
342	<i>Tricoryne elatior</i>	Yellow Rush lily			Q	R							+		
343	<i>Triglochin striatum</i>	Streaked arrow-grass				V	+		+				+	+	W
344	<i>Triodia irritans</i> complex	Spinifex											+		
345	<i>Triptilodiscus pygmaeus</i>	Small Yellow heads							+				+		
346	<i>Trymalium wayae</i>	Grey Trymalium			R	U							+	+	
347	<i>Typha domingensis</i>	Narrow-leaf Cumbungi				Q	+	+	+	+		+	+	+	W
348	<i>Velleia paradoxa</i>	Spur Velleia			Q	Q							+		
349	<i>Veronica plebeia</i>	Trailing Speedwell			-	U		+							
350	<i>Vittadinia australasica</i>	Sticky New Holland Daisy										+			
351	<i>Vittidinia blackii</i>	Narrow-leaf New Holland Daisy			U			+	+	+			+		
352	<i>Vittidinia cervicalaris</i>	Annual New Holland Daisy						+	+	+			+		
353	<i>Vittadina condyloides</i>	Club hair New Holland Daisy							+	+			+		
354	<i>Vittidinia cuneata</i>	Fuzzy New Holland Daisy						+					+		
355	<i>Vittidinia dissecta</i> var. <i>hirta</i>	Dissected New Holland Daisy				-								+	
356	<i>Vittidinia gracilis</i>	Woolly New Holland Daisy					+	+		+			+	+	
357	<i>Vittidinia pterochaeta</i>	Rough New Holland Daisy							+						
358	<i>Vittidinia megacephala</i>	Large-head New Holland Daisy											+		
359	<i>Wahlenbergia communis</i>	Tufted Bluebell							+			+	+	+	
360	<i>Wahlenbergia gracilentia</i>	Annual Bluebell											+	+	
361	<i>Wahlenbergia luteola</i>	Yellow-wash Bluebell					+	+		+		+	+		
362	<i>Wahlenbergia stricta</i> ssp. <i>stricta</i>	Tall Bluebell								+			+		
363	<i>Walwhalleya prolata</i>	Coolah grass						+							
364	<i>Westringia rigida</i>	Stiff Westringia							+	+			+	+	
365	<i>Wurmbea dioica</i> ssp. <i>brevifolia</i>	Short-leaf Early Nancy						+	+	+		+	+	+	
366	<i>Wurmbea dioica</i> ssp. <i>diocia</i>	Early Nancy						+							
367	<i>Xerochrysum leucopsidium</i>	Mallee everlasting							+	+			+	+	
368	<i>Zygophyllum ammophilum</i>	Sand Twinleaf							+	+			+	+	
369	<i>Zygophyllum apiculatum</i>	Common twin leaf							+	+		+	+	+	
370	<i>Zygophyllum aurantiacum</i>	Shrubby Twinleaf							+	+			+	+	

	Scientific name	Common name	AUS	SA	MU	NL	1	2	3	4	5	6	7	8	Species notes
	<i>ssp. aurantiacum</i>														
371	<i>Zygophyllum crenatum</i>	Forked Twinleaf							+	+				+	
372	<i>Zygophyllum confertus</i>	Notched Twinleaf							+	+			+	+	
373	<i>Zygophyllum glaucum</i>	Pale Twinleaf							+	+			+	+	
374	<i>Zygophyllum ovatum</i>	Dwarf Twinleaf											+	+	

Species notes: **R** – Refugium species; **W** – Wetland species; **S** – saxicolous species. “In North” or “in South” refers to a species distribution in South Australia

Australian conservation ratings - Commonwealth EPBC Act 1999

South Australian conservation ratings - South Australian National Parks & Wildlife Act 1972 (Schedules 7,8,9)

Murraylands (MU) and North Lofty (NL) conservation ratings – Florlist, June 2009 Version.

BRADY CREEK WATERHOLES

Local Government Area: Regional Council of Goyder

Location: Ngapala Road, Apoinga

Landholder: J.H. Neal

Site Identification: BSS_01

Opportunistic Collection Site: YES

AMG Zone: 54 **Easting:** 314937 **Northing:** 6237018

Hundred: English **Section:** Lot 2

Date of Survey: 27/07/2009

Quadrat dimensions: 20 x 45 metres

Altitude: 446 metres

SITE DESCRIPTION

The site is located on the main channel of Brady Creek on privately-owned land used for grazing and cropping. It is situated between the Tothill and Bluff Ranges, approximately 8 km west of Robertstown and comprises a permanent creekline with reedbeds and waterholes.

GENERAL DESCRIPTION OF VEGETATION

Floristic vegetation mapping indicates that the surrounding slopes support *Eucalyptus odorata*, +/-*Eucalyptus leucoxyton ssp.*, +/-*Callitris glaucophylla* Low Woodland over *Austrodanthonia caespitosa*, *Austrostipa scabra ssp.*, *Austrostipa nitida*, *Elymus scaber var. scaber*, +/-*Austrostipa eremophila* tussock grasses.

QUADRAT SPECIFIC INFORMATION**Vegetation Association**

The site is situated immediately adjacent to the stream channel and comprises *Typha domingensis* and *Phragmites australis* Closed Sedgeland over **Paspalum sp.*, *Juncus krausii* and *Cyperus vaginatus*.

Landform at Site: Stream Channel

Slope (degrees): 0 **Aspect (degrees):** 0

Outcrop Type: Nil – no outcrop

Surface Stone Type: none apparent

Surface Soil Texture: Silty Clay Loam

Bare Earth Estimate: 2%

Litter Estimate: 5-10%

Table 1.7. Plant species identified during the standard DEH vegetation survey at site BSS_01
An asterisk denotes introduced species.

Scientific Name	Common Name	Cover/Abundance
Shrubs		
* <i>Rosa canina</i>	Dog Rose	1-10 individuals
Grasses		
* <i>Gramineae sp.</i>	Grass Family	sparsely present
* <i>Paspalum sp.</i>		25-50%
* <i>Phalaris aquatica</i>	Phalaris	sparsely present
<i>Phragmites australis</i>	Common Reed	5-25%
* <i>Polypogon monspeliensis</i>	Annual Beard-grass	<5%
Herbaceous Species		
<i>Berula erecta</i>	Water Parsnip	sparsely present
* <i>Cirsium vulgare</i>	Spear Thistle	1-10 individuals
* <i>Echium plantagineum</i>	Salvation Jane	<5%
<i>Geranium retrorsum</i>	Grassland Geranium	sparsely present
* <i>Lactuca serriola f.</i>		sparsely present
<i>Lythrum hyssopifolia</i>	Lesser Loosestrife	sparsely present
* <i>Medicago polymorpha var. polymorpha</i>	Burr-medic	sparsely present
* <i>Sonchus oleraceus</i>	Common Sow-thistle	sparsely present
* <i>Trifolium arvense var. arvense</i>	Hare's-foot Clover	sparsely present
Sedges and Rushes		
<i>Cyperus gymnocaulos</i>	Spiny Flat-sedge	<5%
<i>Cyperus vaginatus</i>	Stiff Flat-sedge	<5%
<i>Juncus kraussii</i>	Sea Rush	<5%
<i>Schoenoplectus pungens</i>	Spiky Club-rush	<5%
<i>Typha domingensis</i>	Narrow-leaf Bulrush	50-75%

No. of Plant Species

Native: 9

Introduced: 11

Total: 20

GRAZING PRESSURE

No signs of grazing were recorded within the quadrat.

CURRENT MANAGEMENT REGIME

The landholders dig out the creek/waterholes every few years to prevent the build up of reeds and rushes. The general area is grazed by sheep.

CONSERVATION SUMMARY

Vegetation condition is described as 'degraded natural'. Twenty (20) species were recorded at the site, of which 11 are introduced (mainly grasses and herbs). One species of conservation significance was recorded – *Schoenoplectus pungens*.



Figure B1. Survey Site 01 - *Typha domingensis* / *Phragmites australis* Closed Sedgeland over *Paspalum sp.*, *Juncus kraussii* and *Cyperus vaginatus*

PEPPERMINT SPRINGS

Local Government Area: Regional Council of Goyder

Location: Webbs Gap Road, Apoinga

Landholder: Minister Environment & Conservation

Site Identification: BSS_02

Opportunistic Collection Site: YES

AMG Zone: 54 **Easting:** 313495 **Northing:** 6238400

Hundred: English **Section:** 485

Date of Survey: 27/07/2009

Quadrat dimensions: 10 x 90 metres

Altitude: 465 metres

SITE DESCRIPTION

The site, which is located on a second order tributary of Brady Creek, is on private property which is used for grazing and cropping and is situated approximately 15 km north-west of Robertstown and is It comprises a permanent (spring-fed) rocky creekline comprising sedges and rushes.

GENERAL DESCRIPTION OF VEGETATION

Floristic vegetation mapping indicates that the surrounding slopes support *Eucalyptus leucoxyton* ssp., +/-*Eucalyptus odorata*, +/-*Amyema miquelii* mid Woodland over *Acacia pycnantha*, *Acacia paradoxa* shrubs over *Acaena echinata* forbs.

QUADRAT SPECIFIC INFORMATION**Vegetation Association:**

The site is situated immediately adjacent to the stream channel and comprises *Juncus krausii* and *Cyperus vaginatus* Closed Sedgeland over *Samolus repens* and **Polypogon monspeliensis*.

Landform at Site: Gully

Slope (degrees): 0 **Aspect (degrees):** 0

Outcrop Type: Sandstone

Surface Stone Type: Sandstone

Surface Soil Texture: Clay Loam Sandy

Bare Earth Estimate: 5%

Litter Estimate: 5%

Table 1.8. Plant species identified during the standard DEH vegetation survey at site BSS_02
An asterisk denotes introduced species.

Scientific Name	Common Name	Cover/Abundance
Trees		
<i>Eucalyptus camaldulensis</i> var. <i>camaldulensis</i>	River Red Gum	1-10 individuals
Shrubs		
* <i>Rosa canina</i>	Dog Rose	1-10 individuals
Grasses		
* <i>Avena barbata</i>	Bearded Oat	<5%
<i>Lachnagrostis aemula</i>	Blown-grass	<5%
* <i>Polypogon monspeliensis</i>	Annual Beard-grass	5-25%
<i>Poa labillardieri</i> var. <i>labillardieri</i>	Common Tussock-grass	<5%
Herbaceous species		
<i>Acaena echinata</i>	Sheep's Burr	<5%
<i>Apium prostratum</i> var.	Native Celery	sparsely present
* <i>Aster subulatus</i>	Aster-weed	<5%
* <i>Cirsium vulgare</i>	Spear Thistle	<5%
<i>Compositae</i> sp.	Daisy Family	sparsely present
* <i>Echium plantagineum</i>	Salvation Jane	sparsely present
* <i>Erodium botrys</i>	Long Heron's-bill	sparsely present
* <i>Hypochaeris glabra</i>	Smooth Cat's Ear	<5%
<i>Lythrum hyssopifolia</i>	Lesser Loosestrife	<5%
<i>Oxalis perennans</i>	Native Sorrel	sparsely present
* <i>Rumex</i> sp.	Dock	<5%
<i>Samolus repens</i>	Creeping Brookweed	5-25%
* <i>Trifolium arvense</i> var. <i>arvense</i>	Hare's-foot Clover	sparsely present
* <i>Trifolium angustifolium</i>	Narrow-leaf Clover	sparsely present
Sedges and Rushes		
<i>Cyperus vaginatus</i>	Stiff Flat-sedge	5-25%
<i>Baumea juncea</i>	Bare Twig-rush	<5%
<i>Schoenoplectus pungens</i>	Spiky Club-rush	<5%
<i>Juncus kraussii</i>	Sea Rush	50-75%
<i>Typha domingensis</i>	Narrow-leaf Bulrush	<5%

No. of Plant Species

Native: 13

Introduced: 11

Total: 24

GRAZING PRESSURE

There is evidence of grazing pressure from rabbits (droppings, nearby active burrows and 1 rabbit sited) and kangaroos (droppings). **Polypogon monspeliensis* was recorded as being 80% heavily grazed and 20% lightly grazed.

CURRENT MANAGEMENT REGIME

Not heavily grazed by stock around water and landholder indicated that grazing in surrounding area is rotational.

CONSERVATION SUMMARY

Vegetation condition is described as 'disturbed natural'. Of the 24 species recorded at the site 11 are introduced (mainly grasses and herbs). Two species of conservation significance were recorded - *Schoenoplectus pungens* and *Baumea juncea*.



Figure B2. Survey Site 02 - *Juncus kraussii* and *Cyperus vaginatus* Closed Sedgeland over *Samolus repens* and **Polypogon monspeliensis*.

PARADISE HUT, NEWIKIE CREEK

Local Government Area: Regional Council of Goyder

Location: Willalo

Landholder: Regional Council of Goyder

Site Identification: BSS_03

Opportunistic Collection Site: YES

AMG Zone: 54 **Easting:** 321299 **Northing:** 6294600

Hundred: Hallett **Section:** 283

Date of Survey: 28/07/2009

Quadrat dimensions: 20 x 45 metres

Altitude: 365 metres

SITE DESCRIPTION

The site is situated approximately 5 km south of Mt Bryan East on Newikie Creek which includes a series of permanent spring-fed waterholes. The Heysen Trail crosses the creek at this point.

GENERAL DESCRIPTION OF VEGETATION

Floristic vegetation mapping indicates that the surrounding area supports *Eucalyptus gracilis*, *Eucalyptus oleosa ssp. oleosa*, *Eucalyptus socialis ssp.*, +/-*Eucalyptus dumosa* mid Mallee Woodland over *Enchylaena tomentosa* var., *Senna artemisioides ssp.*, *Senna artemisioides ssp. petiolaris* (NC), *Grevillea huegelii*, *Olearia muelleri* mid open shrubland over *Zygophyllum aurantiacum ssp.*, +/-*Maireana pentatropis* low sparse shrubland

QUADRAT SPECIFIC INFORMATION**Vegetation Association**

The quadrat comprises *Juncus kraussii* Sedgeland over *Spergularia marina*, *Distichlis distichophylla*, **Limonium companyonis* with emergent *Myoporum montanum*. Approximately 20% of the quadrat is covered by open water (pools greater than 1 metre deep).

Landform at Site: Stream Channel

Slope (degrees): 0 **Aspect (degrees):** 0

Outcrop Type: Sandstone and Slate

Surface Stone Type: Sandstone, Quartz and Shale

Surface Soil Texture: Silty Clay Loam

Bare Earth Estimate: 10%

Litter Estimate: 5%

Table 1.9. Plant species identified during the standard DEH vegetation survey at site BSS_03
An asterisk denotes introduced species.

Scientific Name	Common Name	Cover/Abundance
Shrubs		
<i>Atriplex semibaccata</i>	Berry Saltbush	sparsely present
<i>Frankenia pauciflora</i> var. <i>fruticulosa</i>	Southern Sea-heath	<5%
<i>Maireana</i> sp.	Bluebush/Fissure-plant	sparsely present
<i>Maireana</i> sp.	Bluebush/Fissure-plant	sparsely present
<i>Atriplex suberecta</i>	Lagoon Saltbush	sparsely present
<i>Enchylaena tomentosa</i> var.	Ruby Saltbush	<5%
<i>Sclerolaena obliquispis</i>	Oblique-spined Bindyi	1-10 individuals
* <i>Lycium ferocissimum</i>	African Boxthorn	sparsely present
<i>Myoporum montanum</i>	Native Myrtle	5-25%
* <i>Nicotiana glauca</i>	Tree Tobacco	1-10 individuals
Grasses		
<i>Distichlis distichophylla</i>	Emu-grass	<5%
* <i>Gramineae</i> sp.	Grass Family	sparsely present
Herbaceous Species		
* <i>Limonium companyonis</i>	Sea-lavender	<5%
* <i>Sisymbrium erysimoides</i>	Smooth Mustard	sparsely present
<i>Spergularia marina</i>	Salt Sand-spurrey	5-25%
* <i>Aster subulatus</i>	Aster-weed	sparsely present
* <i>Oxalis pes-caprae</i>	Soursob	sparsely present
* <i>Echium plantagineum</i>	Salvation Jane	1-10 individuals
* <i>Sonchus oleraceus</i>	Common Sow-thistle	sparsely present
* <i>Cotula coronopifolia</i>	Water Buttons	sparsely present
<i>Mimulus repens</i>	Creeping Monkey-flower	sparsely present
<i>Triglochin striata</i>	Streaked Arrowgrass	sparsely present
Sedges and Rushes		
<i>Cyperus vaginatus</i>	Stiff Flat-sedge	sparsely present
<i>Juncus kraussii</i>	Sea Rush	5-25%
<i>Typha domingensis</i>	Narrow-leaf Bulrush	sparsely present
Vines/Twiners		
<i>Einadia nutans</i> ssp. <i>nutans</i>	Climbing Saltbush	1-10 individuals

No. of Plant Species

Native: 16

Introduced: 10

Total: 26

GRAZING PRESSURE

Much evidence of kangaroos was recorded at this site and it was noted that approximately 50% of the *Juncus kraussii* are heavily grazed and a further 10% are considered to be severely grazed.

CURRENT MANAGEMENT REGIME

The site is managed by Department of Environment and Heritage, as part of Caroon Conservation Park.

CONSERVATION SUMMARY

Vegetation condition is described as 'disturbed natural'. Of the 26 species recorded at the site 10 are introduced, including small amounts of Boxthorn and Tobacco Bush. One species of conservation significance was recorded – *Distichlis distichophylla*.



Figure B3. Survey Site 03 - *Juncus kraussii* Sedgeland over *Spergularia marina*, *Distichlis distichophylla*, **Limonium companyonis* with emergent *Myoporum montanum*.

DUST HOLE CROSSING, NEWIKIE CREEK

Local Government Area: Regional Council of Goyder

Location: Dust Hole Creek Road, Mt Bryan East

Landholder: Minister Environment & Conservation

Site Identification: BSS-04

Opportunistic Collection Site: YES

AMG Zone: 54 **Easting:** 319686 **Northing:** 6292397

Hundred: Hallett **Section:** 144

Date of Survey: 28/07/2009

Quadrat dimensions: 30 x 30 metres

Altitude: 364 metres

SITE DESCRIPTION

Approximately 20 km east of Mt Bryan, the site is situated on a road reserve where Newikie Creek crosses Dusthole Creek Road. The surrounding terrain is hilly with ephemeral watercourses and rock outcropping on the ridges.

GENERAL DESCRIPTION OF VEGETATION

Floristic vegetation mapping indicates that the surrounding area supports *Eucalyptus gracilis*, *Eucalyptus oleosa* ssp. *oleosa*, *Eucalyptus socialis* ssp., +/-*Eucalyptus dumosa* mid Mallee Woodland over *Enchylaena tomentosa* var., *Senna artemisioides* ssp., *Senna artemisioides* ssp. *petiolaris* (NC), *Grevillea huegelii*, *Olearia muelleri* mid open shrubland over *Zygophyllum aurantiacum* ssp., +/-*Maireana pentatropis* low sparse shrubland

QUADRAT SPECIFIC INFORMATION**Vegetation Association**

The quadrat comprises *Juncus krausii*, *Phragmites australis* Sedgeland over *Apium prostratum*, *Samolus repens* and **Limonium companyonis* with emergent *Myoporum montanum*.

Landform at Site: Stream Channel

Slope (degrees): 0 **Aspect (degrees):** 0

Outcrop Type: Slate

Surface Stone Type: Sandstone and Slate

Surface Soil Texture: Silty Clay Loam

Table 1.10. Plant species identified during the standard DEH vegetation survey at site

BSS_04

An asterisk denotes introduced species.

Scientific Name	Common Name	Cover/Abundance
Shrubs		
<i>Atriplex suberecta</i>	Lagoon Saltbush	1-10 individuals
<i>Enchylaena tomentosa</i> var.	Ruby Saltbush	1-10 individuals
<i>Myoporum montanum</i>	Native Myrtle	<5%
Mat Plants		
<i>Atriplex semibaccata</i>	Berry Saltbush	sparsely present
Grasses		
<i>Distichlis distichophylla</i>	Emu-grass	<5%
* <i>Gramineae</i> sp.	Grass Family	<5%
<i>Phragmites australis</i>	Common Reed	5-25%
Herbaceous Species		
<i>Apium prostratum</i> var.	Native Celery	<5%
* <i>Cotula coronopifolia</i>	Water Buttons	sparsely present
* <i>Lactuca serriola</i> f.		1-10 individuals
* <i>Limonium companyonis</i>	Sea-lavender	<5%
* <i>Medicago minima</i> var. <i>minima</i>	Little Medic	1-10 individuals
* <i>Oxalis pes-caprae</i>	Soursob	sparsely present
* <i>Sonchus oleraceus</i>	Common Sow-thistle	sparsely present
<i>Samolus repens</i>	Creeping Brookweed	<5%
<i>Spergularia marina</i>	Salt Sand-spurrey	<5%
Sedges and Rushes		
<i>Bolboschoenus caldwellii</i>	Salt Club-rush	<5%
<i>Cyperus vaginatus</i>	Stiff Flat-sedge	<5%
<i>Juncus kraussii</i>	Sea Rush	25-50%

No. of Plant Species

Native: 12

Introduced: 7

Total: 19

GRAZING PRESSURE

There is evidence of both kangaroo and sheep grazing. Plants which appear to be impacted include *Juncus kraussii* (approximately 50% of plants lightly grazed and a further 10% heavily grazed); *Phragmites australis* (approximately 50% of plants heavily grazed and 50% severely grazed); and *Bolboschoenus caldwellii* (approximately 20% of plants heavily grazed and 80% severely grazed).

CURRENT MANAGEMENT REGIME

The site is part of a road reserve, however it appears that sheep are presently watering at the site.

CONSERVATION SUMMARY

Vegetation condition is described as 'disturbed natural'. Of the 19 species recorded at the site 7 are introduced (mainly grasses and herbs). Two species of conservation significance were recorded – *Apium prostratum* and *Distichlis distichophylla*.



Figure B4. Survey Site 04 - *Juncus krausii*, *Phragmites australis* Sedgeland over *Apium prostratum*, *Samolus repens* and **Limonium companyonis* with emergent *Myoporum montanum*.

BALDINA CREEK EAST, RED BANKS CONSERVATION PARK

Local Government Area: Regional Council of Goyder

Location: Baldina Creek East, Red Banks Conservation Park

Landholder: Minister Environment & Conservation

Site Identification: BSS_05

Opportunistic Collection Site: YES

AMG Zone: 54 **Easting:** 322043 **Northing:** 6272173

Hundred: Baldina **Section:** 280

Date of Survey: 29/07/2009

Quadrat dimensions: 20 x 45 metres

Altitude: 384 metres

SITE DESCRIPTION

Red Banks Conservation Park is situated approximately 15 kilometres east of Burra and two creeks traverse the park from east to west, Baldina Creek and Stone Chimney Creek.

GENERAL DESCRIPTION OF VEGETATION

The park supports Red Mallee *Eucalyptus oleosa* with or without Gilja Mallee *E. brachycalyx*., Mallee Box *Eucalyptus porosa* Low Woodland, Black Bluebush *Maireana pyramidata* Shrubland, Scented Mat-rush *Lomandra effusa* Tussock Grassland (an endangered plant community in South Australia, DEH 2005a) and Common Reed *Phragmites australis*, Bulrush *Typha domingensis* Reedlands along the creeks.

QUADRAT SPECIFIC INFORMATION**Vegetation Association**

The quadrat is situated at the western end of the Park on Baldina Creek and is adjacent to a large, deep waterhole. The vegetation comprises a *Typha domingensis* + *Juncus kraussii* Sedgeland over *Selliera radicans*, *Spergularia marina*, *Apium prostratum* and **Limonium companyonis*. Vegetation condition is described as 'disturbed natural'.

Landform at Site: Stream Channel

Slope (degrees): 0 **Aspect (degrees):** 0

Outcrop Type: Sandstone and Quartz

Surface Stone Type: Sandstone (minimal present)

Surface Soil Texture: Clay Loam, Sandy

Bare Earth Estimate: <5%

Litter Estimate: 5%

Table 1.11. Plant species identified during the standard DEH vegetation survey at site

BSS_05

An asterisk denotes introduced species.

Scientific Name	Common Name	Cover/Abundance
Shrubs		
<i>Atriplex suberecta</i>	Lagoon Saltbush	<5%
<i>Distichlis distichophyll</i>	Emu-grass	sparsely present
<i>Enchylaena tomentosa</i> var.	Ruby Saltbush	sparsely present
<i>Myoporum montanum</i>	Native Myrtle	5-25%
Mat Plants		
<i>Chara</i> sp.		<5%
Grasses		
* <i>Gramineae</i> sp.	Grass Family	sparsely present
* <i>Phalaris</i> sp.	Canary Grass	sparsely present
Herbaceous Species		
<i>Apium prostratum</i> var.	Native Celery	<5%
* <i>Aster subulatus</i>	Aster-weed	sparsely present
* <i>Cirsium vulgare</i>	Spear Thistle	sparsely present
* <i>Compositae</i> sp.	Daisy Family	sparsely present
* <i>Cotula coronopifolia</i>	Water Buttons	sparsely present
* <i>Limonium companyonis</i>	Sea-lavender	<5%
<i>Lythrum hyssopifolia</i>	Lesser Loosestrife	<5%
* <i>Medicago polymorpha</i> var. <i>polymorpha</i>	Burr-medic	<5%
* <i>Oxalis pes-caprae</i>	Soursob	sparsely present
* <i>Rorippa nasturtium-aquaticum</i>	Watercress	sparsely present
<i>Samolus repens</i>	Creeping Brookweed	5-25%
<i>Selliera radicans</i>	Shiny Swamp-mat	5-25%
* <i>Sonchus oleraceus</i>	Common Sow-thistle	sparsely present
<i>Spergularia marina</i>	Salt Sand-spurrey	<5%
Sedges and Rushes		
<i>Bolboschoenus caldwellii</i>	Salt Club-rush	sparsely present
<i>Cyperus vaginatus</i>	Stiff Flat-sedge	<5%
<i>Juncus kraussii</i>	Sea Rush	25-50%
<i>Typha domingensis</i>	Narrow-leaf Bulrush	<5%

No. of Plant Species

Native: 14

Introduced: 11

Total: 25

GRAZING PRESSURE

There is evidence of kangaroo grazing at the site (numerous droppings). Plants which appear to be impacted include *Juncus kraussii* (approximately 30% of plants lightly grazed, 40% heavily and 10% severely grazed); and *Typha domingensis* (approximately 100% of plants lightly grazed).

CURRENT MANAGEMENT REGIME

The site is managed for conservation.

CONSERVATION SUMMARY

Baldina Creek is of regional conservation significance because it contains spring-fed permanent waterholes which support a diversity of water-dependent native fauna. These are concentrated in the western portion of the park, while the water infiltrates underground in the eastern portion of the park. Some waterholes are estimated to be up to 12 metres in depth.

According to the Red Banks Conservation Park Management Plan (DEH 2005b, p. 11), “A total of 1,399 hectares of Common Reed/Bulrush Reedland has been described and mapped in the Mid North region. However, Red Banks Conservation Park is the only area where this community is currently protected under the *National Parks and Wildlife Act 1972*.”

Fourteen native plant species and 11 introduced species (mainly grasses and herbs) were recorded at the site. Two species of conservation significance were recorded - *Apium prostratum* and *Distichlis distichophylla*.



Figure B5. Survey Site 05 - *Typha domingensis* + *Juncus kraussii* Sedgeland over *Selliera radicans*, *Spergularia marina*, *Apium prostratum* and **Limonium companyonis*.

BALDINA CREEK WEST, REDBANKS CONSERVATION PARK

Local Government Area: Regional Council of Goyder
Location: Baldina Creek West, Red Banks Conservation Park
Landholder: Minister Environment & Conservation
Site Identification: BSS_06
Opportunistic Collection Site: YES
AMG Zone: 54 **Easting:** 321571 **Northing:** 6272068
Hundred: Baldina **Section:** 280
Date of Survey: 29/07/2009
Quadrat dimensions: 20 x 45 metres
Altitude: 290 metres

SITE DESCRIPTION

Red Banks Conservation Park is situated approximately 15 kilometres east of Burra and two creeks traverse the park from east to west, Baldina Creek and Stone Chimney Creek.

GENERAL DESCRIPTION OF VEGETATION

The park supports Red Mallee *Eucalyptus oleosa* with or without Gilja Mallee *E. brachycalyx*., Mallee Box *Eucalyptus porosa* Low Woodland, Black Bluebush *Maireana pyramidata* Shrubland, Scented Mat-rush *Lomandra effusa* Tussock Grassland (an endangered plant community in South Australia, DEH 2005a) and Common Reed *Phragmites australis*, Bulrush *Typha domingensis* Reedlands along the creeks.

QUADRAT SPECIFIC INFORMATION**Vegetation Association**

The quadrat is situated at the western end of the Park on Baldina Creek. The vegetation comprises a *Typha domingensis* + *Juncus kraussii* Closed Sedgeland over **Rorippa nasturtium-aquaticum*, *Berula erecta*, *Spergularia marina*, *Apium prostratum* and *Samolus repens* with emergent *Myoporum montanum*. Several widely scattered Red Gums *Eucalyptus camaldulensis* occur 50-100 metres downstream of the quadrat. Vegetation condition is described as 'disturbed natural'.

Landform at Site: Stream Channel
Slope (degrees): 0 **Aspect (degrees):** 0
Outcrop Type: Sandstone
Surface Stone Type: Sandstone
Surface Soil Texture: Sandy Clay Loam
Bare Earth Estimate: 5%
Litter Estimate: <5%

Table 1.12. Plant species identified during the standard DEH vegetation survey at site

BSS_06

An asterisk denotes introduced species.

Scientific Name	Common Name	Cover/Abundance
Shrubs		
<i>Atriplex semibaccata</i>	Berry Saltbush	1-10 individuals
<i>Atriplex suberecta</i>	Lagoon Saltbush	1-10 individuals
* <i>Conium maculatum</i>	Hemlock	1-10 individuals
* <i>Nicotiana glauca</i>	Tree Tobacco	1-10 individuals
<i>Tecticornia halocnemoides ssp. halocnemoides</i>	Grey Samphire	1-10 individuals
Grasses		
<i>Distichlis distichophylla</i>	Emu-grass	<5%
* <i>Paspalum sp.</i>		sparsely present
* <i>Phalaris sp.</i>	Canary Grass	sparsely present
<i>Phragmites australis</i>	Common Reed	sparsely present
Herbaceous Species		
<i>Apium prostratum var.</i>	Native Celery	<5%
* <i>Aster subulatus</i>	Aster-weed	sparsely present
<i>Berula erecta</i>	Water Parsnip	<5%
* <i>Cotula coronopifolia</i>	Water Buttons	sparsely present
* <i>Cynara cardunculus ssp. flavescens</i>	Artichoke Thistle	1-10 individuals
* <i>Lactuca serriola f.</i>		sparsely present
* <i>Limonium companyonis</i>	Sea-lavender	<5%
<i>Lythrum hyssopifolia</i>	Lesser Loosestrife	<5%
* <i>Rorippa nasturtium-aquaticum</i>	Watercress	5-25%
<i>Samolus repens</i>	Creeping Brookweed	<5%
<i>Selliera radicans</i>	Shiny Swamp-mat	sparsely present
<i>Spergularia marina</i>	Salt Sand-spurrey	<5%
Mat Plants		
<i>Chara sp.</i>		<5%
Sedges and Rushes		
<i>Bolboschoenus caldwellii</i>	Salt Club-rush	sparsely present
<i>Cyperus vaginatus</i>	Stiff Flat-sedge	<5%
<i>Juncus kraussii</i>	Sea Rush	50-75%
<i>Typha domingensis</i>	Narrow-leaf Bulrush	<5%

No. of Plant Species

Native: 16

Introduced: 10

Total: 26

GRAZING PRESSURE

There is evidence of kangaroo grazing at the site (numerous droppings). Plants which appear to be impacted include *Juncus kraussii* (approximately 20% of plants heavily grazed and 10% severely grazed); *Bolboschoenus caldwellii* (approximately 50% of plants lightly grazed and 50% heavily grazed); and the one *Atriplex semibaccata* in the quadrat has been severely grazed.

CURRENT MANAGEMENT REGIME

The site is managed for conservation.

CONSERVATION SUMMARY

Baldina Creek is of regional conservation significance because it contains spring-fed permanent waterholes which support a diversity of water-dependent native fauna. These are concentrated in the western portion of the park, while the water infiltrates underground in the eastern portion of the park. Some waterholes are estimated to be up to 12 metres in depth.

According to the Red Banks Conservation Park Management Plan (DEH 2005b, p.11), “a total of 1,399 hectares of Common Reed/Bulrush Reedland has been described and mapped in the Mid North region. However, Red Banks Conservation Park is the only area where this community is currently protected under the *National Parks and Wildlife Act 1972*.”

Sixteen native plant species and 10 introduced species (mainly grasses and herbs) were recorded at the site. Of concern is a large patch of mature Bamboo which occurs on the northern edge of the quadrat. Three species of conservation significance were recorded - *Apium prostratum*, *Distichlis distichophylla* and *Selliera radicans*.



Figure B6. Survey Site 06 - *Typha domingensis* / *Juncus kraussii* Closed Sedgeland over **Rorippa nasturtium-aquaticum*, *Berula erecta*, *Spergularia marina*, *Apium prostratum* and *Samolus repens* with emergent *Myoporum montanum*.

BURRA CREEK GORGE

Local Government Area: Regional Council of Goyder

Location: Burra Creek Gorge

Landholder: Regional Council of Goyder

Site Identification: BSS_07

Opportunistic Collection Site: YES

AMG Zone: 54 **Easting:** 318279 **Northing:** 6254607

Hundred: Bright **Section:** 244

Date of Survey: 29/07/2009

Quadrat dimensions: 30 x 30 metres

Altitude: 308 metres

PROPERTY DESCRIPTION

Burra Creek Gorge is situated approximately 26 km south of Burra. It is a council-owned reserve and a popular spot for picnicking, camping and walking.

GENERAL DESCRIPTION OF VEGETATION

Floristic vegetation mapping indicates that the gorge comprises a *Eucalyptus camaldulensis* var., +/-*Eucalyptus largiflorens* Low Woodland over *Acacia victoriae* ssp. mid sparse shrubland over *Maireana pyramidata*, *Rhagodia spinescens*, *Enchylaena tomentosa* var. low sparse shrubland over *Brassica tournefortii*, *Sisymbrium erysimoides*.

QUADRAT SPECIFIC INFORMATION**Vegetation Association**

The surveyed site comprises a *Eucalyptus camaldulensis* Open Forest over dense *Phragmites australis* and *Typha domingensis*.

Landform at Site: Stream Channel

Slope (degrees): 0 **Aspect (degrees):** 0

Outcrop Type: Nil

Surface Stone Type: Nil

Surface Soil Texture: Clay Loam, Sandy

Bare Earth Estimate: 0%

Litter Estimate: 10%

Table 1.13. Plant species identified during the standard DEH vegetation survey at site BSS_07

An asterisk denotes introduced species.

Scientific Name	Common Name	Cover/Abundance
Trees		
<i>Eucalyptus camaldulensis</i> var. <i>camaldulensis</i>	River Red Gum	1-10 individuals
Shrubs		
<i>Enchylaena tomentosa</i> var.	Ruby Saltbush	sparsely present
<i>Myoporum montanum</i>	Native Myrtle	<5%
Grasses		
<i>Phragmites australis</i>	Common Reed	>75%
<i>Poa labillardieri</i> var. <i>labillardieri</i>	Common Tussock-grass	sparsely present
Herbaceous Species		
* <i>Aster subulatus</i>	Aster-weed	sparsely present
* <i>Oxalis pes-caprae</i>	Soursob	<5%
Rushes and Sedges		
<i>Juncus kraussii</i>	Sea Rush	sparsely present
<i>Typha domingensis</i>	Narrow-leaf Bulrush	5-25%

No. of Plant Species

Native: 7

Introduced: 2

Total: 9

GRAZING PRESSURE

No evidence of grazing was recorded.

CURRENT MANAGEMENT REGIME

Burra Gorge is managed by the local council for conservation and recreation purposes.

CONSERVATION SUMMARY

Vegetation condition is described as 'disturbed natural'. Only 9 plant species were recorded at the site – 7 native and 2 introduced (Soursob and Aster-weed). No species of conservation significance were recorded.



Figure B7. Survey Site 07 - *Eucalyptus camaldulensis* Open Forest over dense *Phragmites australis* and *Typha domingensis*.

BURRA CREEK EAST

Local Government Area: Regional Council of Goyder

Location: Burra Creek, Eagle Hawk Gate Road

Landholder: SM Schmidt

Site Identification: BSS_08

Opportunistic Collection Site: YES

AMG Zone: 54 **Easting:** 327633 **Northing:** 6251602

Hundred: Bright **Section:** 220

Date of Survey: 30/07/2009

Quadrat dimensions: 10 x 90 metres

Altitude: 311 metres

PROPERTY DESCRIPTION

This particular section of Burra Creek, which occurs on private property, intersects with Eagle Hawk Gate, approximately 28 km south-east of Burra.

GENERAL DESCRIPTION OF VEGETATION

Floristic vegetation mapping indicates that the creekline supports a *Eucalyptus camaldulensis* var., +/-*Eucalyptus largiflorens* Low Woodland over *Acacia victoriae* ssp. mid sparse shrubland over *Maireana pyramidata*, *Rhagodia spinescens*, *Enchylaena tomentosa* var. low sparse shrubland over *Brassica tournefortii*, *Sisymbrium erysimoides*.

Surrounding areas support *Eucalyptus gracilis*, *Eucalyptus oleosa* ssp. *oleosa*, *Eucalyptus socialis* ssp., +/-*Eucalyptus dumosa* mid Mallee Woodland over *Enchylaena tomentosa* var., *Senna artemisioides* ssp., *Senna artemisioides* ssp. *petiolaris* (NC), *Grevillea huegelii*, *Olearia muelleri* mid open shrubland over *Zygophyllum auraniticum* ssp., +/-*Maireana pentatropis* low sparse shrubland.

QUADRAT SPECIFIC INFORMATION**Vegetation Association**

The surveyed site is along the southern bank of Burra Creek and comprises a *Eucalyptus camaldulensis* var. *camaldulensis* Open Forest over *Myoporum montanum*.

Landform at Site: Stream Channel

Slope (degrees): 0 **Aspect (degrees):** 0

Outcrop Type: Nil

Surface Stone Type: Sandstone

Surface Soil Texture: Sandy Loam

Bare Earth Estimate: 8%

Litter Estimate: 20%

Table 1.14. Plant species identified during the standard DEH vegetation survey at site BSS_08 (southern Burra Creek bank quadrat)
An asterisk denotes introduced species.

Scientific Name	Common Name	Cover/Abundance
Trees		
<i>Acacia pycnantha</i>	Golden Wattle	1-10 individuals
<i>Eucalyptus camaldulensis</i> var. <i>camaldulensis</i>	River Red Gum	5-25%
* <i>Schinus molle</i>	Pepper-tree	1-10 individuals
Shrubs		
<i>Acacia euthycarpa</i>	Wallowa	1-10 individuals
<i>Atriplex semibaccata</i>	Berry Saltbush	sparsely present
<i>Dodonaea viscosa</i> ssp. <i>spatulata</i>	Sticky Hop-bush	sparsely present
<i>Enchylaena tomentosa</i> var.	Ruby Saltbush	5-25%
* <i>Lycium ferocissimum</i>	African Boxthorn	1-10 individuals
<i>Maireana erioclada</i>	Rosy Bluebush	1-10 individuals
<i>Maireana radiata</i>	Radiate Bluebush	sparsely present
<i>Myoporum montanum</i>	Native Myrtle	25-50%
<i>Rhagodia parabolica</i>	Mealy Saltbush	sparsely present
<i>Zygophyllum apiculatum</i>	Pointed Twinleaf	sparsely present
Grasses		
* <i>Gramineae</i> sp.	Grass Family	sparsely present
<i>Poa labillardieri</i> var. <i>labillardieri</i>	Common Tussock-grass	sparsely present
Herbaceous Species		
* <i>Asphodelus fistulosus</i>	Onion Weed	<5%
* <i>Cynara cardunculus</i> ssp. <i>flavescens</i>	Artichoke Thistle	1-10 individuals
* <i>Echium plantagineum</i>	Salvation Jane	sparsely present
* <i>Fumaria capreolata</i>	White-flower Fumitory	sparsely present
* <i>Medicago minima</i> var. <i>minima</i>	Little Medic	sparsely present
* <i>Oxalis pes-caprae</i>	Soursob	5-25%
* <i>Rumex</i> sp.	Dock	sparsely present
* <i>Salvia verbenaca</i> var. <i>verbenaca</i>	Wild Sage	sparsely present
* <i>Sisymbrium erysimoides</i>	Smooth Mustard	<5%
* <i>Sonchus oleraceus</i>	Common Sow-thistle	sparsely present
* <i>Trifolium arvense</i> var. <i>arvense</i>	Hare's-foot Clover	sparsely present
Sedges and Rushes		
<i>Cyperus vaginatus</i>	Stiff Flat-sedge	sparsely present
<i>Juncus kraussii</i>	Sea Rush	sparsely present
Vines/Twiners		
<i>Clematis microphylla</i> var. <i>microphylla</i>	Old Man's Beard	1-10 individuals
<i>Einadia nutans</i> ssp. <i>nutans</i>	Climbing Saltbush	<5%

No. of Plant Species

Native: 16

Introduced: 14

Total: 30

GRAZING PRESSURE

There is evidence of kangaroo grazing at the site (droppings are present). Plants which appear to be impacted include *Juncus kraussii* (of the approximately 8 - 10 plants in the quadrat 100% have been lightly grazed); approximately 50% of *Poa labillardieri* var. *labillardieri* individuals have been lightly grazed; and the one *Dodonaea viscosa* ssp. *spathulata* in the quadrat has been heavily grazed.

CONSERVATION SUMMARY

Vegetation condition is described as 'disturbed natural'. Of the 30 plant species recorded at the site 14 are introduced (mainly grasses and herbs). No species of conservation significance were recorded.



Figure B8. Survey Site 08 - *Eucalyptus camaldulensis* var. *camaldulensis* Open Forest over *Myoporum montanum*.

BURRA CREEK EAST

Local Government Area: Regional Council of Goyder

Location: Burra Creek, Eagle Hawk Gate Road

Landholder: SM Schmidt

Site Identification: BSS-09

Opportunistic Collection Site: YES

AMG Zone: 54 **Easting:** 327624

Northing: 6251613

Hundred: Bright **Section:** 220

Date of Survey: 30/07/2009

Quadrat dimensions: 10 x 90 metres

Altitude: 234 metres

PROPERTY DESCRIPTION

This particular section of Burra Creek intersects with Eagle Hawk Gate, approximately 28 km south-east of Burra.

GENERAL DESCRIPTION OF VEGETATION

Floristic vegetation mapping indicates that the creekline supports a *Eucalyptus camaldulensis* var., +/-*Eucalyptus largiflorens* low woodland over *Acacia victoriae* ssp. mid sparse shrubland over *Maireana pyramidata*, *Rhagodia spinescens*, *Enchylaena tomentosa* var. low sparse shrubland over *Brassica tournefortii*, *Sisymbrium erysimoides*.

Surrounding areas support *Eucalyptus gracilis*, *Eucalyptus oleosa* ssp. *oleosa*, *Eucalyptus socialis* ssp., +/-*Eucalyptus dumosa* mid mallee woodland over *Enchylaena tomentosa* var., *Senna artemisioides* ssp., *Senna artemisioides* ssp. *petiolaris* (NC), *Grevillea huegelii*, *Olearia muelleri* mid open shrubland over *Zygophyllum aurantiacum* ssp., +/-*Maireana pentatropis* low sparse shrubland

QUADRAT SPECIFIC INFORMATION**Vegetation Association**

The surveyed site is on the northern bank of Burra Creek and comprises a *Eucalyptus camaldulensis* Open Forest over *Myoporum montanum*.

Landform at Site: Stream Channel

Slope (degrees): 0 **Aspect (degrees):** 0

Outcrop Type: Nil

Surface Stone Type: Sandstone

Surface Soil Texture: Sandy Loam

Bare Earth Estimate: 5%

Litter Estimate: 20%

Table 1.15. Plant species identified during the standard DEH vegetation survey at site BSS_08 (northern Burra Creek bank quadrat)
An asterisk denotes introduced species.

Scientific Name	Common Name	Cover/Abundance
Trees		
<i>Acacia pycnantha</i>	Golden Wattle	1-10 individuals
<i>Eucalyptus camaldulensis</i> var. <i>camaldulensis</i>	River Red Gum	5-25%
* <i>Schinus molle</i>	Pepper-tree	1-10 individuals
Shrubs		
<i>Acacia euthycarpa</i>	Wallowa	1-10 individuals
<i>Atriplex semibaccata</i>	Berry Saltbush	sparsely present
<i>Cassinia</i> sp.	Cassinia	1-10 individuals
<i>Chenopodium desertorum</i> ssp. <i>microphyllum</i>	Small-leaf Goosefoot	1-10 individuals
<i>Dodonaea lobulata</i>	Lobed-leaf Hop-bush	1-10 individuals
<i>Enchylaena tomentosa</i> var.	Ruby Saltbush	<5%
<i>Maireana brevifolia</i>	Short-leaf Bluebush	1-10 individuals
<i>Maireana radiata</i>	Radiate Bluebush	sparsely present
<i>Maireana</i> sp.	Bluebush/Fissure-plant	sparsely present
* <i>Marrubium vulgare</i>	Horehound	sparsely present
<i>Myoporum montanum</i>	Native Myrtle	5-25%
<i>Olearia brachyphylla</i>	Short-leaf Daisy-bush	1-10 individuals
<i>Pimelea stricta</i>	Erect Riceflower	1-10 individuals
<i>Senna artemisioides</i> ssp. <i>X coriacea</i>	Broad-leaf Desert Senna	1-10 individuals
<i>Sida petrophila</i>	Rock Sida	1-10 individuals
<i>Vittadinia blackii</i>	Narrow-leaf New Holland Daisy	sparsely present
<i>Vittadinia gracilis</i>	Woolly New Holland Daisy	<5%
<i>Austrodanthonia</i> sp.		sparsely present
Grasses		
<i>Austrodanthonia</i> sp.		sparsely present
* <i>Avena barbata</i>	Bearded Oat	sparsely present
<i>Cymbopogon ambiguus</i>	Lemon-grass	sparsely present
* <i>Gramineae</i> sp.	Grass Family	sparsely present
<i>Poa labillardieri</i> var. <i>labillardieri</i>	Common Tussock-grass	sparsely present
Herbaceous Species		
* <i>Asphodelus fistulosus</i>	Onion Weed	<5%
* <i>Carrichtera annua</i>	Ward's Weed	sparsely present
* <i>Compositae</i> sp.	Daisy Family	sparsely present
* <i>Fumaria capreolata</i>	White-flower Fumitory	sparsely present
* <i>Hypochaeris glabra</i>	Smooth Cat's Ear	sparsely present
* <i>Medicago polymorpha</i> var. <i>polymorpha</i>	Burr-medic	sparsely present
<i>Oxalis perennans</i>	Native Sorrel	sparsely present
* <i>Oxalis pes-caprae</i>	Soursob	<5%
<i>Ptilotus spathulatus</i> f.	Pussy-tails	sparsely present
* <i>Salvia verbenaca</i> var. <i>verbenaca</i>	Wild Sage	sparsely present
* <i>Solanum nigrum</i>	Black Nightshade	1-10 individuals
* <i>Sonchus oleraceus</i>	Common Sow-thistle	sparsely present

Table 1.15. (continued)

Scientific Name	Common Name	Cover/Abundance
Sedges and Rushes		
<i>Cyperus vaginatus</i>	Stiff Flat-sedge	sparsely present
<i>Juncus kraussii</i>	Sea Rush	<5%

No. of Plant Species

Native: 25

Introduced: 14

Total: 39

CONSERVATION SUMMARY

Of the 39 species recorded at the site 14 are introduced (mainly grasses and herbs). Three species of conservation significance were recorded – *Cymbopogon ambiguus*, *Dodonaea lobulata* and *Vittadinia blackii*.



Figure B9. Survey Site 9 - *Eucalyptus camaldulensis* Open Forest over *Myoporum montanum*.

Section 2: Terrestrial Vertebrates

by Gavin Kluske

Methods

Collating previous terrestrial vertebrate data

A search was conducted of the Biological Databases of SA (BDBSA) to gather information on species present in the region. The search area was Zone 54 Easting 294 000 to 342 000 and Northing 6217 000 to 6315 000. This corresponded to minimum possible sized rectangular polygon that contained all of the sites plus an additional 20 kilometres in each direction of the compass (ie north, south, east and west).

For terrestrial vertebrates, this included the following databases, in addition to data held by DEH:

SA Museum

- Mammal data up until start of 2005
- Herpetology data up until Aug 2004

Field Survey methodology

Vertebrate sampling was conducted at all 8 survey sites. At each of these sites a single trapping line was established as per the method utilised in agricultural regions (Owens 2000), with some variation in response to the very wet and/or rocky conditions. A trap line consisted of six funnel traps, 15 Elliott traps and two cage traps. Trap lines were open for a minimum of two nights and a maximum of four nights at each site.

Pitfall and Funnel traps

Pitfall trapping was not possible due to the waterlogged boggy soils and/or rocky nature of the watercourses sampled. Six funnel traps were installed at each trapping line positioned approximately 10m apart and parallel to the Elliot trap line.

Elliott traps

Elliott traps were set up according to Owens (2000). Elliott traps are small aluminium traps (330 mm x 100 mm x 90 mm) with a spring-loaded treadle set with bait of peanut butter and oats to attract small mammals. Fifteen Elliott traps were installed at each trap line, positioned approximately 10m apart. In general the Elliott traps were positioned parallel to and approximately 10m away from the funnel trap line and were located within the single vegetation association.

Cage traps

Cage trapping was conducted as per the method in Owens (2000). Two cage traps were installed in a suitable location at either end of the Elliott trap line. A cage trap measures 200 mm x 220 mm x 550 mm and operates with a trip-plate release mechanism. Cage traps are set for the capture of medium-sized mammals and baited with a peanut butter and oat mixture. All cage traps were set over a period of two to four nights.

Active searching

Active searching for reptiles and mammals was conducted at all survey sites. There was a minimum of two-person hours of searching conducted at each of the sites. Searching generally involved lifting rocks, logs and bark and raking leaf litter. Animals such as snakes and large lizards can also be observed by watching logs, rocks and areas of open ground. Traces of animals, such as tracks, skeletal material, scats and skins can also be found and can lead to positive species identification.

Spotlighting

Spotlighting for nocturnal mammals and birds was carried out on three nights. Spotlighting was conducted within a car driving slowly along tracks using hand held spotlights held out of the windows. All spotlighting was conducted within the first few hours after sunset.

Results

Mammals

BDBSA Regional Search

Data from the regional search of the Biological Databases of SA (BDBSA) are shown in Table 2.1. A total of 1138 records represent 20 different species of mammals, 20 native (916 records) and 12 introduced (222 records). Ten native species are represented by 10 or less records, most notably bats, which have 5 different species in this category. The number of times a species has been recorded within the search region provides an indication of the abundance of the species in a local context. This can be used as a reference when assessing the refuge values of each species located during the current surveys (ie species with high numbers of records/high abundance will not be considered to be refugia species, whereas species with few records/low abundance will be considered to be possible refuge species).

Table 2.1. Number of observations of mammal species within Biological Databases of SA (BDBSA) search (regional count based upon number of records in the BDBSA for search area Zone 54 Easting 294 000 to 342 000 and Northing 6217 000 to 6315 000).

Taxonomy cf. Kemper (2000).

Environment Protection and Biodiversity Conservation (EPBC) Act, National Parks and Wildlife (NPW) Act ratings: R – *Rare*, V – *Vulnerable*, E – *Endangered*.

An asterisk indicates introduced species.

Family and Species Name	Common Name	EPBC Rating	NPWS Rating	Regional Count
Tachyglossidae				
<i>Tachyglossus aculeatus</i>	Short-beaked Echidna			53
Dasyuridae				
<i>Sminthopsis crassicaudata</i>	Fat-tailed Dunnart			21
<i>Sminthopsis murina</i>	Common Dunnart			24
Vombatidae				
<i>Lasiorhinus latifrons</i>	Southern Hairy-nosed Wombat			7
Phalangeridae				
<i>Trichosurus vulpecula</i>	Common Brushtail Possum		R	9

Table 2.1 (continued)

Family and Species Name	Common Name	EPBC Rating	NPWS Rating	Regional Count
Macropodidae				
<i>Macropus fuliginosus</i>	Western Grey Kangaroo			321
<i>Macropus giganteus</i>	Eastern Grey Kangaroo		R	1
<i>Macropus robustus</i>	Euro			62
<i>Macropus rufus</i>	Red Kangaroo			247
<i>Macropus</i> sp.				26
<i>Petrogale xanthopus</i>	Yellow-footed Rock-wallaby	ssp	V	1
Burramyidae				
<i>Cercartetus concinnus</i>	Western Pygmy-possum			2
Molossidae				
<i>Mormopterus</i> sp.				12
<i>Mormopterus</i> spp. (species complex) (NC)	Southern Freetail-bats			2
<i>Tadarida australis</i>	White-striped Freetail-bat			8
Vespertilionidae				
<i>Nyctophilus geoffroyi</i>	Lesser Long-eared Bat			25
<i>Chalinolobus gouldii</i>	Gould's Wattled Bat			57
<i>Chalinolobus morio</i>	Chocolate Wattled Bat			10
<i>Scotorepens balstoni</i>	Inland Broad-nosed Bat			1
<i>Vespadelus baverstocki</i>	Inland Forest Bat			3
<i>Vespadelus regulus</i>	Southern Forest Bat			20
<i>Vespadelus vulturnus</i>	Little Forest Bat			2
<i>Vespadelus</i> sp.				2
Canidae				
<i>Canis lupus</i> (NC)*	Dog/Dingo			1
<i>Vulpes vulpes</i> *	Fox (Red Fox)			32
Felidae				
<i>Felis catus</i> *	Feral Cat			3
Equidae				
<i>Equus caballus</i> *	Feral Horse (Brumby)			2
Cervidae				
<i>Cervus dama</i> *	Fallow Deer			5
<i>Cervus elaphus</i> *	Red Deer			1
Bovidae				
<i>Capra hircus</i> *	Feral Goat			33
<i>Ovis aries</i> *	Sheep (Feral Sheep)			7
Muridae				
<i>Mus musculus</i> *	House Mouse			75
<i>Rattus rattus</i> *	Black Rat (Ship Rat, Roof Rat)			6
Leporidae				
<i>Lepus capensis</i> *	Brown Hare (Cape Hare)			20
<i>Oryctolagus cuniculus</i> *	Rabbit (European Rabbit)			37

Field Surveys

Elliot and cage trapping recorded a single species, the introduced House Mouse *Mus musculus* with 30 individuals recorded during the trapping period (Table 2.2).

The Western Grey Kangaroo *Macropus fuliginosus* was the most frequently encountered native mammal, and was observed using the sites as water sources along with the Euro *Macropus robustus* (Figure K) and the Red Kangaroo *Macropus rufus*.

Common Brushtail Possum *Trichosurus vulpecula* scats were recorded at site 7. The Common Brushtail Possum has a threatened species rating of *Rare* in South Australia (NPW Act 1972).

Fallow deer *Cervus dama* (Figure M) were recorded at 3 sites and appeared to be using the sites as watering points.

Large numbers of feral goats *Capra hircus* (Figure N) were recorded in the mallee areas near the sites.

Table 2.2. Number of in site and opportune (Opp) records of mammal species during the field surveys at the eight permanent water sites (BSS01 – BSS08).

Taxonomy and nomenclature cf. Kemper (2000).

An asterisk indicates introduced species.

Family and Species Name	Common Name	BSS01	BSS02	BSS03	BSS04	BSS05	BSS06	BSS07	BSS08	Opp	TOTAL
Tachyglossidae											
<i>Tachyglossus aculeatus</i>	Short-beaked Echidna					1			1		2
Phalangeridae											
<i>Trichosurus vulpecula</i>	Common Brushtail Possum							1			1
Macropodidae											
<i>Macropus fuliginosus</i>	Western Grey Kangaroo			16	2	4	15			11	48
<i>Macropus robustus</i>	Euro			3		7	7	2		3	22
<i>Macropus rufus</i>	Red Kangaroo			16						26	42
Canidae											
<i>Canis lupus ssp.*</i>	Dog/Dingo								1		1
<i>Vulpes vulpes*</i>	Fox	1		1	1				2	6	11
Felidae											
<i>Felis catus*</i>	Cat				1				1		2
Cervidae											
<i>Cervus dama*</i>	Fallow Deer			9	1				6	5	21
Bovidae											
<i>Capra hircus*</i>	Goat								32	152	184
Muridae											
<i>Mus musculus*</i>	House Mouse	4	2	10	4	9	1				30
Leporidae											
<i>Oryctolagus cuniculus*</i>	Rabbit		1			1	3		1	3	9



Figure K. Euros near the site BSS_05 (Photo: Dragos Moise)



Figure M. Fallow deer in the BSS_03 area (Photo: Tom Hands)



Figure L. Echidna scat at site BSS_05 (Photo: Dragos Moise)



Figure N. Feral goats in the mallee near the Government Dam Road (Photo: Tom Hands)

Reptiles

BDBSA Regional Search

Data from regional search of the BDBSA are shown in Table 2.3. A total of 2237 records represent 54 different species of reptiles. The number of records is somewhat artificially inflated by the high number of Pygmy Bluetongue *Tiliqua adelaidensis* records (1046), which has come about due to the intensive studies that have been undertaken on this *Endangered* species. The number of times a species has been recorded within the search region provides an indication of the abundance of the species in a local context. This can be used as a reference when assessing the refuge values of each species located during the current surveys (ie species with high numbers of records/high abundance will not be considered to be refuge species, whereas species with few records/low abundance will be considered to be possible refuge species).

Table 2.3. Number of observations of reptile species within Biological Databases of SA (BDBSA) search (regional count based upon number of records in the BDBSA for search area Zone 54 Easting 294 000 to 342 000 and Northing 6217 000 to 6315 000).

Taxonomy cf. Hutchinson and Edwards (2000).

Environment Protection and Biodiversity Conservation (EPBC) Act, National Parks and Wildlife (NPW) Act ratings: R – *Rare*, V – *Vulnerable*, E – *Endangered*.

Family and Species Name	Common Name	EPBC Rating	NPWS Rating	Regional Count
Chelidae				
<i>Chelodina longicollis</i>	Common Long-necked Tortoise			4
Agamidae				
<i>Ctenophorus decresii</i>	Tawny Dragon			76
<i>Ctenophorus pictus</i>	Painted Dragon			10
<i>Ctenophorus</i> sp.				1
<i>Diporiphora nobbi</i>	Nobbi Dragon			5
<i>Pogona barbata</i>	Eastern Bearded Dragon			11
<i>Pogona vitticeps</i>	Central Bearded Dragon			10
<i>Tympanocryptis lineata</i>	Five-lined Earless Dragon			5
<i>Tympanocryptis tetraporophora</i>	Eyrean Earless Dragon			2
Gekkonidae				
<i>Diplodactylus furcosus</i>	Ranges Stone Gecko			25
<i>Diplodactylus vittatus</i> complex (NC)	Stone Geckos			17
<i>Nephrurus milii</i>	Barking Gecko			9
<i>Strophurus intermedius</i>	Southern Spiny-tailed Gecko			1
<i>Christinus marmoratus</i>	Marbled Gecko			24
<i>Gehyra lazelli</i>	Southern Rock Dtella			73
<i>Gehyra variegata</i>	Tree Dtella			5
<i>Gehyra variegata</i> complex				5
<i>Gehyra</i> sp.				1
<i>Heteronotia binoei</i>	Bynoe's Gecko			24
<i>Aprasia pseudopulchella</i>	Flinders Worm-lizard	V		37
<i>Aprasia</i> sp.				1
<i>Delma mollerii</i>	Adelaide Snake-lizard			48
<i>Lialis burtonis</i>	Burton's Legless Lizard			4
<i>Pygopus schraderi</i>	Hooded Scaly-foot			1

Table 2.3 (continued)

Family and Species Name	Common Name	EPBC Rating	NPWS Rating	Regional Count
Scincidae				
<i>Cryptoblepharus australis</i>	Desert Wall Skink			1
<i>Cryptoblepharus cf. plagiocephalus</i> (NC)	Desert Wall Skink			10
<i>Cryptoblepharus pannosus</i>	Speckled Wall Skink			23
<i>Cryptoblepharus sp.</i>				3
<i>Ctenotus olympicus</i>	Saltbush Ctenotus			2
<i>Ctenotus orientalis</i>	Spotted Ctenotus			32
<i>Ctenotus robustus</i>	Eastern Striped Skink			24
<i>Ctenotus uber</i> (NC)	Spotted Ctenotus			6
<i>Egernia striolata</i>	Eastern Tree Skink			8
<i>Egernia sp.</i>				1
<i>Eremiascincus richardsonii</i>	Broad-banded Sandswimmer			2
<i>Hemiergis decresiensis</i>	Three-toed Earless Skink			81
<i>Hemiergis millewae</i>	Rusty Earless Skink			3
<i>Hemiergis peronii</i>	Four-toed Earless Skink			7
<i>Hemiergis sp.</i>				1
<i>Lampropholis guichenoti</i>	Garden Skink			16
<i>Lerista bougainvillii</i>	Bougainville's Skink			41
<i>Lerista dorsalis</i>	Southern Four-toed Slider			9
<i>Lerista punctatovittata</i>	Spotted Slider			6
<i>Lerista timida</i>	Dwarf Three-toed Slider			4
<i>Lerista sp.</i>				2
<i>Menetia greyii</i>	Dwarf Skink			139
<i>Morethia adelaidensis</i>	Adelaide Snake-eye			45
<i>Morethia boulengeri</i>	Common Snake-eye			44
<i>Morethia obscura</i>	Mallee Snake-eye			44
<i>Pseudemoia entrecasteauxii</i>	Southern Grass Skink			1
<i>Tiliqua adelaidensis</i>	Pygmy Bluetongue	E	E	1046
<i>Tiliqua occipitalis</i>	Western Bluetongue			2
<i>Tiliqua rugosa</i>	Sleepy Lizard			115
<i>Tiliqua scincoides</i>	Eastern Bluetongue			11
Varanidae				
<i>Varanus gouldii</i>	Sand Goanna			4
Boidae				
<i>Morelia spilota</i>	Carpet Python		R	1
Elapidae				
<i>Parasuta nigriceps</i>	Mitchell's Short-tailed Snake			7
<i>Parasuta spectabilis</i>	Mallee Black-headed Snake			43
<i>Pseudonaja textilis</i>	Eastern Brown Snake			49
<i>Pseudonaja sp.</i>				2
<i>Ramphotyphlops bicolor</i>	Southern Blind Snake			2
<i>Suta sp.</i>				1

Field Surveys

The weather conditions during the trapping period were not conducive to trapping reptiles. All days were cold with light rainy periods and few reptiles were active.

Nine species were recorded by active searching with the Three-toed Earless Skink *Hemiergis decresiensis* the most frequently encountered (Table 2.4).

Table 2.4. Number of in site and opportune (Opp) records of reptile species during the field surveys at the eight permanent water sites (BSS01 – BSS08).

Taxonomy and nomenclature cf. Hutchinson and Edwards (2000).

Family and Species Name	Common Name	BSS01	BSS02	BSS03	BSS04	BSS05	BSS06	BSS07	BSS08	Opp	TOTAL
Agamidae											
<i>Pogona vitticeps</i>	Central Bearded Dragon				1					3	4
Gekkonidae											
<i>Christinus marmoratus</i>	Marbled Gecko								1		1
<i>Gehyra lazelli</i>	Southern Rock Dtella						1				1
<i>Heteronotia binoei</i>	Bynoe's Gecko						1				1
Scincidae											
<i>Hemiergis decresiensis</i>	Three-toed Earless Skink		5					1	3		9
<i>Hemiergis peronii</i>	Four-toed Earless Skink							1			1
<i>Menetia greyii</i>	Dwarf Skink		1								1
<i>Morethia obscura</i>	Mallee Snake-eye								1		1
<i>Tiliqua rugosa</i>	Sleepy Lizard		3			1	1	2		8	15



Figure O. Sleepy Lizard sunning at site BSS_05 (Photo: Dragos Moise)



Figure P. Marbled Gecko, site BSS_08 (Photo: Dragos Moise)

Amphibians

BDBSA Regional Search

Data from regional search of the BDBSA are shown in Table 2.5. A total of 199 records represent seven different species of frog. Only three species have been recorded on more than 10 occasions, which suggests that the search region may be marginal habitat for a number of frog species.

Table 2.5 Number of observations of amphibian species within Biological Databases of SA (BDBSA) search (regional count based upon number of records in the BDBSA for search area Zone 54 Easting 294 000 to 342 000 and Northing 6217 000 to 6315 000).

Taxonomy cf. Hutchinson (2009).

Environment Protection and Biodiversity Conservation (EPBC) Act, National Parks and Wildlife (NPW) Act ratings: R – *Rare*, V – *Vulnerable*, E – *Endangered*.

Family and Species Name	Common Name	EPBC Rating	NPWS Rating	Regional Count
Hylidae				
<i>Litoria ewingii</i>	Brown Tree Frog			3
Myobatrachidae				
<i>Crinia signifera</i>	Common Froglet			112
<i>Crinia sp.</i>				2
<i>Limnodynastes dumerilii</i>	Banjo Frog			10
<i>Limnodynastes sp.</i>				1
<i>Limnodynastes tasmaniensis</i>	Spotted Marsh Frog			49
<i>Neobatrachus pictus</i>	Burrowing frog			19
<i>Neobatrachus sudelli</i>	Sudell's Frog			2
<i>Pseudophryne bibronii</i>	Brown Toadlet		R	1

Field Surveys

The wet conditions were conducive to trapping some species of frogs with 60 individuals of a single species, the Common Froglet *Crinia signifera*, caught in funnel traps (Table 2.6). Frogs were calling at all sites. The Common Froglet *Crinia signifera* was the most frequently heard with the Spotted Marsh Frog *Limnodynastes tasmaniensis* the only other species recorded. Several pairs of *Crinia signifera* were observed in amplexus with spawn and active tadpoles of this species observed at most sites. No evidence of breeding was observed of the Spotted Marsh Frog *Limnodynastes tasmaniensis* other than the few calls heard however the breeding season is thought to be from August to May and so it is likely the survey effort may have been outside the frogs breeding season. No evidence of breeding of any other frog species was observed.

Table 2.6 Number of in site and opportune (Opp) records of amphibian species during the field surveys at the eight permanent water sites (BSS01 – BSS08).
Taxonomy and nomenclature cf. Hutchinson (2009).

Family and Species Name	Common Name	BSS01	BSS02	BSS03	BSS04	BSS05	BSS06	BSS07	BSS08	Opp	TOTAL
Myobatrachidae											
<i>Crinia signifera</i>	Common Froglet	16	1	10	15	19	3	1	1		66
<i>Limnodynastes tasmaniensis</i>	Spotted Marsh Frog	1					1	1			3



Figure Q. Common Froglet, site BSS_04 (Photo: Dragos Moise)

Section 3: Birds

by Dragos Moise and Tom Hands

Methods

Collating previous bird data

A search was conducted of the Biological Databases of SA (BDBSA) to gather information on species present in the region. The search area was Zone 54 Easting 294 000 to 342 000 and Northing 6217 000 to 6315 000. This corresponded to minimum possible sized rectangular polygon that contained all of the sites plus an additional 20 kilometres in each direction of the compass (i.e. north, south, east and west).

For birds, in addition to data held by DEH, this included the following databases (not all relevant for this survey):

Birds Australia

- Atlas records for SA -1996 to 2002,

Birds SA

- Field trips database - supplied mid 2005, supplementary load Sept. 2007,
- Journal records – supplied 2007
- Parks Data - supplied mid 2005,
- Member Personal Records – supplied 2007
- Threatened Birds of the South East - supplied through Birds SA Sept. 2006
- Southern Fleurieu Bird Watchers - supplied through Birds SA February 2007

Australasian Wader Study Group

- Supplied 2005

SA Museum

- Bird data - loaded May 2005

The number of times a species has been recorded within the search region provides an indication of the abundance of the species in a local context. This was used as a reference when assessing the refuge values of the species located during the current surveys (i.e. species with few records/low abundance at regional context but with high numbers of records/high abundance at the survey sites are considered to be possible refuge species).

Field Surveys

All the eight survey sites were surveyed for birds by an experienced birdwatcher according to the 'Biological Survey of South Australia' methodology (Owens 2000), with a minimum of two one-hour observation periods conducted at each site, one each in the morning (between 8:00 am and 11:45 am) and afternoon (between 1:00 pm and 5:15 pm), in the week of 27-31 July 2009. The sites were surveyed on foot, by walking up to 1 km along the creekline at slow pace, both upstream and downstream from the site centre. The survey was concentrated in the areas with permanent water. Bird species were identified by sight (with naked eye or using Pentax 12X50 DPS binoculars), or call. When uncertain, for species identification Simpson and Day (1996) field guide was consulted. Only the birds using the permanent water sites and the vegetation associated with them were recorded as 'In Site', on standard Biological Survey datasheets for birds. The data recorded were: species, time of observation

(to the nearest five minutes), number of individuals observed, method of observation (seen, heard, remains, tracks etc), the height the bird(s) was/were observed at, as well as the macro- and the microhabitat. When necessary, additional comments were provided, mainly concerning the birds' behaviour. Birds seen or heard in the adjacent habitats, outside of the survey sites were recorded as 'Out', on opportunistic data sheets. Birds flying over the sites, and not using the habitat within, were also considered 'Out' in assessing the refuge value of the permanent water sites. To reduce the potential for systematic bias, and to increase the detection rate, each site was surveyed in separate days.

This was also supplemented with opportune surveys carried out within a radius of 1 kilometre of each survey site by a different bird expert between 18-21 August 2009. The observations were recorded on standard Biological Survey Opportune Records datasheets. The data recorded were: species, location (recorded with a GPS unit), habitat description, method of observation (seen, heard, remains, tracks etc) and number of individuals observed. When necessary, additional comments were provided, mainly concerning the birds' behaviour. Overall, at least four hours were spent within each site.

Results

BDBSA Regional Search

Data from the regional search of the Biological Databases of SA (BDBSA) are shown in Table 3.1. A total of 11,614 records represent 212 different bird species (205 native and 7 introduced), and one hybrid. Thirty-five of the species identified in the BDBSA regional search have significant conservation rating at State level, two being listed also nationally. The bird species with the most numerous records at the regional level is the Galah *Eolophus roseicapillus*, with 564 records. Twenty-six species have only one record, 14 species have only two records and 14 species have only three records at the regional level.

Table 3.1 Number of observations of bird species within Biological Databases of SA (BDBSA) search (regional count based upon number of records in the BDBSA for search area Zone 54 Easting 294 000 to 342 000 and Northing 6217 000 to 6315 000).

Taxonomy after Christidis and Boles (2008).

Environment Protection and Biodiversity Conservation (EPBC) Act, National Parks and Wildlife (NPW) Act ratings: R – Rare, V – Vulnerable, E – Endangered.

An asterisk denotes introduced species.

Family and Species Name	Common Name	EPBC Rating	NPW Rating	Regional Count
Casuariidae				
<i>Dromaius novaehollandiae</i>	Emu			85
Phasianidae				
<i>Coturnix pectoralis</i>	Stubble Quail			33
Anseranatidae				
<i>Anseranas semipalmata</i>	Magpie Goose		E	1
Anatidae				
<i>Anas castanea</i>	Chestnut Teal			6
<i>Anas platyrhynchos</i> *	Northern Mallard			12
<i>Anas gracilis</i>	Grey Teal			58
<i>Anas rhynchosotis</i>	Australasian Shoveler		R	2

Table 3.1 (continued)

Family and Species Name	Common Name	EPBC Rating	NPW Rating	Regional Count
Anatidae				
<i>Anas superciliosa</i>	Pacific Black Duck			86
<i>Anas superciliosa</i> x <i>A. platyrhynchos</i>	Pacific Black Duck/Mallard Hybrid			2
<i>Aythya australis</i>	Hardhead			25
<i>Chenonetta jubata</i>	Australian Wood Duck			56
<i>Cygnus atratus</i>	Black Swan			18
<i>Dendrocygna eytoni</i>	Plumed Whistling-Duck			3
<i>Malacorhynchus membranaceus</i>	Pink-eared Duck			8
<i>Stictonetta naevosa</i>	Freckled Duck		V	1
<i>Tadorna tadornoides</i>	Australian Shelduck			27
Podicipedidae				
<i>Poliiocephalus poliocephalus</i>	Hoary-headed Grebe			14
<i>Tachybaptus novaehollandiae</i>	Australasian Grebe			53
Columbidae				
<i>Columba livia</i> *	Rock Dove			111
<i>Geopelia cuneata</i>	Diamond Dove			1
<i>Geopelia striata</i>	Peaceful Dove			31
<i>Ocyphaps lophotes</i>	Crested Pigeon			195
<i>Phaps chalcoptera</i>	Common Bronzewing			114
<i>Phaps sp.</i>				1
Podargidae				
<i>Podargus strigoides</i>	Tawny Frogmouth			23
Eurostopodidae				
<i>Eurostopodus argus</i>	Spotted Nightjar			9
Aegothelidae				
<i>Aegotheles cristatus</i>	Australian Owlet-nightjar			37
Apodidae				
<i>Apus pacificus</i>	Fork-tailed Swift			4
Anhingidae				
<i>Anhinga novaehollandiae</i>	Australasian Darter		R	2
Phalacrocoracidae				
<i>Microcarbo melanoleucos</i>	Little Pied Cormorant			30
<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant			2
<i>Phalacrocorax varius</i>	Pied Cormorant			5
Pelecanidae				
<i>Pelecanus conspicillatus</i>	Australian Pelican			3
Ardeidae				
<i>Ardea ibis</i>	Cattle Egret		R	2
<i>Ardea modesta</i>	Eastern Great Egret			3
<i>Ardea pacifica</i>	White-necked Heron			2
<i>Egretta novaehollandiae</i>	White-faced Heron			95
<i>Nycticorax caledonicus</i>	Nankeen Night Heron			2
Threskiornithidae				
<i>Platalea flavipes</i>	Yellow-billed Spoonbill			3
<i>Threskiornis molucca</i>	Australian White Ibis			2

Table 3.1 (continued)

Family and Species Name	Common Name	EPBC Rating	NPW Rating	Regional Count
Accipitridae				
<i>Accipiter cirrocephalus</i>	Collared Sparrowhawk			17
<i>Accipiter fasciatus</i>	Brown Goshawk			38
<i>Accipiter sp.</i>				1
<i>Aquila audax</i>	Wedge-tailed Eagle			122
<i>Circus approximans</i>	Swamp Harrier			3
<i>Circus assimilis</i>	Spotted Harrier			36
<i>Elanus axillaris</i>	Black-shouldered Kite			51
<i>Haliastur sphenurus</i>	Whistling Kite			27
<i>Hieraaetus morphnoides</i>	Little Eagle			12
<i>Milvus migrans</i>	Black Kite			7
Falconidae				
<i>Falco berigora</i>	Brown Falcon			84
<i>Falco cenchroides</i>	Nankeen Kestrel			174
<i>Falco longipennis</i>	Australian Hobby			23
<i>Falco peregrinus</i>	Peregrine Falcon		R	29
<i>Falco subniger</i>	Black Falcon			12
Gruidae				
<i>Grus rubicunda</i>	Brolga		V	1
Rallidae				
<i>Fulica atra</i>	Eurasian Coot			30
<i>Gallinula tenebrosa</i>	Dusky Moorhen			28
<i>Gallirallus philippensis</i>	Buff-banded Rail			1
<i>Porzana fluminea</i>	Australian Spotted Crake			1
<i>Porzana pusilla</i>	Baillon's Crake			1
<i>Porzana tabuensis</i>	Spotless Crake		R	1
<i>Tribonyx ventralis</i>	Black-tailed Native-hen			32
Otididae				
<i>Ardeotis australis</i>	Australian Bustard		V	4
Burhinidae				
<i>Burhinus grallarius</i>	Bush Stone-curlew		R	1
Recurvirostridae				
<i>Cladorhynchus leucocephalus</i>	Banded Stilt		V	4
<i>Himantopus himantopus</i>	Black-winged Stilt			14
<i>Recurvirostra novaehollandiae</i>	Red-necked Avocet			6
Charadriidae				
<i>Charadrius australis</i>	Inland Dotterel			6
<i>Charadrius bicinctus</i>	Double-banded Plover			1
<i>Charadrius ruficapillus</i>	Red-capped Plover			5
<i>Charadrius veredus</i>	Oriental Plover			1
<i>Elsayornis melanops</i>	Black-fronted Dotterel			22
<i>Erythrogonyx cinctus</i>	Red-kneed Dotterel			1
<i>Pluvialis squatarola</i>	Grey Plover			1
<i>Vanellus miles</i>	Masked Lapwing			74
<i>Vanellus tricolor</i>	Banded Lapwing			30
<i>Vanellus sp.</i>				1

Table 3.1 (continued)

Family and Species Name	Common Name	EPBC Rating	NPW Rating	Regional Count
Pedionomidae				
<i>Pedionomus torquatus</i>	Plains-wanderer	V	E	1
Rostratulidae				
<i>Rostratula australis</i>	Australian Painted Snipe		V	1
Scolopacidae				
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper			5
<i>Calidris ruficollis</i>	Red-necked Stint			3
Turnicidae				
<i>Turnix pyrrhorthorax</i>	Red-chested Button-quail		R	1
<i>Turnix varius</i>	Painted Button-quail		R	2
<i>Turnix velox</i>	Little Button-quail			21
<i>Turnix sp.</i>				1
Glareolidae				
<i>Glareola maldivarum</i>	Oriental Pratincole			1
<i>Stiltia isabella</i>	Australian Pratincole			4
Laridae				
<i>Chlidonias hybrida</i>	Whiskered Tern			3
<i>Chroicocephalus novaehollandiae</i>	Silver Gull			17
Cacatuidae				
<i>Cacatua galerita</i>	Sulphur-crested Cockatoo			4
<i>Cacatua sanguinea</i>	Little Corella			35
<i>Cacatua sp.</i>				3
<i>Eolophus roseicapillus</i>	Galah			564
<i>Lophocroa leadbeateri</i>	Major Mitchell's Cockatoo		R	1
<i>Nymphicus hollandicus</i>	Cockatiel			39
Psittacidae				
<i>Barnardius zonarius</i>	Australian Ringneck			213
<i>Glossopsitta concinna</i>	Musk Lorikeet			43
<i>Glossopsitta porphyrocephala</i>	Purple-crowned Lorikeet			28
<i>Glossopsitta pusilla</i>	Little Lorikeet		E	2
<i>Melopsittacus undulatus</i>	Budgerigar			62
<i>Neophema chrysostoma</i>	Blue-winged Parrot		V	4
<i>Neophema elegans</i>	Elegant Parrot		R	23
<i>Neophema sp.</i>				1
<i>Northiella haematogaster</i>	Blue Bonnet		ssp	14
<i>Platycercus elegans</i>	Crimson Rosella			253
<i>Psephotus haematonotus</i>	Red-rumped Parrot			170
<i>Psephotus varius</i>	Mulga Parrot			63
<i>Trichoglossus haematodus</i>	Rainbow Lorikeet			1
Cuculidae				
<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo			5
<i>Cacomantis pallidus</i>	Pallid Cuckoo			11
<i>Chalcites basalis</i>	Horsfield's Bronze-cuckoo			46
<i>Chalcites osculans</i>	Black-eared Cuckoo			11
Strigidae				
<i>Ninox novaeseelandiae</i>	Southern Boobook			20

Table 3.1 (continued)

Family and Species Name	Common Name	EPBC Rating	NPW Rating	Regional Count
Tytonidae				
<i>Tyto javanica</i>	Eastern Barn Owl			8
Halcyonidae				
<i>Dacelo novaeguineae</i>	Laughing Kookaburra			114
<i>Todiramphus pyrrhopygius</i>	Red-backed Kingfisher			20
<i>Todiramphus sanctus</i>	Sacred Kingfisher			11
Meropidae				
<i>Merops ornatus</i>	Rainbow Bee-eater			66
Climacteridae				
<i>Climacteris picumnus</i>	Brown Treecreeper			157
Maluridae				
<i>Malurus cyaneus</i>	Superb Fairy-wren			67
<i>Malurus lamberti</i>	Variegated Fairy-wren			94
<i>Malurus leucopterus</i>	White-winged Fairy-wren			61
<i>Malurus splendens</i>	Splendid Fairy-wren			1
Acanthizidae				
<i>Acanthiza apicalis</i>	Inland Thornbill			44
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill			159
<i>Acanthiza nana</i>	Yellow Thornbill			82
<i>Acanthiza pusilla</i>	Brown Thornbill			4
<i>Acanthiza reguloides</i>	Buff-rumped Thornbill			70
<i>Acanthiza uropygialis</i>	Chestnut-rumped Thornbill			101
<i>Acanthiza sp.</i>				2
<i>Aphelocephala leucopsis</i>	Southern Whiteface			163
<i>Calamanthus campestris</i>	Rufous Fieldwren			12
<i>Hylacola cauta</i>	Shy Heathwren		R	2
<i>Pyrrholaemus brunneus</i>	Redthroat			74
<i>Smicromnis brevirostris</i>	Weebill			312
Pardalotidae				
<i>Pardalotus punctatus</i>	Spotted Pardalote			57
<i>Pardalotus striatus</i>	Striated Pardalote			313
Meliphagidae				
<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater			159
<i>Acanthorhynchus tenuirostris</i>	Eastern Spinebill			2
<i>Anthochaera carunculata</i>	Red Wattlebird			219
<i>Ashbyia lovensis</i>	Gibberbird			2
<i>Certhionyx variegatus</i>	Pied Honeyeater			2
<i>Epthianura albifrons</i>	White-fronted Chat			64
<i>Epthianura aurifrons</i>	Orange Chat			4
<i>Epthianura tricolor</i>	Crimson Chat			8
<i>Glyciphila melanops</i>	Tawny-crowned Honeyeater			1
<i>Lichenostomus chrysops</i>	Yellow-faced Honeyeater			83
<i>Lichenostomus leucotis</i>	White-eared Honeyeater			40
<i>Lichenostomus ornatus</i>	Yellow-plumed Honeyeater			56
<i>Lichenostomus penicillatus</i>	White-plumed Honeyeater			179
<i>Lichenostomus plumulus</i>	Grey-fronted Honeyeater			8

Table 3.1 (continued)

Family and Species Name	Common Name	EPBC Rating	NPW Rating	Regional Count
Meliphagidae				
<i>Lichenostomus virescens</i>	Singing Honeyeater			180
<i>Manorina flavigula</i>	Yellow-throated Miner			132
<i>Manorina melanocephala</i>	Noisy Miner			90
<i>Melithreptus brevirostris</i>	Brown-headed Honeyeater			99
<i>Melithreptus gularis</i>	Black-chinned Honeyeater		ssp	3
<i>Melithreptus lunatus</i>	White-naped Honeyeater			3
<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater			13
<i>Plectorhyncha lanceolata</i>	Striped Honeyeater		R	3
<i>Purnella albifrons</i>	White-fronted Honeyeater			51
<i>Sugomel niger</i>	Black Honeyeater			7
Pomatostomidae				
<i>Pomatostomus ruficeps</i>	Chestnut-crowned Babbler			25
<i>Pomatostomus superciliosus</i>	White-browed Babbler			100
<i>Pomatostomus sp.</i>				1
Eupetidae				
<i>Cinclosoma castanotum</i>	Chestnut Quail-thrush		ssp	6
<i>Psophodes cristatus</i>	Chirruping Wedgebill			1
Neosittidae				
<i>Daphoenositta chrysoptera</i>	Varied Sittella			43
Campephagidae				
<i>Coracina maxima</i>	Ground Cuckoo-shrike			5
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike			142
<i>Lalage sueurii</i>	White-winged Triller			34
Pachycephalidae				
<i>Colluricincla harmonica</i>	Grey Shrike-thrush			247
<i>Falcunculus frontatus</i>	Crested Shrike-tit		R	3
<i>Oreoica gutturalis</i>	Crested Bellbird			5
<i>Pachycephala inornata</i>	Gilbert's Whistler		R	3
<i>Pachycephala pectoralis</i>	Golden Whistler			30
<i>Pachycephala rufiventris</i>	Rufous Whistler			123
<i>Pachycephala rufogularis</i>	Red-lored Whistler	V	R	2
<i>Pachycephala sp.</i>				1
Artamidae				
<i>Artamus cinereus</i>	Black-faced Woodswallow			7
<i>Artamus cyanopterus</i>	Dusky Woodswallow			49
<i>Artamus personatus</i>	Masked Woodswallow			34
<i>Artamus superciliosus</i>	White-browed Woodswallow			34
<i>Artamus sp.</i>				1
<i>Cracticus nigrogularis</i>	Pied Butcherbird			1
<i>Cracticus tibicen</i>	Australian Magpie			472
<i>Cracticus torquatus</i>	Grey Butcherbird			119
<i>Strepera versicolor</i>	Grey Currawong		ssp	121
Rhipiduridae				
<i>Rhipidura albiscapa</i>	Grey Fantail			105
<i>Rhipidura leucophrys</i>	Willie Wagtail			213

Table 3.1 (continued)

Family and Species Name	Common Name	EPBC Rating	NPW Rating	Regional Count
Corvidae				
<i>Corvus bennetti</i>	Little Crow			8
<i>Corvus coronoides</i>	Australian Raven			112
<i>Corvus mellori</i>	Little Raven			317
<i>Corvus sp.</i>				24
Monarchidae				
<i>Grallina cyanoleuca</i>	Magpie-lark			189
<i>Myiagra cyanoleuca</i>	Satin Flycatcher		E	1
<i>Myiagra inquieta</i>	Restless Flycatcher		R	15
Corcoracidae				
<i>Corcorax melanorhamphos</i>	White-winged Chough		R	189
<i>Struthidea cinerea</i>	Apostlebird			38
Petroicidae				
<i>Drymodes brunneopygia</i>	Southern Scrub-robin			3
<i>Melanodryas cucullata</i>	Hooded Robin		ssp	52
<i>Microeca fascinans</i>	Jacky Winter		ssp	55
<i>Petroica boodang</i>	Scarlet Robin		ssp	33
<i>Petroica goodenovii</i>	Red-capped Robin			116
<i>Petroica rosea</i>	Rose Robin			1
Alaudidae				
<i>Alauda arvensis*</i>	Eurasian Skylark			63
<i>Mirafrja javanica</i>	Horsfield's Bushlark			31
Acrocephalidae				
<i>Acrocephalus australis</i>	Australian Reed Warbler			54
Megaluridae				
<i>Cincloramphus cruralis</i>	Brown Songlark			62
<i>Cincloramphus mathewsi</i>	Rufous Songlark			30
<i>Megalurus gramineus</i>	Little Grassbird			15
Timaliidae				
<i>Zosterops lateralis</i>	Silvereye			114
Hirundinidae				
<i>Cheramoeca leucosterna</i>	White-backed Swallow			7
<i>Hirundo neoxena</i>	Welcome Swallow			131
<i>Petrochelidon ariel</i>	Fairy Martin			15
<i>Petrochelidon nigricans</i>	Tree Martin			60
Turdidae				
<i>Turdus merula*</i>	Common Blackbird			108
Sturnidae				
<i>Sturnus vulgaris*</i>	Common Starling			234
Nectariniidae				
<i>Dicaeum hirundinaceum</i>	Mistletoebird			106
Estrildidae				
<i>Stagonopleura guttata</i>	Diamond Firetail		V	31
<i>Taeniopygia guttata</i>	Zebra Finch			21
Passeridae				
<i>Passer domesticus*</i>	House Sparrow			148

Table 3.1 (continued)

Family and Species Name	Common Name	EPBC Rating	NPW Rating	Regional Count
Motacillidae				
<i>Anthus novaeseelandiae</i>	Australasian Pipit			145
Fringillidae				
<i>Carduelis carduelis</i> *	European Goldfinch			12

Field Surveys

Ninety-two bird species with a total of 806 observations were recorded during the field surveys at and around the eight permanent water sites (Table H). Of the bird species identified 85 were native and 6 introduced. Thirteen species (12 native and one introduced, with a total of 41 observations) were recorded ‘In Site’ only: the Chestnut Teal *Anas castanea*, the Grey Teal *Anas gracilis*, the Pacific Black Duck *Anas superciliosa*, the Peaceful Dove *Geopelia striata*, the Australian Pelican *Pelecanus conspicillatus*, the White-faced Heron *Egretta novaehollandiae*, the Little Corella *Cacatua sanguinea*, the Sacred Kingfisher *Todiramphus sanctus*, the Buff-rumped Thornbill *Acanthiza reguloides*, the Golden Whistler *Pachycephala pectoralis*, the Grey Fantail *Rhipidura albiscapa*, the Little Grassbird *Megalurus gramineus* and the Common Blackbird *Turdus merula*. Conversely, 32 species with a total of 102 observations were recorded only in the habitats outside the survey sites (‘Out’), within a radius of 1 km of the sites (recorded as opportune).

Table 3.2 Number of in site and opportune (Opp) records of bird species during the field surveys at and around the eight permanent water sites (BSS_01 – BSS_08)
Taxonomy and nomenclature after Christidis and Boles (2008).
An asterisk denotes introduced species.

Family and Species Name	Common Name	In Site Rec.	Opp Rec.	Sites
Casuariidae				
<i>Dromaius novaehollandiae</i>	Emu	7	7	3, 4, 5, 6, 8 and Opp
Anatidae				
<i>Anas castanea</i>	Chestnut Teal	1		8
<i>Anas gracilis</i>	Grey Teal	1		4
<i>Anas superciliosa</i>	Pacific Black Duck	4		4, 5, 6
<i>Chenonetta jubata</i>	Australian Wood Duck	5	1	1, 3, 4, 8 and Opp
Columbidae				
<i>Columba livia</i> *	Rock Dove		4	Opp
<i>Geopelia striata</i>	Peaceful Dove	5		8
<i>Ocyphaps lophotes</i>	Crested Pigeon		3	Opp
<i>Phaps chalcoptera</i>	Common Bronzewing		5	Opp
Pelecanidae				
<i>Pelecanus conspicillatus</i>	Australian Pelican	1		8
Ardeidae				
<i>Egretta novaehollandiae</i>	White-faced Heron	4		2, 3, 4, 7

Table 3.2 (continued)

Family and Species Name	Common Name	In Site Rec.	Opp Rec.	Sites
Accipitridae				
<i>Accipiter fasciatus</i>	Brown Goshawk		3	Opp
<i>Aquila audax</i>	Wedge-tailed Eagle		8	Opp
<i>Circus assimilis</i>	Spotted Harrier		2	Opp
<i>Elanus axillaris</i>	Black-shouldered Kite		1	Opp
<i>Milvus migrans</i>	Black Kite		1	Opp
Falconidae				
<i>Falco berigora</i>	Brown Falcon		2	Opp
<i>Falco cenchroides</i>	Nankeen Kestrel		3	Opp
<i>Falco longipennis</i>	Australian Hobby		1	Opp
<i>Falco peregrinus</i>	Peregrine Falcon		2	Opp
Rallidae				
<i>Porphyrio porphyrio</i>	Purple Swanphen	2		5
<i>Tribonyx ventralis</i>	Black-tailed Native-hen	3	1	5 and Opp
Cacatuidae				
<i>Cacatua galerita</i>	Sulphur-crested Cockatoo		1	Opp
<i>Cacatua sanguinea</i>	Little Corella	2		7, 8
<i>Eolophus roseicapillus</i>	Galah	40	60	4, 6, 7, 8 and Opp
Psittacidae				
<i>Barnardius zonarius</i>	Australian Ringneck	9	13	3, 4, 5, 6, 7 and Opp
<i>Glossopsitta concinna</i>	Musk Lorikeet		3	Opp
<i>Platycercus elegans</i>	Crimson Rosella	8	15	7, 8 and Opp
<i>Psephotus haematonotus</i>	Red-rumped Parrot	4	3	8 and Opp
<i>Psephotus varius</i>	Mulga Parrot		1	Opp
Cuculidae				
<i>Chalcites basalis</i>	Horsfield's Bronze-cuckoo	5	1	5, 6, 7 and Opp
<i>Chalcites osculans</i>	Black-eared Cuckoo	7	1	5, 6, 8 and Opp
Halcyonidae				
<i>Dacelo novaeguineae</i>	Laughing Kookaburra	2	4	7 and Opp
<i>Todiramphus sanctus</i>	Sacred Kingfisher	1		7
Climacteridae				
<i>Climacteris picumnus</i>	Brown Treecreeper	3	8	7, 8 and Opp
Maluridae				
<i>Malurus lamberti</i>	Variiegated Fairy-wren	24	2	2, 3, 4, 5, 6, 7, 8 and Opp
<i>Malurus leucopterus</i>	White-winged Fairy-wren		3	Opp
Acanthizidae				
<i>Acanthiza apicalis</i>	Inland Thornbill	2	2	4, 8 and Opp
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill	2	2	2 and Opp
<i>Acanthiza nana</i>	Yellow Thornbill		1	Opp
<i>Acanthiza reguloides</i>	Buff-rumped Thornbill	2		7
<i>Acanthiza uropygialis</i>	Chestnut-rumped Thornbill	3	5	4, 7 and Opp
<i>Aphelocephala leucopsis</i>	Southern Whiteface	8	7	3, 4, 6 and Opp
<i>Pyrrholaemus brunneus</i>	Redthroat	9	8	3, 5, 6 and Opp
<i>Smicronis brevirostris</i>	Weebill	14	14	3, 6, 7, 8 and Opp
Pardalotidae				
<i>Pardalotus punctatus</i>	Spotted Pardalote	1	3	8 and Opp
<i>Pardalotus striatus</i>	Striated Pardalote	7	14	7, 8 and Opp

Table 3.2 (continued)

Family and Species Name	Common Name	In Site Rec.	Opp Rec.	Sites
Meliphagidae				
<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater	17	12	3, 5, 6, 7, 8 and Opp
<i>Anthochaera carunculata</i>	Red Wattlebird	2	4	6, 8 and Opp
<i>Epthianura albifrons</i>	White-fronted Chat	4	6	3, 4, 5, 6 and Opp
<i>Lichenostomus chrysops</i>	Yellow-faced Honeyeater		1	Opp
<i>Lichenostomus leucotis</i>	White-eared Honeyeater	3	1	3, 4 and Opp
<i>Lichenostomus ornatus</i>	Yellow-plumed Honeyeater	2	11	7 and Opp
<i>Lichenostomus penicillatus</i>	White-plumed Honeyeater	25	10	3, 4, 6, 7, 8 and Opp
<i>Lichenostomus virescens</i>	Singing Honeyeater	11	1	4, 5, 6 and Opp
<i>Manorina flavigula</i>	Yellow-throated Miner		12	Opp
<i>Manorina melanocephala</i>	Noisy Miner		2	Opp
<i>Melithreptus brevirostris</i>	Brown-headed Honeyeater	1	5	3 and Opp
<i>Purnella albifrons</i>	White-fronted Honeyeater	1	1	6 and Opp
Pomatostomidae				
<i>Pomatostomus superciliosus</i>	White-browed Babbler	7	5	3, 4, 8 and Opp
Eupetidae				
<i>Cinclosoma castanotum</i>	Chestnut Quail-thrush		1	Opp
Neosittidae				
<i>Daphoenositta chrysoptera</i>	Varied Sittella		2	Opp
Campephagidae				
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike		2	Opp
<i>Lalage sueurii</i>	White-winged Triller	1	4	5 and Opp
Pachycephalidae				
<i>Colluricincla harmonica</i>	Grey Shrike-thrush	13	9	3, 4, 7, 8 and Opp
<i>Pachycephala pectoralis</i>	Golden Whistler	2		7, 8
<i>Pachycephala rufiventris</i>	Rufous Whistler	5	3	7 and Opp
Artamidae				
<i>Artamus cyanopterus</i>	Dusky Woodswallow		2	Opp
<i>Cracticus tibicen</i>	Australian Magpie	8	31	4, 5, 7, 8 and Opp
<i>Cracticus torquatus</i>	Grey Butcherbird	1	2	5 and Opp
<i>Strepera versicolor</i>	Grey Currawong	1	8	7 and Opp
Rhipiduridae				
<i>Rhipidura albiscapa</i>	Grey Fantail	11		2, 3, 7, 8
<i>Rhipidura leucophrys</i>	Willie Wagtail	15	2	3, 4, 5, 6, 7, 8 and Opp
Corvidae				
<i>Corvus coronoides</i>	Australian Raven	2	8	8 and Opp
<i>Corvus mellori</i>	Little Raven	6	16	4, 5, 6, 7 and Opp
Monarchidae				
<i>Grallina cyanoleuca</i>	Magpie-lark	2	3	1, 8 and Opp
Corcoracidae				
<i>Corcorax melanorhamphos</i>	White-winged Cough		11	Opp
<i>Struthidea cinerea</i>	Apostlebird		3	Opp
Petroicidae				
<i>Microeca fascinans</i>	Jacky Winter		1	Opp
<i>Petroica goodenovii</i>	Red-capped Robin	6	9	3, 4, 5 and Opp

Table 3.2 (continued)

Family and Species Name	Common Name	In Site Rec.	Opp Rec.	Sites
Alaudidae				
<i>Alauda arvensis</i> *	Eurasian Skylark		2	Opp
Megaluridae				
<i>Cincloramphus cruralis</i>	Brown Songlark		4	Opp
<i>Megalurus gramineus</i>	Little Grassbird	1		6
Timaliidae				
<i>Zosterops lateralis</i>	Silvereeye	9	3	3, 4, 8 and Opp
Hirundinidae				
<i>Hirundo neoxena</i>	Welcome Swallow	4	1	3, 5, and Opp
<i>Petrochelidon nigricans</i>	Tree Martin	4	8	5, 8 and Opp
Turdidae				
<i>Turdus merula</i> *	Common Blackbird	6		5, 7
Sturnidae				
<i>Sturnus vulgaris</i> *	Common Starling	1	6	7 and Opp
Nectariniidae				
<i>Dicaeum hirundinaceum</i>	Mistletoebird		2	Opp
Passeridae				
<i>Passer domesticus</i> *	House Sparrow	3	4	3, 4, 5 and Opp
Motacillidae				
<i>Anthus novaeseelandiae</i>	Australasian Pipit		12	Opp
Fringillidae				
<i>Carduelis carduelis</i> *	European Goldfinch		1	Opp

Five species identified during the surveys have significant conservation rating at State level: the Peregrine Falcon *Falco peregrinus*, the Chestnut Quail-thrush *Cinlosoma castanotum*, the Grey Currawong *Strepera versicolor*, the White-winged Chough *Corcorax melanorhamphos* and the Jacky Winter *Microeca fascinans*. The Peregrine Falcon and the White-winged Chough are listed as *Rare* under the revised (2008) Schedule 9 of the National Parks and Wildlife (NPW) Act 1972. The eastern subspecies (ssp. *castanotus*) of the Chestnut Quail-thrush, present in the survey region, is also listed as *Rare* at the State level, under the NPW Act. The north western subspecies (ssp. *plumbea*) of the Grey Currawong is listed as Endangered under the revised (2008) Schedule 7 of the NPW Act 1972, and the south east subspecies (ssp. *fascinans*) of the Jacky Winter is listed as *Rare*. However, the last two subspecies do not occur in the survey region. The Purple Swamphen *Porphyrio porphyrio*, recorded at site BSS_05, was not on the BDBSA list of local birds; however the species was recorded before on Burra Creek (D. Moise, J. Smyth, pers. obs.), during the NCSA Biological Surveys in Hopkins Creek area (Rouse 2004).

The most common bird recorded in site was the Galah, with 40 observations, followed by the White-plumed Honeyeater *Lichenostomus penicillatus* with 25 observations, and by the Variegated Fairy-wren *Malurus lamberti* with 24 observations. It needs to be stressed that throughout the text 'number of observations' or 'number of records' denote the number of times the species was recorded, and not the number of individuals. Twelve species (11 native and one introduced) had only one record 'in site': the Chestnut Teal, the Grey Teal, the Australian Pelican, the Sacred Kingfisher, the Spotted Pardalote *Pardalotus punctatus*, the Brown-headed Honeyeater *Melithreptus brevirostris*, the White-fronted Honeyeater *Purnella albifrons*, the White-winged Triller *Lalage sueurii*, the Grey Butcherbird *Cracticus torquatus*, the Grey Currawong, the Little Grassbird *Megalurus gramineus* and the Common Starling *Sturnus vulgaris*.



Figure R. Emus in *Maireana* shrubland, site BSS_06 area (Photo: Dragos Moise)



Figure T. Wedge-tailed Eagle soaring over site BSS_03 area (Photo: Dragos Moise)



Figure S. Australian Wood Ducks, site BSS_03 (Photo: Dragos Moise)



Figure U. Australian Ringneck and Black-eared Cuckoo perching together in a dead tree, site BSS_06 (Photo: Dragos Moise)



Figure V. Black-eared Cuckoo with a large caterpillar in its beak, site BSS_04 area (Photo: Tom Hands)



Figure W. Willie Wagtail feeding on aquatic invertebrates from shallow water, site BSS_06 (Photo: Dragos Moise)



Figure X. Redthroat, a common presence in the sites BSS_03, BSS_05 and BSS_06 (Photo: Dragos Moise)



Figure Y. Pair of Galahs guarding their hollow, site BSS_07 (Photo: Dragos Moise)



Figure Z. White-browed Babbler with food, site BSS_04 area (Photo: Tom Hands)



Figure AA. White-winged Chough sitting on nest, site BSS_02 area (Photo: Tom Hands)

Eleven bird species were observed breeding in or around the sites: the Wedge-tailed Eagle *Aquila audax*, the Galah, the Red-rumped Parrot *Psephotus haematonotus*, the Horsfield's Bronze-cuckoo, the Chestnut-rumped Thornbill *Acanthiza uropygialis*, the Southern Whiteface *Aphelocephala leucopsis*, the Redthroat *Pyrrholaemus brunneus*, the Noisy Miner *Manorina melanocephala*, the White-winged Chough, the Red-capped Robin *Petroica goodenovii* and the Common Starling *Sturnus vulgaris*.

The greatest bird species richness occurred at site BSS_08 (29 species in site), followed by BSS_07 (27 species), and by BSS_04 (23 species). In descending order of the bird species richness, the remaining sites ranged as follows: BSS_05 (22 species), BSS_03 (21 species), BSS_06 (19 species), BSS_02 (4 species), BSS_01 (2 species). When considering the number of records, a similar pattern emerges, the sites ranging (in descending order) as follows: BSS_07 (96 records in site), BSS_08 (92 records), BSS_05 (47 records), BSS_03 and BSS_04 with 40 records each, BSS_06 (39 records), BSS_02 (5 records), BSS_01 (2 records).

At sites BSS_06, BSS_07 and BSS_08 both number of species and number of records 'In Site' were higher than the number of species/records 'Out'. Overall, there were 32 bird species with higher records 'In Site' than 'Out' (possible refugia species, see Table I). Of those, the following species had the highest difference between 'In Site' and 'Out' records: the Variegated Fairy-wren, the White-plumed Honeyeater, the Willie Wagtail *Rhipidura leucophrys*, the Grey Fantail *Rhipidura albiscapa* and the Singing Honeyeater *Lichenostomus virescens*. In assessing the refuge value for the species identified during the surveys at the permanent water sites based on their regional records, two thresholds can be considered: the median of the regional records (21) or their mean (51). Considering the median, six species identified using the permanent water sites qualify as possible refuge species (have less than 21 records at the regional level, and more records 'In Site' than 'Out'). They are as follows (in ascending order of the number of regional records): the Purple Swamphen (n = 0), the Australian Pelican (n = 3), the Chestnut Teal (n = 6), the Black-eared Cuckoo *Chalcites osculans* (n = 11), the Sacred Kingfisher (n = 11) and the Little Grassbird (n = 15). Considering the mean of the regional records as threshold, further six species could be added to the list: the Golden Whistler (n = 30), the Peaceful Dove (n = 31), the Black-tailed Native-hen *Tribonyx ventralis* (n = 32), the Little Corella (n = 35), the White-eared Honeyeater *Lichenostomus leucotis* (n = 40) and the Horsfield's Bronze-cuckoo *Chalcites basalis* (n = 46).

Table 3.3 Possible refugia species (with higher records 'In Site' than 'Out') identified during the field survey, and their number of records at a regional level (from the BDBSA search) Taxonomy and nomenclature after Christidis and Boles (2008). An asterisk denotes introduced species.

Family and Species Name	Common Name	'In Site'/'Out' Difference	Regional Count
Anatidae			
<i>Anas castanea</i>	Chestnut Teal	1	6
<i>Anas gracilis</i>	Grey Teal	1	58
<i>Anas superciliosa</i>	Pacific Black Duck	4	86
<i>Chenonetta jubata</i>	Australian Wood Duck	4	56
Columbidae			
<i>Geopelia striata</i>	Peaceful Dove	5	31
Pelecanidae			
<i>Pelecanus conspicillatus</i>	Australian Pelican	1	3
Ardeidae			
<i>Egretta novaehollandiae</i>	White-faced Heron	4	95

Table 3.3 (continued)

Family and Species Name	Common Name	'In Site'/'Out' Difference	Regional Count
Rallidae			
<i>Porphyrio porphyrio</i>	Purple Swamphen	1	0
<i>Tribonyx ventralis</i>	Black-tailed Native-hen	2	32
Cacatuidae			
<i>Cacatua sanguinea</i>	Little Corella	2	35
Psittacidae			
<i>Psephotus haematonotus</i>	Red-rumped Parrot	1	170
Cuculidae			
<i>Chalcites basalis</i>	Horsfield's Bronze-cuckoo	4	46
<i>Chalcites osculans</i>	Black-eared Cuckoo	6	11
Halcyonidae			
<i>Todiramphus sanctus</i>	Sacred Kingfisher	1	11
Maluridae			
<i>Malurus lamberti</i>	Variegated Fairy-wren	22	94
Acanthizidae			
<i>Acanthiza reguloides</i>	Buff-rumped Thornbill	2	159
<i>Aphelocephala leucopsis</i>	Southern Whiteface	1	163
<i>Pyrrholaemus brunneus</i>	Redthroat	1	74
Meliphagidae			
<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater	5	159
<i>Lichenostomus leucotis</i>	White-eared Honeyeater	2	40
<i>Lichenostomus penicillatus</i>	White-plumed Honeyeater	15	56
<i>Lichenostomus virescens</i>	Singing Honeyeater	10	180
Pomatostomidae			
<i>Pomatostomus superciliosus</i>	White-browed Babbler	2	100
Pachycephalidae			
<i>Colluricincla harmonica</i>	Grey Shrike-thrush	4	247
<i>Pachycephala pectoralis</i>	Golden Whistler	2	30
<i>Pachycephala rufiventris</i>	Rufous Whistler	2	123
Rhipiduridae			
<i>Rhipidura albiscapa</i>	Grey Fantail	11	105
<i>Rhipidura leucophrys</i>	Willie Wagtail	13	213
Megaluridae			
<i>Megalurus gramineus</i>	Little Grassbird	1	15
Timaliidae			
<i>Zosterops lateralis</i>	Silvereeye	6	114
Hirundinidae			
<i>Hirundo neoxena</i>	Welcome Swallow	3	131
Turdidae			
<i>Turdus merula*</i>	Common Blackbird	6	108

Section 4: Fish

by Scotte Wedderburn and Karl Hillyard

Introduction

Freshwater fishes are ideal indicators of waterway health as they rely on underwater habitat relating to different physical or biological conditions (e.g. water quality, flows and water permanency, riparian and in-stream habitat, introduced fish). Consequently, the diversity and abundance of fishes in a catchment or at particular sites can be a useful indicator of the current and historic conditions. Further, they play a role within aquatic ecosystems such as being natural mosquito control agents and food resources for predators (e.g. turtles, piscivorous birds). Fish can also act as potential icons to foster interest and awareness of aquatic systems and the conditions required to preserve such habitats.

The South Australian section of the Murray-Darling Basin holds some 26 native species of freshwater fish capable of completing their lifecycle inland (Hammer and Walker 2004), and they potentially exist in the Burra region. The previous inventory of freshwater fishes in the Eastern Mount Lofty Ranges (Hammer 2004) excluded sampling from the Burra region, but a later report documented the results of fish sampling at Baldina Creek, Burra Creek, Hopkins Creek, Newikie Creek, Truro Creek and Ulooloo Creek (Hammer *et al.* 2005). This section presents information on a fish survey component of the biosurvey in winter 2009 for two sites at each of four waterways: Baldina Creek (Red Banks Conservation Park), Newikie Creek, Burra Creek and Brady Creek.

Methods:

Collating previous data

Any previous fish survey data was gathered from all sources, including records of the South Australian Museum and data held by Native Fish Australia (SA) from extensive sampling across the State.

Field Survey

The pre-determined biological survey site generally consisted of a main pool or river channel location where sampling was concentrated and general site descriptors obtained, with supplementary investigations employed within a 100 m stretch of habitat. A range of gear types were used for field sampling, often applied in conjunction depending on habitat. Site specific details are maintained on a Native Fish Australia (NFA) (SA) data base for direct examination in future monitoring programs.

Fish sampling was undertaken under a PIRSA Fisheries exemption (9902232). Sampling methods varied depending on site conditions (Table 4.1), and often included three 10 metre hauls of a seine net (4 m×2 m, 6 mm mesh) if habitat conditions allowed. Sites with high structural integrity, difficult access or situated in sensitive areas (preventing seining) were sampled with bait traps (collapsible, 400×250×200 mm, 30 & 60 mm inlets; baited with dry cat food and set for 2 daylight hours). Fyke nets (Figure AB) were set overnight at all sites, and depending on accessibility, included a combination of long-winged (single 6 m wing, 3 compartments and 5 mm half mesh), short-winged (single 3 m wing, 2 compartments and 3 mm stretch mesh) and dual-winged (double 3.5m wings, 3 compartments, 5mm stretch mesh) net types. Supplementary techniques included spotlight from the pool bank on one occasion (Baldina Creek) and angling at one site (Burra Creek Gorge). The focus was on detecting native fish populations and hence the gear used is most effective for medium and smaller native species likely to be encountered (Hammer 2004).

Notes were made on any signs of reproductive condition and external disease or parasites. Total length (TL) was recorded for fish to obtain general biological information (size range, snap shot of population structure). Location (description and GPS), weather, landuse, potential impacts and environmental characteristics were recorded for each sampling site to assist with the interpretation of results and future replication (monitoring change). Briefly, these included descriptors such as size and depth of pools, the amount of submerged and emerged cover, condition of interlinked riparian condition (e.g. cover of edge vegetation such as reeds, sedges, amount of shade), and water quality (conductivity, temperature, dissolved oxygen, pH) (see Hammer 2004 or Hammer *et al.* 2005 for details).



Figure AB. Setting a fyke net in Newikie Creek (Photo: Karl Hillyard).

Table 4.1 Sampling sites and methods employed.

Site	Waterway	Location	Date	4m seine	Large single-wing fyke	Small single-wing fyke	Double-wing fyke	Bait trap	Night observations	Angling
BSS_01	Brady Creek	East of Web Gapp	31/07/09	3	2	2		6		
BSS_02	Brady Creek	Peppermint Springs	31/07/09		2	3		6		
BSS_03	Newikie Creek	Paradise (Hut)	29/07/09	3	2	2	1	8		
BSS_04	Newikie Creek	Dust Hole Creek Road	29/07/09	3	1	2	1	6		
BSS_05	Baldina Creek	Red Banks (Pump)	28/07/09		2	2	1	8		
BSS_supp.	Baldina Creek	Red Banks (mid reach)	28/07/09		2	2	1	8		
BSS_06	Baldina Creek	Red Banks (waterfalls)	28/07/09					6	x	
BSS_07	Burra Creek	Burra Gorge	30/07/09		2	2	1	8		x
BSS_08	Burra Creek	Worlds End (track)	30/07/09	3	1	3		4		

Results

Collating previous data

The results of the previous fish sampling undertaken by Native Fish Australia (SA) in the region (northeastern Mount Lofty Ranges) are shown in Table 4.2. There are no SA Museum records or other sources for the area. More will be covered in *Discussion*.

Table 4.2 Results of the previous fish sampling undertaken by Native Fish Australia (SA) in the northeastern Mount Lofty Ranges.

Site Code	Date	Waterway	Location	Easting	Northing	Brown trout	Common carp	Gambusia	Goldfish	Rainbow trout	No fish
ML02-01	6/06/02	Truro Creek	Truro -Moorundie St	328018	6190606		1	200	2		
ML02-03a	28/01/02	Burra Creek	Worlds End	318209	6254649			1000			
ML02-03b	29/01/02	Hopkins Creek	Gorge	317238	6253789						x
ML02-04	27/11/02	Baldina Creek	Red Banks	322074	6272164						x
ML04-151	13/09/04	Newikie Creek	Dust Hole Creek Road	319702	6292419						x
ML05-05a	4/02/05	Baldina Creek	Red Banks CP	321585	6272061						x
ML05-05b	4/02/04	Baldina Creek	Red Banks CP	322065	6272164						x
ML05-06	5/02/05	Ulooloo Creek (Wonna Ck)	Wittow Spring	312129	6314942						x
ML05-07	5/02/05	Burra Creek	Weir in Burra	308974	6271306			100			
ML05-48	9/09/05	Baldina Creek	Redbanks CP pump pool	322072	6272173					12	
ML05-49	9/09/05	Burra Creek	Below Lagoon Creek	315031	6256991	3		1000			
ML05-50	9/09/05	Burra Creek	ds Logans Creek Junction	315031	6256991	14		1000		1	
ML05-51	9/09/05	Burra Creek	us Logan Creek junction	314963	6257494			10			
ML05-54	10/09/05	Burra Creek	Mosey property	339661	6252797						x
ML05-56	20/06/05	Burra Creek	Burra Gorge	318500	6254715			409			
ML05-57	21/06/05	Hopkins Creek	Conservation Park	317937	6254582						x

Field Surveys

Nine sites were sampled on four streams between 27-31 July 2009. No native fish were captured, and no fish were recorded at seven of the sites or three out of four streams (Table 4.3). The alien *Gambusia holbrooki* (Figure AC) was the only fish species captured (size range = 18-54 mm TL, $n = 378$), being recorded at both sites on Burra Creek.

Common Froglet *Crinia signifera* (adult) was captured in abundance at Newikie Creek, and in low numbers at Baldina Creek and Burra Creek. Fish sampling also captured various species of macroinvertebrates (e.g. Yabbie *Cherax destructor*), which are presented in Section 5 of this report.

Water quality varied somewhat between sites (Table L). Conductivity was moderate to high being ~5000 $\mu\text{S}/\text{cm}$ for most sites at Burra Creek, Baldina Creek and Brady Creek, but higher (9,000-11,000 $\mu\text{S}/\text{cm}$) at Newikie Creek. Conversely, pH varied little between sites, ranging from 7.7-8.3 overall. Winter temperatures ranged from 10-14°C, and water transparency was mostly high (i.e. $\geq 0.7\text{m}$). Dissolved oxygen was also high at all sites (>6.4 parts per million).

Physical characteristics of the waterways varied in terms of water depth and habitat structure. Water depth varied considerably between sites, ranging from shallow pools in lower Burra Creek (maximum depth 0.4 m) and Newikie Creek (0.7 m) to very deep pools in Baldina Creek (5.6 m). Most sites had low to moderate levels of underwater cover, mainly provided by physical structure such as rock and snags, and emergent vegetation such as *Typha*. Edge (fringing) vegetation in winter was reasonably abundant at most sites (Table L).

All sites had a low water flow at the time of sampling due to recent rains and/or local spring flow (all sampling locations were pre-determined due to being permanent refuges).

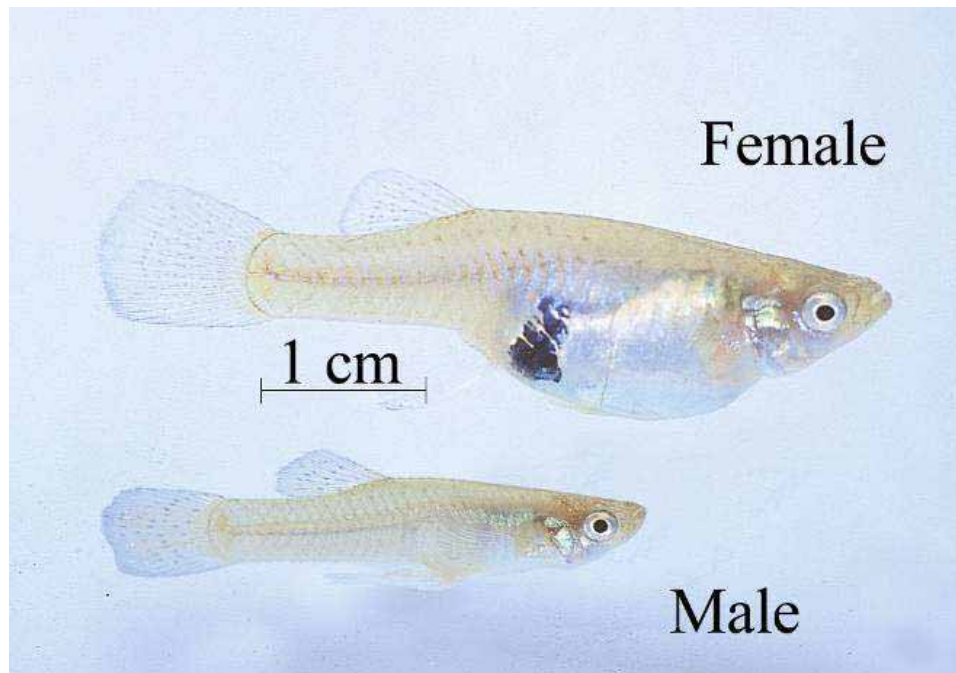


Figure AC. Male and female *Gambusia* (Photo: Michael Hammer)

Table 4.3 Fish sampling results.

Site	Aquasave Code	Waterway	No fish	<i>Gambusia holbrooki</i>	Other aquatic vertebrates
BSS_01	ML09-63	Brady Creek	x		
BSS_02	ML09-64	Brady Creek	x		
BSS_03	ML09-65	Newickie Creek	x		
BSS_04	ML09-66	Newickie Creek	x		42 Common Froglets
BSS_05	ML09-67	Baldina Creek	x		
BSS_supp.	ML09-68	Baldina Creek	x		
BSS_06	ML09-69	Baldina Creek	x		2 Common Froglets
BSS_07	ML09-70	Burra Creek		336	
BSS_08	ML09-71	Burra Creek		42	1 Common Froglet

Table 4.4 Water quality and habitat data.

Site	Waterway	Depth max. (m)	Temperature (°C)	Conductivity (µS/cm)	pH	Dissolved Oxygen (ppm)	Transparency = Secchi depth (m)	Subsurface physical habitat (%)	Subsurface biological habitat (%)	Emergent plants (%)	Edge vegetation (%)	Flow rate
BSS_01	Brady Creek	0.7	11.4	5410	8.3	10.3	>0.7	10	0	5	2	Low
BSS_02	Brady Creek	1.6	10.9	4650	7.9	6.4	>1.6	5	0	10	50	Low
BSS_03	Newickie Creek	1.0	11.4	10970	8.3	11.3	0.8	20	0	1	10	Low
BSS_04	Newickie Creek	0.6	10.6	9170	7.7	9.4	0.35	5	0	5	60	Low
BSS_05	Baldina Creek	3.2	11.2	5020	7.8	9.6	1.05	0	0	2	80	Low
BSS_supp.	Baldina Creek	5.6	10.0	4800	8.2	10.5	1.7	30	0	2	30	Low
BSS_06	Baldina Creek	1.1	13.6	4420	8.1	10.3	>1.1	0	0	1	80	Low
BSS_07	Burra Creek	2.2	10.4	5640	8.0	8.9	1.6	2	0	15	95	Low
BSS_08	Burra Creek	0.4	14.0	8160	8.2	11.0	>0.4	20	0	0	20	Low

Section 5: Aquatic Macroinvertebrates

by Scotte Wedderburn and Karl Hillyard

Introduction

‘Aquatic macroinvertebrate’ is the general term for an invertebrate that occupies inland waters for some or all of its life stages and is large enough to be seen with the unaided eye. Macroinvertebrates are an important part of the aquatic food chain in which they are a major food source for many fish and birds. They are a significant component of aquatic biodiversity, occurring in a wide variety of forms and often have unique and interesting life histories (Gooderham & Tsyrlin 2002).

Macroinvertebrates predominantly include aquatic insects (e.g. beetles, dragonflies), crustaceans (shrimp, yabbies) and molluscs (snails). Although recent major steps have been taken to classifying macroinvertebrates taxonomically there is still much uncertainty and many taxa remain undescribed. This means that any survey will have difficulty identifying many specimens to a level finer than Family.

Macroinvertebrates are little studied in the South Australian section of the Murray-Darling Basin around the Burra region. This report section presents information on a macroinvertebrate survey component of the biosurvey in winter 2009 for two sites at each of four waterways: Baldina Creek (Red Banks Conservation Park), Newikie Creek, Burra Creek and Brady Creek.

Methods

Macroinvertebrates were sampled semi-quantitatively using a hand-held dip net (1-mm mesh) that was operated through all habitat types for 5 minutes at each site. Further samples were collected from the small fyke nets (3-mm mesh) for each site except BSS_06 Baldina Creek (see Section 4). Samples were preserved in 70% ethanol and returned to the laboratory for sorting and identification.

Specimens were identified to at least Order, but to Family, Genus or Species level if possible (there are no keys for many Orders). Identifications were obtained using keys produced by the Co-operative Research Centre for Freshwater Ecology (e.g. Watts 1998), from keys in journal articles (e.g. Lansbury 1968), and from keys and descriptive information in several books (Bennison *et al.* 1989; Hawkings and Smith 1997; Ingram *et al.* 1997; Gooderham and Tsyrlin 2002).

Results

Aquatic invertebrates captured in sampling consist of approximately 40 species from 12 Orders (Table 5.1). Two species (Order: Ostracoda and Cladocera) are zooplankton.

Species richness (Figure AD) was highest in samples from the two sites in Brady Creek (17 and 18 taxa) and Newikie Creek (14 and 17 taxa) and from the downstream site in Burra Creek (12 taxa). Samples from Baldina Creek had the lowest macroinvertebrate diversity recorded (4 and 7 taxa), as did those from the site at Burra Creek Gorge (5 taxa).

Hemipterans from two families, namely Water Boatmen (Corixidae) and Backswimmers (Notonectidae), were one of two dominant groups at Brady Creek and Newikie Creek (AE,

Table M). Decapoda was the other dominant group at these sites and included only Freshwater Shrimp (*Paratya australiensis*) and Freshwater Yabbies (*Cherax destructor*). Scuds (Eusiridae) were also abundant in samples from most sites except Newikie Creek. There is a noticeable absence of Scuds from samples taken at the downstream Burra Creek site (BSS_08), where Coleopterans, mostly Predacious Diving Beetles (Dytisidae), dominated. Dipterans were relatively abundant in samples taken from Newikie Creek (BSS_04), and consisted only of Non-biting midge larvae (Chironomidae).

The highest species diversity in the samples from the upstream site at Brady Creek (BSS_02) is largely due to four species of damselflies and several species of Hemipterans (Water boatmen and Backswimmers).

Table 5.1 Aquatic invertebrates captured.

Group	Common name	Species	Site captured and abundance										
			BSS	01	02	03	04	05	06	07	08		
MOLLUSCA													
Gastropoda	Snail												
Planorbidae		sp1										2	
CRUSTACEA													
Cladocera	Water flea												
Daphniidae		<i>Daphnia carinata</i>						182					
Ostracoda	Seed shrimp												
Cyprididae		<i>Australocypris</i> sp1	7										
Amphipoda													
Eusiridae	Scud		75	191	20	4	26	115	2				
Decapoda													
Atyidae	Freshwater shrimp	<i>Paratya australiensis</i>		220	56	7	428	27	657				
Parastacidae	Yabby	<i>Cherax destructor</i>	85	6	38	5	47	2	20				
INSECTA													
Ephemeroptera	Mayfly												
Caenidae		<i>Tasmanocoenis</i> sp1						1					
Odonata													

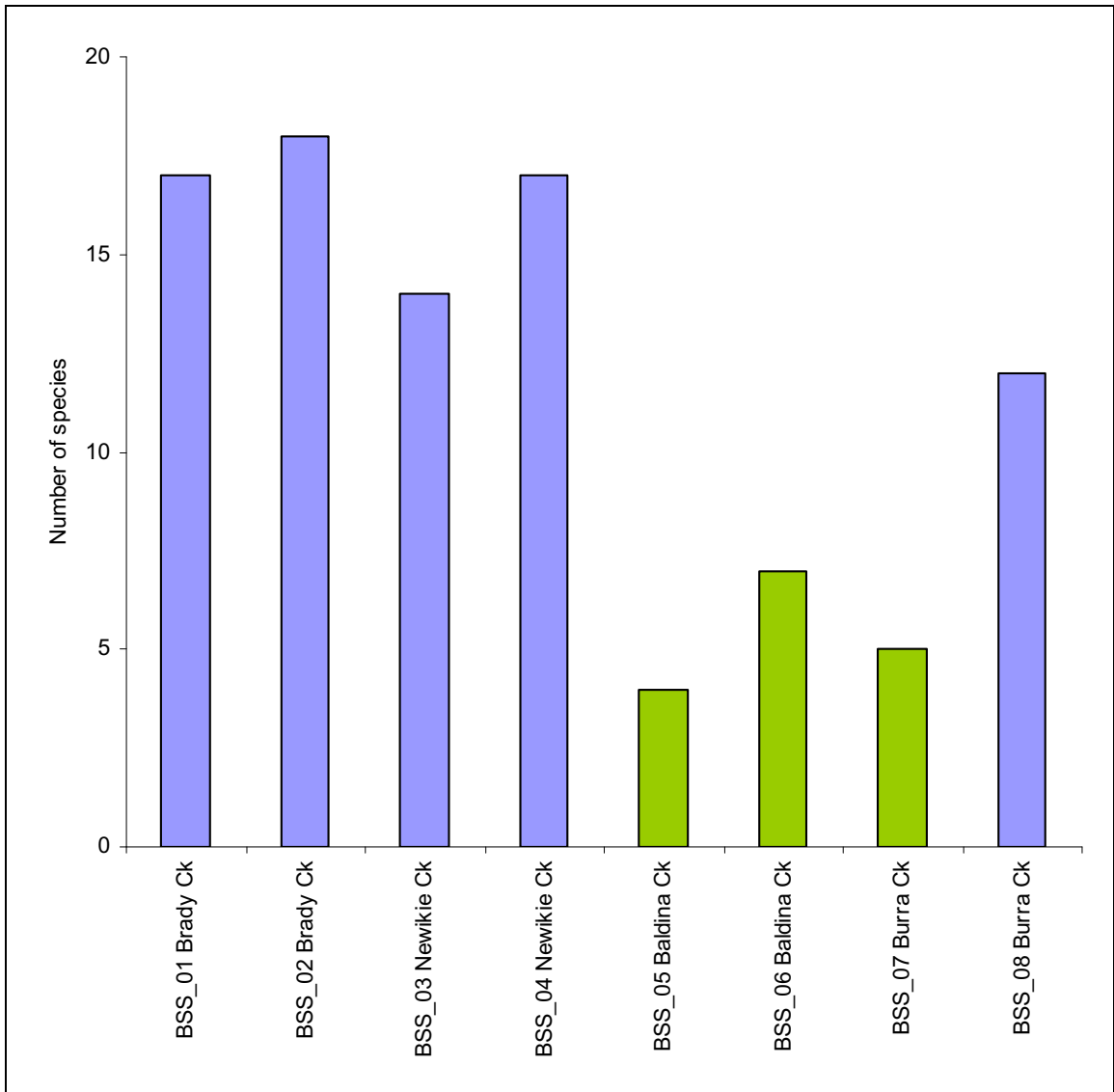


Figure AD. Comparison of macroinvertebrate species richness between sites, with shallow stream (blue) and deep pool (green) sites highlighted.

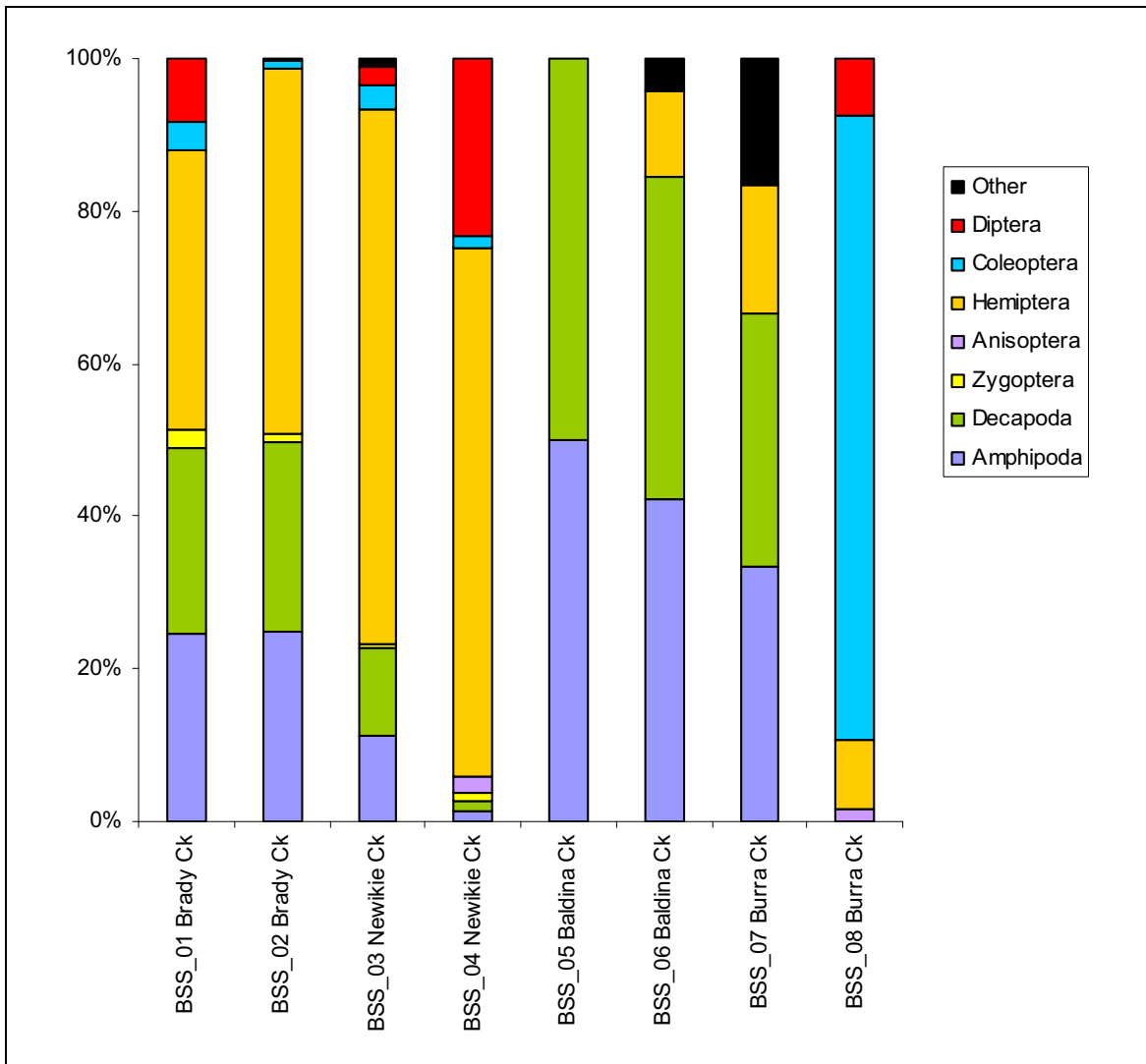


Figure AE. Comparison of macroinvertebrate species composition between sites.

Discussion

Vegetation

Both the presence of water and the higher biomass production of sites containing permanent water would attract a higher abundance of introduced and native herbivores. This impacts on both the watercourse/wetland vegetation, but also on surrounding landscapes. Evidence of grazing pressure on plants was noted in all but two of the sites. Sites along Brady (BSS_01) and Newikie Creeks (BSS_03, BSS_04), and the downstream site along Burra Creek (BSS_08) are subject to ongoing cattle and sheep grazing, with visible impacts including the reduction of plant biomass through herbivory, pugging of soils along creek beds and degradation of native vegetation communities. This ongoing process is likely to have reduced the plant diversity of affected surveyed sites by depleting herbaceous species and other taxa sensitive to grazing.

For most sites we found that steep rocky terrain such as cliffs, gorges and rock outcrops were equally or more significant as refugia for rare or restricted plant species than water bodies, probably owing to the lower accessibility for herbivores. Some rocky habitats also appeared to contain more stable microclimates for refuge species, afforded by moisture retention and shading, which do not occur in the surrounding landscape. It is also likely that the higher biomass production of sites containing permanent water attract more herbivores due to augmented forage, compared with drier habitats nearby. Watercourse and wetland vegetation also appeared to be influenced by upstream processes such as sedimentation from grazed and eroding catchments.

Grazing is therefore seen as a significant process in the ecology of the sites surveyed. Management of grazing pressure may be beneficial, not only in terms of increasing diversity of both wetland and terrestrial plant species, but also to allow growth to provide structure and habitat for animal species that may refuge at the sites.

An obvious limitation of this flora survey was its timing with only 2 visits prior to mid spring. While efforts were made to record all flora present there is always potential to miss plant species due to the large areas surveyed. The list of observed plant species is therefore only indicative of the total flora of survey sites. Future surveys will need to be undertaken throughout the year, particularly in spring and summer to obtain a more complete inventory of floristic diversity.

We also suggest that in regard to indigenous flora, future surveys need to give more consideration to the impact of contemporary ecological processes that influence species distributions (i.e. total grazing pressure), than to just sites with permanent water or high biomass productivity.

Mammals

Observations of the tracks left by animals at the water's edge appear to indicate that the permanent water source is used by native mammals, particularly macropods, as well as supporting several species of introduced mammal.

During the survey period there was abundant water lying in roadside pools and other low areas. It is possible that during the hotter summer months, when this temporary water is

unavailable, the permanent water sources of the survey sites support a greater number of animals than was recorded in July.

Birds

Three sites (BSS_06, BSS_07 and BSS_08) were identified as possible refugia sites for birds, supporting greater bird diversity around the permanent water areas than in the neighbouring habitats. Besides the permanent presence of water, the refuge value of sites BSS_07 and BSS_08 could relate also to the greater structural diversity of the vegetation associated with those sites. The refuge value of the site BSS_06 is obvious in that it supports bird species not found in the neighbouring habitats (open *Maireana* shrubland and grassland): the Australian Ringneck *Barnardius zonarius*, the Black-eared Cuckoo, the Horsfield's Bronze-cuckoo, the Red Wattlebird *Anthochaera carunculata*, the Spiny-cheeked Honeyeater *Acanthagenys rufogularis*, the Singing Honeyeater and the White-plumed Honeyeater.

Twelve bird species were identified as possible refugia species, of those, six are waterbirds or are associated with wetland habitats: the Australian Pelican, the Chestnut Teal, the Purple Swamphen, the Black-tailed Native-hen, the Little Grassbird and the Sacred Kingfisher.

As a general comment, the timing of the surveys might have not been very appropriate to assess the refuge value for birds of the permanent water sites. It is expected that during the dry and hot periods in summer more bird species will use the permanent water sites. Many birds in the semi-arid regions (especially the insectivorous birds) are adapted to cope with the scarcity of water in those areas; however, there are numerous species that have drinking requirements, and are known to travel daily to the permanent water sites (natural or artificial), to drink (Harrington 2002).

Three bird species identified during the surveys have conservation value, significant for the region. In addition, 20 species identified at or around the permanent water sites are known as declining in the Mount Lofty Ranges: the Common Bronzewing *Phaps chalcoptera*, the Brown Treecreeper *Climacteris picummus*, the Buff-rumped Thornbill, the Yellow-rumped Thornbill *Acanthiza chrysorrhoa*, the Yellow Thornbill *Acanthiza nana*, the Southern Whiteface *Aphelocephala leucopsis*, the Jacky Winter, the White-browed Babbler *Pomatostomus superciliosus*, the Rufous Whistler *Pachycephala rufiventris*, the Little Grassbird, the Red-rumped Parrot *Psephotus haematonotus*, the Sacred Kingfisher, the Yellow-faced Honeyeater *Lichenostomus Chrysops*, the Brown-headed Honeyeater, the Varied Sittella *Daphoenositta chrysoptera*, the Willie Wagtail, the Dusky Woodswallow *Artamus cyanopterus*, the White-winged Chough, the Tree Martin *Hirundo nigricans* and the Silveryeye *Zosterops lateralis* (Paton *et al.* 2004). The permanent water sites of the SA MDB rangelands might become future refuges for these disappearing species.

Reptiles

The survey period was cold and wet, generally unsuitable for surveying reptiles so it can be assumed that the list is not a complete list of the reptiles that actually inhabit the sites.

The small number of recorded reptiles is more indicative of the seasonal inactivity of reptiles generally, rather than an indication of reptiles present or any measure of abundance or habitat use. However, all reptile species recorded during this survey are known to exist away from permanent water sources and it is therefore unlikely that any of these species are reliant on the permanent water bodies of the surveyed locations.

The Biological Databases of SA record 54 species of reptile from the broad area surrounding the survey sites including the 9 species recorded during this survey. Many of these species have habitat preferences other than the riparian habitat of the survey sites. With the exception of the Common Long-necked Tortoise *Chelodina longicollis*, all reptile species from the Biological Databases of SA list are known to exist away from permanent water sources and it is therefore unlikely that any of these species are reliant on the permanent water bodies of the surveyed locations.

Amphibians

Four of the seven frog species recorded from the survey area are known to use habitat similar to the sites as breeding locations. It is possible they are present; however this is not certain given the timing of the survey effort.

A previous record of the Brown Toadlet *Pseudophryne bibronii* from the area near site 1 & 2, indicates the possibility of some suitable habitat in this area. However, *Pseudophryne bibronii* is a terrestrial breeder and is reliant on damp shelter sites under rocks and logs, damp vegetation and deep leaf litter but not necessarily in the presence of permanent water. *Pseudophryne bibronii* has a threatened species rating of 'rare' in South Australia.

The Biological Databases of SA record 7 species of frog from the broad area surrounding the survey sites including the 2 species recorded during this survey. From this list, 4 species *Pseudophryne bibronii*, *Neobatrachus pictus*, *Neobatrachus sudelli* and *Limnodynastes dumerilii* are unlikely to be breeding in July and therefore difficult to detect. *Neobatrachus pictus* and *Neobatrachus sudelli* are burrowing species that inhabit semi-arid shrubland/woodland and usually breed in temporary water bodies and are unlikely to be reliant on the survey sites.

Fish

The Burra region has had very little attention from fish biologists to date. In this study only the alien *Gambusia holbrooki* was captured, at both sites on Burra Creek. Sampling at the other three waterways failed to detect fish, and this corresponds to previous attempts (Hammer *et al.* 2005) with no other verified records for the region uncovered (i.e. search of SA Museum records). Anecdotal accounts suggest Murray cod *Maccullochella peelii peelii* and smelt *Retropinna semoni* may have occurred in Burra Creek (native or introduced populations: Hammer *et al.* 2005).

It is possible that Baldina Creek, Brady Creek, Burra Creek and Newikie Creek are devoid of native fishes. This could either be a natural feature due to the geographic isolation (see below) or the result of more recent (post-European) impacts leading to local extirpation. However, the low number of sampling sites for each waterway makes this observation uncertain. Sampling during different seasons may also help to detect fish during periods of higher activity (i.e. warmer water) or different life stages (e.g. more abundant juvenile fish after spawning), particularly if recent drought has impacted the distribution and abundance of any native species.

The four waterways surveyed for this study in the north-western EMLR are characterised by their ephemeral nature (reduced to core refuges in dry periods) and isolation from other major drainages. The exception is Burra Creek, which occasionally connects for short periods with the River Murray near Morgan. Anecdotal accounts suggest that Burra Creek last connected with the Murray in the early 1990s, but only for a matter of days and at high velocity flows. It

is possible that some highly mobile fish species might move from the Murray to Burra Creek during such times. Relictual populations from wetter climatic periods (higher connectivity to source populations) could occur, and conditions appear suitable for mountain galaxias *Galaxias olidus* in particular (Figure AF), being similar to other EMLR tributaries further to the south where the species occurs (e.g. Marne River and Reedy Creek catchments).

It is possible that sampling failed to detect alien trout in some of these waterways because rainbow trout *Oncorhynchus mykiss* fingerlings (illegally introduced) have previously been recorded in Baldina Creek (Figure AG) and adult brown trout *Salmo trutta* and rainbow trout at Burra Creek (Hammer *et al.* 2005; Wetsergaard and Hammer 2005). Although undetected in this study, alien trout likely still occur in Burra Creek and possibly Baldina Creek, and may impact on any remnant native fish populations (McDowall 2006) and the diversity and abundance of aquatic invertebrates (e.g. Flecker and Townsend 1994). *Gambusia* is a prolific fish species and its abundance in Burra Creek suggests it might have a significant impact on the invertebrate assemblage. Indeed macroinvertebrate sampling in this study (see Section 5) suggests lower species richness for Burra Creek compared to the other four sampled waterways, with the noticeable absence of the more sensitive species such as damselflies and mayflies, and lack of micro-invertebrates (e.g. *Daphnia*). Other introduced species known from the general study region include common carp *Cyprinus carpio* and goldfish *Carassius auratus*, both recorded from Truro Creek (Hammer *et al.* 2005).

This survey contributes further understanding to the fish fauna of the region as part of broader biological study. More comprehensive surveys of some waterways is required to provide a reliable conclusion in this regard (e.g. any other permanent refuges), with spatial and temporal replication at Burra Creek Catchment being a priority due to more extensive habitat and higher relative connection to the River Murray. Collating oral history on permanent refuges and any past or recent fish sighting would be a valuable tool to guide further sampling.



Figure AF. Mountain galaxias from the Marne River Catchment: the native fish species most likely to occur on the northeastern Mount Lofty Ranges (Photo: Michael Hammer).



Figure AG. Juvenile rainbow trout recorded from Baldina Creek in 2005 (Photo: Michael Hammer)

Aquatic Macroinvertebrates

This study recorded 40 species of macroinvertebrates from 12 main taxonomic groups. Notably, higher diversities were recorded from the smaller catchments, namely Brady Creek and Newikie Creek, largely due to the occurrence of several damselfly species and an array of Water boatmen and Backswimmers. Samples from Baldina Creek had the lowest diversity.

The relatively low diversity of macroinvertebrates in samples from Burra Creek Gorge (BSS_07) and Baldina Creek (BSS_05 and BSS_06) might relate to obvious differences in habitat when compared to the remaining sites. These three sites are deep pools with steep banks and very little or no submerged structure. Conversely, sites at Brady Creek and Newikie Creek are relatively shallow, rocky, slow-flowing waterbodies and might provide conditions that are favourable for additional groups (e.g. Odonata: Damselflies and Dragonflies).

Water quality is another feature that can influence the occurrence of some macroinvertebrate species (Gooderham and Tsyrlin 2002). For example, the dominance of Hemipterans at Newikie Creek is possibly related to their tolerance of the higher salinity of the waterway (see 'conductivity' Table L). Although many aspects of water quality were measured in this study (Section 4), there might be unmeasured factors (e.g. levels of some heavy metals) that influence the macroinvertebrate community composition.

Burra Creek had the greatest observed differences between sites within a single waterway in terms of species richness and community composition. Again, the reason is likely related to the differences in habitats. Burra Creek at Eagle Hawke Gate Road (BSS_08) is a shallow, slow flowing creek with abundant fringing vegetation and had samples had a moderate macroinvertebrate diversity, whereas the site at Burra Creek Gorge is a deep pool with sparse aquatic plants and had one of the lowest diversities recorded.

Alien fish species, namely *Gambusia* and trout, might impact the invertebrate community of Burra Creek and Baldina Creek (i.e. trout have been recorded in these waterways previously:

Hammer *et al.* 2005). Given that *Gambusia* was in high abundance (even during winter) in the pool at Burra Creek Gorge (see Table K) the species might be partly accountable for the relatively low macroinvertebrate diversity. Similarly, *Gambusia* was recorded at the downstream site on Burra Creek where samples had only moderate species richness.

Many macroinvertebrate species living in the waterways are likely to have been undetected in this study, partly due to the low number of sites sampled at each waterway. Further, other sampling techniques not included in this survey (e.g. a 'substrate sampler' placed in the water at a site for several months) would likely detect additional species. A more comprehensive study over a longer time frame would be required to accurately assess the diversity of macroinvertebrates species at each waterway and the region.

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