

6 Cell descriptions

6.1 Constructing the Cell Descriptions

Seventeen coastal cells have been defined for the Limestone Coast and Coorong. Coorong Cells SE 15-17 have been described and collated into one detailed cell description given the uniformity of this geographic region.

A template showing the construction of the detailed cell descriptions in Section 6.3 is provided below in Table 6.1.

Table 6.1. Cell description template.

Paragraph in coastal cell description	Source of information
Landforms Benthic Habitat Biota Land use/ land ownership	The DENR internal GIS system – ‘Coastmaps’ / ‘Naturemaps’. Reference materials. Floristic vegetation maps.
Values / Uses Threats Opportunities	Field appraisals. Information from, and discussions with community members and government officers working on coastal projects in the area. Analysis of aerial and oblique photography. Current management plans.
Conservation analysis (GIS) Threats analysis (GIS)	Analysis of state and museum databases, with supplementation by experts; ranking of conservation and threat data. Spatial summation and analysis by SRC, Client Services, DENR.
Climate change impacts	Analysis by the consultant of the IPCC (2007) and CSIRO (2008) projections for South Australia. Interpretation at a local scale of possible resulting changes in biophysical systems.
Actions	Derived from information above, including consultation with key players.
Priority assigned to actions	Categorisation of priority was decided by the project team and other key players. Priority depended on (i) GIS Analysis; (ii) Key players within the locality; (iii) Potential hazard to life and property. This is further detailed below.
Biota	State and museum databases with supplementation from experts.

6.2 Prioritising Actions

In the Cell Descriptions (Section 6.3) a priority is assigned for each proposed action. The project team adopted a scheme of priority assessment based on the data, mapping and on-ground knowledge, having regard to the end users of the report with its associated maps. This assessment is shown in Table 6.2.

Cell Descriptions

Table 6.2. Criteria for prioritising proposed actions.

Priority	Description
High (cons/threat)	A matter or area that has a high conservation priority score in the region and is under very significant immediate threat
High (hazard)	An actual or potential flooding or erosion hazard, water quality or cliff instability issue for human safety
High (soc/econ)	An issue or place that has a high social or economic significance
Medium (cell)	An area or issue identified as being important in this cell
Medium (region)	An area or issue identified as being important in the region
Medium (threat)	A significant threat, within the GIS threat analysis, i.e. a threat to conservation values
Medium (cons)	An area or matter with high to medium total conservation priority scores in the region
Medium (soc/econ)	An area or matter of moderate social or economic significance
Low (cons)	An issue or place of low to moderate conservation priority and low to moderate threat
Low (hazard)	A flooding, erosion, water quality or cliff hazard of long term potential but low immediate concern

6.3 Description and Analysis of Coastal Cells

6.3.1 Cell SE1 Piccaninnie Ponds

Danger Point to State border.

Cell area 1149 ha. Length of shoreline 14.6km.



SE1 – Piccaninnie Ponds

Landforms

This is a coastal plain, with a low dune barrier of beach ridges <400m wide, backed by a limestone/clay plain with groundwater-fed freshwater swamps and ponds. Wave energy is medium to low, since offshore reefs to the west (Green Point and Point Danger) offer some protection. Although 27% of the cell area is within dunes, sand storage volumes are low: Offshore reefs may have retarded Holocene onshore movement, resulting in alongshore sand movement (possibly to Canunda, Short)

The beaches are of fine/ medium carbonate-rich sand, with low stable dune development; in ridges some 200m wide. There is a low rolling coastal plain behind the dunes, in calcarenite and Mt Gambier Limestone. Freshwater springs and marshes in low lying areas are supplied by groundwater movement from the north.

Dunes widen west of Green Point, but are mainly stable. Brown Bay shows medium energy conditions, with a flat coastal plain and low beach ridges <5m in height and c.200m wide. Danger Point shows beach and nearshore sand accumulation in lee of reefs.



Piccaninnie Ponds, Discovery Bay. Photograph Coast Protection Board 2003.

Benthic Habitat

Bare sand is found to 2km offshore, with patches of low profile platform reef.

Biota

There are 10 flora survey sites, 74 opportune flora sites, 29 Herbarium record sites, 7 fauna survey sites, and 74 opportune fauna survey sites. 491.7 ha are in remnant vegetation, this is 43% of the cell area.

Vegetated sand dunes + swamps at Piccaninnie Ponds and Pick Swamp *Leucopogon parviflorus*, *Acacia longifolia* var. *sophorae*, *Olearia axillaris* tall shrubland over *Lepidosperma gladiatum*, *Ficinia nodosa* over ground covers. (Approx. 60% of this is vegetated coastal dune). At Piccaninnie Ponds and adjacent wetlands *Typha domingensis* sedgeland and *Gabnia trifida* sedgeland are mapped.

SE1 – Piccaninnie Ponds

221 bird species have been recorded in this cell, notably the EPBC listed critically endangered Orange-bellied Parrot (*Neophema chrysogaster*) and State endangered Magpie Goose (*Anseranas semipalmata*), Azure Kingfisher (*Ceyx azureus*), White-bellied Sea Eagle (*Haliaeetus leucogaster*), Eastern Osprey (*Pandion cristatus*), and Little (*Sternula albifrons*) and Fairy (*Sternula nereis*) Terns. 22 butterflies, 15 mammals, 11 reptiles and 6 amphibians have also been recorded and include the State endangered Swamp Antechinus (*Antechinus minimus*) and Swamp Skink (*Lissolepis coventryi*).

Land Use/ Land Ownership

Piccaninnie Ponds CP, referred to as PP CP below (Management Plan 1992). Lower South East Marine Park. 33% of the cell protected in Conservation Park. 73% vegetated area is protected. Western extent of Piccaninnie Ponds / Pick Swamp wetland complex in private ownership. Western half of Browns Bay to Danger Point dominated by linear strip of rural living zoned private allotments on the coast.

Values/ Uses (Field visits and local reports)

Coastal dune ridges flattened, grazed and subdivided into small allotments near Danger Point. Larger farmed allotments at the western end of the cell. Well used area for fishing, ORVs and for surfing at Browns Bay. Danger Point is an internationally significant site due to the seasonal migratory presence of large numbers of Sanderling (*Calidris alba*). It is also a nationally significant site due to large numbers of migratory Ruddy Turnstones (*Arenaria interpres*). Aboriginal Heritage values throughout.

Threats (Field visits and local reports)

Grasslands are threatened by shrub incursion and inappropriate fire regime. Coastal wetlands are threatened by many small informal farm drains connecting to the sea and now tidal incursion. Air photo analysis shows ORV activity in dune ridges near Glenro, Browns Bay.

Falling groundwater pressure and current rising sea level constitute a potential threat to freshwater coastal swamps and lakes and to conservation values. (See Scholz O, 1990, p.240, 241 “Water within the aquifer had a lower salinity and different ionic dominants than the water present within the ponds. The water within the aquifer was characterized by calcium and bicarbonate as dominant ions, whereas sodium and chloride predominated within the ponds. This marked difference in composition and total salinity, in conjunction with the proximity of the ponds to the coast, suggests that there is a subterranean contribution of sea water to the ponds via the Chasm, resulting in a 4-5 fold increase in salinity.”). A recent scientific review (Department of Water, 2010) has confirmed a regional trend of fall in water table within the Limestone Coast region, with clear threats for all wetlands.

Opportunities

Monitoring of groundwater and coastal lake salinity (impact of regional farming practices and sea level rise).

Vegetation management from parks plan (1992):

SE1 – Piccaninnie Ponds

Actions

- encourage scientific research into the Ponds and other habitats to facilitate management decision making
- continue to maintain limited vehicle access
- manage diving/snorkelling activities within the Ponds to ensure the conservation and sustainable use of the environment
- identify and monitor the ecology of and impacts on the vegetation in the Ponds and wetland areas
- control pest plant and animal species which have detrimental effects on the endemic vegetation
- restrict visitor access within the eastern and western wetlands

Fauna management from parks plan:

Actions

- prepare and implement a vertebrate pest control program
- protect habitat by controlling access and fire
- encourage investigation of habitat requirements for the maintenance of native fauna populations of the Park

(From Slater & Farrington, 2010, draft).

“Piccaninnie Ponds and surrounding wetlands are managed for conservation by DENR. Pick Swamp represents a recent acquisition to the Crown and will soon be gazetted as a Conservation Park. This wetland is bordered by the Southern Ocean to the south and Piccaninnie Ponds Conservation Park to the east. Private grazing properties lie to the north and west. The hydrology of Pick Swamp has been restored through the construction of a levee bank and outflow regulation. This complex of sites form regionally significant habitat for waterbirds and fish owing to the extent of permanent water.”

Pick Swamp (land parcel A50 DP83130) has now been incorporated into Piccaninnie Ponds CP. However the total wetland system extends from Green Point in Browns Bay to the Glenelg River in Victoria. Opportunity exists to incorporate further land into the CP to protect the entire wetland complex, which is habitat for nationally and State threatened biota, critically dependent upon the hydrology of this area.

Conservation Analysis (GIS)

The sum of means for all conservation layers is 138.47, making this second highest value cell in the region. When the detailed conservation summary map is examined it shows that these values are strongly concentrated in Piccaninnie Ponds CP, Pick Swamp and Browns Beach dunes: other than the poorly drained land between Pick Swamp and the CP, other parts of the cell show low total values.

Coastal wetlands (*Typha* sedgelands and *Gahnia* sedgelands) in the CP and at Pick Swamp show high values for rare plant associations, threatened bird species; numbers of bird species is high to very high for the whole cell: west of Green Point most of the cell show at least moderate values for bird habitat.

Based on the floristic vegetation map of SA and the CDC survey, very high scores for the proportion of plants endemic to the region were found in the dune areas of eastern Brown Bay and PP CP; Vegetation communities threatened status, rarity within the state, and endemism all rated highly. Total numbers of plant and animal species are low for the cell, with the exception of the PP CP, where species numbers are high within the sand dune areas. Throughout this cell butterfly species numbers and butterfly habitat values are high, notably in the CP and the dune ridges of eastern Brown Bay. Piccaninnie Ponds and Pick Swamp showed high scores for reptile habitat. These areas were also valuable as habitat for the Southern Bell Frog (focal species).

SE1 – Piccaninnie Ponds

Listed Aboriginal sites are found within this cell. Slater and Farrington (2010) list Piccaninnie Ponds and Pick swamp as regionally significant and attribute them a high wetland rating score.

Piccaninnie Ponds is listed as a ‘significant geological feature’, as one of a series of “Sinkholes in the Lower South East”, as a distinctive ‘doline’ (limestone solution) feature, developed within the Gambier Limestone formation; The entire foreshore, c. <100m from low water mark is designated a significant geological feature, “Glenelg River and Lower South East Coast”. These give further conservation value to this location. Vegetation patch metrics did not rate highly in this cell, with the exception of patch shape.

Threat Analysis (GIS)

This cell has a medium to low total threat score, with relatively high scores for viewshed, viewscape and off road vehicle tracks. Detailed summary mapping of the combined threat layers shows threats are medium to high in two of the high value areas: Pick Swamp and Browns Beach dunes.

Coastal zoning of much of the seaward section of the cell shows low values for development, although ‘rural living’ at the eastern end of Brown Bay attracts high threat scores. Moderately high threat totals for off road vehicle tracks were found, and this threat was found to concentrate around the dunes of Brown Bay (including the cleared dunes at the western end of the bay) and the eastern end of Piccaninnie Ponds CP.

Note: Some major threats to conservation values of this area were not part of the GIS analysis, including the proliferation of drains and falling groundwater pressures, (see Scholz & Department of Water above).

Adaptation to Climate Change: Threats for Cell SE1

(see also discussion of scenario in Section 4.11)

NOTE: the advice below is indicative of likely change and the direction of change, with implications for ecosystems. Dates, amounts and probabilities cannot be accurately calculated at this time. Thus advice on flood levels, for example, should not be used in engineering or development planning.

Climate change element/ scenario	Impacts and implications (for this cell)	Protect and manage habitat threats	Address landscape issues: fire, connectivity, refuges, hydrology
Combined climate changes and sea level rise throughout this cell	This cell presents a complex pattern of habitats sensitive to change.	Create a baseline for shoreline, dune and lake change by establishing a rectified aerial imagery record at an appropriate resolution.	
Sea level rise: 2030 : +c.20cm 2070: +c.80cm	Rise in frequency of tidal flooding, threatens freshwater swamps. Lidar elevation data shows Pick Swamp will be threatened with incursion before Piccaninnie Ponds.	Manage sill height on tidal inlets.	
	Increase in storm foredune damage and beach recession.	Establish profile monitoring at Brown Bay and Discovery Bay, as baseline information	

SE1 – Piccaninnie Ponds

Climate change element/ scenario	Impacts and implications (for this cell)	Protect and manage habitat threats	Address landscape issues: fire, connectivity, refuges, hydrology
		for the threats to the CP and coastal lowlands.	
	Sandy coast has marked recession, (low sand storage volume), foredune blowouts, and dune transgression. Beach and nearshore sand accumulation in lee of reefs may be reduced together with reef protection of the shore.	Active management of dune blowouts.	
Storms: <i>Frequency</i> continues to show great variation on a decadal scale. <i>Intensity</i> of large storms increases.	2030: Occasional storm tide flooding above highest known tides. Flooding frequency critical for freshwater swamps. (Lidar survey shows extensive inundation of the low ground behind Jones Bay) 2070: Flooding will affect all swamps and adjacent low lying areas.	Manage sill height on tidal inlets to adjust to higher marine storm elevations.	
	Frequent damage to foredunes.	Active management of dune blowouts.	
Warmer average conditions: 2030:+0.3 to 0.6°C 2070:+1.5 to 2°C	Impacts uncertain. Existing terrestrial vegetation is found in warmer conditions elsewhere.		Maintain connectivity of vegetation within the region.
Drier average conditions: 2030: -2% to 5% 2070: - 10% to 20%	Dunes adapt well to drier conditions, but recover more slowly from fire, disease and storm damage: dune mobilization becomes more likely.	Active weed control within dunes.	
‘Flashy’ run off: Drier creeks, but larger rare floods	Drains and creeks may increase sediment and nutrient load to coastal swamps, (this depends on land management practices).	Maintain watching brief on sedimentation of high value swamps areas.	
Groundwater lowering; saline incursion:	The fall in fresh groundwater pressure a significant threat to vegetation survival in freshwater swamps.	Adaptive management of plant assets.	Continue to monitor salinity of Piccaninnie Ponds.
Nearshore sea changes - temperature; acidity; wave	Persistent swell wave climate maintains sediment movement towards the east along the coast.	Monitor beaches, see above.	

SE1 – Piccaninnie Ponds

Climate change element/ scenario	Impacts and implications (for this cell)	Protect and manage habitat threats	Address landscape issues: fire, connectivity, refuges, hydrology
<p>climate: 2030: +0.3°C to +0.6°C</p> <p>2070: +1.0°C to +1.50C</p>	(Changes in upwellings timing and frequency has been discussed, but not projected).		

Table 6.3. Recommended Actions and Priority for Cell SE1 – Piccaninnie Ponds

Component	Issue	Proposed Action	Priority of Action	Key Players
Beaches and dunes	Coastal erosion and flooding threaten loss of high conservation value dune ridges at Browns Beach and Piccaninnie Ponds.	Establish beach profile survey monitoring lines at Browns Bay and Discovery Bay as baseline information. Aerial imagery analysis of shoreline recession.	Medium (Threat)	DENR, CPB, NRM
	Off road vehicle use and unleashed dogs threaten shorebird activity.	Reduce pressure on habitat at shorebird nesting times by a seasonal vehicle ban or seasonal detours.	High (Cons/Threat)	DENR, NRM, Council
		Fence nests/ Community monitoring	High (Cons/Threat)	DENR, Council, community, NRM
		Raising community awareness through signage at major beach access points.	High (Cons/Threat)	DENR, Council, community, NRM
	Threat of weed invasion to edges of vegetation patches from surrounding land and roadsides.	Regular monitoring for alert weeds, listed in Section 4.9. Weed strategy development and action on weed removal for beach and dune areas.	Medium (Threat)	Council, DENR, Community, NRM
	Inappropriate ORV use in the dunes, particularly between Danger Point and Green Point.	Restrict beach access to nodal tracks. Fence sensitive areas and enforce compliance.	High (Threat)	Council, DENR, Community, SA Police, DTEI
	On-going and accelerating sea level rise threatens beach and dune recession.	Active management of blowouts.	Medium (cell)	DENR, CPB

SE1 – Piccaninnie Ponds

Component	Issue	Proposed Action	Priority of Action	Key Players
Piccaninnie Ponds CP	The CP has high biodiversity associated with a concentration of conservation values within the vegetation of the reserve and adjacent Pick Swamp.	Ongoing implementation of the management plan to minimise impacts and threats on flora and fauna.	High (Cons/Threat)	DENR, NRM, Friends Groups
Coastal swamps and wetlands	Valuable coastal wetlands at Pick Swamp and Piccaninnie Ponds are potentially threatened by sea level rise, greater frequency and height of storm tides, as well as fall in fresh groundwater pressure.	Continue monitoring water quality at Piccaninnie Ponds. Manage sill height of tidal inlet.	High (Cons/Threat)	Dept. for Water, DENR
	Coastal wetlands threatened by reduced inland flows through over extraction, continued drainage and drying of the landscape.	Continue to monitor water volumes of wetlands. Work with private landholders to increase/preserve flows where possible.	High (Cons/Threat)	Dept. for Water, DENR, NRM, SEWCDB, community
	Rare habitat for butterflies within the sedge and reed plant communities.	Planting of larval host plants. Protection of existing remnants.	Medium (Cons)	DENR, NRM, Community
	High conservation value habitat for the Swamp Antechinus, Swamp Skink and Southern Bell Frog focal species.	Protection of existing habitat and efforts to re-establish linkages between remnants.	Medium (Cons)	DENR, NRM, Community
	Habitat for rare and threatened flora species, particularly orchids.	Protection of existing habitat and efforts to improve extent of wetlands.	Medium (Cons)	DENR, NRM, Community
Whole Cell	Aboriginal Heritage sites recorded in this cell: need for appropriate and sustainable management.	Consultation to appropriately manage sites in this area.	High (Cons)	Murrapeena Heritage Association Inc., SE Aboriginal Focus Group, NRM, Council, Aboriginal Heritage Branch – DPC, Aboriginal Partnership Unit – DENR

SE1 – Piccaninnie Ponds

Component	Issue	Proposed Action	Priority of Action	Key Players
	Inappropriate management of creeks and drains across the cell.	Work with landholders to establish better management practises or alternatives to drainage.	Medium (cell)	Dept. for Water, SEWCDB, DENR, NRM, community
	Scattered development between Danger Point and Green Point threatens conservation values of adjacent areas.	Restrict further development and minimise impact of existing development.	Medium (Threat)	Council, DPLG, CPB
	Cell statistics show poor vegetation block connectivity and high block isolation, threatening habitat resilience.	Seek opportunities, (eg through reservation, heritage agreements and assisted landholder action) to improve biodiversity linkages.	High (Cons/ threat)	DENR, NRM, Community
	Lack of recognition of significant geological feature (Bridgewater formation).	Interpretation. Council to include map of the feature in its development plan.	Med (Cons)	Council, Geological Society SA, NRM

BIOTA

Flora

Remnant vegetation area (ha)	491.7 ha, 42.8% of cell area
# flora surveys / records	10 surveys, 74 opportune sites, 29 herbarium record sites, 5 threatened plant population record site, 1 reserve database record site
# flora in cell	401
# conservation rated flora in cell	34 recorded
# non-indigenous flora in cell	77 recorded
Significant CDCS floristic community	<i>Juncus kraussii</i> sedgeland (>50% of known sites occur along SE coast; <20 records along SA coast). <i>Leucopogon parviflorus</i> / <i>Olearia axillaris</i> shrubland (>50% of known sites occur along SE coast).
Protected area	Piccaninnie Ponds Conservation Park (377.3ha in total)

Weeds

Species	Common Name	Status	Study rating
<i>Asparagus asparagoides</i> (NC)	Bridal Creeper	WONS, D	9
<i>Lycium ferocissimum</i>	African Boxthorn	D	9
<i>Thinopyrum junceiforme</i>	Sea Wheat-grass		8
<i>Leptospermum laevigatum</i>	Coast Tea-tree		7
<i>Festuca arundinacea</i>	Tall Meadow Fescue		5
<i>Euphorbia paralias</i>	Sea Spurge		4
<i>Euphorbia terracina</i>	False Caper	D	4
<i>Pinus radiata</i>	Radiata Pine		3
<i>Senecio elegans</i>	Purple Groundsel		3
<i>Acacia longifolia</i> ssp. <i>longifolia</i>	Sallow Wattle		2

SE1 – Piccaninnie Ponds

Species	Common Name	Status	Study rating
<i>Ammophila arenaria</i>	Marram Grass		2
<i>Rubus sp.</i>	Blackberry	WONS, D	2
<i>Anagallis arvensis</i>	Pimpernel		
<i>Avellinia michelii</i>	Avellinia		
<i>Avena fatua</i>	Wild Oat		
<i>Berula erecta</i>	Water Parsnip		
<i>Briza maxima</i>	Large Quaking-grass		
<i>Bromus diandrus</i>	Great Brome		
<i>Bromus hordeaceus ssp. hordeaceus</i>	Soft Brome		
<i>Cakile maritima ssp. maritima</i>	Two-horned Sea Rocket		
<i>Carduus sp.</i>	Thistle		
<i>Carduus tenuiflorus</i>	Slender Thistle		
<i>Catapodium rigidum</i>	Rigid Fescue		
<i>Centaureum erythraea</i>	Common Centaury		
<i>Centaureum maritimum</i>	Sea Centaury		
<i>Centaureum sp.</i>	Centaury		
<i>Cerastium balearicum</i>	Chickweed		
<i>Cerastium glomeratum</i>	Common Mouse-ear Chickweed		
<i>Cirsium vulgare</i>	Spear Thistle		
<i>Cotula coronopifolia</i>	Water Buttons		
<i>Crassula natans var. minus</i>	Water Crassula		
<i>Cynodon dactylon (NC)</i>	Couch		
<i>Dactylis glomerata</i>	Cocksfoot		
<i>Erodium cicutarium</i>	Cut-leaf Heron's-bill		
<i>Euphorbia peplus</i>	Petty Spurge		
<i>Galenia sp.</i>	Galenia		
<i>Galium murale</i>	Small Bedstraw		
<i>Geranium molle var. molle</i>	Soft Geranium		
<i>Holcus lanatus</i>	Yorkshire Fog		
<i>Hypochaeris glabra</i>	Smooth Cat's Ear		
<i>Hypochaeris radicata</i>	Rough Cat's Ear		
<i>Juncus bulbosus</i>	Bulbous Rush		
<i>Lagurus ovatus</i>	Hare's Tail Grass		
<i>Leontodon taraxacoides ssp. taraxacoides</i>	Lesser Hawkbit		
<i>Lolium perenne</i>	Perennial Ryegrass		
<i>Medicago lupulina</i>	Black Medic		
<i>Medicago truncatula</i>	Barrel Medic		
<i>Melilotus indicus</i>	King Island Melilot		
<i>Minuartia mediterranea</i>	Slender Sandwort		
<i>Myosotis discolor ssp. discolor</i>	Yellow-and-blue Forget-me-not		
<i>Parapholis incurva</i>	Curly Ryegrass		
<i>Plantago coronopus ssp.</i>	Bucks-horn Plantain		
<i>Plantago lanceolata var. lanceolata</i>	Ribwort		
<i>Polypogon maritimus</i>	Coast Beard-grass		
<i>Prunella vulgaris</i>	Self-heal		
<i>Puccinellia fasciculata</i>	Borrer's Saltmarsh-grass		
<i>Raphanus raphanistrum</i>	Wild Radish		
<i>Romulea rosea var. australis</i>	Common Onion-grass		
<i>Rorippa microphylla</i>	One-row Watercress		
<i>Rorippa nasturtium-aquaticum</i>	Watercress		
<i>Rostraria cristata</i>	Annual Cat's-tail		
<i>Rumex crispus</i>	Curled Dock		
<i>Rumex pulcher ssp. pulcher</i>	Fiddle Dock		

SE1 – Piccaninnie Ponds

Species	Common Name	Status	Study rating
<i>Sagina apetala</i>	Annual Pearlwort		
<i>Sambucus gaudichaudiana</i>	White Elderberry		
<i>Solanum aviculare</i>	Kangaroo Apple		
<i>Solanum nigrum</i>	Black Nightshade		
<i>Sonchus oleraceus</i> (NC)	Common Sow-thistle		
<i>Stellaria media</i>	Chickweed		
<i>Taraxacum</i> sp.	Dandelion		
<i>Tribolium oblitterum</i>			
<i>Trifolium fragiferum</i> var. <i>fragiferum</i>	Strawberry Clover		
<i>Trifolium resupinatum</i> var. <i>resupinatum</i>	Shaftal Clover		
<i>Trifolium</i> sp.	Clover		
<i>Trifolium stellatum</i>	Star Clover		
<i>Verbascum virgatum</i>	Twiggy Mullein		
<i>Veronica anagallis-aquatica</i>			

D: Declared weed, WONS: Weeds of National Significance

Native flora

Species	Common Name	Aus status	SA status
<i>Prasophyllum frenchii</i>	Maroon Leek-orchid	E	E
<i>Prasophyllum frenchii</i> (NC)	Maroon Leek-orchid	E	E
<i>Oreomyrrhis eriopoda</i>	Australian Carraway		E
<i>Pterostylis parviflora</i>			E
<i>Prasophyllum litorale</i>	Coast Leek-orchid		E*
<i>Glycine latrobeana</i>	Clover Glycine	V	V
<i>Pterostylis tenuissima</i>	Swamp Greenhood	V	V
<i>Senecio psilocarpus</i>		V	V
<i>Arthropodium milleflorum</i>	Pale Vanilla-lily		V
<i>Centella uniflora</i>			V
<i>Gentianella gunniana</i>	Mountain Gentian		V
<i>Lachnagrostis scabra</i>	Ruddy Bent		V
<i>Luzula flaccida</i>	Pale Wood-rush		V
<i>Mazus pumilio</i>	Swamp Mazus		V
<i>Scaevola calendulacea</i>	Dune Fanflower		V
<i>Veronica gracilis</i>	Slender Speedwell		V
<i>Veronica subtilis</i>	Slender Speedwell		V
<i>Asperula subsimplex</i>	Water Woodruff		R
<i>Brachyscome graminea</i>	Grass Daisy		R
<i>Brachyscome parvula</i>	Coast Daisy		R
<i>Carex gunniana</i>	Mountain Sedge		R
<i>Cladium procerum</i>	Leafy Twig-rush		R
<i>Deyeuxia densa</i>	Heath Bent-grass		R
<i>Diuris sulphurea</i>	Tiger Orchid		R
<i>Gabnia clarkei</i>	Tall Saw-sedge		R
<i>Haloragis brownii</i>	Swamp Raspwort		R
<i>Leptinella reptans</i>	Creeping Cotula		R
<i>Leptorhynchus tenuifolius</i>	Wiry Buttons		R
<i>Melaleuca squarrosa</i>	Bottlebrush Tea-tree		R
<i>Mentha diemenica</i>	Slender Mint		R
<i>Microtis rara</i>	Sweet Onion-orchid		R
<i>Myriophyllum variifolium</i>	Varied Milfoil		R
<i>Poa fax</i>	Scaly Poa		R
<i>Ranunculus inundatus</i>	River Buttercup		R

SE1 – Piccaninnie Ponds

Species	Common Name	Aus status	SA status
<i>Acacia leiophylla</i>	Coast Golden Wattle		
<i>Acacia longifolia</i> ssp.	Sallow Wattle		
<i>Acacia longifolia</i> ssp. <i>sophorae</i>	Coastal Wattle		
<i>Acacia melanoxylon</i>	Blackwood		
<i>Acacia myrtifolia</i> var. (NC)	Myrtle Wattle		
<i>Acacia myrtifolia</i> var. <i>myrtifolia</i> (NC)	Myrtle Wattle		
<i>Acacia pycnantha</i>	Golden Wattle		
<i>Acacia verticillata</i> ssp. <i>ovoidea</i>	Prickly Moses		
<i>Acaena echinata</i> var. (NC)	Sheep's Burr		
<i>Acaena novae-zelandiae</i>	Biddy-biddy		
<i>Acaena</i> sp.	Sheep's Burr		
<i>Acrotriche affinis</i>	Ridged Ground-berry		
<i>Acrotriche serrulata</i>	Cushion Ground-berry		
<i>Acrotriche</i> sp.	Ground-berry		
<i>Actites megalocarpa</i>	Coast Sow-thistle		
<i>Agrostis avenacea</i> var. <i>avenacea</i> (NC)	Common Blown-grass		
<i>Ajuga australis</i>	Australian Bugle		
<i>Allocasuarina verticillata</i>	Drooping Sheoak		
<i>Angianthus preissianus</i>	Salt Angianthus		
<i>Apalochlamys spectabilis</i>	Showy Firebush		
<i>Apium annuum</i>	Annual Celery		
<i>Apium prostratum</i> var.	Native Celery		
<i>Apium prostratum</i> var. <i>filiforme</i>	Native Celery		
<i>Apium prostratum</i> var. <i>prostratum</i>	Native Celery		
<i>Apodasmia brownii</i>	Coarse Twine-rush		
<i>Arthropodium strictum</i>	Common Vanilla-lily		
<i>Asperula conferta</i>	Common Woodruff		
<i>Astroloma humifusum</i>	Cranberry Heath		
<i>Atriplex cinerea</i>	Coast Saltbush		
<i>Austrodanthonia caespitosa</i>	Common Wallaby-grass		
<i>Austrodanthonia geniculata</i>	Kneed Wallaby-grass		
<i>Austrodanthonia racemosa</i> var. <i>racemosa</i>	Slender Wallaby-grass		
<i>Austrodanthonia setacea</i>	Small-flower Wallaby-grass		
<i>Austrofestuca littoralis</i>	Coast Fescue		
<i>Austrostipa exilis</i>	Heath Spear-grass		
<i>Austrostipa flavescens</i>	Coast Spear-grass		
<i>Austrostipa</i> sp.	Spear-grass		
<i>Azolla filiculoides</i>	Pacific Azolla		
<i>Baumea arthropophylla</i>	Swamp Twig-rush		
<i>Baumea juncea</i>	Bare Twig-rush		
<i>Billardiera cymosa</i> (NC)	Sweet Apple-berry		
<i>Bolboschoenus caldwellii</i>	Salt Club-rush		
<i>Bossiaea prostrata</i>	Creeping Bossiaea		
<i>Bromus</i> sp.	Brome		
<i>Brunonia australis</i>	Blue Pincushion		
<i>Burchardia umbellata</i>	Milkmaids		
<i>Bursaria spinosa</i> ssp. <i>spinosa</i>	Sweet Bursaria		
<i>Caladenia carnea</i>	Pink Fingers		
<i>Caladenia latifolia</i>	Pink Caladenia		
<i>Carex bichenoviana</i>	Notched Sedge		
<i>Carpobrotus rossii</i>	Native Pigface		
<i>Carpobrotus rossii</i> (NC)	Native Pigface		
<i>Cassyntha glabella</i> f. <i>dispar</i>	Slender Dodder-laurel		

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Species	Common Name	Aus status	SA status
<i>Cassytha pubescens</i>	Downy Dodder-laurel		
<i>Centella cordifolia</i>	Native Centella		
<i>Centrolepis polygyna</i>	Wiry Centrolepis		
<i>Centrolepis strigosa</i> ssp. <i>strigosa</i>	Hairy Centrolepis		
<i>Chamaescilla corymbosa</i> var. <i>corymbosa</i>	Blue Squill		
<i>Chrysocephalum apiculatum</i>	Common Everlasting		
<i>Clematis microphylla</i> var. <i>microphylla</i>	Old Man's Beard		
<i>Comesperma volubile</i>	Love Creeper		
<i>Convolvulus angustissimus</i> ssp. <i>angustissimus</i>	Australian Bindweed		
<i>Convolvulus erubescens</i> (NC)	Australian Bindweed		
<i>Correa reflexa</i> var. <i>reflexa</i> (NC)	Common Correa		
<i>Corybas diemenicus</i>	Veined Helmet-orchid		
<i>Cotula vulgaris</i> var. <i>australasica</i>	Slender Cotula		
<i>Crassula closiana</i>	Stalked Crassula		
<i>Crassula colligata</i> ssp. <i>lamprosperma</i>			
<i>Crassula colorata</i> var.	Dense Crassula		
<i>Crassula decumbens</i> var. <i>decumbens</i>	Spreading Crassula		
<i>Crassula belmsii</i>	Swamp Crassula		
<i>Crassula sieberiana</i> ssp. <i>tetramera</i> (NC)	Australian Stonecrop		
<i>Cynoglossum australe</i>	Australian Hound's-tongue		
<i>Cynoglossum suaveolens</i>	Sweet Hound's-tongue		
<i>Cyperus laevigatus</i>	Bore-drain Sedge		
<i>Cyrtostylis reniformis</i>	Small Gnat-orchid		
<i>Danthonia pilosa</i> var. <i>pilosa</i> (NC)	Velvet Wallaby-grass		
<i>Daucus glochidiatus</i>	Native Carrot		
<i>Deyeuxia quadriseta</i>	Reed Bent-grass		
<i>Dianella brevicaulis</i>	Short-stem Flax-lily		
<i>Dianella revoluta</i> var. <i>divaricata</i>	Broad-leaf Flax-lily		
<i>Dichelachne crinita</i>	Long-hair Plume-grass		
<i>Dichondra repens</i>	Kidney Weed		
<i>Distichlis distichophylla</i>	Emu-grass		
<i>Diuris orientis</i>	Wallflower Donkey-orchid		
<i>Diuris palustris</i>	Little Donkey-orchid		
<i>Drosera aberrans</i>			
<i>Drosera auriculata</i>	Tall Sundew		
<i>Drosera peltata</i>	Pale Sundew		
<i>Drosera pygmaea</i>	Tiny Sundew		
<i>Eleocharis acuta</i>	Common Spike-rush		
<i>Elymus scaber</i> var. <i>scaber</i>	Native Wheat-grass		
<i>Elymus scaber</i> var. <i>scaber</i> (NC)	Native Wheat-grass		
<i>Epilobium billardierianum</i> ssp. <i>billardierianum</i>	Robust Willow-herb		
<i>Epilobium billardierianum</i> ssp. <i>cinereum</i>	Variable Willow-herb		
<i>Epilobium</i> sp.	Willow-herb		
<i>Eucalyptus ovata</i> (NC)	Swamp Gum		
<i>Eucalyptus viminalis</i> ssp. <i>cygnetensis</i>	Rough-bark Manna Gum		
<i>Euchiton involucratu</i>	Star Cudweed		
<i>Euphorbia</i> sp. (NC)	Spurge		
<i>Eutaxia microphylla</i>	Common Eutaxia		
<i>Exocarpos cupressiformis</i>	Native Cherry		
<i>Ficinia nodosa</i>	Knobby Club-rush		
<i>Gabnia trifida</i>	Cutting Grass		
<i>Galium gaudichaudii</i> (NC)	Rough Bedstraw		

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Species	Common Name	Aus status	SA status
<i>Geranium potentilloides</i> var. <i>potentilloides</i>	Downy Geranium		
<i>Geranium retrorsum</i>	Grassland Geranium		
<i>Gnaphalium indutum</i> ssp. <i>indutum</i>	Tiny Cudweed		
<i>Gonocarpus tetragynus</i>	Small-leaf Raspwort		
<i>Gramineae</i> sp.	Grass Family		
<i>Gratiola peruviana</i>	Austral Brooklime		
<i>Hakea nodosa</i>	Yellow Hakea		
<i>Helichrysum</i> sp.	Everlasting		
<i>Hemarthria uncinata</i> var. <i>uncinata</i>	Mat Grass		
<i>Hibbertia australis</i>	Stalked Guinea-flower		
<i>Hibbertia sericea</i>	Silky Guinea-flower		
<i>Hibbertia sericea</i> var. <i>scabrifolia</i> (NC)	Rough-leaf Guinea-flower		
<i>Hibbertia</i> sp.	Guinea-flower		
<i>Hydrocotyle callicarpa</i>	Tiny Pennywort		
<i>Hydrocotyle capillaris</i>	Thread Pennywort		
<i>Hydrocotyle hirta</i>	Hairy Pennywort		
<i>Hydrocotyle laxiflora</i>	Stinking Pennywort		
<i>Hydrocotyle muscosa</i>	Mossy Pennywort		
<i>Hydrocotyle plebeya</i>			
<i>Hypericum gramineum</i>	Small St John's Wort		
<i>Hypericum</i> sp.	St John's Wort		
<i>Hypoxis vaginata</i> var. <i>vaginata</i>	Yellow Star		
<i>Imperata cylindrica</i>	Blady Grass		
<i>Isolepis cernua</i>	Nodding Club-rush		
<i>Isolepis</i> sp.	Club-rush		
<i>Juncus bufonius</i>	Toad Rush		
<i>Juncus caespiticus</i>	Grassy Rush		
<i>Juncus holoschoenus</i>	Joint-leaf Rush		
<i>Juncus kraussii</i>	Sea Rush		
<i>Juncus planifolius</i>	Broad-leaf Rush		
<i>Juncus</i> sp.	Rush		
<i>Kennedia prostrata</i>	Scarlet Runner		
<i>Lachnagrostis aemula</i>	Blown-grass		
<i>Lachnagrostis billardierei</i> ssp. <i>billardierei</i>	Coast Blown-grass		
<i>Lagenophora stipitata</i>	Spreading Bottle-daisy		
<i>Lemna disperma</i>	Common Duckweed		
<i>Lemna trisulca</i>	Ivy-leaf Duckweed		
<i>Lepidosperma gladiatum</i>	Coast Sword-sedge		
<i>Lepidosperma laterale</i>	Tall Sword-sedge		
<i>Lepilaena cylindrocarpa</i>	Long-fruit Water-mat		
<i>Lepilaena marina</i>	Sea Water-mat		
<i>Lepilaena patentifolia</i>	Spreading Water-mat		
<i>Lepilaena preissii</i>	Slender Water-mat		
<i>Leptoceras menziesii</i>	Hare Orchid		
<i>Leptospermum continentale</i>	Prickly Tea-tree		
<i>Leptospermum lanigerum</i>	Silky Tea-tree		
<i>Leptospermum</i> sp.	Tea-tree		
<i>Leucopogon ericoides</i>	Pink Beard-heath		
<i>Leucopogon lanceolatus</i> var. <i>lanceolatus</i>	Lance Beard-heath		
<i>Leucopogon parviflorus</i>	Coast Beard-heath		
<i>Lilaeopsis polyantha</i>	Australian Lilaeopsis		
<i>Limosella australis</i>	Australian Mudwort		
<i>Linum marginale</i>	Native Flax		

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Species	Common Name	Aus status	SA status
<i>Lobelia anceps</i>	Angled Lobelia		
<i>Lobelia gibbosa</i>	Tall Lobelia		
<i>Logania ovata</i>	Oval-leaf Logania		
<i>Lomandra longifolia</i>	Spiny-headed Mat-rush		
<i>Lomandra micrantha</i> ssp. <i>micrantha</i>	Small-flower Mat-rush		
<i>Lotus australis</i>	Austral Trefoil		
<i>Lycium australe</i>	Australian Boxthorn		
<i>Lytbrum hyssoifolia</i>	Lesser Loosestrife		
<i>Melaleuca gibbosa</i>	Slender Honey-myrtle		
<i>Melaleuca lanceolata</i> ssp. <i>lanceolata</i> (NC)	Dryland Tea-tree		
<i>Microlaena stipoides</i> var. <i>stipoides</i>	Weeping Rice-grass		
<i>Microtis arenaria</i>	Notched Onion-orchid		
<i>Microtis unifolia</i> (NC)	Common Onion-orchid		
<i>Monotoca scoparia</i>	Prickly Broom-heath		
<i>Moss</i> sp.			
<i>Muehlenbeckia adpressa</i>	Climbing Lignum		
<i>Muehlenbeckia gunnii</i>	Coastal Climbing Lignum		
<i>Myoporum insulare</i>	Common Boobialla		
<i>Myosotis australis</i>	Austral Forget-me-not		
<i>Myriophyllum salsugineum</i>	Lake Milfoil		
<i>Myriophyllum simulans</i>	Amphibious Milfoil		
<i>Notodanthonia semiannularis</i>	Wetland Wallaby-grass		
<i>Olearia axillaris</i>	Coast Daisy-bush		
<i>Olearia ramulosa</i>	Twiggy Daisy-bush		
<i>Olearia ramulosa</i> / <i>tubuliflora</i>	Daisy-bush		
<i>Opercularia varia</i>	Variable Stinkweed		
<i>Ophioglossum lusitanicum</i>	Austral Adder's-tongue		
<i>Oxalis perennans</i>	Native Sorrel		
<i>Oxalis perennans</i> (NC)	Native Sorrel		
<i>Oxalis</i> sp.	Sorrel		
<i>Ozothamnus ferrugineus</i>	Tree Everlasting		
<i>Ozothamnus turbinatus</i>	Coast Bush-everlasting		
<i>Parietaria debilis</i> (NC)	Smooth-nettle		
<i>Pelargonium australe</i>	Austral Stork's-bill		
<i>Pelargonium littorale</i>	Native Pelargonium		
<i>Phragmites australis</i>	Common Reed		
<i>Phragmites</i> sp.	Reed		
<i>Pimelea glauca</i>	Smooth Riceflower		
<i>Pimelea humilis</i>	Low Riceflower		
<i>Pimelea serpyllifolia</i> ssp. <i>serpyllifolia</i>	Thyme Riceflower		
<i>Pimelea</i> sp.	Riceflower		
<i>Plantago</i> sp.	Plantain		
<i>Plantago varia</i>	Variable Plantain		
<i>Poa labillardieri</i> var. <i>labillardieri</i>	Common Tussock-grass		
<i>Poa poiiformis</i> var. <i>poiiformis</i>	Coast Tussock-grass		
<i>Poa tenera</i>	Slender Tussock-grass		
<i>Poranthera microphylla</i>	Small Poranthera		
<i>Poranthera microphylla</i> (NC)	Small Poranthera		
<i>Potamogeton pectinatus</i>	Fennel Pondweed		
<i>Pratia irrigua</i>	Salt Pratia		
<i>Pratia pedunculata</i>	Matted Pratia		
<i>Pteridium esculentum</i>	Bracken Fern		
<i>Pterostylis nutans</i>	Nodding Greenhood		

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Species	Common Name	Aus status	SA status
<i>Pultenaea acerosa</i>	Bristly Bush-pea		
<i>Pultenaea hispidula</i>	Rusty Bush-pea		
<i>Pultenaea penna</i>	Feather Bush-pea		
<i>Pultenaea stricta</i>	Erect Bush-pea		
<i>Pultenaea tenuifolia</i>	Narrow-leaf Bush-pea		
<i>Ranunculus amphitrichus</i>	Small River Buttercup		
<i>Ranunculus sessiliflorus</i> var.	Annual Buttercup		
<i>Rhagodia candolleana</i> ssp.	Sea-berry Saltbush		
<i>Rhagodia candolleana</i> ssp. <i>candolleana</i>	Sea-berry Saltbush		
<i>Rhagodia</i> sp.	Saltbush		
<i>Rubus parvifolius</i>	Native Raspberry		
<i>Rumex brownii</i>	Slender Dock		
<i>Ruppia polycarpa</i>	Widgeon Grass		
<i>Ruppia</i> sp.	Water-tassel		
<i>Sagina maritima</i>	Sea Pearlwort		
<i>Samolus repens</i>	Creeping Brookweed		
<i>Scaevola albida</i>	Pale Fanflower		
<i>Scaevola</i> sp.	Fanflower		
<i>Schenkia australis</i>	Spike Centaury		
<i>Schoenoplectus pungens</i>	Spiky Club-rush		
<i>Schoenoplectus validus</i>	River Club-rush		
<i>Schoenus apogon</i>	Common Bog-rush		
<i>Schoenus breviculmis</i>	Matted Bog-rush		
<i>Schoenus nitens</i>	Shiny Bog-rush		
<i>Sebaea albidiflora</i>	White Sebaea		
<i>Sebaea ovata</i>	Yellow Sebaea		
<i>Selaginella gracillima</i>	Tiny Selaginella		
<i>Selliera radicans</i>	Shiny Swamp-mat		
<i>Senecio biserratus</i>	Jagged Groundsel		
<i>Senecio glomeratus</i> (NC)	Swamp Groundsel		
<i>Senecio glomeratus</i> ssp. <i>longifructus</i>	Swamp Groundsel		
<i>Senecio minimus</i>	Fine-tooth Groundsel		
<i>Senecio odoratus</i> var. <i>odoratus</i> (NC)	Scented Groundsel		
<i>Senecio picridioides</i>	Purple-leaf Groundsel		
<i>Senecio pinnatifolius</i> (NC)	Variable Groundsel		
<i>Senecio pinnatifolius</i> var. <i>lanceolatus</i>	Variable Groundsel		
<i>Senecio</i> sp.	Groundsel		
<i>Senecio squarrosus</i>	Squarrose Groundsel		
<i>Solanum laciniatum</i>	Cut-leaf Kangaroo-apple		
<i>Sonchus hydrophilus</i>	Native Sow-thistle		
<i>Sonchus</i> sp.	Sow-thistle		
<i>Spinifex sericeus</i> (NC)	Rolling Spinifex		
<i>Sporobolus virginicus</i>	Salt Couch		
<i>Sporobolus virginicus</i> (NC)	Salt Couch		
<i>Spyridium phylloides</i>	Narrow-leaf Spyridium		
<i>Spyridium</i> sp.	Spyridium		
<i>Spyridium vexilliferum</i> var.	Winged Spyridium		
<i>Spyridium vexilliferum</i> var. <i>latifolium</i>	Winged Spyridium		
<i>Spyridium vexilliferum</i> var. <i>vexilliferum</i>	Winged Spyridium		
<i>Stackhousia monogyna</i>	Creamy Candles		
<i>Stackhousia</i> sp.	Candles		
<i>Stackhousia spathulata</i>	Coast Candles		
<i>Stylidium graminifolium</i>	Grass Trigger-plant		

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Species	Common Name	Aus status	SA status
<i>Swainsona lessertiiifolia</i>	Coast Swainson-pea		
<i>Tetragonia implexicoma</i>	Bower Spinach		
<i>Thelymitra pauciflora</i> (NC)	Slender Sun-orchid		
<i>Themeda</i> sp.	Ilintji		
<i>Themeda triandra</i>	Kangaroo Grass		
<i>Thysanotus juncifolius</i>	Rush Fringe-lily		
<i>Thysanotus</i> sp.	Fringe-lily		
<i>Triglochin centrocarpum</i> (NC)	Dwarf Arrowgrass		
<i>Triglochin mucronata</i>	Prickly Arrowgrass		
<i>Triglochin procera</i>	Water-ribbons		
<i>Triglochin</i> sp.	Arrowgrass/Water-ribbons		
<i>Triglochin striata</i>	Streaked Arrowgrass		
<i>Typha domingensis</i>	Narrow-leaf Bulrush		
<i>Typha</i> sp.	Bulrush		
<i>Urtica incisa</i>	Scrub Nettle		
<i>Veronica</i> sp.	Speedwell		
<i>Villarsia reniformis</i>	Running Marsh-flower		
<i>Villarsia umbricola</i> var. <i>umbricola</i>	Lax Marsh-flower		
<i>Viola hederacea</i>	Ivy-leaf Violet		
<i>Viola hederacea</i> (NC)	Ivy-leaf Violet		
<i>Viola</i> sp.	Violet		
<i>Vittadinia dissecta</i> var. <i>hirta</i>	Dissected New Holland Daisy		
<i>Vittadinia</i> sp.	New Holland Daisy		
<i>Wurmbea dioica</i> ssp. <i>dioica</i> (NC)	Early Nancy		

E: Endangered, V: Vulnerable, R: Rare, E*: application of the status requires qualification

Fauna

# of fauna in cell	275 recorded – 221 birds, 22 butterflies, 15 mammals, 11 reptiles, 6 amphibians (an additional 14 butterflies, 1 mammal, 4 reptiles and 2 amphibians identified by experts as possibly occurring)
# of fauna surveys / records	7 surveys, 74 opportune sites, 1 reserve database sites
# of threatened fauna in cell	59 recorded
# of non-indigenous fauna	17 recorded (an additional 1 mammal possible)

Non-indigenous fauna

Species	Common Name	Class	Record
<i>Alanda arvensis</i>	Eurasian Skylark	Aves	x
<i>Carduelis carduelis</i>	European Goldfinch	Aves	x
<i>Chloris chloris</i>	Common Greenfinch (European Greenfinch)	Aves	x
<i>Columba livia</i>	Rock Dove (Feral Pigeon)	Aves	x
<i>Passer domesticus</i>	House Sparrow	Aves	x
<i>Streptopelia chinensis</i>	Spotted Dove (Spotted turtle-dove)	Aves	x
<i>Sturnus vulgaris</i>	Common Starling	Aves	x
<i>Turdus merula</i>	Common Blackbird	Aves	x
	Common Skylark	Aves	x
<i>Pieris rapae rapae</i>	Cabbage White	Invertebrate	x
<i>Danaus plexippus plexippus</i>	Wanderer, Monarch	Invertebrate	x
<i>Bos taurus</i>	Cattle (European Cattle)	Mammalia	x
<i>Felis catus</i>	Cat (Feral Cat)	Mammalia	x
<i>Lepus capensis</i>	Brown Hare (European Hare)	Mammalia	x

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Species	Common Name	Class	Record
<i>Mus musculus</i>	House Mouse	Mammalia	x
<i>Oryctolagus cuniculus</i>	Rabbit (European Rabbit)	Mammalia	x
<i>Rattus rattus</i>	Black Rat (Ship Rat, Roof Rat)	Mammalia	e
<i>Vulpes vulpes</i>	Fox (Red Fox)	Mammalia	x

x: recorded, e: expected to be there (C. Kemper pers. comm. 2009)

Birds

Species	Common Name	Aus status	SA status
<i>Neophema chrysogaster</i>	Orange-bellied Parrot	CR/M	E
<i>Anseranas semipalmata</i>	Magpie Goose		E
<i>Ceyx azureus</i>	Azure Kingfisher		E
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	M	E
<i>Pandion cristatus</i>	Eastern Osprey		E
<i>Sternula albifrons</i>	Little Tern		E
<i>Sternula nereis</i>	Fairy Tern		E
<i>Botaurus poiciloptilus</i>	Australasian Bittern		V
<i>Calyptorhynchus funereus</i>	Yellow-tailed Black-Cockatoo		V
<i>Cladorhynchus leucocephalus</i>	Banded Stilt		V
<i>Coturnix ypsilophora</i>	Brown Quail		V
<i>Grus rubicunda</i>	Brolga		V
<i>Lewinia pectoralis</i>	Lewin's Rail		V
<i>Neophema chrysostoma</i>	Blue-winged Parrot		V
<i>Numenius madagascariensis</i>	Eastern Curlew	M	V
<i>Petroica phoenicea</i>	Flame Robin		V
<i>Thinornis rubricollis</i>	Hooded Plover		V
<i>Actitis hypoleucos</i>	Common Sandpiper	M	R
<i>Anas rhynchotis</i>	Australasian Shoveler		R
<i>Anhinga novaehollandiae</i>	Australasian Darter		R
<i>Ardea ibis</i>	Cattle Egret		R
<i>Ardea intermedia</i>	Intermediate Egret		R
<i>Arenaria interpres</i>	Ruddy Turnstone	M	R
<i>Biziura lobata</i>	Musk Duck		R
<i>Calidris alba</i>	Sanderling	M	R
<i>Calidris melanotos</i>	Pectoral Sandpiper	M	R
<i>Calidris tenuirostris</i>	Great Knot	M	R
<i>Cereopsis novaehollandiae</i>	Cape Barren Goose		R
<i>Charadrius leschenaultii</i>	Greater Sand Plover (Large Sand Plover)	M	R
<i>Charadrius mongolus</i>	Lesser Sand Plover (Mongolian Plover)	M	R
<i>Egretta garzetta</i>	Little Egret		R
<i>Egretta sacra</i>	Eastern Reef Egret	M	R
<i>Falco peregrinus</i>	Peregrine Falcon		R
<i>Falcunculus frontatus</i>	Crested Shrike-tit		R
<i>Gallinago hardwickii</i>	Latham's Snipe (Japanese Snipe)	M	R
<i>Gerygone albogularis</i>	White-throated Gerygone		R
<i>Haematopus fuliginosus</i>	Sooty Oystercatcher		R
<i>Haematopus longirostris</i>	Australian Pied Oystercatcher		R
<i>Larus dominicanus</i>	Kelp Gull		R
<i>Limosa lapponica</i>	Bar-tailed Godwit	M	R
<i>Limosa limosa</i>	Black-tailed Godwit	M	R
<i>Myiagra inquieta</i>	Restless Flycatcher		R
<i>Neophema elegans</i>	Elegant Parrot		R
<i>Numenius phaeopus</i>	Whimbrel	M	R

SE1 – Piccaninnie Ponds

Species	Common Name	Aus status	SA status
<i>Oxyura australis</i>	Blue-billed Duck		R
<i>Plegadis falcinellus</i>	Glossy Ibis	M	R
<i>Pluvialis fulva</i>	Pacific Golden Plover	M	R
<i>Podiceps cristatus</i>	Great Crested Grebe		R
<i>Porzana tabuensis</i>	Spotless Crake		R
<i>Stagonopleura bella</i>	Beautiful Firetail		R
<i>Tringa brevipes</i>	Grey-tailed Tattler	M	R
<i>Xenus cinereus</i>	Terek Sandpiper	M	R
<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater		
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill		
<i>Acanthiza lineata</i>	Striated Thornbill		
<i>Acanthiza pusilla</i>	Brown Thornbill		
<i>Acanthiza reguloides</i>	Buff-rumped Thornbill		
<i>Acanthorhynchus tenuirostris</i>	Eastern Spinebill		
<i>Accipiter cirrocephalus</i>	Collared Sparrowhawk		
<i>Acrocephalus australis</i>	Australian Reed Warbler, (Clamorous Reed-Warbler)		
<i>Alcedo azureus</i> (NC)	Azure Kingfisher		
<i>Anas castanea</i>	Chestnut Teal		
<i>Anas gracilis</i>	Grey Teal		
<i>Anas superciliosa</i>	Pacific Black Duck		
<i>Anthochaera carunculata</i>	Red Wattlebird		
<i>Anthochaera chrysoptera</i>	Little Wattlebird		
<i>Anthus novaeseelandiae</i>	Australasian Pipit (Richard's Pipit)		
<i>Apus pacificus</i>	Fork-tailed Swift		
<i>Aquila audax</i>	Wedge-tailed Eagle		
<i>Ardea alba</i>	Great Egret		
<i>Ardea modesta</i>	Eastern Great Egret		
<i>Ardea pacifica</i>	White-necked Heron (Pacific Heron)		
<i>Ardenna tenuirostris</i>	Short-tailed Shearwater (Mutton Bird)		
<i>Artamus cyanopterus</i>	Dusky Woodswallow		
<i>Artamus personatus</i>	Masked Woodswallow		
<i>Artamus superciliosus</i>	White-browed Woodswallow		
<i>Aythya australis</i>	Hardhead (White-eyed Duck)		
<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo		
<i>Cacomantis pallidus</i>	Pallid Cuckoo		
<i>Calamanthus fuliginosus</i>	Striated Fieldwren		
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	M	
<i>Calidris canutus</i>	Red Knot	M	
<i>Calidris ferruginea</i>	Curlew Sandpiper	M	
<i>Calidris ruficollis</i>	Red-necked Stint	M	
<i>Catharacta skua</i>	Great Skua		
<i>Chalcites basalis</i>	Horsfield's Bronze-cuckoo		
<i>Chalcites lucidus</i>	Shining Bronze-Cuckoo		
<i>Charadrius bicinctus</i>	Double-banded Plover		
<i>Charadrius ruficapillus</i>	Red-capped Plover (Red-capped Dotterel)		
<i>Chenonetta jubata</i>	Australian Wood Duck, (Maned Duck)		
<i>Chlidonias hybrida</i>	Whiskered Tern	M	
<i>Chroicocephalus novaehollandiae</i>	Silver Gull		
<i>Chrysococcyx osculans</i>	Black-eared Cuckoo		
<i>Cincloramphus cruralis</i>	Brown Songlark		
<i>Circus approximans</i>	Swamp Harrier (Marsh Harrier)		
<i>Circus assimilis</i>	Spotted Harrier		

SE1 – Piccaninnie Ponds

Species	Common Name	Aus status	SA status
<i>Cisticola exilis</i>	Golden-headed Cisticola		
<i>Colluricincla harmonica</i>	Grey Shrike-thrush		
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike		
<i>Corcorax melanorhamphos</i>	White-winged Cough		
<i>Cormobates leucophaea</i>	White-throated Treecreeper		
<i>Corvus coronoides</i>	Australian Raven		
<i>Corvus mellori</i>	Little Raven		
<i>Corvus tasmanicus</i>	Forest Raven		
<i>Coturnix pectoralis</i>	Stubble Quail		
<i>Cracticus tibicen</i>	Australian Magpie		
<i>Cracticus torquatus</i>	Grey Butcherbird		
<i>Cygnus atratus</i>	Black Swan		
<i>Dacelo novaeguineae</i>	Laughing Kookaburra		
<i>Daphoenositta chrysoptera</i>	Varied Sittella		
<i>Daption capense</i>	Cape Petrel		
<i>Dasyornis broadbenti</i>	Rufous Bristlebird		ssp
<i>Dicaeum birundinaceum</i>	Mistletoebird		
<i>Egretta novaehollandiae</i>	White-faced Heron		
<i>Elanus axillaris</i>	Black-shouldered Kite		
<i>Elseyornis melanops</i>	Black-fronted Dotterel (Black-fronted Plover)		
<i>Eolophus roseicapillus</i>	Galah		
<i>Eopsaltria australis</i>	Eastern Yellow Robin		
<i>Epthianura albifrons</i>	White-fronted Chat		
<i>Erythrogonys cinctus</i>	Red-kneed Dotterel		
<i>Eudyptula minor</i>	Little Penguin (Fairy Penguin)		
<i>Falco berigora</i>	Brown Falcon		
<i>Falco cenchroides</i>	Nankeen Kestrel (Australian Kestrel)		
<i>Falco longipennis</i>	Australian Hobby		
<i>Fulica atra</i>	Eurasian Coot		
<i>Fulmarus glacialisoides</i>	Southern Fulmar		
<i>Gallinula tenebrosa</i>	Dusky Moorhen		
<i>Gallirallus philippensis</i>	Buff-banded Rail		
<i>Geopelia striata</i>	Peaceful Dove		
<i>Glossopsitta concinna</i>	Musk Lorikeet		
<i>Glossopsitta porphyrocephala</i>	Purple-crowned Lorikeet		
<i>Grallina cyanoleuca</i>	Magpie-lark		
<i>Haliastur sphenurus</i>	Whistling Kite		
<i>Hieraaetus morphnoides</i>	Little Eagle		
<i>Himantopus himantopus</i>	Black-winged Stilt		
<i>Hirundapus caudacutus</i>	White-throated Needletail	M	
<i>Hirundo neoxena</i>	Welcome Swallow		
<i>Hydroprogne caspia</i>	Caspian Tern		
<i>Lalage sueurii</i>	White-winged Triller		
<i>Larus pacificus</i>	Pacific Gull		
<i>Lichenostomus chrysops</i>	Yellow-faced Honeyeater		
<i>Lichenostomus leucotis</i>	White-eared Honeyeater		
<i>Lichenostomus penicillatus</i>	White-plumed Honeyeater		
<i>Lichenostomus virescens</i>	Singing Honeyeater		
<i>Limicola falcinellus</i>	Broad-billed Sandpiper	M	
<i>Malacorhynchus membranaceus</i>	Pink-eared Duck		
<i>Malurus cyaneus</i>	Superb Fairy-wren		
<i>Megalurus gramineus</i>	Little Grassbird		
<i>Melanodryas cucullata</i>	Hooded Robin		

SE1 – Piccaninnie Ponds

Species	Common Name	Aus status	SA status
<i>Melithreptus brevirostris</i>	Brown-headed Honeyeater		
<i>Melithreptus lunatus</i>	White-naped Honeyeater		
<i>Microcarbo melanoleucos</i>	Little Pied Cormorant		
<i>Microeca fascians</i>	Jacky Winter		ssp
<i>Morus serrator</i>	Australasian Gannet		
<i>Neochmia temporalis</i>	Red-browed Finch		
<i>Ninox novaeseelandiae</i>	Southern Boobook		
<i>Nycticorax caledonicus</i>	Nankeen Night Heron		
<i>Ocyphaps lophotes</i>	Crested Pigeon		
<i>Pachycephala olivacea</i>	Olive Whistler		ssp
<i>Pachycephala pectoralis</i>	Golden Whistler		
<i>Pachycephala rufiventris</i>	Rufous Whistler		
<i>Pardalotus punctatus</i>	Spotted Pardalote		
<i>Pardalotus striatus</i>	Striated Pardalote		
<i>Pelecanus conspicillatus</i>	Australian Pelican		
<i>Petrochelidon ariel</i>	Fairy Martin		
<i>Petrochelidon nigricans</i>	Tree Martin		
<i>Petroica boodang</i>	Scarlet Robin		ssp
<i>Pezoporus wallicus</i>	Ground Parrot		
<i>Phalacrocorax carbo</i>	Great Cormorant		
<i>Phalacrocorax fuscescens</i>	Black-faced Cormorant (Black-faced Shag)		
<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant		
<i>Phalacrocorax varius</i>	Pied Cormorant		
<i>Phaps chalcoptera</i>	Common Bronzewing		
<i>Phaps elegans</i>	Brush Bronzewing		
<i>Philemon corniculatus</i>	Noisy Firebird		
<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater		
<i>Phylidonyris pyrrhoptera</i>	Crescent Honeyeater		
<i>Platalea flavipes</i>	Yellow-billed Spoonbill		
<i>Platalea regia</i>	Royal Spoonbill		
<i>Platycercus elegans</i>	Crimson Rosella		
<i>Pluvialis squatarola</i>	Grey Plover	M	
<i>Podargus strigoides</i>	Tawny Frogmouth		
<i>Poliiocephalus poliocephalus</i>	Hoary-headed Grebe		
<i>Pomatostomus superciliosus</i>	White-browed Babbler		
<i>Pomatostomus temporalis</i>	Grey-crowned Babbler		ssp
<i>Porphyrio porphyrio</i>	Purple Swamphen (Purple Moorhen)		
<i>Porzana fluminea</i>	Australian Spotted Crake (Australian Crake)		
<i>Psephotus haematonotus</i>	Red-rumped Parrot		
<i>Recurvirostra novaehollandiae</i>	Red-necked Avocet		
<i>Rhipidura albiscapa</i>	Grey Fantail		
<i>Rhipidura leucophrys</i>	Willie Wagtail		
<i>Rhipidura rufifrons</i>	Rufous Fantail		
<i>Sericornis frontalis</i>	White-browed Scrubwren		
<i>Sterna striata</i>	White-fronted Tern		
<i>Stipiturus malachurus</i>	Southern Emu-wren	ssp	ssp
<i>Stipiturus malachurus malachurus</i>	Southern Emu-wren		
<i>Strepera versicolor</i>	Grey Currawong		ssp
<i>Tachybaptus novaehollandiae</i>	Australasian Grebe, (Little Grebe)		
<i>Tadorna tadornoides</i>	Australian Shelduck (Mountain Duck)		
<i>Thalasseus bergii</i>	Crested Tern		
<i>Threskiornis molucca</i>	Australian White Ibis (Sacred Ibis)		
<i>Threskiornis spinicollis</i>	Straw-necked Ibis		

SE1 – Piccaninnie Ponds

Species	Common Name	Aus status	SA status
<i>Todiramphus sanctus</i>	Sacred Kingfisher		
<i>Tribonyx ventralis</i>	Black-tailed Native-hen		
<i>Trichoglossus haematodus</i>	Rainbow Lorikeet		
<i>Tringa nebularia</i>	Common Greenshank	M	
<i>Tringa stagnatilis</i>	Marsh Sandpiper	M	
<i>Tyto alba</i>	Barn Owl		
<i>Tyto javanica</i>	Eastern Barn Owl		
<i>Vanellus miles</i>	Masked Lapwing		
<i>Vanellus tricolor</i>	Banded Lapwing		
<i>Zosterops lateralis</i>	Silvereye		

CR: Critically endangered, E: Endangered, V: Vulnerable, R: Rare, M: Migratory, ssp: sub-species

Butterflies

Species	Common Name	Status*	Record
<i>Heteronympha cordace wilsoni</i>	Bright-eyed Brown	E	x
<i>Jamenus icilius</i>	Icilius Hairstreak	E in SE	p
<i>Hesperilla cyrbsoticha cyclospila</i>	Chrysotricha Sedge-skipper or Golden-haired Sedge-skipper	V	x
<i>Oreixenica kershawi kanunda</i>	Striped Xenica	V	x
<i>Oreixenica lathoniella berceus</i>	Silver Xenica	V	x
<i>Trapezites symmomus soma</i>	Symmomus Rush-skipper or Splendid Ochre	V	x
<i>Candalides beathi beathi</i>	Rayed Blue	R	p
<i>Erina hyacinthina form josephina</i>	Common Dusky-blue	R	x
<i>Erina hyacinthina hyacinthina</i>	Dusky blue	R	x
<i>Lucia limbaria</i>	Small Copper	R	p
<i>Taractrocera papyria papyria</i>	White-banded Grass-dart	R	x
<i>Tisiphone abeona albifascia</i>	Sword-grass brown	R	p
<i>Belenois java teutonia</i>	Caper White	Va	x
<i>Delias aganippe</i>	Wood White	R	p
<i>Dispar compacta</i>	Barred Grass Skipper		x
<i>Erina acasta</i>	Blotched Dusky-blue		p
<i>Geitoneura klugii klugii</i>	Common Xenica	C	p
<i>Hesperilla donmya</i>	Variable Sedge-skipper		x
<i>Hesperilla donmya delos (incl. form diluta)</i>	Donnysa skipper		x
<i>Hesperilla idothea idothea</i>			x
<i>Heteronympha merope merope</i>	Common Brown	C	x
<i>Heteronympha penelope</i>	Shouldered Brown		x
<i>Junonia villida calybe</i>	Meadow argus	Va	p
<i>Lampides boeticus</i>	Long-tailed Pea-blue		p
<i>Nacuduba biocellata biocellata</i>	Two-spotted Line-blue	LC	p
<i>Neolucia agricola agricola</i>	Fringed Heath-blue		p
<i>Ocybadistes walkeri hypochlorus</i>	Southern Grass-dart		p
<i>Ogyris amaryllis</i>	Satin Azure		x
<i>Ogyris amaryllis meridionalis</i>	Amaryllis Azure		x
<i>Theclinesibes miskini miskini</i>	Wattle Blue		p
<i>Theclinesibes serpentata serpentata</i>	Salt-bush blue		p
<i>Vanessa itea</i>	Australian Admiral	Va	x
<i>Vanessa kershawi</i>	Australian Painted Lady	Va	x
<i>Zizina labradus labradus</i>	Common Grass Blue		x

*Vulnerability as per R. Grund, E: Endangered, V: Vulnerable, R: Rare, Va: Vagrant, LC: Locally common, C: Common

SE1 – Piccaninnie Ponds

x: recorded, p: possibly there as suggested by R. Grund

Mammals

Species	Common Name	Aus status	SA status	Record
<i>Antechinus minimus</i>	Swamp Antechinus		E	x
<i>Wallabia bicolor</i>	Swamp Wallaby		V	x
<i>Macropus rufogriseus</i>	Red-necked Wallaby		R	x
<i>Rattus lutreolus</i>	Swamp Rat		R	x
<i>Trichosurus vulpecula</i>	Common Brushtail Possum		R	x
<i>Hydromys chrysogaster</i>	Water-rat			x
<i>Pseudocheirus peregrinus</i>	Common Ringtail Possum			x
<i>Rattus fuscipes</i>	Bush Rat			x
<i>Tachyglossus aculeatus</i>	Short-beaked Echidna			x

E: Endangered, V: Vulnerable, R: Rare

Reptiles

Species	Common Name	Aus status	SA status	Record
<i>Lissolepis coventryi</i>	Swamp Skink		E	x
<i>Amphibolurus muvicanus</i>	Jacky Dragon		R	p
<i>Drysdalia coronoides</i>	White-lipped Snake		R	x
<i>Austrelaps superbus</i>	Lowland Copperhead			e
<i>Bassiana duperreyi</i>	Eastern Three-lined Skink			x
<i>Emydura macquarii</i>	Short-necked Turtle (Murray Turtle)			x
<i>Eulamprus tympanus</i>	Southern Water Skink			p
<i>Hemiernis peronii</i>	Four-toed Earless Skink			x
<i>Lerista bougainvillii</i>	Bougainville's Skink			x
<i>Liopholis whitii</i>	White's Skink			x
<i>Notechis scutatus</i>	Eastern Tiger Snake	ssp		x
<i>Pseudemoia entrecasteauxii</i>	Southern Grass Skink			e
<i>Pseudonaja textilis</i>	Eastern Brown Snake			x
<i>Tiliqua nigrolutea</i>	Blotched Bluetongue			x
<i>Tiliqua rugosa</i>	Sleepy Lizard			x

E: Endangered, V: Vulnerable, R: Rare

x: recorded, e: expected to be there, p: possibly there, but no record (M. Hutchinson pers. comm. 2009)

Amphibians

Species	Common Name	Aus status	SA status	Record
<i>Pseudophryne semimarmorata</i>	Marbled Toadlet		V	p
<i>Pseudophryne bibronii</i>	Brown Toadlet		R	p
<i>Crinia signifera</i>	Common Froglet			x
<i>Limnodynastes dumerilii</i>	Banjo Frog			x
<i>Limnodynastes peronii</i>	Striped Marsh Frog			x
<i>Litoria ewingii</i>	Brown Tree Frog			x
<i>Neobatrachus pictus</i>	Burrowing Frog			x
<i>Neobatrachus sudelli</i>	Sudell's Frog			x

E: Endangered, V: Vulnerable, R: Rare

x: recorded, e: expected to be there, p: possibly there, but no record (M. Hutchinson pers. comm. 2009)

SE2 – Port MacDonnell

6.3.2 Cell SE2 Port MacDonnell

This cell extends from east of Cape Northumberland to Danger Point. Shoreline is 14.9 km in length; cell area is 899.4 ha.



SE2 – Port MacDonnell

Landforms

This is a low lying undulating coastal plain with swamp muds and beach ridges over limestone. There are a series of small open embayments, between reefs and low headlands; there is little onshore sand storage in a narrow low Holocene beach ridge system. Beaches are narrow, with low foredunes, and wave energy is medium to low, gradually decreasing from E to W along the cell shoreline. Beach sands are fine to medium, with some shingle; the narrow beach ridges contain shingle ridges. There are also some coarse sand beaches at the western end of the cell. At Cape Northumberland aeolianite forms a low undulating plateau, with 20m cliffs and stranded cliff top dunes. There are extensive shore platforms and nearshore limestone reef that (together with the large breakwater) shelter Port MacDonald immediately to the east.



Port MacDonnell. Photograph Coast Protection Board 2003.

Benthic Habitat

There is inshore bare sand in Riddoch Bay, west to Stony Point and adjacent headlands where low profile platform reef extends to the shore. Macdonnell Bay again has inshore bare sand with patches of low platform reef. There is dense seagrass mapped to 200m off Port Macdonnell; then bare sand to near Cape Northumberland, where heavy limestone/ calcarenite reef is found inshore.

Biota

There are 3 flora survey sites, 16 Herbarium record sites, and 57 opportune fauna survey sites. There is 140 ha of remnant vegetation, i.e. 15.5% of the cell.

The main associations are *Leucopogon parviflorus* tall shrubland on stranded dunes near Cape Northumberland; *Leptospermum lanigerum* tall shrubland on coastal swamps; *Eucalyptus obliqua* woodland on hills and slopes.

Recorded fauna species include 215 birds, 21 butterflies, 16 mammals, 12 reptiles and 5 amphibians. Listed species include the EPBC critically endangered Orange-bellied Parrot

SE2 – Port MacDonnell

(*Neophema chrysogaster*) and State endangered Magpie Goose (*Anseranas semipalmata*), Azure Kingfisher (*Ceyx azureus*), Powerful Owl (*Ninox strenua*), Eastern Osprey (*Pandion cristatus*), Little (*Sternula albifrons*) and Fairy (*Sternula nereis*) Terns, Swamp Antechinus (*Antechinus minimus*), Swamp Skink (*Lissolepis coventryi*) and Salamander Skink (*Nannoscincus maccoyi*).

Land Use/ Land Ownership

56% of cell is Crown leasehold. Lower South East Marine Park (Victorian border to 7 km E of Port MacDonnell). 31% of the vegetated area is Crown Land Act Reserve. A linear strip of rural living allotments on the coast through Riddock and Racecourse Bays. The coastal plain landward of Eight Mile Creek Rd and Port MacDonnell is largely primary industry land, split by the drainage network. A narrow coastal frontage crown leasehold reserve, under the care and control of Council, is widened and thinned by accretion and erosion respectively between French Point and Cape Northumberland.

Values/ Uses (Field visits and local reports)

The coastal plain is used primarily for grazing and residential development. A port for the fishing fleet is prominent. The coast is popular for fishing, surfing and ORVs and there is facilities and access along large sections for recreation activities. Aboriginal heritage values throughout.

Threats (Field visits and local reports)

ORVs threaten shorebird activity at Danger Point and in Riddoch Bay. Shoreline recession and wave driven erosion threatens the coast between Port MacDonnell and Stony Point. Seawater intrusion into low lying land behind the cobble foredune ridge takes place via the artificial drains.

Opportunities

Jerusalem Creek Wetland has retained a highly diverse habitat structure despite drainage in the area. Slater and Farrington 2010 (in draft) give it high scores for the presence of fish and amphibians. The wetland is fed by a spring and the flow path has been excavated to take water from the spring to the coast. The overstorey of the wetland is dominated by Silky Tea Tree. Fencing was undertaken at the site to exclude stock and a weir has been installed by SEWCDB to allow raising of the water level of the spring (Bachmann, 2002). The site is probably being managed to its full potential.

Cress Creek Spring contains wetland habitats along a creek line that has been intentionally set aside for conservation purposes (Bachmann, 2002). It has a site score less than five but a fish and amphibian score of ten. The flow path from the spring has been excavated to drain water toward the coast. The site contains Southern Pygmy Perch, River Blackfish and the Glenelg Spiny Cray. Regulation of the outflow point of the spring should be investigated similarly to Jerusalem Creek.

Lions Park contains Southern Pygmy Perch, River Blackfish and the Glenelg Spiny Cray. The site has a fish and amphibian score of eleven but information on the site is limited and it is recommended that a formal inventory be undertaken.

The seaward end of Eight Mile Creek (approximately 650m within cell, leading from Ewens Ponds CP to near Danger Point) is contained within the study boundary of the cell. Slater and Farrington (2010) state “Eight Mile Creek and its connecting drains (i.e. Branch Drain 5) are the most important drains in the LSE in terms of ecological value. They provide habitat for nine different species of listed aquatic dependent fauna resulting in a biological score of 25 (a high score relative to other wetlands in the region). The system is home to the largest population of nationally listed Variegated Pygmy Perch (*Nannoperca variegata*) in South Australia and the only remaining healthy population of River Blackfish (*Gadopsis marmoratus*) in the SE. The Eight Mile Creek drain remains subject to maintenance dredging which may be impacting upon the biodiversity values of the waterway.

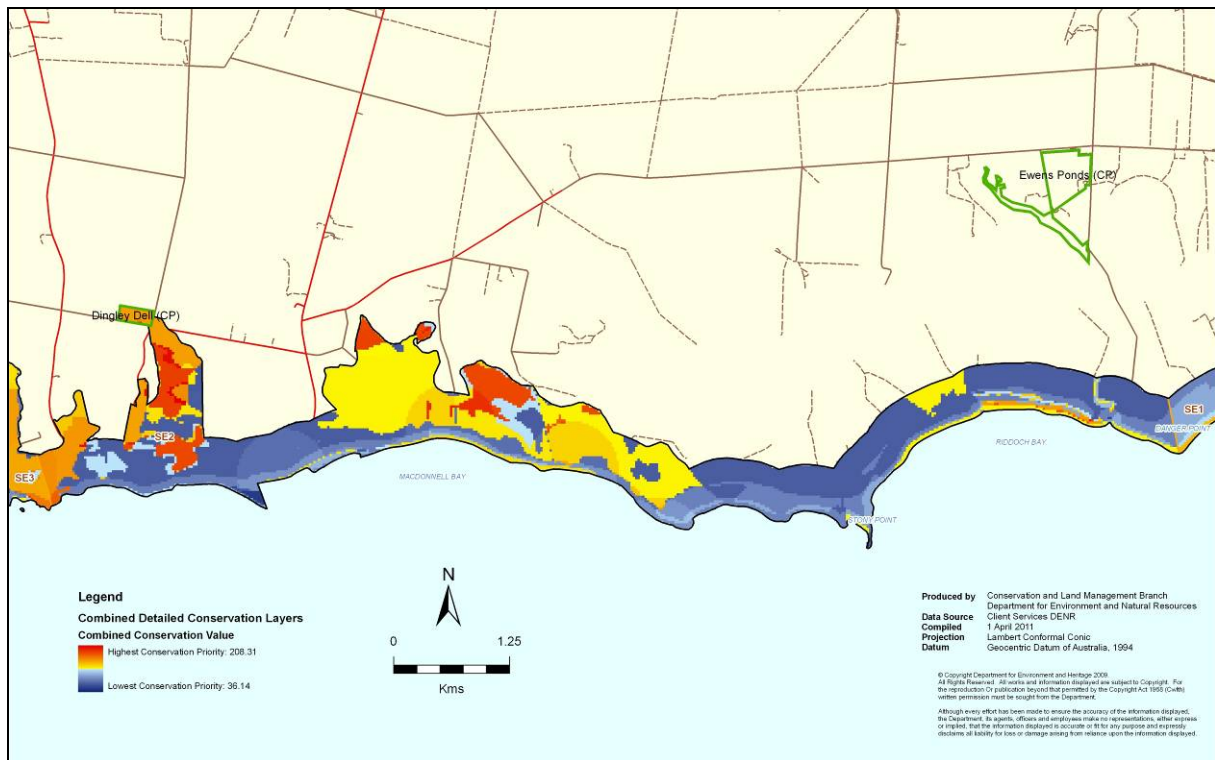
SE2 – Port MacDonnell

The cell also includes another minor drainage channel – Deep Creek, which connects Stratman’s Pond to the sea. This originally connected to Eight Mile Creek via a channel running behind the coastal dunes, with the remnants of this flow remaining as a narrow wetland (Slater and Farrington 2010). Connectivity should be reinstated to improve the health of fish, reptile and amphibian populations that have been separated by the artificial drainage (Slater and Farrington 2010).

Opportunity exists for improved education and interpretation of European heritage sites and items in the area.

Conservation Analysis (GIS)

The total of conservation summary means for this cell shows generally average values, 112.42. However a number of small areas, indicated in red in the map below, show high total values: Jerusalem Swamp, Cress Creek Swamp, Dingley Dell CP and adjacent swamps, and the Lions Park at Port MacDonnell. The coastal shrubland near Cape Northumberland totals average values.



Cell SE2 combined detailed conservation layer summary map.

Endemic (to the region) floristic vegetation shows a low average priority for this cell: only the swamp and shrub areas NE and NW of Port MacDonnell show medium values, while the coastal shrublands on the stranded dunes near Cape Northumberland show high values. Bird habitat shows low values east of MacDonnell Bay, medium values for the sub-coastal wetlands within the coastal boundary, however the vegetated areas to the west and northwest (Germein Reserve) of Port MacDonnell – the teatree shrublands and the *E. obliqua* woodlands – record high values as habitat. Flora threatened status detailed totals, show moderate to high values over almost all the cell, with high totals in the vegetation blocks of the western end.

Vegetation connectivity, shape and size are generally higher at the western end of the cell; as might be expected, the largely cleared land of the centre and eastern end of the cell give low conservation vegetation block metrics.

SE2 – Port MacDonnell

Of the focal species the Swamp Skink and the Southern Bell Frog have habitat widely distributed throughout the sub-coastal wetlands of the cell. The dunes, backshores and saltmarsh fragments provide opportunities for the migratory Orange-bellied Parrot, and the sandy, narrow foreshores for the Fairy Tern. Habitat for the Yellow Sedge Skipper (focal species), grass and sedgeland, within and edging the coastal wetlands, is restricted to a number of small fragments. The sub-coastal lowlands and wetlands behind MacDonnell Bay show moderate numbers of all reptiles. These same areas, together with the vegetation blocks of the western end of the cell show moderate to high numbers of all mammals.

Sea views are recorded throughout the cell; scenic amenity value is moderate, except for high values at the aeolianite cliffs and plateau west of Port MacDonnell. The entire foreshore, <100m from low water mark is designated a significant geological feature, “Glenelg River and Lower South East Coast”.

Threat Analysis (GIS)

Almost the entire cell shows high to very high threat values, including the high value areas noted in the conservation analysis at Jerusalem Swamp, Cress Creek Swamp, Dingley Dell CP and adjacent swamps, and the Lions Park at Port MacDonnell.

Development zoning gives high threat values as most of the cell is zoned primary industry, rural living and townships; only fragments of coastal zone and parklands relieve this pressure. Private landownership gives a high threat value for most of this cell, with the exception of Germein Reserve, Dingley Dell CP, Ewens Pond CP (just outside boundary but connected to the sea via 8 Mile Creek), and adjacent Crown leasehold land. Land use values are high to medium throughout the cell, reflecting the significant areas of residential and rural residential land. SE Petroleum Production and SE Petroleum Exploration licenses give moderate to high threat values to the mining layer for the cell. These, together with high viewscape scores give this cell the third highest threat total in the region, 70.59.

Adaptation to Climate Change: Threats for Cell SE2

(see also discussion of scenario in Section 4.11)

NOTE: the advice below is indicative of likely change and the direction of change, with implications for ecosystems. Dates, amounts and probabilities cannot be accurately calculated at this time. Thus advice on flood levels, for example, should not be used in engineering or development planning.

Climate change element/ scenario	Impacts and implications (for this cell)	Protect and manage habitat threats	Address landscape issues: fire, connectivity, refuges, hydrology
Combined climate changes and sea level rise throughout this cell	This cell presents a complex pattern of habitats sensitive to change.	Create a baseline for shoreline, dune and lake change by establishing a rectified aerial photographic record at an appropriate resolution.	
Sea level rise: 2030 : +c.20cm 2070: +c.80cm	Rise in frequency of tidal flooding, threatens freshwater swamps. Lidar data shows early flooding potential of Cress Creek Swamp and Jerusalem	Install (if necessary) and manage sill and valve structures on drains to the sea, for example at Cress Creek Swamp, Jerusalem Creek	

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Climate change element/ scenario	Impacts and implications (for this cell)	Protect and manage habitat threats	Address landscape issues: fire, connectivity, refuges, hydrology
	Swamp.	Wetland, Eight Mile Creek and Stratman Pond.	
	Increase in storm foredune damage and beach recession in embayments.	Continue and if necessary extend beach profile monitoring, as baseline information for coastal change.	
	Sandy coast has marked recession, (low sand storage volume), foredune blowouts, and dune transgression. Beach and nearshore sand accumulation in lee of reefs may be reduced together with reef protection of the shore.	Active management of dune blowouts.	
Storms: <i>Frequency</i> continues to show great variation on a decadal scale. <i>Intensity</i> of large storms increases.	2030: Occasional storm tide flooding above highest known tides. Flooding frequency critical for freshwater swamps,(see above). 2070: Flooding will affect all swamps and adjacent low lying areas.	Manage sill height on tidal inlets to adjust to higher marine storm elevations (see above).	
	Frequent damage to foredunes.	Active management of dune blowouts.	
Warmer average conditions: 2030:+0.3 to .6°C 2070:+1.5 to 2°C	(Impacts uncertain. Existing terrestrial vegetation is found in warmer conditions elsewhere).		Maintain connectivity of vegetation within the region.
Drier average conditions: 2030: -2% to 5% 2070: - 10% to 20%	Dune vegetation adapts well to drier conditions, but recover more slowly from fire, disease and storm damage: dune mobilization becomes more likely.	Active weed control within dunes.	
'Flashy' run off: Drier creeks, but larger rare floods	Drains and creeks may increase sediment and nutrient load to coastal swamps (this depends on land management practices).	Maintain watching brief on sedimentation of high value swamps areas.	
Groundwater lowering; saline incursion:	The potential fall in groundwater pressure a significant threat to vegetation survival in freshwater swamps.	Adaptive management of plant assets.	Monitor salinity of coastal swamps.

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Climate change element/ scenario	Impacts and implications (for this cell)	Protect and manage habitat threats	Address landscape issues: fire, connectivity, refuges, hydrology
<p>Nearshore sea changes - temperature; acidity; wave climate:</p> <p>2030: +0.3°C to + 0.6°C</p> <p>2070: +1.0°C to + 1.50C</p>	<p>Persistent swell wave climate maintains sediment movement towards the east along the coast.</p> <p>(Changes in upwelling timing and frequency has been discussed, but not projected).</p>	<p>Monitor beaches (see above).</p>	

Table 6.4. Recommended Actions and Priority for Cell SE2 – Port MacDonnell

Component	Issue	Proposed Action	Priority of Action	Key Players
Beaches, dunes and cobble ridges.	Coastal erosion causing shoreline recession in MacDonnell Bay. Acceleration of sea level rise due to climate change threatens more rapid future recession.	Continue existing beach profile record. Establish new profiles at Racecourse Bay and Riddoch Bay Aerial photography analysis to determine shoreline change. Management as required.	High (Hazard)	Council, NRM, CPB
	Off road vehicle use and unleashed dogs threaten shorebird activity.	Reduce pressure on habitat at shorebird nesting times by a seasonal vehicle ban or seasonal detours.	High (Cons/Threat)	DENR, NRM, Council
		Fence nests/ Community monitoring.	High (Cons/Threat)	DENR, Council, community, NRM
		Raising community awareness through signage at major beach access points.	High (Cons/Threat)	DENR, Council, community, NRM

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Component	Issue	Proposed Action	Priority of Action	Key Players
	Number of exotic and aggressive plants contained in surrounding land and spreading into coastal vegetation.	Develop and distribute educational resources to local community about garden escapes/ weeds and provide alternative local species. Weed strategy development and action on weed removal for beach and dune areas.	Medium (Cons/Threat)	DENR, Council, NRM, Community
Coastal swamps and wetlands	High conservation value habitat for the Swamp Skink and Southern Bell Frog focal species and for threatened reptile species.	Protection of existing habitat and efforts to re-establish linkages between remnants.	High (Cons)	DENR, NRM, Community
	Coastal wetlands threatened by reduced inland flows through over extraction, continued drainage and drying of the landscape.	Continue to monitor water volumes of wetlands. Work with private landholders to increase/preserve flows where possible.	High (Cons/Threat)	Dept. for Water, DENR, NRM, SEWCDB, community
	Climate changed induced sea level rise and reduced groundwater pressure threaten to raise future salinity levels in freshwater swamps.	Establish baseline for monitoring future salinity change	High (Cons)	DFW, NRM
Stormwater	Flow of stormwater to coastal waters in peak flows impacts nearshore reefs and seagrass meadows.	Address drain and stormwater discharges to marine environment. Continue Reefwatch monitoring program.	Medium (cell)	Council, EPA
Drains	Seawater flooding threatens drain habitat and upstream wetlands. Flood risk to low lying land via the drains.	Monitor seawater inundation and saltwater intrusion into groundwater. Alter drains as necessary.	Medium (cell)	SEWCDB, Council, NRM
Whole Cell	Existing linear development along the coast, land ownership and land use threaten conservation values of the cell.	Restrict development to nodes and minimise impacts of existing development on adjacent vegetation and the coast.	High (Threat)	Council, DPLG, CPB

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Component	Issue	Proposed Action	Priority of Action	Key Players
	Petroleum production and explorations license over almost the entire cell threatens conservation values.	Remove license from high value conservation areas.	Medium (Threat)	PIRSA
	Aboriginal Heritage sites recorded in this cell. Need for appropriate and sustainable management.	Consultation to appropriately manage sites in this area.	High (Cons)	Murrapeena Heritage Association Inc., SE Aboriginal Focus Group, NRM, Council, Aboriginal Heritage Branch – DPC, Aboriginal Partnership Unit – DENR, SA Water
	European heritage values of shipwrecks in MacDonnell Bay and buildings in Port MacDonnell are not well known.	Interpretive signage. Develop a heritage trail or other awareness raising material.	Medium (Cons)	Council, DENR
	Lack of recognition of significant geological feature (Bridgewater formation).	Interpretation. Council to include map of the feature in its development plan.	Medium (Cons)	Council, Geological Society SA, NRM

BIOTA

Flora

Remnant vegetation area (ha)	139.8 ha, 15.5% of cell
# flora surveys / records	3 surveys, 16 herbarium record sites, 1 reserve database record site.
# flora in cell	268 (includes some marine species)
# conservation rated flora in cell	9 recorded
# non-indigenous flora in cell	27 recorded
Significant CDCS floristic community	No significant floristic communities recorded
Protected area	Dingley Dell Conservation Park (5.9ha in total)

Weeds

Species	Common Name	Status	Study rating
<i>Dipogon lignosus</i>	Lavatory Creeper		9
<i>Lycium ferocissimum</i>	African Boxthorn	D	9
<i>Coprosma repens</i>	New Zealand Mirror-bush		7
<i>Leptospermum laevigatum</i>	Coast Tea-tree		7
<i>Argyranthemum frutescens</i> ssp. <i>foeniculaceum</i>	Teneriffe Daisy		5

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Species	Common Name	Status	Study rating
<i>Senecio elegans</i>	Purple Groundsel		3
<i>Ammophila arenaria</i>	Marram Grass		2
<i>Aeonium haworthii</i>			
<i>Arum italicum</i>	Italian Arum		
<i>Ehrharta erecta</i>	Panic Veldt Grass		
<i>Holcus lanatus</i>	Yorkshire Fog		
<i>Lathyrus odoratus</i>	Sweet Pea		
<i>Malva linnaei</i>	Cretan Hollyhock		
<i>Medicago lupulina</i>	Black Medic		
<i>Mentha spicata</i> f. B (B.Copley 1119)	Spearmint		
<i>Minuartia mediterranea</i>	Slender Sandwort		
<i>Oxalis corniculata</i> ssp. <i>corniculata</i>	Creeping Wood-sorrel		
<i>Parapholis incurva</i>	Curly Ryegrass		
<i>Plantago major</i>	Greater Plantain		
<i>Poa pratensis</i>	Kentucky Blue-grass		
<i>Rumex crispus</i>	Curled Dock		
<i>Sberardia arvensis</i>	Field Madder		
<i>Silene conica</i>	Striated Catchfly		
<i>Silene vulgaris</i>	Bladder Champion		
<i>Sisymbrium orientale</i>	Indian Hedge Mustard		
<i>Solanum marginatum</i>	White-edged Nightshade		
<i>Tanacetum vulgare</i>	Tansy		

D: Declared weed, WONS: Weeds of National Significance

Native flora*

Species	Common Name	Aus status	SA status
<i>Glycine latrobeana</i>	Clover Glycine	V	V
<i>Olearia glandulosa</i>	Swamp Daisy-bush		V
<i>Scaevola calendulacea</i>	Dune Fanflower		V
<i>Carex gunniana</i>	Mountain Sedge		R
<i>Cladium procerum</i>	Leafy Twig-rush		R
<i>Eucalyptus leucoxylon</i> ssp. <i>megalocarpa</i>	Large-fruit Blue Gum		R
<i>Haloragis brownii</i>	Swamp Raspwort		R
<i>Melaleuca squarrosa</i>	Bottlebrush Tea-tree		R
<i>Schoenus tesquorum</i>	Grassy Bog-rush		R
<i>Acacia leiophylla</i>	Coast Golden Wattle		
<i>Acacia melanoxylon</i>	Blackwood		
<i>Acacia pycnantha</i>	Golden Wattle		
<i>Acaena novae-zelandiae</i>	Biddy-biddy		
<i>Acrocarpia paniculata</i>			
<i>Acrosorium ciliolatum</i>			
<i>Alyxia buxifolia</i>	Sea Box		
<i>Amphibolis antarctica</i>	Sea Nymph		
<i>Anotrichium crinitum</i>			
<i>Anotrichium elongatum</i>			
<i>Apium prostratum</i> var. <i>prostratum</i>	Native Celery		
<i>Apjohnia laetevirens</i>			
<i>Apodasmia brownii</i>	Coarse Twine-rush		
<i>Asperula conferta</i>	Common Woodruff		
<i>Andouinella caespitosa</i>			
<i>Andouinella dictyotae</i>			
<i>Andouinella humilis</i>			

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Species	Common Name	Aus status	SA status
<i>Audouinella microscopica</i>			
<i>Austrophyllis alaicornis</i>			
<i>Austrostipa eremophila</i>	Rusty Spear-grass		
<i>Austrostipa flavescens</i>	Coast Spear-grass		
<i>Austrostipa mundula</i>	Neat Spear-grass		
<i>Austrostipa stipoides</i>	Coast Spear-grass		
<i>Ballia callitricha</i>			
<i>Baumea juncea</i>	Bare Twig-rush		
<i>Beyeria lechenaultii</i>	Pale Turpentine Bush		
<i>Billardiera cymosa</i> ssp. <i>cymosa</i>	Sweet Apple-berry		
<i>Blidingia minima</i>			
<i>Bryopsis gemellipara</i>			
<i>Bryopsis minor</i>			
<i>Bryopsis plumosa</i>			
<i>Bursaria spinosa</i> ssp. <i>spinosa</i>	Sweet Bursaria		
<i>Callithamnion byssoides</i>			
<i>Callophyllis rangiferina</i>			
<i>Carex appressa</i>	Tall Sedge		
<i>Carex breviculmis</i>	Short-stem Sedge		
<i>Carpobrotus rossii</i> (NC)	Native Pigface		
<i>Cassytha glabella</i> f. <i>dispar</i>	Slender Dodder-laurel		
<i>Caulerpa brownii</i>			
<i>Caulerpa cactoides</i>			
<i>Caulerpa longifolia</i>			
<i>Caulerpa obscura</i>			
<i>Caulerpa scalpelliformis</i>			
<i>Caulerpa sedoides</i>			
<i>Caulerpa simpliciuscula</i>			
<i>Ceramium excellens</i>			
<i>Ceramium tasmanicum</i>			
<i>Chaetomorpha aerea</i>			
<i>Chaetomorpha billardieri</i>			
<i>Chaetomorpha coliformis</i>			
<i>Chaetomorpha linum</i>			
<i>Champia zostericola</i>			
<i>Chondria capreolis</i>			
<i>Chondria fusifolia</i>			
<i>Chondria subsecunda</i>			
<i>Cladophora feredayi</i>			
<i>Cladophora hutchinsioides</i>			
<i>Cladophora lehmannaiana</i>			
<i>Cladophora subsimplex</i>			
<i>Cladosiphon vermicularis</i>			
<i>Clematis microphylla</i> var. <i>microphylla</i>	Old Man's Beard		
<i>Codium australicum</i>			
<i>Codium duthieae</i>			
<i>Codium fragile</i> ssp. <i>novae-zelandiae</i>			
<i>Codium fragile</i> ssp. <i>tasmanicum</i>			
<i>Codium galeatum</i>			
<i>Codium muelleri</i>			
<i>Codium pomoides</i>			
<i>Coeloclonium tasmanicum</i>			
<i>Coeloclonium verticillatum</i>			

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Species	Common Name	Aus status	SA status
<i>Colpomenia ecuticulata</i>			
<i>Colpomenia peregrina</i>			
<i>Colpomenia sinuosa</i>			
<i>Cordylecladia furcellata</i>			
<i>Correa reflexa</i> var. <i>reflexa</i> (NC)	Common Correa		
<i>Craspedocarpus venosus</i>			
<i>Curdiea angustata</i>			
<i>Cystophora moniliformis</i>			
<i>Dasya haffiae</i>			
<i>Dasya naccarioides</i>			
<i>Dasya quadrispora</i>			
<i>Dasyclonium incisum</i>			
<i>Dasyphila preissii</i>			
<i>Delisea hypneoides</i>			
<i>Dianella revoluta</i> var. <i>revoluta</i>	Black-anther Flax-lily		
<i>Dichondra repens</i>	Kidney Weed		
<i>Dicranema revolutum</i>			
<i>Dictyomenia tridens</i>			
<i>Dictyopteris muelleri</i>			
<i>Dictyosphaeria sericea</i>			
<i>Dictyota dichotoma</i>			
<i>Dictyota diemensis</i>			
<i>Dictyota furcellata</i>			
<i>Dilophus fastigiatus</i>			
<i>Dilophus gunnianus</i>			
<i>Doxodasya lenormandiana</i>			
<i>Echinothamnion hystrix</i>			
<i>Eleocharis acuta</i>	Common Spike-rush		
<i>Epilobium billardierianum</i> ssp. <i>billardierianum</i>	Robust Willow-herb		
<i>Epilobium billardierianum</i> ssp. <i>X intermedium</i>	Variable Willow-herb		
<i>Epilobium hirtigerum</i>	Hairy Willow-herb		
<i>Epilobium pallidiflorum</i>	Showy Willow-herb		
<i>Eucalyptus obliqua</i>	Messmate Stringybark		
<i>Eucalyptus ovata</i> var. <i>grandiflora</i>	Swamp Gum		
<i>Eucalyptus ovata</i> var. <i>ovata</i>	Swamp Gum		
<i>Gahnia trifida</i>	Cutting Grass		
<i>Galium compactum</i>	Compact Bedstraw		
<i>Gelidium asperum</i>			
<i>Gelinaria ulvoidea</i>			
<i>Gigartina muelleriana</i>			
<i>Gigartina pinnata</i>			
<i>Gigartina webbiae</i>			
<i>Gloiosaccion brownii</i>			
<i>Gramineae</i> sp.	Grass Family		
<i>Gratelopia ovata</i>			
<i>Griffithsia tegea</i>			
<i>Halopteris funicularis</i>			
<i>Halopteris pseudospicata</i>			
<i>Halymenia muelleri</i>			
<i>Haraldiophyllum erosum</i>			
<i>Helichrysum scorpioides</i>	Button Everlasting		

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Species	Common Name	Aus status	SA status
<i>Heterocladia umbellifera</i>			
<i>Hincksia mitchelliae</i>			
<i>Hydrocotyle capillaris</i>	Thread Pennywort		
<i>Hydrocotyle hirta</i>	Hairy Pennywort		
<i>Hydrocotyle laxiflora</i>	Stinking Pennywort		
<i>Hymenena curdieana</i>			
<i>Hymenena endiviaefolia</i>			
<i>Hymenena multipartita</i>			
<i>Hymenocladia chondricola</i>			
<i>Involucrana crassa</i>			
<i>Involucrana meredithiana</i>			
<i>Isolepis cernua</i>	Nodding Club-rush		
<i>Isolepis fluitans</i>	Floating Club-rush		
<i>Isolepis inundata</i>	Swamp Club-rush		
<i>Jania micrarthrodia</i>			
<i>Juncus planifolius</i>	Broad-leaf Rush		
<i>Lachnagrostis filiformis</i>	Common Blown-grass		
<i>Lagenophora stipitata</i>	Spreading Bottle-daisy		
<i>Lasiopetalum schulzenii</i>	Drooping Velvet-bush		
<i>Laurencia arbuscula</i>			
<i>Laurencia elata</i>			
<i>Laurencia filiformis f. dendritica</i>			
<i>Lepidosperma gladiatum</i>	Coast Sword-sedge		
<i>Lepidosperma laterale</i>	Tall Sword-sedge		
<i>Lepilaena preissii</i>	Slender Water-mat		
<i>Leptophyllis conferta</i>			
<i>Leptospermum lanigerum</i>	Silky Tea-tree		
<i>Leucopogon parviflorus</i>	Coast Beard-heath		
<i>Liagora wilsoniana</i>			
<i>Lobelia anceps</i>	Angled Lobelia		
<i>Lomandra longifolia</i>	Spiny-headed Mat-rush		
<i>Lomentaria pyramidalis</i>			
<i>Lophothamnion hirtum</i>			
<i>Macrothamnion pellucidum</i>			
<i>Mastophoropsis canaliculata</i>			
<i>Medeiothamnion protensum</i>			
<i>Melaleuca lanceolata ssp. lanceolata (NC)</i>	Dryland Tea-tree		
<i>Melanema dumosum</i>			
<i>Melanthalia abscissa</i>			
<i>Metagoniolithon radiatum</i>			
<i>Microtis arenaria</i>	Notched Onion-orchid		
<i>Myriophyllum muelleri</i>	Hooded Milfoil		
<i>Myriophyllum simulans</i>	Amphibious Milfoil		
<i>Myriophyllum verrucosum</i>	Red Milfoil		
<i>Neogoniolithon brassica-florida</i>			
<i>Nitospinosa pristoidea</i>			
<i>Ozothamnus ferrugineus</i>	Tree Everlasting		
<i>Ozothamnus turbinatus</i>	Coast Bush-everlasting		
<i>Pachymenia orbicularis</i>			
<i>Perithalia caudata</i>			
<i>Persicaria decipiens</i>	Slender Knotweed		
<i>Petalonia fascia</i>			
<i>Peyssonnelia novae-hollandiae</i>			

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Species	Common Name	Aus status	SA status
<i>Phacelocarpus alatus</i>			
<i>Phacelocarpus peperocarpus</i>			
<i>Phacelocarpus sessilis</i>			
<i>Phytimophora amansioides</i>			
<i>Phloiocaulon foecundum</i>			
<i>Phragmites australis</i>	Common Reed		
<i>Pimelea serpyllifolia</i> ssp. <i>serpyllifolia</i>	Thyme Riceflower		
<i>Platyclinia crenulata</i>			
<i>Plocamium cartilagineum</i>			
<i>Plocamium costatum</i>			
<i>Plocamium mertensii</i>			
<i>Poa poiformis</i> var. <i>poiformis</i>	Coast Tussock-grass		
<i>Polycerea nigrescens</i>			
<i>Polysiphonia decipiens</i>			
<i>Posidonia angustifolia</i>	Narrow-leaf Tapeweed		
<i>Posidonia australis</i>	Southern Tapeweed		
<i>Ptilocladia vestita</i>			
<i>Ptilonia australasica</i>			
<i>Ptilothamnion schmitzii</i>			
<i>Rhagodia candolleana</i> ssp. <i>candolleana</i>	Sea-berry Saltbush		
<i>Rhodocallis elegans</i>			
<i>Rhodymenia obtusa</i>			
<i>Robea costata</i>			
<i>Rumex bidens</i>	Mud Dock		
<i>Samolus repens</i>	Creeping Brookweed		
<i>Sarcobalia crassifolia</i>			
<i>Sarcotrichia tenera</i>			
<i>Scaevola albida</i>	Pale Fanflower		
<i>Schoenoplectus validus</i>	River Club-rush		
<i>Schoenus apogon</i>	Common Bog-rush		
<i>Schoenus fluitans</i>	Floating Bog-rush		
<i>Schoenus nitens</i>	Shiny Bog-rush		
<i>Sebaea albidiflora</i>	White Sebaea		
<i>Sebaea ovata</i>	Yellow Sebaea		
<i>Selliera radicans</i>	Shiny Swamp-mat		
<i>Senecio glomeratus</i> (NC)	Swamp Groundsel		
<i>Senecio odoratus</i>	Scented Groundsel		
<i>Senecio odoratus</i> var. <i>odoratus</i> (NC)	Scented Groundsel		
<i>Spongoclonium fasciculatum</i>			
<i>Sporobolus</i> sp.			
<i>Sporobolus virginicus</i>	Salt Couch		
<i>Sporolithon durum</i>			
<i>Stackhousia spathulata</i>	Coast Candles		
<i>Stilophora rhizodes</i>			
<i>Swainsona lessertiifolia</i>	Coast Swainson-pea		
<i>Synarthrophyton patena</i>			
<i>Tetragonia implexicoma</i>	Bower Spinach		
<i>Trithamnion aculeatum</i>			
<i>Tsengia comosa</i>			
<i>Tsengia feredayae</i>			
<i>Typha domingensis</i>	Narrow-leaf Bulrush		
<i>Ulothrix subflaccida</i>			
<i>Ulva australis</i>			

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Species	Common Name	Aus status	SA status
<i>Urtica incisa</i>	Scrub Nettle		
<i>Villarsia umbricola</i> var. <i>umbricola</i>	Lax Marsh-flower		
<i>Wilsonia backhousei</i>	Narrow-leaf Wilsonia		
<i>Wollastoniella mucronata</i>			
<i>Zonaria angustata</i>			

E: Endangered, V: Vulnerable, R: Rare

*note: includes some marine species

Fauna

# of fauna in cell	269 recorded – 215 birds, 21 butterflies, 16 mammals, 12 reptiles, 5 amphibians (an additional 5 butterflies and 5 reptiles identified by experts as possibly occurring)
# of fauna surveys / records	57 opportune sites
# of threatened fauna in cell	62 recorded
# of non-indigenous fauna	15 recorded (an additional invertebrate and mammal possible)

Non-indigenous fauna

Species	Common Name	Class	Record
<i>Alauda arvensis</i>	Eurasian Skylark	Aves	x
<i>Carduelis carduelis</i>	European Goldfinch	Aves	x
<i>Chloris chloris</i>	Common Greenfinch (European Greenfinch)	Aves	x
<i>Columba livia</i>	Rock Dove (Feral Pigeon)	Aves	x
<i>Passer domesticus</i>	House Sparrow	Aves	x
<i>Streptopelia chinensis</i>	Spotted Dove (Spotted turtle-dove)	Aves	x
<i>Sturnus vulgaris</i>	Common Starling	Aves	x
<i>Turdus merula</i>	Common Blackbird	Aves	x
	Common Skylark	Aves	x
<i>Pieris rapae rapae</i>	Cabbage White	Invertebrate	x
<i>Felis catus</i>	Cat (Feral Cat)	Mammalia	x
<i>Lepus capensis</i>	Brown Hare (European Hare)	Mammalia	x
<i>Mus musculus</i>	House Mouse	Mammalia	x
<i>Rattus rattus</i>	Black Rat (Ship Rat, Roof Rat)	Mammalia	x
<i>Vulpes vulpes</i>	Fox (Red Fox)	Mammalia	x

x: recorded

Birds

Species	Common Name	Aus status	SA status
<i>Neophema chrysogaster</i>	Orange-bellied Parrot	CR/M	E
<i>Anseranas semipalmata</i>	Magpie Goose		E
<i>Ceyx azureus</i>	Azure Kingfisher		E
<i>Ninox strenua</i>	Powerful Owl		E
<i>Pandion cristatus</i>	Eastern Osprey		E
<i>Sternula albifrons</i>	Little Tern		E
<i>Sternula nereis</i>	Fairy Tern		E
<i>Botaurus poiciloptilus</i>	Australasian Bittern		V
<i>Calyptorhynchus funereus</i>	Yellow-tailed Black-Cockatoo		V
<i>Cladorhynchus leucocephalus</i>	Banded Stilt		V
<i>Coturnix ypsilophora</i>	Brown Quail		V
<i>Grus rubicunda</i>	Brolga		V

SE2 – Port MacDonnell

Species	Common Name	Aus status	SA status
<i>Leipoa ocellata</i>	Malleefowl	V	V
<i>Lewinia pectoralis</i>	Lewin's Rail		V
<i>Neophema chrysostoma</i>	Blue-winged Parrot		V
<i>Numenius madagascariensis</i>	Eastern Curlew	M	V
<i>Petroica phoenicea</i>	Flame Robin		V
<i>Rostratula australis</i>	Australian Painted Snipe	V	V
<i>Stictonetta naevosa</i>	Freckled Duck		V
<i>Thinornis rubricollis</i>	Hooded Plover		V
<i>Actitis hypoleucos</i>	Common Sandpiper	M	R
<i>Anas rhynchos</i>	Australasian Shoveler		R
<i>Anhinga novaehollandiae</i>	Australasian Darter		R
<i>Ardea intermedia</i>	Intermediate Egret		R
<i>Calidris alba</i>	Sanderling	M	R
<i>Calidris subminuta</i>	Long-toed Stint	M	R
<i>Calidris tenuirostris</i>	Great Knot	M	R
<i>Cereopsis novaehollandiae</i>	Cape Barren Goose		R
<i>Charadrius leschenaultii</i>	Greater Sand Plover (Large Sand Plover)	M	R
<i>Charadrius mongolus</i>	Lesser Sand Plover (Mongolian Plover)	M	R
<i>Egretta garzetta</i>	Little Egret		R
<i>Egretta sacra</i>	Eastern Reef Egret	M	R
<i>Falco peregrinus</i>	Peregrine Falcon		R
<i>Falcunculus frontatus</i>	Crested Shrike-tit		R
<i>Gallinago hardwickii</i>	Latham's Snipe (Japanese Snipe)	M	R
<i>Haematopus fuliginosus</i>	Sooty Oystercatcher		R
<i>Haematopus longirostris</i>	Australian Pied Oystercatcher		R
<i>Hylacola canta</i>	Shy Heathwren (Shy Hylacola)		R
<i>Larus dominicanus</i>	Kelp Gull		R
<i>Limosa lapponica</i>	Bar-tailed Godwit	M	R
<i>Limosa limosa</i>	Black-tailed Godwit	M	R
<i>Myiagra inquieta</i>	Restless Flycatcher		R
<i>Neophema elegans</i>	Elegant Parrot		R
<i>Numenius phaeopus</i>	Whimbrel	M	R
<i>Philomachus pugnax</i>	Ruff	M	R
<i>Plegadis falcinellus</i>	Glossy Ibis	M	R
<i>Pluvialis fulva</i>	Pacific Golden Plover	M	R
<i>Podiceps cristatus</i>	Great Crested Grebe		R
<i>Stagonopleura bella</i>	Beautiful Firetail		R
<i>Tringa brevipes</i>	Grey-tailed Tattler	M	R
<i>Tringa glareola</i>	Wood Sandpiper	M	R
<i>Xenus cinereus</i>	Terek Sandpiper	M	R
<i>Zosterornis lunulata</i>	Bassian Thrush (White's Thrush)		R
<i>Acanthiza apicalis</i>	Inland Thornbill		
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill		
<i>Acanthiza iredalei</i>	Slender-billed Thornbill	ssp	ssp
<i>Acanthiza lineata</i>	Striated Thornbill		
<i>Acanthiza nana</i>	Yellow Thornbill		
<i>Acanthiza pusilla</i>	Brown Thornbill		
<i>Acanthiza reguloides</i>	Buff-rumped Thornbill		
<i>Acanthorhynchus tenuirostris</i>	Eastern Spinebill		
<i>Accipiter cirrocephalus</i>	Collared Sparrowhawk		
<i>Aegotheles cristatus</i>	Australian Owlet-nightjar		
<i>Alcedo azureus</i> (NC)	Azure Kingfisher		
<i>Anas castanea</i>	Chestnut Teal		

SE2 – Port MacDonnell

Species	Common Name	Aus status	SA status
<i>Anas gracilis</i>	Grey Teal		
<i>Anas superciliosa</i>	Pacific Black Duck		
<i>Anas superciliosa</i> × <i>anas platyrhynchos</i>	Pacific Black Duck/Mallard Hybrid		
<i>Anthochaera carunculata</i>	Red Wattlebird		
<i>Anthochaera chrysoptera</i>	Little Wattlebird		
<i>Aptenodytes patagonicus</i>	King Penguin		
<i>Apus pacificus</i>	Fork-tailed Swift		
<i>Ardea alba</i>	Great Egret		
<i>Ardea modesta</i>	Eastern Great Egret		
<i>Ardea pacifica</i>	White-necked Heron (Pacific Heron)		
<i>Ardenna tenuirostris</i>	Short-tailed Shearwater (Mutton Bird)		
<i>Artamus cinereus</i>	Black-faced Woodswallow		
<i>Artamus cyanopterus</i>	Dusky Woodswallow		
<i>Artamus personatus</i>	Masked Woodswallow		
<i>Artamus superciliosus</i>	White-browed Woodswallow		
<i>Aythya australis</i>	Hardhead (White-eyed Duck)		
<i>Barnardius zonarius</i>	Australian Ringneck, (Ring-necked Parrot)		
<i>Cacomantis pallidus</i>	Pallid Cuckoo		
<i>Calamanthus fuliginosus</i>	Striated Fieldwren		
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	M	
<i>Calidris minuta</i>	Little Stint	M	
<i>Calidris ruficollis</i>	Red-necked Stint	M	
<i>Catharacta skua</i>	Great Skua		
<i>Chalcites basalis</i>	Horsfield's Bronze-cuckoo		
<i>Charadrius bicinctus</i>	Double-banded Plover		
<i>Charadrius ruficapillus</i>	Red-capped Plover (Red-capped Dotterel)		
<i>Charadrius veredus</i>	Oriental Plover	M	
<i>Chenonetta jubata</i>	Australian Wood Duck (Maned Duck)		
<i>Cheramoeca leucosterna</i>	White-backed Swallow		
<i>Chlidonias hybrida</i>	Whiskered Tern	M	
<i>Chlidonias leucopterus</i>	White-winged Black Tern	M	
<i>Chroicocephalus novaehollandiae</i>	Silver Gull		
<i>Chrysococcyx osculans</i>	Black-eared Cuckoo		
<i>Cincloramphus cruralis</i>	Brown Songlark		
<i>Cincloramphus mathewsi</i>	Rufous Songlark		
<i>Circus approximans</i>	Swamp Harrier (Marsh Harrier)		
<i>Circus assimilis</i>	Spotted Harrier		
<i>Cisticola exilis</i>	Golden-headed Cisticola		
<i>Corcorax melanorhamphos</i>	White-winged Chough		
<i>Cormobates leucophaea</i>	White-throated Treecreeper		
<i>Corvus tasmanicus</i>	Forest Raven		
<i>Cracticus torquatus</i>	Grey Butcherbird		
<i>Dacelo novaeguineae</i>	Laughing Kookaburra		
<i>Daphoenositta chrysoptera</i>	Varied Sittella		
<i>Dasyornis broadbenti</i>	Rufous Bristlebird		ssp
<i>Dendrocygna eytoni</i>	Plumed Whistling-Duck		
<i>Dicaeum hirundinaceum</i>	Mistletoebird		
<i>Drymodes brunneopygia</i>	Southern Scrub-robin		
<i>Elsayornis melanops</i>	Black-fronted Dotterel (Black-fronted Plover)		
<i>Eolophus roseicapillus</i>	Galah		
<i>Eopsaltria australis</i>	Eastern Yellow Robin		
<i>Epthianura albifrons</i>	White-fronted Chat		
<i>Epthianura tricolor</i>	Crimson Chat		

SE2 – Port MacDonnell

Species	Common Name	Aus status	SA status
<i>Erythrogonys cinctus</i>	Red-kneed Dotterel		
<i>Eudyptula minor</i>	Little Penguin (Fairy Penguin)		
<i>Falco berigora</i>	Brown Falcon		
<i>Falco cenchroides</i>	Nankeen Kestrel (Australian Kestrel)		
<i>Falco longipennis</i>	Australian Hobby		
<i>Fulica atra</i>	Eurasian Coot		
<i>Fulmarus glacialisoides</i>	Southern Fulmar		
<i>Gelochelidon nilotica</i>	Gull-billed Tern		
<i>Glossopsitta concinna</i>	Musk Lorikeet		
<i>Glossopsitta porphyrocephala</i>	Purple-crowned Lorikeet		
<i>Grallina cyanoleuca</i>	Magpie-lark		
<i>Himantopus himantopus</i>	Black-winged Stilt		
<i>Hirundapus caudacutus</i>	White-throated Needletail	M	
<i>Hirundo neoxena</i>	Welcome Swallow		
<i>Hydroprogne caspia</i>	Caspian Tern		
<i>Lalage sneurii</i>	White-winged Triller		
<i>Larus pacificus</i>	Pacific Gull		
<i>Lichenostomus chrysops</i>	Yellow-faced Honeyeater		
<i>Lichenostomus cratitius</i>	Purple-gaped Honeyeater		ssp
<i>Lichenostomus fuscus</i>	Fuscous Honeyeater		
<i>Lichenostomus leucotis</i>	White-eared Honeyeater		
<i>Lichenostomus ornatus</i>	Yellow-plumed Honeyeater		
<i>Lichenostomus penicillatus</i>	White-plumed Honeyeater		
<i>Limicola falcinellus</i>	Broad-billed Sandpiper	M	
<i>Malurus cyaneus</i>	Superb Fairy-wren		
<i>Malurus lamberti</i>	Variiegated Fairy-wren		
<i>Manorina melanocephala</i>	Noisy Miner		
<i>Megalurus gramineus</i>	Little Grassbird		
<i>Melanodryas cucullata</i>	Hooded Robin		
<i>Melithreptus brevirostris</i>	Brown-headed Honeyeater		
<i>Microcarbo melanoleucos</i>	Little Pied Cormorant		
<i>Microeca fascinans</i>	Jacky Winter		ssp
<i>Morus serrator</i>	Australasian Gannet		
<i>Neochmia temporalis</i>	Red-browed Finch		
<i>Numenius minutus</i>	Little Curlew	M	
<i>Nycticorax caledonicus</i>	Nankeen Night Heron		
<i>Nymphicus hollandicus</i>	Cockatiel		
<i>Ocyphaps lophotes</i>	Crested Pigeon		
<i>Onychoprion anaethetus</i>	Bridled Tern (Bridal Tern)		
<i>Onychoprion fuscata</i>	Sooty Tern		
<i>Pachycephala olivacea</i>	Olive Whistler		ssp
<i>Pachycephala rufiventris</i>	Rufous Whistler		
<i>Pardalotus punctatus</i>	Spotted Pardalote		
<i>Pardalotus striatus</i>	Striated Pardalote		
<i>Pelecanus conspicillatus</i>	Australian Pelican		
<i>Petrochelidon ariel</i>	Fairy Martin		
<i>Petrochelidon nigricans</i>	Tree Martin		
<i>Petroica boodang</i>	Scarlet Robin		ssp
<i>Pezoporus wallicus</i>	Ground Parrot		
<i>Phaethon rubricauda</i>	Red-tailed Tropicbird		
<i>Phalacrocorax carbo</i>	Great Cormorant		
<i>Phalacrocorax fuscescens</i>	Black-faced Cormorant (Black-faced Shag)		
<i>Phalaropus fulicarius</i>	Grey Phalarope		

SE2 – Port MacDonnell

Species	Common Name	Aus status	SA status
<i>Phalaropus lobatus</i>	Red-necked Phalarope	M	
<i>Phaps elegans</i>	Brush Bronzewing		
<i>Philemon corniculatus</i>	Noisy Firebird		
<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater		
<i>Platalea flavipes</i>	Yellow-billed Spoonbill		
<i>Platalea regia</i>	Royal Spoonbill		
<i>Platycercus excimius</i>	Eastern Rosella		
<i>Pluvialis squatarola</i>	Grey Plover	M	
<i>Poliiocephalus poliocephalus</i>	Hoary-headed Grebe		
<i>Pomatostomus superciliosus</i>	White-browed Babbler		
<i>Pomatostomus temporalis</i>	Grey-crowned Babbler		ssp
<i>Porphyrio porphyrio</i>	Purple Swamphen (Purple Moorhen)		
<i>Porzana pusilla</i>	Baillon's Crake		
<i>Pulvialis dominica</i>	Lesser Golder Plover	M	
<i>Recurvirostra novaehollandiae</i>	Red-necked Avocet		
<i>Rhipidura albiscapa</i>	Grey Fantail		
<i>Rhipidura leucophrys</i>	Willie Wagtail		
<i>Rhipidura rufifrons</i>	Rufous Fantail		
<i>Sericornis frontalis</i>	White-browed Scrubwren		
<i>Smicromis brevirostris</i>	Weebill		
<i>Sterna striata</i>	White-fronted Tern		
<i>Strepera versicolor</i>	Grey Currawong		ssp
<i>Tachybaptus novaehollandiae</i>	Australasian Grebe (Little Grebe)		
<i>Tadorna tadornoides</i>	Australian Shelduck (Mountain Duck)		
<i>Thalasseus bergii</i>	Crested Tern		
<i>Threskiornis molucca</i>	Australian White Ibis (Sacred Ibis)		
<i>Todiramphus pyrrophygius</i>	Red-backed Kingfisher		
<i>Tribonyx ventralis</i>	Black-tailed Native-hen		
<i>Tringa nebularia</i>	Common Greenshank	M	
<i>Tringa stagnatilis</i>	Marsh Sandpiper	M	
<i>Tyto alba</i>	Barn Owl		
<i>Tyto javanica</i>	Eastern Barn Owl		
<i>Vanellus miles</i>	Masked Lapwing		
<i>Vanellus tricolor</i>	Banded Lapwing		
<i>Zosterops lateralis</i>	Silvereye		

CR: Critically endangered, E: Endangered, V: Vulnerable, R: Rare, M: Migratory, ssp: sub-species

Butterflies

Species	Common Name	Status*	Record
<i>Jamenus icilius</i>	Icilius Hairstreak	E in SE	p
<i>Ogyris olane</i>	Olane Azure	E in SE	x
<i>Hesperilla cyrboticha cyclopsila</i>	Chrysotricha Sedge-skipper or Golden-haired Sedge-skipper	V	x
<i>Oreixenica kershawi kanunda</i>	Striped Xenica	V	x
<i>Trapezites symmomus soma</i>	Symmomus Rush-skipper or Splendid Ochre	V	x
<i>Erina hyacinthina hyacinthina</i>	Dusky blue	R	x
<i>Lucia limbaria</i>	Small Copper	R	p
<i>Ogyris abrota</i>	Dark-purple Azure	R	x
<i>Taractrocera papyria papyria</i>	White-banded Grass-dart	R	x
<i>Tisiphone abeona albifascia</i>	Sword-grass brown	R	x
<i>Belenois java tentonia</i>	Caper White	Va	x

SE2 – Port MacDonnell

Species	Common Name	Status*	Record
<i>Dispar compacta</i>	Barred Grass Skipper		x
<i>Erina acasta</i>	Blotched Dusky-blue		p
<i>Geitoneura klugii klugii</i>	Common Xenica	C	x
<i>Hesperilla donnysa delos (incl. form diluta)</i>	Donnysa skipper		x
<i>Hesperilla idothea idothea</i>			x
<i>Heteronympha merope merope</i>	Common Brown	C	x
<i>Heteronympha penelope</i>	Shouldered Brown		x
<i>Junonia villida calybe</i>	Meadow argus	Va	x
<i>Nacuduba biocellata biocellata</i>	Two-spotted Line-blue	LC	x
<i>Theclinessthes miskini miskini</i>	Wattle Blue		p
<i>Theclinessthes serpentata serpentata</i>	Salt-bush blue		p
<i>Vanessa itea</i>	Australian Admiral	Va	x
<i>Vanessa kershawi</i>	Australian Painted Lady	Va	x
<i>Zizina labradus labradus</i>	Common Grass Blue		x

*Vulnerability as per R. Grund, E: Endangered, V: Vulnerable, R: Rare

Va: Vagrant, LC: Locally common, C: Common

x: recorded, p: possibly there as suggested by R. Grund

Mammals

Species	Common Name	Aus status	SA status	Record
<i>Antechinus minimus</i>	Swamp Antechinus		E	x
<i>Wallabia bicolor</i>	Swamp Wallaby		V	x
<i>Macropus rufogriseus</i>	Red-necked Wallaby		R	x
<i>Rattus lutreolus</i>	Swamp Rat		R	x
<i>Trichosurus vulpecula</i>	Common Brushtail Possum		R	x
<i>Vombatus ursinus</i>	Common Wombat		R	x
<i>Hydromys chrysogaster</i>	Water-rat			x
<i>Pseudocheirus peregrinus</i>	Common Ringtail Possum			x
<i>Rattus fuscipes</i>	Bush Rat			x
<i>Sminthopsis crassicaudata</i>	Fat-tailed Dunnart			x
<i>Tachyglossus aculeatus</i>	Short-beaked Echidna			x

E: Endangered, V: Vulnerable, R: Rare

x: recorded

Reptiles

Species	Common Name	Aus status	SA status	Record
<i>Lissolepis coventryi</i>	Swamp Skink		E	e
<i>Nannoscincus maccoyi</i>	Salamander skink		E	x
<i>Drysdalia coronoides</i>	White-lipped Snake		R	x
<i>Amphibolurus norrisi</i>	Mallee Tree-dragon			x
<i>Austrelaps superbus</i>	Lowland Copperhead			x
<i>Emydura macquarii</i>	Short-necked Turtle (Murray Turtle)			x
<i>Hemiergis peronii</i>	Four-toed Earless Skink			e
<i>Lampropholis guichenoti</i>	Garden Skink			x
<i>Lerista bougainvillei</i>	Bougainville's Skink			x
<i>Liopholis whitii</i>	White's Skink			x
<i>Notechis scutatus</i>	Eastern Tiger Snake	ssp		x
<i>Pseudemoia entrecasteauxii</i>	Southern Grass Skink			x
<i>Pseudonaja textilis</i>	Eastern Brown Snake			x
<i>Tiliqua nigrolutea</i>	Blotched Bluetongue			x
<i>Tiliqua rugosa</i>	Sleepy Lizard			e

SE2 – Port MacDonnell

E: Endangered, V: Vulnerable, R: Rare

x: recorded, e: expected to be there (M. Hutchinson pers. comm. 2009)

Amphibians

Species	Common Name	Aus status	SA status	Record
<i>Crinia signifera</i>	Common Froglet			x
<i>Limnodynastes peronii</i>	Striped Marsh Frog			x
<i>Limnodynastes tasmaniensis</i>	Spotted Marsh Frog			x
<i>Litoria ewingii</i>	Brown Tree Frog			x
<i>Neobatrachus sudelli</i>	Sudell's Frog			x

E: Endangered, V: Vulnerable, R: Rare

x: recorded

SE3 – Cape Douglas

6.3.3 Cell SE3 Cape Douglas

Shoreline length is 13.88 km; area of cell is 741 ha.



SE3 – Cape Douglas

Landforms

This is a variable cell, with Gambier Limestone and calcarenite cliffs, huge shore platforms, reefs, and small embayments, dunes and coastal wetlands as notable features. At Umpherstone Bay there is a narrow coarse sand and flint cobble beach behind platforms and reefs; some beach ridges are cobbles, with sand capping; and towards Blanche Bay and Middle Point beaches are in places made up entirely of cobbles. Sand storage in dunes is low in volume: it appears that reefs have reduced Holocene transgressive onshore sand transport.

At Middle Point the cobble beach is sheltered from heavy offshore surf by wide limestone reefs. The beach ridge system at Blanche Bay is well vegetated and relatively stable, compared with further NW. There is a distinctive cobble cusped foreland immediately NW of Middle Point (pictured below, centre), that has accumulated on a shore platform; another is found on the SE side of the headland. These forelands are an unusual landform in South Australia (cf. Pine Point, York Peninsula), and appear to result from reef refraction of inshore waves, constructing cobble berms parallel to the two shores of the foreland, in a context of low to moderate wave energy and plentiful supply of cobble-sized debris.

From Finger Point to Cape Douglas the narrow dunes and cobble ridges are backed by coastal swamps. Near Cape Northumberland stranded cliff top dune over aeolianite is found. Douglas Point shows calcarenite cliffs with large shore platforms, also small high tide pocket beaches of coarse sands and shingle.



Middle Point foreland, Umpherstone Bay beach, dunes and cobble ridges; Middle Point Wetland. Photograph Coast Protection Board 2008.

Benthic Habitat

Entirely heavy limestone reef inshore, with low platform reef beyond about 1 km offshore. Seagrass meadows in protected embayments.

Biota

There are 11 flora survey sites, 2 opportune flora sites, 15 Herbarium record sites, 3 fauna survey sites, and 27 opportune fauna survey sites. There is 429ha of remnant vegetation., which is 58% of the cell area.

SE3 – Cape Douglas

98% of coastal dunes are vegetated with *Leucopogon parviflorus*, *Acacia longifolia* var. *sophorae*, *Olearia axillaris* tall shrubland over *Lepidosperma gladiatum*, *Isolepis nodosa* over ground covers. Rushland/sedgeland backing dunes at mid-Umpherstone Bay has shrub *Melaleuca balmatororum* over *Gabnia filum*.

205 bird species have been recorded in this cell, including the EPBC listed endangered Orange-bellied Parrot (*Neophema chrysogaster*) and State endangered Eastern Osprey (*Pandion cristatus*), and Little (*Sternula albifrons*) and Fairy (*Sternula nereis*) Terns. 7 butterflies, 11 mammals, 5 reptiles and 3 amphibians have also been recorded.

Land Use/ Land Ownership

Most of this cell is privately owned; however 14.3% is Crown land, and the tiny Cape Douglas CP makes up 3% of the cell. SA Water Corporation controls 2 headland areas as wastewater treatment plant reserve at Finger Point and the next small headland to the west. A narrow unallotted Crown Land reserve exists between Cape Northumberland and Cape Douglas.

Values/ Uses (Field visits and local reports)

Highly utilised scenic drive between Cape Northumberland and Finger Point. Aboriginal Heritage values throughout.

Threats (Field visits and local reports)

McLaren et al 1980 report that domestic rubbish from Port MacDonnell was dumped into the sea at Cape Northumberland, via a metal chute, (then dispersed by wave action along the shore); however this practice ceased in the early 1980s, leaving only traces of polished glass along the shore. Excessive ORV activity between Finger Point and Cape Douglas.

Opportunities

Middle Point Swamp, otherwise known as Pascoe's swamp, is an area of coastal wetland that has been drained for agricultural use. The site was partially hydrologically restored in 2005 (Taylor, 2006) and is undergoing further restoration through regulation of a second drain in 2010. An action plan for the restoration of the site is being prepared by DENR.

Conservation Analysis (GIS)

Sum of conservation layer means is 126.29, an average total. This small cell shows good connection between intact and partially cleared dune vegetated areas; together with the coastal wetlands, these support a variety of coastal habitats for plants and animals. As a result average to good total conservation layer scores are spread across 2/3 of the cell. Small high value areas are found at Middle Point Wetland and the small wetland west of the intersection of Hut Bay Road and Thompsons Lane. The northern end of Umpherstone Bay shows notably low conservation values.

High total layers for the whole cell are vegetation metrics – shape, connectivity, and size; however total number of species is not high. The Middle Point wetlands score highly for habitat of focal species Swamp skink, Southern Bell Frog and Yellow Sedge Skipper; habitat for the Orange-bellied Parrot is found extensively through the dunes and cobble ridges.

The entire foreshore, <100m from low water mark is designated a significant geological feature, “Glenelg River and Lower South East Coast”.

Threat Analysis (GIS)

The total of threat means for cell SE3 is relatively high, 69.157: the main threat totals comprising this are ORV tracks, development zoning, land ownership and land use, viewshed, viewscape and

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mining leases (SE Petroleum production and exploration licenses). Most dunes and gravel ridges show impact of tracks made by ORVs, with damage especially concentrated around headlands.

Almost the entire cell shows medium high to high threat totals, and notably the high conservation Middle Point Wetland is demonstrated to have high pressure from combined threats.

Adaptation to Climate Change: Threats for Cell SE3

(see also discussion of scenario in Section 4.11)

NOTE: the advice below is indicative of likely change and the direction of change, with implications for ecosystems. Dates, amounts and probabilities cannot be accurately calculated at this time. Thus advice on flood levels, for example, should not be used in engineering or development planning.

Climate change element/ scenario	Impacts and implications (for this cell)	Protect and manage habitat threats	Address landscape issues: fire, connectivity, refuges, hydrology
Combined climate changes and sea level rise throughout this cell	This cell presents a complex pattern of habitats sensitive to change.	Create a baseline for shoreline, dune and lake change by establishing a rectified aerial imagery record at an appropriate resolution.	
Sea level rise: 2030 : +c.20cm 2070: +c.80cm.	Rise in frequency of tidal flooding, threatens freshwater swamps, first at Winterfield Creek and Middle Point Wetland. (These show high total conservation values).	Monitor storm tide impacts, with a view to sill construction on drainage outlets.	
	Increase in storm foredune damage and beach recession in embayments.	Beach profile monitoring, as baseline information for coastal change.	
	Beach change may be rapid, because of low storage volumes of sand. Low dune elevations threaten surge overtopping, and rapid dune recession. Beach and nearshore sand accumulation in lee of reefs may be reduced together with reef protection of the shore.	Active management of dune blowouts.	
Storms: <i>Frequency</i> continues to show great variation on a decadal scale. <i>Intensity</i> of large	2030: Occasional storm tide flooding above highest known tides. Flooding frequency critical for freshwater swamps. 2070: Flooding will affect all swamps and adjacent low	Manage sill height on tidal inlets to adjust to higher marine storm elevations, (see above).	

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Climate change element/ scenario	Impacts and implications (for this cell)	Protect and manage habitat threats	Address landscape issues: fire, connectivity, refuges, hydrology
storms increases.	lying areas. Frequent storm damage to foredunes.	Active management of dune blowouts.	
Warmer average conditions: 2030:+0.3 to .6°C 2070:+1.5 to 2°C	(Impacts uncertain. Existing terrestrial vegetation is found in warmer conditions elsewhere)		Maintain connectivity of vegetation within the region.
Drier average conditions: 2030: -2% to 5% 2070: - 10% to 20%	Dune vegetation adapts well to drier conditions, but recover more slowly from fire, disease and storm damage: dune mobilization becomes more likely.	Active weed control within dunes.	
'Flashy' run off: Drier creeks, but larger rare floods	Drains and creeks may increase sediment load to coastal swamps, (this depends on land management practices).	Maintain watching brief on sedimentation of high value swamps areas.	
Groundwater lowering; saline incursion:	The potential fall in groundwater pressure a significant threat to vegetation survival in freshwater swamps.	Adaptive management of plant assets.	Monitor salinity of coastal swamps.
Nearshore sea changes - temperature; acidity; wave climate: 2030: +0.3°C to + 0.6°C 2070: +1.0°C to + 1.50C	Persistent swell wave climate maintains sediment movement towards the east along the coast. (Changes in upwelling timing and frequency has been discussed, but not projected).	Monitor beaches, see above.	

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Table 6.5. Recommended Actions and Priority for Cell SE3 – Cape Douglas

Component	Issue	Proposed Action	Priority of Action	Key Players
Beaches, Dunes & Headlands	Inappropriate ORV use in the dunes, over headlands and over cobble ridges. Middle Point and the southern end of Douglas CP are heavily degraded.	Restrict beach access to nodal tracks. Discourage access along the coast. Fence sensitive areas and enforce compliance.	High (Threat)	Council, DENR, Community, SA Police, DTEI
	Informal access is adding to dune and cliff instability.	Access to be clearly defined with signage, markers and access control fencing. Upgrade vehicle and pedestrian beach access tracks and ramps to protect against erosion damage and minimise environmental impact. Address run-off caused erosion on Cape Douglas headland.	Medium (Cons/Threat)	DENR, Council, NRM, Community Groups
	Accelerating sea level rise threatens beach erosion and dune recession	Establish beach profiles at Umpherstone Bay and within embayment immediately NW of Finger Point as a baseline measure for change.	Medium (cell)	DENR, CPB
Sub-coastal wetlands	High conservation values, but in part threatened by development zoning.	Consider extending the development plan coastal zone.	Medium (Threat)	Council, DPLG
	Changing coastal groundwater quality due to climate change	Monitoring of salinity levels in swamps	Medium (cell)	DFW, NRM

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Component	Issue	Proposed Action	Priority of Action	Key Players
	Marine incursion of water and sediment into drainage outlets during storm tide events.	Monitor water quality and sediment deposition in swamps. Maintain a record of drainage outlet sill performance during high sea level events.	Medium (cell)	SEWCDB, NRM
Finger Point	Remnant vegetation is threatened by exotic species.	Regular monitoring for alert weeds, listed in Section 4.9. Weed strategy development and action on weed removal.	High (Cons/Threat)	Council, NRM
Cape Douglas settlement	Rare plant species and endemic vegetation condition and vegetation connectivity at risk from existing development.	Access control. Buffer plantings, including rare plants.	Medium (Cons/Threat)	Council, Community, NRM, DENR
	Potential for increased weed invasion within adjacent vegetation from dwellings.	Ongoing weed management and regular monitoring for alert weeds listed in Section 4.9. Education initiative targeting residences re: common garden species which become 'weeds' and alternatives for planting.	Medium (Threat)	Council, Community, NRM
Whole Cell	Petroleum production and explorations license over almost the entire cell threatens conservation values.	Remove licence from high value conservation areas.	Medium (Threat)	PIRSA, NRM
	This cell presents a complex pattern of habitats subject to change.	Continue a rectified aerial photographic record at an appropriate resolution, in order to show change from current baseline.	Medium (Cons/Threat)	DENR, NRM

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Component	Issue	Proposed Action	Priority of Action	Key Players
	Aboriginal Heritage sites recorded in this cell. Need for appropriate and sustainable management.	Consultation to appropriately manage sites in this area.	High (Cons)	Murrapeena Heritage Association Inc., SE Aboriginal Focus Group, NRM, Council, Aboriginal Heritage Branch – DPC, Aboriginal Partnership Unit – DENR, SA Water
	Lack of recognition of significant geological feature (Bridgewater formation).	Interpretation. Council to include map of the feature in its development plan.	Medium (Cons)	Council, Geological Society SA, NRM

BIOTA

Flora

Remnant vegetation area (ha)	428.5 ha, 57.8% of cell area
# flora surveys / records	11 surveys, 2 opportune sites, 15 herbarium record sites, 2 threatened plant population record site, 1 reserve database record site
# flora in cell	117
# conservation rated flora in cell	2 recorded
# non-indigenous flora in cell	30 recorded
Significant CDCS floristic community	<i>Leucopogon parviflorus</i> / <i>Olearia axillaris</i> shrubland (>50% of known sites occur along SE coast).
Protected area	Douglas Point Conservation Park (24.1ha in total)

Weeds

Species	Common Name	Status	Study rating
<i>Dipogon lignosus</i>	Lavatory Creeper		9
<i>Polygala myrtifolia</i>	Myrtle-leaf Milkwort		9
<i>Thinopyrum junceiforme</i>	Sea Wheat-grass		8
<i>Leptospermum laevigatum</i>	Coast Tea-tree		7
<i>Euphorbia paralias</i>	Sea Spurge		4
<i>Limonium companyonis</i>	Sea-lavender		4
<i>Mesembryanthemum crystallinum</i>	Common Iceplant		3
<i>Senecio elegans</i>	Purple Groundsel		3
<i>Sporobolus africanus</i>	Rat-tail Grass		3
<i>Ammophila arenaria</i>	Marram Grass		2
<i>Cakile edentula</i>	American Sea Rocket		
<i>Carduus tenuiflorus</i>	Slender Thistle		
<i>Catapodium rigidum</i>	Rigid Fescue		
<i>Cerastium glomeratum</i>	Common Mouse-ear Chickweed		
<i>Cerastium sp.</i>	Chickweed		

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Species	Common Name	Status	Study rating
<i>Diplotaxis muralis</i> var. <i>muralis</i>	Wall Rocket		
<i>Galium murale</i>	Small Bedstraw		
<i>Holcus lanatus</i>	Yorkshire Fog		
<i>Hypochaeris radicata</i>	Rough Cat's Ear		
<i>Lagurus ovatus</i>	Hare's Tail Grass		
<i>Melilotus indicus</i>	King Island Melilot		
<i>Minnuartia mediterranea</i>	Slender Sandwort		
<i>Plantago coronopus</i> ssp.	Bucks-horn Plantain		
<i>Rostraria cristata</i>	Annual Cat's-tail		
<i>Sonchus oleraceus</i> (NC)	Common Sow-thistle		
<i>Stellaria media</i>	Chickweed		
<i>Trifolium dubium</i>	Suckling Clover		
<i>Urtica urens</i>	Small Nettle		
<i>Vulpia myuros</i> f. <i>megalura</i>	Fox-tail Fescue		
<i>Vulpia myuros</i> f. <i>myuros</i>	Rat's-tail Fescue		

D: Declared weed, WONS: Weeds of National Significance

Native flora

Species	Common Name	Aus status	SA status
<i>Ixodia achillaeoides</i> ssp. <i>arenicola</i>	Sand Ixodia	V	E
<i>Mentha diemenica</i>	Slender Mint		R
<i>Acacia leiophylla</i>	Coast Golden Wattle		
<i>Acacia longifolia</i> ssp. <i>sophorae</i>	Coastal Wattle		
<i>Acaena novae-zelandiae</i>	Biddy-biddy		
<i>Actites megalocarpa</i>	Coast Sow-thistle		
<i>Alyxia buxifolia</i>	Sea Box		
<i>Apium prostratum</i> var.	Native Celery		
<i>Apium prostratum</i> var. <i>prostratum</i>	Native Celery		
<i>Apium</i> sp.	Celery		
<i>Asperula conferta</i>	Common Woodruff		
<i>Austrostipa</i> sp.	Spear-grass		
<i>Austrostipa stipoides</i>	Coast Spear-grass		
<i>Baumea juncea</i>	Bare Twig-rush		
<i>Beyeria lechenaultii</i>	Pale Turpentine Bush		
<i>Carex</i> sp.	Sedge		
<i>Carpobrotus rossii</i> (NC)	Native Pigface		
<i>Cassytha pubescens</i>	Downy Dodder-laurel		
<i>Chrysocephalum apiculatum</i>	Common Everlasting		
<i>Clematis microphylla</i> var. <i>microphylla</i>	Old Man's Beard		
<i>Correa reflexa</i> (NC)	Common Correa		
<i>Correa reflexa</i> var. <i>reflexa</i> (NC)	Common Correa		
<i>Correa reflexa</i> var. <i>scabridula</i>	Common Correa		
<i>Crassula sieberiana</i> ssp. <i>tetramera</i> (NC)	Australian Stonecrop		
<i>Cyperus gymnocaulos</i>	Spiny Flat-sedge		
<i>Daucus glochidiatus</i>	Native Carrot		
<i>Dianella brevicaulis</i>	Short-stem Flax-lily		
<i>Dianella revoluta</i> var. <i>revoluta</i>	Black-anther Flax-lily		
<i>Dichondra repens</i>	Kidney Weed		
<i>Epilobium billardierianum</i> ssp. <i>billardierianum</i>	Robust Willow-herb		
<i>Epilobium billardierianum</i> ssp. <i>X intermedium</i>	Variable Willow-herb		
<i>Epilobium</i> sp.	Willow-herb		
<i>Ficinia nodosa</i>	Knobby Club-rush		

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Species	Common Name	Aus status	SA status
<i>Gabnia filum</i>	Thatching Grass		
<i>Galium</i> sp.	Bedstraw		
<i>Geranium solanderi</i> var. <i>solanderi</i>	Austral Geranium		
<i>Geranium</i> sp.	Geranium		
<i>Gramineae</i> sp.	Grass Family		
<i>Helichrysum</i> sp. (NC)			
<i>Hydrocotyle laxiflora</i>	Stinking Pennywort		
<i>Hydrocotyle</i> sp.	Pennywort		
<i>Juncus kraussii</i>	Sea Rush		
<i>Juncus pauciflorus</i>	Loose-flower Rush		
<i>Lasiopetalum discolor</i>	Coast Velvet-bush		
<i>Lasiopetalum schulzenii</i>	Drooping Velvet-bush		
<i>Lepidosperma gladiatum</i>	Coast Sword-sedge		
<i>Leptospermum lanigerum</i>	Silky Tea-tree		
<i>Leucophyta brownii</i>	Coast Cushion Bush		
<i>Leucopogon parviflorus</i>	Coast Beard-heath		
<i>Lotus australis</i>	Austral Trefoil		
<i>Melaleuca lanceolata</i>	Dryland Tea-tree		
<i>Melaleuca lanceolata</i> ssp. <i>lanceolata</i> (NC)	Dryland Tea-tree		
Moss sp.			
<i>Myosotis australis</i>	Austral Forget-me-not		
<i>Olearia axillaris</i>	Coast Daisy-bush		
<i>Oxalis perennans</i> (NC)	Native Sorrel		
<i>Parietaria debilis</i> (NC)	Smooth-nettle		
<i>Pelargonium australe</i>	Austral Stork's-bill		
<i>Pelargonium littorale</i>	Native Pelargonium		
<i>Phragmites australis</i>	Common Reed		
<i>Pimelea serpyllifolia</i> ssp. <i>serpyllifolia</i>	Thyme Riceflower		
<i>Poa poiformis</i> var. <i>poiformis</i>	Coast Tussock-grass		
<i>Poa</i> sp.	Meadow-grass/Tussock-grass		
<i>Pomaderris paniculosa</i> ssp. <i>paniculosa</i>	Mallee Pomaderris		
<i>Pultenaea canaliculata</i> var. <i>canaliculata</i>	Soft Bush-pea		
<i>Pultenaea tenuifolia</i>	Narrow-leaf Bush-pea		
<i>Rbagodia candolleana</i> ssp. <i>candolleana</i>	Sea-berry Saltbush		
<i>Rumex</i> sp.	Dock		
<i>Samolus repens</i>	Creeping Brookweed		
<i>Sarcocornia quinqueflora</i>	Beaded Samphire		
<i>Scaevola albida</i>	Pale Fanflower		
<i>Schoenoplectus litoralis</i>	Shore Club-rush		
<i>Schoenoplectus pungens</i>	Spiky Club-rush		
<i>Senecio glomeratus</i> (NC)	Swamp Groundsel		
<i>Senecio pinnatifolius</i> (NC)	Variable Groundsel		
<i>Senecio pinnatifolius</i> var. <i>maritimus</i>	Variable Groundsel		
<i>Sonchus</i> sp.	Sow-thistle		
<i>Spinifex sericeus</i> (NC)	Rolling Spinifex		
<i>Sporobolus virginicus</i> (NC)	Salt Couch		
<i>Stackhousia spathulata</i>	Coast Candles		
<i>Swainsona lessertiiifolia</i>	Coast Swainson-pea		
<i>Tetragonia implexicoma</i>	Bower Spinach		
<i>Tbrelkeldia diffusa</i>	Coast Bonefruit		
<i>Triglochin striata</i>	Streaked Arrowgrass		
<i>Typha domingensis</i>	Narrow-leaf Bulrush		
<i>Veronica</i> sp.	Speedwell		

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Species	Common Name	Aus status	SA status
<i>Zygophyllum billardi</i>	Coast Twinleaf		

E: Endangered, V: Vulnerable, R: Rare

Fauna

# of fauna in cell	231 recorded – 205 birds, 7 butterflies, 11 mammals, 5 reptiles, 3 amphibians (an additional 10 butterflies, 2 mammal and 6 reptiles identified by experts as possibly occurring)
# of fauna surveys / records	3 surveys, 27 opportune sites
# of threatened fauna in cell	50 recorded
# of non-indigenous fauna	15 recorded (an additional 1 mammal possible)

Non-indigenous fauna

Species	Common Name	Class	Record
<i>Alanda arvensis</i>	Eurasian Skylark	Aves	x
<i>Carduelis carduelis</i>	European Goldfinch	Aves	x
<i>Chloris chloris</i>	Common Greenfinch (European Greenfinch)	Aves	x
<i>Columba livia</i>	Rock Dove (Feral Pigeon)	Aves	x
<i>Passer domesticus</i>	House Sparrow	Aves	x
<i>Streptopelia chinensis</i>	Spotted Dove (Spotted turtle-dove)	Aves	x
<i>Sturnus vulgaris</i>	Common Starling	Aves	x
<i>Turdus merula</i>	Common Blackbird	Aves	x
	Common Skylark	Aves	x
<i>Pieris rapae rapae</i>	Cabbage White	Invertebrate	x
<i>Rattus rattus</i>	Black Rat (Ship Rat, Roof Rat)	Mammalia	e
<i>Felis catus</i>	Cat (Feral Cat)	Mammalia	x
<i>Lepus capensis</i>	Brown Hare (European Hare)	Mammalia	x
<i>Mus musculus</i>	House Mouse	Mammalia	x
<i>Oryctolagus cuniculus</i>	Rabbit (European Rabbit)	Mammalia	x
<i>Vulpes vulpes</i>	Fox (Red Fox)	Mammalia	x

x: recorded

Birds

Species	Common Name	Aus status	SA status
<i>Neophema chrysogaster</i>	Orange-bellied Parrot	CR/M	E
<i>Pandion cristatus</i>	Eastern Osprey		E
<i>Sternula albifrons</i>	Little Tern		E
<i>Sternula nereis</i>	Fairy Tern		E
<i>Botaurus poiciloptilus</i>	Australasian Bittern		V
<i>Calyptorhynchus funereus</i>	Yellow-tailed Black-Cockatoo		V
<i>Cladorhynchus leucocephalus</i>	Banded Stilt		V
<i>Coturnix ypsilophora</i>	Brown Quail		V
<i>Grus rubicunda</i>	Brolga		V
<i>Neophema chrysostoma</i>	Blue-winged Parrot		V
<i>Numenius madagascariensis</i>	Eastern Curlew	M	V
<i>Petroica phoenicea</i>	Flame Robin		V
<i>Thinornis rubricollis</i>	Hooded Plover		V
<i>Actitis hypoleucos</i>	Common Sandpiper	M	R
<i>Anas rhynchotis</i>	Australasian Shoveler		R
<i>Anbinga novaehollandiae</i>	Australasian Darter		R

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Species	Common Name	Aus status	SA status
<i>Ardea ibis</i>	Cattle Egret		R
<i>Ardea intermedia</i>	Intermediate Egret		R
<i>Arenaria interpres</i>	Ruddy Turnstone	M	R
<i>Biziura lobata</i>	Musk Duck		R
<i>Calidris alba</i>	Sanderling	M	R
<i>Calidris melanotos</i>	Pectoral Sandpiper	M	R
<i>Calidris tenuirostris</i>	Great Knot	M	R
<i>Cereopsis novaehollandiae</i>	Cape Barren Goose		R
<i>Charadrius leschenaultii</i>	Greater Sand Plover (Large Sand Plover)	M	R
<i>Charadrius mongolus</i>	Lesser Sand Plover (Mongolian Plover)	M	R
<i>Egretta garzetta</i>	Little Egret		R
<i>Egretta sacra</i>	Eastern Reef Egret	M	R
<i>Falco peregrinus</i>	Peregrine Falcon		R
<i>Falcunculus frontatus</i>	Crested Shrike-tit		R
<i>Gallinago hardwickii</i>	Latham's Snipe (Japanese Snipe)	M	R
<i>Gerygone albogularis</i>	White-throated Gerygone		R
<i>Haematopus fuliginosus</i>	Sooty Oystercatcher		R
<i>Haematopus longirostris</i>	Australian Pied Oystercatcher		R
<i>Larus dominicanus</i>	Kelp Gull		R
<i>Limosa lapponica</i>	Bar-tailed Godwit	M	R
<i>Limosa limosa</i>	Black-tailed Godwit	M	R
<i>Neophema elegans</i>	Elegant Parrot		R
<i>Numenius phaeopus</i>	Whimbrel	M	R
<i>Oxyura australis</i>	Blue-billed Duck		R
<i>Plegadis falcinellus</i>	Glossy Ibis	M	R
<i>Pluvialis fulva</i>	Pacific Golden Plover	M	R
<i>Podiceps cristatus</i>	Great Crested Grebe		R
<i>Stagonopleura bella</i>	Beautiful Firetail		R
<i>Tringa brevipes</i>	Grey-tailed Tattler	M	R
<i>Xenus cinereus</i>	Terek Sandpiper	M	R
<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater		
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill		
<i>Acanthiza lineata</i>	Striated Thornbill		
<i>Acanthiza pusilla</i>	Brown Thornbill		
<i>Acanthiza reguloides</i>	Buff-rumped Thornbill		
<i>Acanthorhynchus tenuirostris</i>	Eastern Spinebill		
<i>Accipiter cirrocephalus</i>	Collared Sparrowhawk		
<i>Acrocephalus australis</i>	Australian Reed Warbler (Clamorous Reed-Warbler)		
<i>Anas castanea</i>	Chestnut Teal		
<i>Anas gracilis</i>	Grey Teal		
<i>Anas superciliosa</i>	Pacific Black Duck		
<i>Anthochaera carunculata</i>	Red Wattlebird		
<i>Anthochaera chrysoptera</i>	Little Wattlebird		
<i>Anthus novaeseelandiae</i>	Australasian Pipit (Richard's Pipit)		
<i>Apus pacificus</i>	Fork-tailed Swift		
<i>Aquila audax</i>	Wedge-tailed Eagle		
<i>Ardea alba</i>	Great Egret		
<i>Ardea modesta</i>	Eastern Great Egret		
<i>Ardea pacifica</i>	White-necked Heron (Pacific Heron)		
<i>Ardenna tenuirostris</i>	Short-tailed Shearwater (Mutton Bird)		
<i>Artamus cyanopterus</i>	Dusky Woodswallow		
<i>Artamus personatus</i>	Masked Woodswallow		
<i>Artamus superciliosus</i>	White-browed Woodswallow		

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Species	Common Name	Aus status	SA status
<i>Aythya australis</i>	Hardhead (White-eyed Duck)		
<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo		
<i>Cacomantis pallidus</i>	Pallid Cuckoo		
<i>Calamanthus fuliginosus</i>	Striated Fieldwren		
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	M	
<i>Calidris canutus</i>	Red Knot	M	
<i>Calidris ferruginea</i>	Curlew Sandpiper	M	
<i>Calidris ruficollis</i>	Red-necked Stint	M	
<i>Catharacta skua</i>	Great Skua		
<i>Chalcites basalis</i>	Horsfield's Bronze-cuckoo		
<i>Chalcites lucidus</i>	Shining Bronze-Cuckoo		
<i>Charadrius bicinctus</i>	Double-banded Plover		
<i>Charadrius ruficapillus</i>	Red-capped Plover (Red-capped Dotterel)		
<i>Chenonetta jubata</i>	Australian Wood Duck (Maned Duck)		
<i>Chlidonias hybrida</i>	Whiskered Tern	M	
<i>Chroicocephalus novaehollandiae</i>	Silver Gull		
<i>Chrysococcyx osculans</i>	Black-eared Cuckoo		
<i>Cincloramphus cruralis</i>	Brown Songlark		
<i>Circus approximans</i>	Swamp Harrier (Marsh Harrier)		
<i>Circus assimilis</i>	Spotted Harrier		
<i>Cisticola exilis</i>	Golden-headed Cisticola		
<i>Colluricincla harmonica</i>	Grey Shrike-thrush		
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike		
<i>Corcorax melanorhynchos</i>	White-winged Chough		
<i>Cormobates leucophaea</i>	White-throated Treecreeper		
<i>Corvus coronoides</i>	Australian Raven		
<i>Corvus mellori</i>	Little Raven		
<i>Corvus tasmanicus</i>	Forest Raven		
<i>Coturnix pectoralis</i>	Stubble Quail		
<i>Cracticus tibicen</i>	Australian Magpie		
<i>Cracticus torquatus</i>	Grey Butcherbird		
<i>Cygnus atratus</i>	Black Swan		
<i>Dacelo novaeguinae</i>	Laughing Kookaburra		
<i>Daphoenositta chrysoptera</i>	Varied Sittella		
<i>Daption capense</i>	Cape Petrel		
<i>Dasyornis broadbenti</i>	Rufous Bristlebird		ssp
<i>Dicaeum hirundinaceum</i>	Mistletoebird		
<i>Egretta novaehollandiae</i>	White-faced Heron		
<i>Elanus axillaris</i>	Black-shouldered Kite		
<i>Euseyornis melanops</i>	Black-fronted Dotterel (Black-fronted Plover)		
<i>Eolophus roseicapillus</i>	Galah		
<i>Eopsaltria australis</i>	Eastern Yellow Robin		
<i>Epthianura albifrons</i>	White-fronted Chat		
<i>Eudyptula minor</i>	Little Penguin (Fairy Penguin)		
<i>Falco berigora</i>	Brown Falcon		
<i>Falco cenchroides</i>	Nankeen Kestrel (Australian Kestrel)		
<i>Falco longipennis</i>	Australian Hobby		
<i>Fulica atra</i>	Eurasian Coot		
<i>Gallinula tenebrosa</i>	Dusky Moorhen		
<i>Gallirallus philippensis</i>	Buff-banded Rail		
<i>Glossopsitta concinna</i>	Musk Lorikeet		
<i>Glossopsitta porphyrocephala</i>	Purple-crowned Lorikeet		
<i>Grallina cyanoleuca</i>	Magpie-lark		

SE3 – Cape Douglas

Species	Common Name	Aus status	SA status
<i>Haliastur sphenurus</i>	Whistling Kite		
<i>Himantopus himantopus</i>	Black-winged Stilt		
<i>Hirundapus caudacutus</i>	White-throated Needletail	M	
<i>Hirundo neoxena</i>	Welcome Swallow		
<i>Hydroprogne caspia</i>	Caspian Tern		
<i>Lalage sueurii</i>	White-winged Triller		
<i>Larus pacificus</i>	Pacific Gull		
<i>Lichenostomus chrysops</i>	Yellow-faced Honeyeater		
<i>Lichenostomus leucotis</i>	White-eared Honeyeater		
<i>Lichenostomus penicillatus</i>	White-plumed Honeyeater		
<i>Lichenostomus virescens</i>	Singing Honeyeater		
<i>Malurus cyaneus</i>	Superb Fairy-wren		
<i>Megalurus gramineus</i>	Little Grassbird		
<i>Melanodryas cucullata</i>	Hooded Robin		
<i>Melithreptus brevirostris</i>	Brown-headed Honeyeater		
<i>Melithreptus lunatus</i>	White-naped Honeyeater		
<i>Microcarbo melanoleucos</i>	Little Pied Cormorant		
<i>Microeca fascinans</i>	Jacky Winter		ssp
<i>Morus serrator</i>	Australasian Gannet		
<i>Neochmia temporalis</i>	Red-browed Finch		
<i>Ninox novaeseelandiae</i>	Southern Boobook		
<i>Nycticorax caledonicus</i>	Nankeen Night Heron		
<i>Ocyphaps lophotes</i>	Crested Pigeon		
<i>Pachycephala olivacea</i>	Olive Whistler		ssp
<i>Pachycephala pectoralis</i>	Golden Whistler		
<i>Pachycephala rufiventris</i>	Rufous Whistler		
<i>Pardalotus punctatus</i>	Spotted Pardalote		
<i>Pardalotus striatus</i>	Striated Pardalote		
<i>Pelecanus conspicillatus</i>	Australian Pelican		
<i>Petrochelidon ariel</i>	Fairy Martin		
<i>Petrochelidon nigricans</i>	Tree Martin		
<i>Petroica boodang</i>	Scarlet Robin		ssp
<i>Pezoporus wallicus</i>	Ground Parrot		
<i>Phaethon rubricauda</i>	Red-tailed Tropicbird		
<i>Phalacrocorax carbo</i>	Great Cormorant		
<i>Phalacrocorax fuscescens</i>	Black-faced Cormorant (Black-faced Shag)		
<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant		
<i>Phalacrocorax varius</i>	Pied Cormorant		
<i>Phaps chalcoptera</i>	Common Bronzewing		
<i>Phaps elegans</i>	Brush Bronzewing		
<i>Philemon corniculatus</i>	Noisy Firebird		
<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater		
<i>Phylidonyris pyrrhoptera</i>	Crescent Honeyeater		
<i>Platalea flavipes</i>	Yellow-billed Spoonbill		
<i>Platalea regia</i>	Royal Spoonbill		
<i>Platycercus elegans</i>	Crimson Rosella		
<i>Pluvialis squatarola</i>	Grey Plover	M	
<i>Podargus strigoides</i>	Tawny Frogmouth		
<i>Poliiocephalus poliocephalus</i>	Hoary-headed Grebe		
<i>Pomatostomus superciliosus</i>	White-browed Babbler		
<i>Pomatostomus temporalis</i>	Grey-crowned Babbler		ssp
<i>Porphyrio porphyrio</i>	Purple Swamphen (Purple Moorhen)		
<i>Porzana fluminea</i>	Australian Spotted Crake (Australian Crake)		

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Species	Common Name	Aus status	SA status
<i>Psephotus haematonotus</i>	Red-rumped Parrot		
<i>Rhipidura albiscapa</i>	Grey Fantail		
<i>Rhipidura leucophrys</i>	Willie Wagtail		
<i>Sericornis frontalis</i>	White-browed Scrubwren		
<i>Stipiturus malachurus</i>	Southern Emu-wren	ssp	ssp
<i>Stipiturus malachurus malachurus</i>	Southern Emu-wren		
<i>Strepera versicolor</i>	Grey Currawong		ssp
<i>Tachybaptus novaehollandiae</i>	Australasian Grebe, (Little Grebe)		
<i>Tadorna tadornoides</i>	Australian Shelduck (Mountain Duck)		
<i>Thalasseus bergii</i>	Crested Tern		
<i>Threskiornis molucca</i>	Australian White Ibis (Sacred Ibis)		
<i>Threskiornis spinicollis</i>	Straw-necked Ibis		
<i>Todiramphus sanctus</i>	Sacred Kingfisher		
<i>Tribonyx ventralis</i>	Black-tailed Native-hen		
<i>Trichoglossus haematodus</i>	Rainbow Lorikeet		
<i>Tringa nebularia</i>	Common Greenshank	M	
<i>Tringa stagnatilis</i>	Marsh Sandpiper	M	
<i>Tyto alba</i>	Barn Owl		
<i>Vanellus miles</i>	Masked Lapwing		
<i>Vanellus tricolor</i>	Banded Lapwing		
<i>Zosterops lateralis</i>	Silvereye		

CR: Critically endangered, E: Endangered, V: Vulnerable, R: Rare, M: Migratory, ssp: sub-species

Butterflies

Species	Common Name	Status*	Record
<i>Hesperilla donnysa donnysa</i> (pale form <i>flavescens</i>)	Yellowish Sedge-Skipper	E	ex?
<i>Hesperilla cyrsoticha cyclopsila</i>	Chrysotricha Sedge-skipper or Golden-haired Sedge-skipper	V	p
<i>Erina hyacinthina hyacinthina</i>	Dusky blue	R	x
<i>Lucia limbaria</i>	Small Copper	R	p
<i>Belenois java teutonia</i>	Caper White	Va	x
<i>Dispar compacta</i>	Barred Grass Skipper		x
<i>Erina acasta</i>	Blotched Dusky-blue		p
<i>Geitoneura klugii klugii</i>	Common Xenica	C	p
<i>Hesperilla donnysa delos</i> (incl. form <i>diluta</i>)	Donnysa skipper		x
<i>Hesperilla idothea idothea</i>			x
<i>Heteronympha penelope</i>	Shouldered Brown		x
<i>Lampides boeticus</i>	Long-tailed Pea-blue		p
<i>Nacuduba biocellata biocellata</i>	Two-spotted Line-blue	LC	p
<i>Neolucia agricola agricola</i>	Fringed Heath-blue		p
<i>Theclinesibes serpentata serpentata</i>	Salt-bush blue		p
<i>Vanessa itea</i>	Australian Admiral	Va	p
<i>Zizina labradus labradus</i>	Common Grass Blue		p

Vulnerability as per R. Grund, E: Endangered, V: Vulnerable, R: Rare

Va: Vagrant, LC: Locally common, C: Common

x: recorded, p: possibly there as suggested by R. Grund, ex?: probably extinct

Mammals

Species	Common Name	Aus status	SA status	Record
<i>Antechinus minimus</i>	Swamp Antechinus		E	e
<i>Wallabia bicolor</i>	Swamp Wallaby		V	x

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Species	Common Name	Aus status	SA status	Record
<i>Rattus lutreolus</i>	Swamp Rat		R	x
<i>Trichosurus vulpecula</i>	Common Brushtail Possum		R	x
<i>Pseudocheirus peregrinus</i>	Common Ringtail Possum			x
<i>Rattus fuscipes</i>	Bush Rat			x
<i>Tachyglossus aculeatus</i>	Short-beaked Echidna			x

E: Endangered, V: Vulnerable, R: Rare

x: recorded, e: expected to be there (C Kemper pers. comm. 2009)

Reptiles

Species	Common Name	Aus status	SA status	Record
<i>Lissolepis coventryi</i>	Swamp Skink		E	e
<i>Austrelaps superbis</i>	Lowland Copperhead			e
<i>Hemiergis peronii</i>	Four-toed Earless Skink			x
<i>Lerista bougainvillii</i>	Bougainville's Skink			x
<i>Notechis scutatus</i>	Eastern Tiger Snake	ssp		x
<i>Pseudemoia entrecasteauxii</i>	Southern Grass Skink			x
<i>Pseudonaja textilis</i>	Eastern Brown Snake			x
<i>Tiliqua nigrolutea</i>	Blotched Bluetongue			e
<i>Tiliqua rugosa</i>	Sleepy Lizard			e

E: Endangered, V: Vulnerable, R: Rare

x: recorded, e: expected to be there (M. Hutchinson pers. comm. 2009)

Amphibians

Species	Common Name	Aus status	SA status	Record
<i>Litoria raniformis</i>	Southern Bell Frog	V	V	x
<i>Crinia signifera</i>	Common Froglet			x
<i>Limnodynastes peronii</i>	Striped Marsh Frog			x

E: Endangered, V: Vulnerable, R: Rare

x: recorded

SE4 – Blackfellows Caves

6.3.4 Cell SE4 Blackfellows Caves

1411.6 ha. Shoreline length is 18.62 km.



SE4 – Blackfellows Caves

Landforms

This is a low coastal plain, with limestone outcrops leading to low cliffs and shore platforms at headlands, with beaches and sand dune ridge fields in between. Beaches are generally low energy, due to reef protection; although 55% of the area of this cell is sand dunes, only small volumes of sand are stored in the low dune ridges and narrow beaches. In places beach ridge fields only remain as vestiges, following clearance for grazing. Landward of the dunes there are remnants of sub-coastal wetlands, that have been included within the coastal boundary where coastal vegetation remains.

Jones Bay is a low energy fine to medium sand beach sheltered by nearshore reefs, and backed by c.400m. of medium to low dune ridges. (Considerable storm foredune erosion shown on 2003 obliques). Some small reef controlled salients (small sandy shoreline protrusions) near Jones Bay straightened in the autumn 2003 storm foredune erosion; (cf. climate change SLR).

Reef protected, low energy beaches continue NW to Nene Valley, where low (2m.) Gambier Limestone bluffs and nearshore reefs protect the small settlement. North of Nene Valley reef protection decreases with waves being of medium energy at the beach and terrestrial sand dune masses increase in size. Another low limestone headland is found at Blackfellows Cave. Gambier Limestone and aeolianite are found in low cliffs and nearshore reefs in this section; high tide, storm beaches composed of fine sands and shingle are found at sheltered points. The shingle, which is derived from the reefs, is also found within the dune ridges. The reefs and platforms are described by Short & Hesp (1984, p.102) as having three functions in coastal landform dynamics: “(a) they significantly lower wave energy; (b) they act as a barrier to onshore sand transport by restricting the development of equilibrium nearshore sand profiles; and, (c) they provide the shingle to build beaches.”



Blackfellows Caves. Photograph Coast Protection Board 2003.

Biota

There are 12 flora survey sites, 3 opportune flora sites, 14 herbarium record sites, 3 fauna survey sites, and 39 opportune fauna survey sites. 873 ha. (61.8% of the cell) is in native vegetation. The low dunes are in remnant *Leucopogon parviflorus*, *Acacia longifolia* var. *sophorae*, *Olearia axillaris* tall

SE4 – Blackfellows Caves

shrubland over *Lepidosperma gladiatum*, *Isolepsis nodosa* over ground covers. 1 km W of Black Rock is sedgeland/ rushland, (*Juncus* sp.). Areas of *Eucalyptus obliqua* woodland, are found at the inner edge of boundary, near Carpenter Rocks. *Gabnia filum* sedgelands are found within an extension of the inland boundary at Jones Bay.

There are 200 bird species listed for this cell including the State listed endangered White-bellied Sea Eagle (*Haliaeetus leucogaster*), Magpie Goose (*Anseranas semipalmata*), Eastern Osprey (*Pandion cristatus*), and Little (*Sternula albifrons*) and Fairy (*Sternula nereis*) Terns. 14 butterflies, 10 mammals, 7 reptiles and 6 amphibians have also been recorded and include the EPBC listed endangered Leathery Turtle (*Dermochelys coriacea*).

Benthic Habitat

Entirely heavy limestone reef inshore, with low platform reef beyond about 1 km offshore.

Land Use/ Land Ownership

29% of the cell is protected in NPW Act reserve - Nene Valley Conservation Park; (see 'Small Coastal Parks Management Plan', 1994) and Douglas Point Conservation Park. Nodal residential settlements at Nene Valley and Blackfellows Caves. Narrow Crown land reserve between Blackfellows Caves and Pelican Point, seaward of the Pelican Point road reserve, widens and thins in sections along its length. Adjoining the eastern edge of Nene Valley, three Crown Leasehold allotments extend in a ribbon along the coast within vegetated dunes.

Values/ Uses (Field visits and local reports)

Large parts of the coastal reserve are cleared and grazed. However, large areas of coastal vegetation are also protected in reserves or heritage agreements. Nene Valley and Blackfellows Caves are popular residential and holiday settlements. Aboriginal Heritage values throughout.

Threats (Field visits and local reports)

The Blackfellows Caves end of Nene Valley CP is heavily impacted by ORV tracks. The CP is also threatened by pest plant and animal incursion from the settlements at either end.

Opportunities

As per the Small Coastal Parks Management Plan 1994, road reserves adjoining and internal to the CP should be included within the park. The management plan should be revised and expanded to improve the habitat values of the park.

Conservation Analysis (GIS)

The sum of conservation means is medium to high within the region for this cell (130.2), although only 29% of the area of this cell is protected. Detailed summary conservation values (see map below) are medium to high within the dunes between Jones Bay and Black Rock, there are high totals in the remnant vegetated area in the Nene Valley Swamp, (inland from Jones Bay), and adjacent to Nene Valley CP.

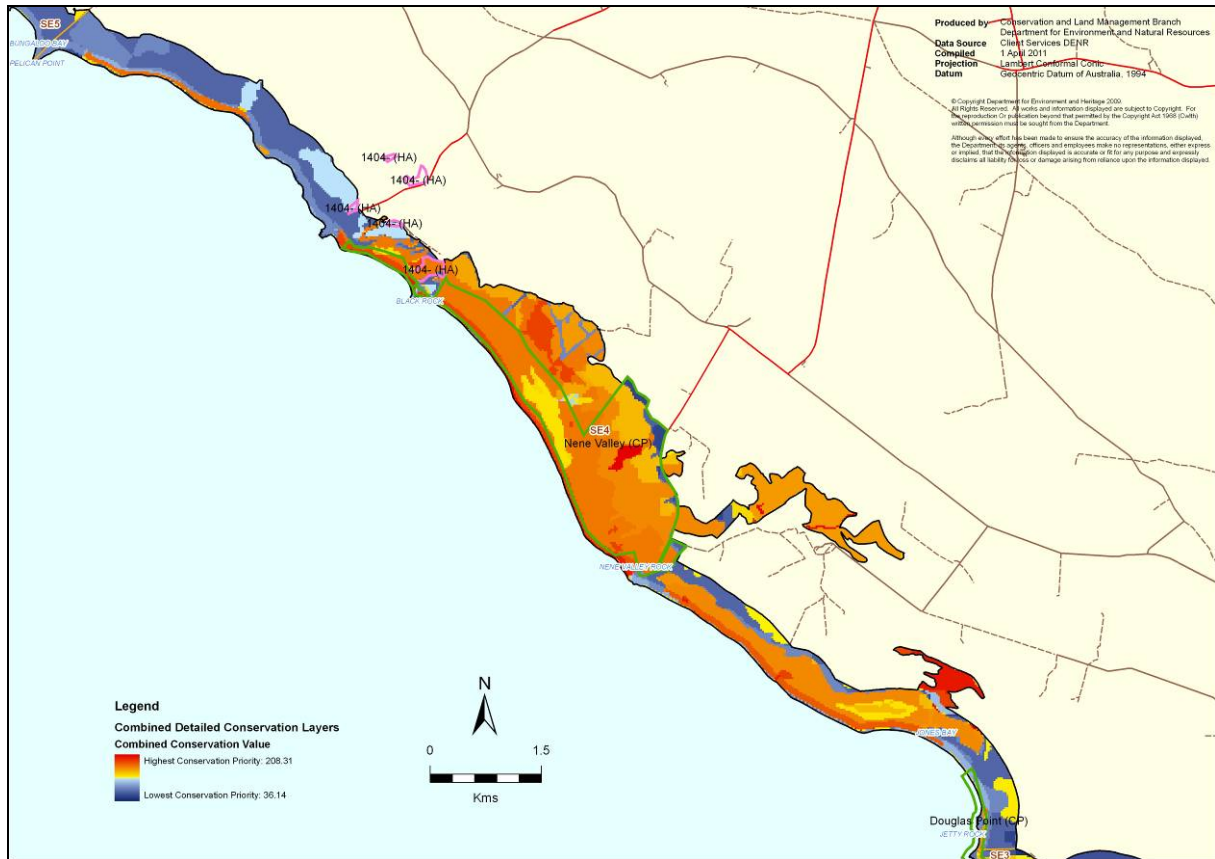
Distribution of endemic floristic vegetation, bird habitat, reptile and amphibian habitat, butterfly habitat, habitat for Orange-bellied Parrot (focal species), viewscape and viewshed analysis, and vegetation metrics all contribute strongly to this high priority.

Where native vegetation has been mapped, as part of the state floristic vegetation survey, the sand dune areas score highly, with over 80% of the state's endemic vegetation area for this association; the lack of mapping of the near coastal wetlands gives these no values on this layer. Total numbers of bird species are moderate to high through the region, with high values in the small sedgelands (Jones Bay) and *E. obliqua* areas; these two areas also record moderate numbers of threatened bird species, while the rest of the cell show low totals. The same spatial pattern is

SE4 – Blackfellows Caves

apparent for habitat for threatened reptiles, though with the same two areas showing very high scores. High scores for butterfly larvae habitat are widespread through the dunes of this cell, and the Jones Bay sedgeland. The extensive low dunal areas also score highly as Orange-bellied Parrot habitat (EPBC listed critically endangered). Sea views (high) and visual amenity (moderate) add to these scores, as do high scores from size, shape and connectivity of vegetation blocks.

The entire foreshore, <100m from low water mark is designated a significant geological feature, “Glenelg River and Lower South East Coast”.



Cell SE4 combined detailed conservation layer summary map.

Threat Analysis (GIS)

The total score of 62.2 for threat summary layers is average for the study area. The distribution of threats shows high to medium totals for all parts of the cell, except Nene Valley CP. The major contributions to the total are made by vegetation block degradation, weed distribution, ORV activity, viewshed, development zoning and land ownership and land use. However none of these layer totals stand out in their total contribution. On examination of the detail, it is clear that development zoning, weed degradation, ownership and land use are significant threats to the valuable small areas of *Gabnia filum* sedgeland and the *E. obliqua* woodland.

The extensive low dune areas of this cell are generally well vegetated, with the notable exception of vehicle and foot damage to Douglas Point, the northern end of Nene Valley CP and Hines Bay. At Jones Bay an extensive area (800m x 100m, or 8 hectares) of mid-dune has been excavated.

Adaptation to Climate Change: Threats for Cell SE4

(see also discussion of scenario in Section 4.11)

NOTE: the advice below is indicative of likely change and the direction of change, with implications for ecosystems. Dates, amounts and probabilities cannot be accurately calculated at

SE4 – Blackfellows Caves

this time. Thus advice on flood levels, for example, should not be used in engineering or development planning.

Climate change element/ scenario	Impacts and implications (for this cell)	Protect and manage habitat threats	Address landscape issues: fire, connectivity, refuges, hydrology
Combined climate changes and sea level rise throughout this cell	This cell presents a complex pattern of habitats sensitive to change.	Create a baseline for shoreline, dune and lake change by establishing a rectified aerial photographic record at an appropriate resolution.	
Sea level rise: 2030 : +c.20cm 2070: +c.80cm.	Rise in frequency of tidal flooding, threatens freshwater swamps: Blackfellows Cave Wetland, Nene Valley Wetland, and Winterfield Creek Wetland.	Monitor storm tide impacts, with a view to sill construction on drainage outlets.	
	Increase in storm foredune damage and beach recession in embayments. Beach change may be rapid, because of low storage volumes of sand. Low dune elevations threaten surge overtopping, and rapid dune recession.	Beach profile monitoring, as baseline information for coastal change.	
	Beach and nearshore sand accumulation in lee of reefs may be reduced together with reef protection of the shore.	Active management of dune blowouts.	
Storms: <i>Frequency</i> continues to show great variation on a decadal scale. <i>Intensity</i> of large storms increases.	2030: Occasional storm tide flooding above highest known tides. Flooding frequency critical for freshwater swamps. 2070: Flooding will affect all swamps and adjacent low lying areas.	Manage sill height on tidal inlets to adjust to higher marine storm elevations, (see above).	
	Frequent storm damage to foredunes.	Active management of dune blowouts.	
Warmer average conditions: 2030:+0.3 to .6°C 2070:+1.5 to 2°C	(Impacts uncertain. Existing terrestrial vegetation is found in warmer conditions elsewhere)		Maintain connectivity of vegetation within the region.
Drier average conditions: 2030: -2% to 5%	Dune vegetation adapts well to drier conditions, but recover more slowly from fire, disease and storm	Active weed control within dunes.	

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Climate change element/ scenario	Impacts and implications (for this cell)	Protect and manage habitat threats	Address landscape issues: fire, connectivity, refuges, hydrology
2070: - 10% to 20%	damage: dune mobilization becomes more likely.		
'Flashy' run off: Drier creeks, but larger rare floods	Drains and creeks may increase sediment load to coastal swamps, (this depends on land management practices).	Maintain watching brief on sedimentation of high value swamps areas.	
Groundwater lowering; saline incursion:	The potential fall in groundwater pressure a significant threat to vegetation survival in freshwater swamps	Adaptive management of plant assets.	Monitor salinity of coastal swamps.
Nearshore sea changes - temperature; acidity; wave climate: 2030: +0.3°C to + 0.6°C 2070: +1.0°C to + 1.50C	Persistent swell wave climate maintains sediment movement towards the east along the coast. (Changes in upwelling timing and frequency has been discussed, but not projected).	Monitor beaches, see above.	

Table 6.6. Recommended Actions and Priority for Cell SE4 – Blackfellows Caves

Component	Issue	Proposed Action	Priority of Action	Key Players
Beaches & Dunes	Inappropriate ORV use in the dunes and beaches particularly at Jones Bay.	Restrict access to nodal tracks. Discourage access along the coast. Fence sensitive areas and enforce compliance.	High (Threat)	Council, DENR, Community, SA Police, D'TEI
	Vehicle use threatens shorebird activity.	Reduce pressure on habitat at shorebird nesting times by a seasonal vehicle ban.	High (Cons/Threat)	DENR, NRM, Council
		Fence nests/ Community monitoring.	High (Cons/Threat)	DENR, NRM Council, community,
		Raising community awareness through signage at major beach access points.	High (Cons/Threat)	DENR, NRM Council, community,

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Component	Issue	Proposed Action	Priority of Action	Key Players
	High conservation value habitat for the Orange-bellied Parrot focal species.	Protection of existing habitat and efforts to re-establish linkages between remnants.	High (Cons/Threat)	DENR, NRM, community
Nene Valley CP	The CP has good biodiversity and high values for vegetation patch size, shape and connectivity. The proximity of Nene Valley and Blackfellows Caves settlements threatens conservation values and limits vegetation extent and connectivity to other patches.	Revise park management plan to minimise impacts and threats on flora and fauna. Educate adjacent residents about park values and their threats. Limit impact of settlements.	High (Cons/Threat)	DENR, NRM, Friends Groups, community
	Part of CP inappropriately zoned (Primary Industry).	Consider including whole of park within conservation or coastal zone.	High (Cons/Threat)	Council, DPLG
Stormwater	Flow of stormwater to coastal waters in peak flows at Nene Valley and Blackfellows Caves.	Continuation and extend sustainable practices in dealing with run off.	low (Threat)	Council, EPA
Sub-Coastal Swamps	Rising sea level and reducing groundwater pressure threatens conservation values, notably within Nene Valley Swamp.	Monitoring swamp salinity levels. Evaluate excluding storm tide incursion through sill construction at outlet.	Medium (Cons)	DFW, NRM
Whole Cell	Existing development, land ownership and land use threaten conservation values of the cell.	Restrict development to nodes and minimise impacts of existing development and land uses on adjacent vegetation and the coast.	High (Threat)	Council, DPLG, CPB, DENR
	This cell presents a complex pattern of habitats subject to change.	Continue a rectified aerial photographic record at an appropriate resolution, in order to show change from current baseline.	Medium (Cons/Threat)	DENR, NRM

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Component	Issue	Proposed Action	Priority of Action	Key Players
	CP and remnant vegetation is threatened by exotic species.	Regular monitoring for alert weeds, listed in Section 4.9. Weed strategy development and action on weed removal. Education initiative targeting residences re: common garden species which become 'weeds' and alternatives for planting.	Medium (Cons/Threat)	Council, NRM, DENR
	Aboriginal Heritage sites recorded in this cell. Need for appropriate and sustainable management.	Consultation to appropriately manage sites in this area.	High (Cons)	Murrapeena Heritage Association Inc., SE Aboriginal Focus Group, NRM, Council, Aboriginal Heritage Branch – DPC, Aboriginal Partnership Unit – DENR
	Lack of recognition of significant geological feature (Bridgewater formation).	Interpretation. Council to include map of the feature in its development plan.	Medium (Cons)	Council, Geological Society SA, NRM

SE4 – Blackfellows Caves

BIOTA

Flora

Remnant vegetation area (ha)	872.9 ha, 61.8% of the cell
# flora surveys / records	12 surveys, 3 opportune sites, 14 herbarium record sites.
# flora in cell	111
# conservation rated flora in cell	3 recorded
# non-indigenous flora in cell	39 recorded
Significant CDCS floristic community	<i>Leucopogon parviflorus</i> / <i>Olearia axillaris</i> shrubland (>50% of known sites occur along SE coast). <i>Olearia axillaris</i> / <i>Leucopogon parviflorus</i> shrubland (>50% of known sites occur along SE coast).
Protected area	Douglas Point and Nene Valley Conservation Parks (398.9ha in total)

Weeds

Species	Common Name	Status	Study rating
<i>Arctoteca populifolia</i>	Beach Daisy		8
<i>Thinopyrum junceiforme</i>	Sea Wheat-grass		8
<i>Leptospermum laevigatum</i>	Coast Tea-tree		7
<i>Festuca arundinacea</i>	Tall Meadow Fescue		5
<i>Pennisetum clandestinum</i>	Kikuyu		5
<i>Euphorbia paralias</i>	Sea Spurge		4
<i>Euphorbia terracina</i>	False Caper	D	4
<i>Senecio elegans</i>	Purple Groundsel		3
<i>Ammophila arenaria</i>	Marram Grass		2
<i>Anagallis arvensis</i>	Pimpernel		
<i>Avellinia michelii</i>	Avellinia		
<i>Briza minor</i>	Lesser Quaking-grass		
<i>Bromus hordeaceus</i> ssp. <i>hordeaceus</i>	Soft Brome		
<i>Cakile maritima</i> ssp. <i>maritima</i>	Two-horned Sea Rocket		
<i>Carduus tenuiflorus</i>	Slender Thistle		
<i>Carthamus lanatus</i>	Saffron Thistle		
<i>Catapodium rigidum</i>	Rigid Fescue		
<i>Centranthus macrosiphon</i>			
<i>Cerastium balearicum</i>	Chickweed		
<i>Conyza bonariensis</i>	Flax-leaf Fleabane		
<i>Conyza</i> sp.	Fleabane		
<i>Cynosurus echinatus</i>	Rough Dog's-tail Grass		
<i>Diplotaxis tenuifolia</i>	Lincoln Weed		
<i>Galium murale</i>	Small Bedstraw		
<i>Holcus lanatus</i>	Yorkshire Fog		
<i>Hypochaeris radicata</i>	Rough Cat's Ear		
<i>Lagurus ovatus</i>	Hare's Tail Grass		
<i>Malva dendromorpha</i>	Tree Mallow		
<i>Medicago</i> sp.	Medic		
<i>Melilotus indicus</i>	King Island Melilot		
<i>Parapholis incurva</i>	Curly Ryegrass		
<i>Plantago coronopus</i> ssp. <i>coronopus</i>	Bucks-horn Plantain		
<i>Polygomon maritimus</i>	Coast Beard-grass		
<i>Rostraria cristata</i>	Annual Cat's-tail		
<i>Sambucus gaudichaudiana</i>	White Elderberry		

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Species	Common Name	Status	Study rating
<i>Silene vulgaris</i>	Bladder Champion		
<i>Sonchus oleraceus</i> (NC)	Common Sow-thistle		
<i>Urtica urens</i>	Small Nettle		
<i>Vulpia myuros</i> f. <i>megalura</i>	Fox-tail Fescue		

D: Declared weed, WONS: Weeds of National Significance

Native flora

Species	Common Name	Aus status	SA status
<i>Ixodia achillaeoides</i> ssp. <i>arenicola</i>	Sand Ixodia	V	E
<i>Pterostylis tenuissima</i>	Swamp Greenhood	V	V
<i>Veronica gracilis</i>	Slender Speedwell		V
<i>Acacia longifolia</i> ssp. <i>sophorae</i>	Coastal Wattle		
<i>Acaena novae-zelandiae</i>	Biddy-biddy		
<i>Actites megalocarpa</i>	Coast Sow-thistle		
<i>Apium annuum</i>	Annual Celery		
<i>Apium prostratum</i> var. <i>prostratum</i>	Native Celery		
<i>Austrofestuca littoralis</i>	Coast Fescue		
<i>Austrostipa</i> sp.	Spear-grass		
<i>Bromus</i> sp.	Brome		
<i>Caladenia latifolia</i>	Pink Caladenia		
<i>Carpobrotus rossii</i> (NC)	Native Pigface		
<i>Centrolepis polygyna</i>	Wiry Centrolepis		
<i>Chrysocephalum apiculatum</i>	Common Everlasting		
<i>Clematis microphylla</i> var. <i>microphylla</i>	Old Man's Beard		
<i>Comesperma volubile</i>	Love Creeper		
<i>Crassula colligata</i> ssp. <i>lamprosperma</i>			
<i>Crassula decumbens</i> var. <i>decumbens</i>	Spreading Crassula		
<i>Crassula sieberiana</i> ssp. <i>tetramera</i> (NC)	Australian Stonecrop		
<i>Cynoglossum australe</i>	Australian Hound's-tongue		
<i>Cynoglossum suaveolens</i>	Sweet Hound's-tongue		
<i>Cyperus</i> sp.	Flat-sedge		
<i>Daucus glochidiatus</i>	Native Carrot		
<i>Dianella brevicaulis</i>	Short-stem Flax-lily		
<i>Dianella revoluta</i> var. <i>revoluta</i>	Black-anther Flax-lily		
<i>Dichondra repens</i>	Kidney Weed		
<i>Epilobium billardierianum</i> ssp. <i>billardierianum</i>	Robust Willow-herb		
<i>Epilobium billardierianum</i> ssp. <i>X intermedium</i>	Variable Willow-herb		
<i>Epilobium</i> sp.	Willow-herb		
<i>Ficinia nodosa</i>	Knobby Club-rush		
<i>Geranium retrorsum</i>	Grassland Geranium		
<i>Gnaphalium indutum</i> ssp. <i>indutum</i>	Tiny Cudweed		
<i>Gramineae</i> sp.	Grass Family		
<i>Helichrysum leucopsideum</i>	Satin Everlasting		
<i>Hibbertia sericea</i>	Silky Guinea-flower		
<i>Hydrocotyle laxiflora</i>	Stinking Pennywort		
<i>Juncus kraussii</i>	Sea Rush		
<i>Kennedia prostrata</i>	Scarlet Runner		
<i>Lachnagrostis aemula</i>	Blown-grass		
<i>Lasiopetalum discolor</i>	Coast Velvet-bush		
<i>Lepidosperma gladiatum</i>	Coast Sword-sedge		
<i>Leucophyta brownii</i>	Coast Cushion Bush		
<i>Leucopogon parviflorus</i>	Coast Beard-heath		

SE4 – Blackfellows Caves

Species	Common Name	Aus status	SA status
<i>Lomandra collina</i>	Sand Mat-rush		
<i>Microtis sp.</i>	Onion-orchid		
<i>Moss sp.</i>			
<i>Muehlenbeckia adpressa</i>	Climbing Lignum		
<i>Olearia axillaris</i>	Coast Daisy-bush		
<i>Ozothamnus ferrugineus</i>	Tree Everlasting		
<i>Ozothamnus turbinatus</i>	Coast Bush-everlasting		
<i>Parietaria debilis (NC)</i>	Smooth-nettle		
<i>Pelargonium australe</i>	Austral Stork's-bill		
<i>Pimelea serpyllifolia ssp. serpyllifolia</i>	Thyme Riceflower		
<i>Poa poiformis var. poiformis</i>	Coast Tussock-grass		
<i>Rhagodia candolleana ssp. candolleana</i>	Sea-berry Saltbush		
<i>Sagina maritima</i>	Sea Pearlwort		
<i>Samolus repens</i>	Creeping Brookweed		
<i>Sarcocornia quinqueflora</i>	Beaded Samphire		
<i>Schenkia australis</i>	Spike Centaury		
<i>Schoenus nitens</i>	Shiny Bog-rush		
<i>Senecio biserratus</i>	Jagged Groundsel		
<i>Senecio pinnatifolius (NC)</i>	Variable Groundsel		
<i>Solanum laciniatum</i>	Cut-leaf Kangaroo-apple		
<i>Sonchus sp.</i>	Sow-thistle		
<i>Spinifex sericeus (NC)</i>	Rolling Spinifex		
<i>Sporobolus virginicus</i>	Salt Couch		
<i>Sporobolus virginicus (NC)</i>	Salt Couch		
<i>Stackhousia spathulata</i>	Coast Candles		
<i>Swainsona lessertiiifolia</i>	Coast Swainson-pea		
<i>Tetragonia implexicoma</i>	Bower Spinach		
<i>Veronica hillebrandii</i>	Rigid Speedwell		

E: Endangered, V: Vulnerable, R: Rare

Fauna

# of fauna in cell	237 recorded – 200 birds, 14 butterflies, 10 mammals, 7 reptiles, 6 amphibians (an additional 12 butterflies, 2 mammal and 6 reptiles are identified by experts as possibly occurring)
# of fauna surveys / records	3 surveys, 39 opportune sites
# of threatened fauna in cell	52 recorded
# of non-indigenous fauna	12 recorded (an additional mammal possible)

Non-indigenous fauna

Species	Common Name	Class	Record
<i>Alauda arvensis</i>	Eurasian Skylark	Aves	x
<i>Carduelis carduelis</i>	European Goldfinch	Aves	x
<i>Chloris chloris</i>	Common Greenfinch (European Greenfinch)	Aves	x
<i>Columba livia</i>	Rock Dove (Feral Pigeon)	Aves	x
<i>Passer domesticus</i>	House Sparrow	Aves	x
<i>Sturnus vulgaris</i>	Common Starling	Aves	x
<i>Turdus merula</i>	Common Blackbird	Aves	x
<i>Pieris rapae rapae</i>	Cabbage White	Invertebrate	x
<i>Felis catus</i>	Cat (Feral Cat)	Mammalia	x
<i>Mus musculus</i>	House Mouse	Mammalia	x

SE4 – Blackfellows Caves

Species	Common Name	Class	Record
<i>Oryctolagus cuniculus</i>	Rabbit (European Rabbit)	Mammalia	x
<i>Rattus rattus</i>	Black Rat (Ship Rat, Roof Rat)	Mammalia	e
<i>Vulpes vulpes</i>	Fox (Red Fox)	Mammalia	x

x: recorded, e: expected to be there (C. Kemper pers. comm. 2009)

Birds

Species	Common Name	Aus status	SA status
<i>Anseranas semipalmata</i>	Magpie Goose		E
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	M	E
<i>Neophema chrysogaster</i>	Orange-bellied Parrot	CR/M	E
<i>Pandion cristatus</i>	Eastern Osprey		E
<i>Sternula albifrons</i>	Little Tern		E
<i>Sternula nereis</i>	Fairy Tern		E
<i>Botaurus poiciloptilus</i>	Australasian Bittern		V
<i>Calyptorhynchus funereus</i>	Yellow-tailed Black-Cockatoo		V
<i>Cladorhynchus leucocephalus</i>	Banded Stilt		V
<i>Coturnix ypsilophora</i>	Brown Quail		V
<i>Neophema chrysostoma</i>	Blue-winged Parrot		V
<i>Numenius madagascariensis</i>	Eastern Curlew	M	V
<i>Petroica phoenicea</i>	Flame Robin		V
<i>Thinornis rubricollis</i>	Hooded Plover		V
<i>Actitis hypoleucos</i>	Common Sandpiper	M	R
<i>Anas rhynchotis</i>	Australasian Shoveler		R
<i>Anhinga novaehollandiae</i>	Australasian Darter		R
<i>Ardea ibis</i>	Cattle Egret		R
<i>Ardea intermedia</i>	Intermediate Egret		R
<i>Arenaria interpres</i>	Ruddy Turnstone	M	R
<i>Biziura lobata</i>	Musk Duck		R
<i>Calidris alba</i>	Sanderling	M	R
<i>Calidris melanotos</i>	Pectoral Sandpiper	M	R
<i>Calidris tenuirostris</i>	Great Knot	M	R
<i>Cereopsis novaehollandiae</i>	Cape Barren Goose		R
<i>Charadrius leschenaultii</i>	Greater Sand Plover (Large Sand Plover)	M	R
<i>Charadrius mongolus</i>	Lesser Sand Plover (Mongolian Plover)	M	R
<i>Egretta garzetta</i>	Little Egret		R
<i>Egretta sacra</i>	Eastern Reef Egret	M	R
<i>Falco peregrinus</i>	Peregrine Falcon		R
<i>Falcunculus frontatus</i>	Crested Shrike-tit		R
<i>Gallinago hardwickii</i>	Latham's Snipe (Japanese Snipe)	M	R
<i>Gerygone albogularis</i>	White-throated Gerygone		R
<i>Haematopus fuliginosus</i>	Sooty Oystercatcher		R
<i>Haematopus longirostris</i>	Australian Pied Oystercatcher		R
<i>Larus dominicanus</i>	Kelp Gull		R
<i>Limosa lapponica</i>	Bar-tailed Godwit	M	R
<i>Limosa limosa</i>	Black-tailed Godwit	M	R
<i>Numenius phaeopus</i>	Whimbrel	M	R
<i>Philomachus pugnax</i>	Ruff	M	R
<i>Plegadis falcinellus</i>	Glossy Ibis	M	R
<i>Pluvialis fulva</i>	Pacific Golden Plover	M	R
<i>Podiceps cristatus</i>	Great Crested Grebe		R
<i>Stagonopleura bella</i>	Beautiful Firetail		R
<i>Tringa brevipes</i>	Grey-tailed Tattler	M	R

SE4 – Blackfellows Caves

<i>Species</i>	Common Name	Aus status	SA status
<i>Xenus cinereus</i>	Terek Sandpiper	M	R
<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater		
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill		
<i>Acanthiza lineata</i>	Striated Thornbill		
<i>Acanthiza pusilla</i>	Brown Thornbill		
<i>Acanthiza reguloides</i>	Buff-rumped Thornbill		
<i>Acanthorhynchus tenuirostris</i>	Eastern Spinebill		
<i>Accipiter cirrocephalus</i>	Collared Sparrowhawk		
<i>Acrocephalus australis</i>	Australian Reed Warbler (Clamorous Reed-Warbler)		
<i>Anas castanea</i>	Chestnut Teal		
<i>Anas gracilis</i>	Grey Teal		
<i>Anas superciliosa</i>	Pacific Black Duck		
<i>Anthochaera carunculata</i>	Red Wattlebird		
<i>Anthochaera chrysoptera</i>	Little Wattlebird		
<i>Anthus novaeseelandiae</i>	Australasian Pipit (Richard's Pipit)		
<i>Apus pacificus</i>	Fork-tailed Swift		
<i>Aquila audax</i>	Wedge-tailed Eagle		
<i>Ardea alba</i>	Great Egret		
<i>Ardea pacifica</i>	White-necked Heron (Pacific Heron)		
<i>Ardenna tenuirostris</i>	Short-tailed Shearwater (Mutton Bird)		
<i>Artamus cyanopterus</i>	Dusky Woodswallow		
<i>Artamus personatus</i>	Masked Woodswallow		
<i>Artamus superciliosus</i>	White-browed Woodswallow		
<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo		
<i>Cacomantis pallidus</i>	Pallid Cuckoo		
<i>Calamanthus fuliginosus</i>	Striated Fieldwren		
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	M	
<i>Calidris canutus</i>	Red Knot	M	
<i>Calidris ferruginea</i>	Curlew Sandpiper	M	
<i>Calidris ruficollis</i>	Red-necked Stint	M	
<i>Catharacta skua</i>	Great Skua		
<i>Chalcites basalis</i>	Horsfield's Bronze-cuckoo		
<i>Chalcites lucidus</i>	Shining Bronze-Cuckoo		
<i>Charadrius bicinctus</i>	Double-banded Plover		
<i>Charadrius ruficapillus</i>	Red-capped Plover (Red-capped Dotterel)		
<i>Chenonetta jubata</i>	Australian Wood Duck (Maned Duck)		
<i>Chlidonias hybrida</i>	Whiskered Tern	M	
<i>Chroicocephalus novaehollandiae</i>	Silver Gull		
<i>Chrysococcyx osculans</i>	Black-eared Cuckoo		
<i>Cincloramphus cruralis</i>	Brown Songlark		
<i>Cincloramphus mathewsi</i>	Rufous Songlark		
<i>Circus approximans</i>	Swamp Harrier (Marsh Harrier)		
<i>Circus assimilis</i>	Spotted Harrier		
<i>Cisticola exilis</i>	Golden-headed Cisticola		
<i>Colluricincla harmonica</i>	Grey Shrike-thrush		
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike		
<i>Corcorax melanorhynchos</i>	White-winged Chough		
<i>Cormobates leucophaea</i>	White-throated Treecreeper		
<i>Corvus coronoides</i>	Australian Raven		
<i>Corvus mellori</i>	Little Raven		
<i>Corvus tasmanicus</i>	Forest Raven		
<i>Coturnix pectoralis</i>	Stubble Quail		
<i>Cracticus tibicen</i>	Australian Magpie		

SE4 – Blackfellows Caves

<i>Species</i>	Common Name	Aus status	SA status
<i>Cracticus torquatus</i>	Grey Butcherbird		
<i>Cygnus atratus</i>	Black Swan		
<i>Dacelo novaeguineae</i>	Laughing Kookaburra		
<i>Daphoenositta chrysoptera</i>	Varied Sittella		
<i>Daption capense</i>	Cape Petrel		
<i>Dasyornis broadbenti</i>	Rufous Bristlebird		ssp
<i>Dicaeum hirundinaceum</i>	Mistletoebird		
<i>Egretta novaehollandiae</i>	White-faced Heron		
<i>Elanus axillaris</i>	Black-shouldered Kite		
<i>Euseyornis melanops</i>	Black-fronted Dotterel (Black-fronted Plover)		
<i>Eolophus roseicapillus</i>	Galah		
<i>Eopsaltria australis</i>	Eastern Yellow Robin		
<i>Epthianura albifrons</i>	White-fronted Chat		
<i>Eudyptula minor</i>	Little Penguin (Fairy Penguin)		
<i>Falco berigora</i>	Brown Falcon		
<i>Falco cenchroides</i>	Nankeen Kestrel (Australian Kestrel)		
<i>Falco longipennis</i>	Australian Hobby		
<i>Fulica atra</i>	Eurasian Coot		
<i>Gallinula tenebrosa</i>	Dusky Moorhen		
<i>Gallirallus philippensis</i>	Buff-banded Rail		
<i>Gelochelidon nilotica</i>	Gull-billed Tern		
<i>Glossopsitta concinna</i>	Musk Lorikeet		
<i>Glossopsitta porphyrocephala</i>	Purple-crowned Lorikeet		
<i>Grallina cyanoleuca</i>	Magpie-lark		
<i>Haliastur sphenurus</i>	Whistling Kite		
<i>Himantopus himantopus</i>	Black-winged Stilt		
<i>Hirundapus caudacutus</i>	White-throated Needletail	M	
<i>Hirundo neoxena</i>	Welcome Swallow		
<i>Hydroprogne caspia</i>	Caspian Tern		
<i>Lalage sueurii</i>	White-winged Triller		
<i>Larus pacificus</i>	Pacific Gull		
<i>Lichenostomus chrysops</i>	Yellow-faced Honeyeater		
<i>Lichenostomus leucotis</i>	White-eared Honeyeater		
<i>Lichenostomus penicillatus</i>	White-plumed Honeyeater		
<i>Lichenostomus virescens</i>	Singing Honeyeater		
<i>Malurus cyaneus</i>	Superb Fairy-wren		
<i>Megalurus gramineus</i>	Little Grassbird		
<i>Melithreptus brevirostris</i>	Brown-headed Honeyeater		
<i>Melithreptus lunatus</i>	White-naped Honeyeater		
<i>Microcarbo melanoleucos</i>	Little Pied Cormorant		
<i>Morus serrator</i>	Australasian Gannet		
<i>Neochmia temporalis</i>	Red-browed Finch		
<i>Ninox novaeseelandiae</i>	Southern Boobook		
<i>Nycticorax caledonicus</i>	Nankeen Night Heron		
<i>Ocyphaps lophotes</i>	Crested Pigeon		
<i>Pachycephala olivacea</i>	Olive Whistler		ssp
<i>Pachycephala pectoralis</i>	Golden Whistler		
<i>Pachycephala rufiventris</i>	Rufous Whistler		
<i>Pardalotus punctatus</i>	Spotted Pardalote		
<i>Pardalotus striatus</i>	Striated Pardalote		
<i>Pelecanus conspicillatus</i>	Australian Pelican		
<i>Petrochelidon ariel</i>	Fairy Martin		
<i>Petrochelidon nigricans</i>	Tree Martin		

SE4 – Blackfellows Caves

<i>Species</i>	Common Name	Aus status	SA status
<i>Petroica boodang</i>	Scarlet Robin		ssp
<i>Pezoporus wallicus</i>	Ground Parrot		
<i>Phalacrocorax carbo</i>	Great Cormorant		
<i>Phalacrocorax fuscescens</i>	Black-faced Cormorant (Black-faced Shag)		
<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant		
<i>Phalacrocorax varius</i>	Pied Cormorant		
<i>Phaps chalcoptera</i>	Common Bronzewing		
<i>Phaps elegans</i>	Brush Bronzewing		
<i>Philemon corniculatus</i>	Noisy Firebird		
<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater		
<i>Phylidonyris pyrrhoptera</i>	Crescent Honeyeater		
<i>Platalea flavipes</i>	Yellow-billed Spoonbill		
<i>Platalea regia</i>	Royal Spoonbill		
<i>Platycercus elegans</i>	Crimson Rosella		
<i>Pluvialis squatarola</i>	Grey Plover	M	
<i>Podargus strigoides</i>	Tawny Frogmouth		
<i>Poliiocephalus poliocephalus</i>	Hoary-headed Grebe		
<i>Pomatostomus superciliosus</i>	White-browed Babbler		
<i>Pomatostomus temporalis</i>	Grey-crowned Babbler		ssp
<i>Porphyrio porphyrio</i>	Purple Swamphen (Purple Moorhen)		
<i>Porzana fluminea</i>	Australian Spotted Crake (Australian Crake)		
<i>Psephotus haematonotus</i>	Red-rumped Parrot		
<i>Recurvirostra novaehollandiae</i>	Red-necked Avocet		
<i>Rhipidura albiscapa</i>	Grey Fantail		
<i>Rhipidura leucophrys</i>	Willie Wagtail		
<i>Sericornis frontalis</i>	White-browed Scrubwren		
<i>Stipiturus malachurus malachurus</i>	Southern Emu-wren		
<i>Strepera versicolor</i>	Grey Currawong		ssp
<i>Tachybaptus novaehollandiae</i>	Australasian Grebe, (Little Grebe)		
<i>Tadorna tadornoides</i>	Australian Shelduck (Mountain Duck)		
<i>Thalasseus bergii</i>	Crested Tern		
<i>Threskiornis molucca</i>	Australian White Ibis (Sacred Ibis)		
<i>Threskiornis spinicollis</i>	Straw-necked Ibis		
<i>Todiramphus sanctus</i>	Sacred Kingfisher		
<i>Tribonyx ventralis</i>	Black-tailed Native-hen		
<i>Trichoglossus haematodus</i>	Rainbow Lorikeet		
<i>Tringa nebularia</i>	Common Greenshank	M	
<i>Tringa stagnatilis</i>	Marsh Sandpiper	M	
<i>Tyto alba</i>	Barn Owl		
<i>Vanellus miles</i>	Masked Lapwing		
<i>Vanellus tricolor</i>	Banded Lapwing		
<i>Zosterops lateralis</i>	Silvereye		

CR: Critically endangered, E: Endangered, V: Vulnerable, R: Rare, M: Migratory, ssp: sub-species

Butterflies

<i>Species</i>	Common Name	Status*	Record
<i>Jamennus icilius</i>	Icilius Hairstreak	E in SE	p
<i>Ogyris olane</i>	Olane Azure	E in SE	p
<i>Delias aganippe</i>	Wood White	R	p
<i>Erina hyacinthina hyacinthina</i>	Dusky blue	R	x
<i>Lucia limbaria</i>	Small Copper	R	p
<i>Ogyris abrota</i>	Dark-purple Azure	R	x

SE4 – Blackfellows Caves

Species	Common Name	Status*	Record
<i>Belenois java teutonia</i>	Caper White	Va	x
<i>Dispar compacta</i>	Barred Grass Skipper		x
<i>Erina acasta</i>	Blotched Dusky-blue		p
<i>Geitoneura klugii klugii</i>	Common Xenica	C	p
<i>Hesperilla donnysa delos (incl. form diluta)</i>	Donnysa skipper		x
<i>Hesperilla idothea idothea</i>			x
<i>Heteronympha merope merope</i>	Common Brown	C	x
<i>Heteronympha penelope</i>	Shouldered Brown		x
<i>Junonia villida calybe</i>	Meadow argus	Va	x
<i>Lampides boeticus</i>	Long-tailed Pea-blue		p
<i>Nacuduba biocellata biocellata</i>	Two-spotted Line-blue	LC	x
<i>Neolucia agricola agricola</i>	Fringed Heath-blue		p
<i>Ocybadistes walkeri hypochlorus</i>	Southern Grass-dart		p
<i>Ogyris amaryllis meridionalis</i>	Amaryllis Azure		x
<i>Theclinessthes miskini miskini</i>	Wattle Blue		p
<i>Theclinessthes serpentata serpentata</i>	Salt-bush blue		p
<i>Vanessa itea</i>	Australian Admiral	Va	x
<i>Vanessa kershawi</i>	Australian Painted Lady	Va	x
<i>Zizina labradus labradus</i>	Common Grass Blue		p

Vulnerability as per R. Grund, E: Endangered, V: Vulnerable, R: Rare

Va: Vagrant, LC: Locally common, C: Common

x: recorded, p: possibly there as suggested by R. Grund

Mammals

Species	Common Name	Aus status	SA status	Record
<i>Antechinus minimus</i>	Swamp Antechinus		E	e
<i>Wallabia bicolor</i>	Swamp Wallaby		V	x
<i>Rattus lutreolus</i>	Swamp Rat		R	x
<i>Trichosurus vulpecula</i>	Common Brushtail Possum		R	x
<i>Vombatus ursinus</i>	Common Wombat		R	x
<i>Rattus fuscipes</i>	Bush Rat			x
<i>Tachyglossus aculeatus</i>	Short-beaked Echidna			x

E: Endangered, V: Vulnerable, R: Rare

x: recorded, e: expected to be there (C Kemper pers. comm. 2009)

Reptiles

Species	Common Name	Aus status	SA status	Record
<i>Dermochelys coriacea</i>	Leathery Turtle	E	V	x
<i>Austrelaps superbis</i>	Lowland Copperhead			x
<i>Bassiana duperreyi</i>	Eastern Three-lined Skink			x
<i>Hemiergis peronii</i>	Four-toed Earless Skink			e
<i>Lerista bougainvillii</i>	Bougainville's Skink			x
<i>Notechis scutatus</i>	Eastern Tiger Snake	ssp		x
<i>Pseudemoia entrecasteauxii</i>	Southern Grass Skink			x
<i>Tiliqua nigrolutea</i>	Blotched Bluetongue			e
<i>Tiliqua rugosa</i>	Sleepy Lizard			x

E: Endangered, V: Vulnerable, R: Rare

x: recorded, e: expected to be there, p: possibly there, but no record (M. Hutchinson pers. comm. 2009)

SE4 – Blackfellows Caves

Amphibians

Species	Common Name	Aus status	SA status	Record
<i>Crinia signifera</i>	Common Froglet			x
<i>Limnodynastes dumerilii</i>	Banjo Frog			x
<i>Limnodynastes peronii</i>	Striped Marsh Frog			x
<i>Litoria ewingii</i>	Brown Tree Frog			x
<i>Neobatrachus pictus</i>	Burrowing Frog			x
<i>Neobatrachus sudelli</i>	Sudell's Frog			x

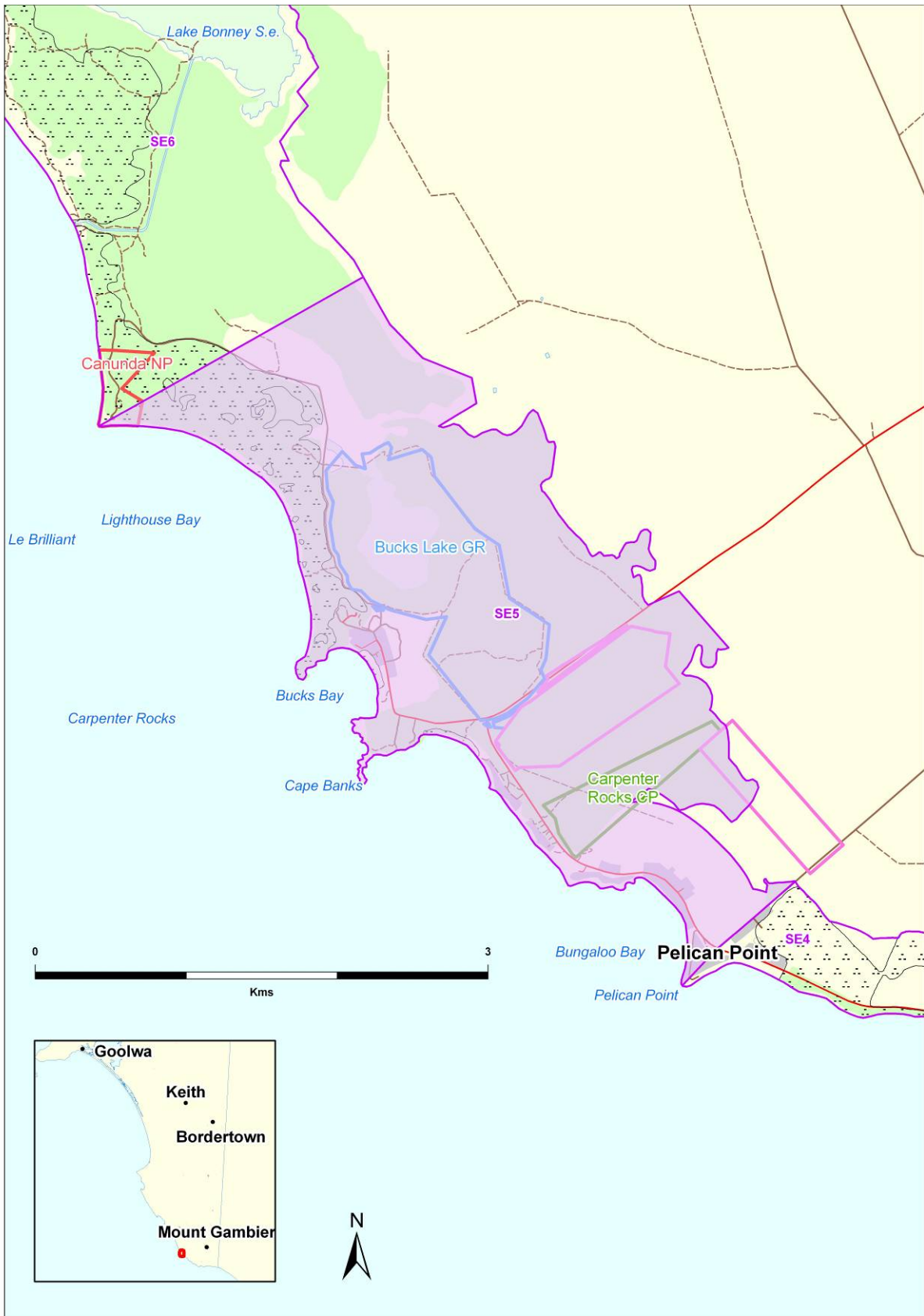
E: Endangered, V: Vulnerable, R: Rare

x: recorded

SE5 – Carpenters Rocks

6.3.5 Cell SE5 Carpenter Rocks

Shoreline 7.93km in length; area of cell 749.8 ha.



SE5 – Carpenters Rocks

Landforms

This small cell extends up to 2km inland, including medium to large dunes, swamps and lakes and low coastal slopes. The Gambier Limestone at Cape Banks lighthouse and Carpenter Rocks forms low cliffs and extensive shallow nearshore reefs: cliff retreat is at c. 4cm/yr, (Gill, 1978) and platform formation is active. The headland at the NW end of Lighthouse Bay extends as tombolo to large nearshore reef. The reefs and platforms are described by Short & Hesp (1984, p.102) as having three functions in coastal landform dynamics: “(a) they significantly lower wave energy; (b) they act as a barrier to onshore sand transport by restricting the development of equilibrium nearshore sand profiles; and, (c) they provide the shingle to build beaches.”

Much of the coastal plain is of low undulating calcarenite, with varied soils: on the slopes above Bucks Lake this is shallow terra rossa. Bucks Lake is part of a topographic depression in this undulating plain, which extends as a natural corridor to Lake Bonney. This was part of the former outlet for Lake Bonney, until an outlet was made through the dunes in 1954; an artificial cut and level regulator was established between the two lakes in 2009.



Cape Banks; Bucks Lake (mid-rear of image); Carpenter Rocks. Photograph Coast Protection Board 2003.

Biota

There are 14 flora survey sites, 4 opportune flora sites, 24 Herbarium record sites, 8 fauna survey sites, and 54 opportune fauna survey sites. 73% of this cell is in native vegetation. 38% of this is protected.

Dune areas are mainly in tall shrubland dominated by *Leucopogon parviflorus*. Sedgeland is found inland from the dunes with *Gabnia filum*, *Juncus* and *Melaleuca balmatororum*. The calcarenite slopes on the inner parts of the coastal boundary are frequently *Eucalyptus obliqua* mid woodland over +/- *Acacia melanoxylon* shrubs over *Pteridium esculentum*, +/- *Hypochaeris radicata*, +/- *Hydrocotyle laxiflora*.

241 fauna species have been recorded in the cell including 199 birds, 10 butterflies, 13 mammals, 13 reptiles and 6 amphibians. Listed species include the EPBC listed critically endangered

SE5 – Carpenters Rocks

Orange-bellied Parrot (*Neophema chrysogaster*); also the State endangered White-bellied Sea Eagle (*Haliaeetus leucogaster*) and Little (*Sternula albifrons*) and Fairy (*Sternula nereis*) Terns. Numbers of the tall shrub *Pomaderris balmaturina ssp. balmaturina* (EPBC listed V), Kangaroo Island Pomaderris, have been recorded in this cell, within open woodland over calcarenite, within and adjacent to Carpenter Rocks CP; the CP also contains the only known stand of the Carpenter Rocks Manna Gum, *Eucalyptus splendens ssp. arcana*. Other listed fauna species include the EPBC listed endangered Leathery Turtle (*Dermochelys coriacea*) and State endangered Swamp Antechinus (*Antechinus minimus*) and Swamp Skink (*Lissolepis coventryi*).

Benthic Habitat

Some bare sand inshore in the embayments; large areas of platform limestone/ calcarenite reef.

Land Use/ Land Ownership

Carpenter Rocks CP. Bucks Lake Game Reserve; (see Management Plan for Carpenter Rocks CP and Bucks Lake Game Reserve, 2007). Heritage Agreements 26001 & 26002. 16% of the cell area is unallotted Crown land, mainly along the northern boundary of the cell. Linear residential development along the coast from Pelican Point to Carpenter Rocks, is interspersed with unallotted Crown land. Much of the vegetated dunes of Lighthouse Bay and vegetation adjoining Bucks Lake GR is in private ownership.

Threats (Field visits and local reports)

The health of Bucks Lake depends on flows from Lake Bonney, which is subject to a number of threats, including management decisions. The fire and grazing history show past threats to the cell.

Opportunities

Bucks Lake Game Reserve is 138 hectares of near pristine seasonally inundated wetland (DEH, 2007). Bucks Lake rates highly in Slater and Farrington's report (2010) for biological value and wetland health. It is situated at the southern end of Lake Bonney. Hydrological alterations to Lake Bonney, primarily drainage works in 1958 and 1972, reduced the frequency of inundation of Bucks Lake and as a result this and other peripheral wetlands declined in condition (Bachmann, 2002). A connecting channel and regulating structure was constructed in 2009 and this has resulted in restoration of the site, with a confirmed presence of the nationally vulnerable Dwarf Galaxias in 2009. This site is currently being managed by DENR.

From Management Plan for Carpenter Rocks CP and Bucks Lake Game Reserve, 2007:

- Identify sinkholes and safety issues.
- Map soil types/ remediation.
- Support hydrological investigation in Bucks Lake.
- Survey and monitor species of conservation significance and identify and mitigate any threats, particularly with regard to the Carpenter Rocks Manna Gum.
- Manage the Coastal Wattle grassy shrublands to promote a more open grassland environment to assist with the conservation of the Orange-bellied Parrot.
- Undertake any necessary rehabilitation programs in the reserves, particularly with regard to the cleared area in Carpenter Rocks Conservation Park and the necessary removal of any rubbish from either reserve.
- Maintain and establish programs to comprehensively monitor changes in vegetation communities. In particular, support the monitoring programs associated with the Bucks Lake Rehabilitation Project.
- Monitor and investigate the need to rehabilitate riparian zone and wetland native vegetation in Bucks Lake Game Reserve once the rehabilitation project is completed.

SE5 – Carpenters Rocks

- Integrate management of threatened species with regional, district and national plans.
- Consider the threat of Mundulla Yellows and Phytophthora and take steps to prevent the introduction of either whenever practicable, report and investigate suspected infections, and treat whenever possible.
- Encourage and support biological surveys, research and monitoring of native species in the reserves and on neighbouring properties with landowners consent, especially with regard to the avifauna monitoring associated with the Bucks Lake Rehabilitation Project.
- Encourage approved volunteer groups and individuals to conduct fauna surveys and undertake population monitoring.
- Use the results of fauna monitoring to determine any required habitat rehabilitation and identify any threats that need to be mitigated.
- Undertake any necessary habitat rehabilitation projects or threat mitigation to support the survival of fauna species, ensuring that a regional, state-wide or national perspective is taken when needed. Concentrate on the protection of the Orange-bellied Parrot and the Swamp Antechinus.
- Provide assistance to threatened species recovery projects that are applicable to the reserves.
- Monitor and control introduced plant infestations through establishing pest plant control priorities and actions, with particular attention paid to the removal of Radiata Pines from Carpenter Rocks Conservation Park.
- Monitor visitor numbers and their impact on the environment to assess if any controls on reserve access are required.
- Manage the reserves for low-key visitor use, without the need for any facility development, unless the reviews of the level of access in Bucks Lake Game Reserve indicate that the provision of additional basic facilities is necessary.
- Construct, realign and maintain fencing, boundary markers and vehicle barriers where necessary.
- Liaise with operators engaged in petroleum exploration or extraction activities associated with Carpenter Rocks Conservation Park to prevent undue disturbance and ensure compliance with the provisions of this management plan.

The analysis provides a strong argument for the acquisition of high conservation value land parcels adjacent to Carpenters Rocks CP and Bucks Lake GR and their inclusion in the national reserve system.

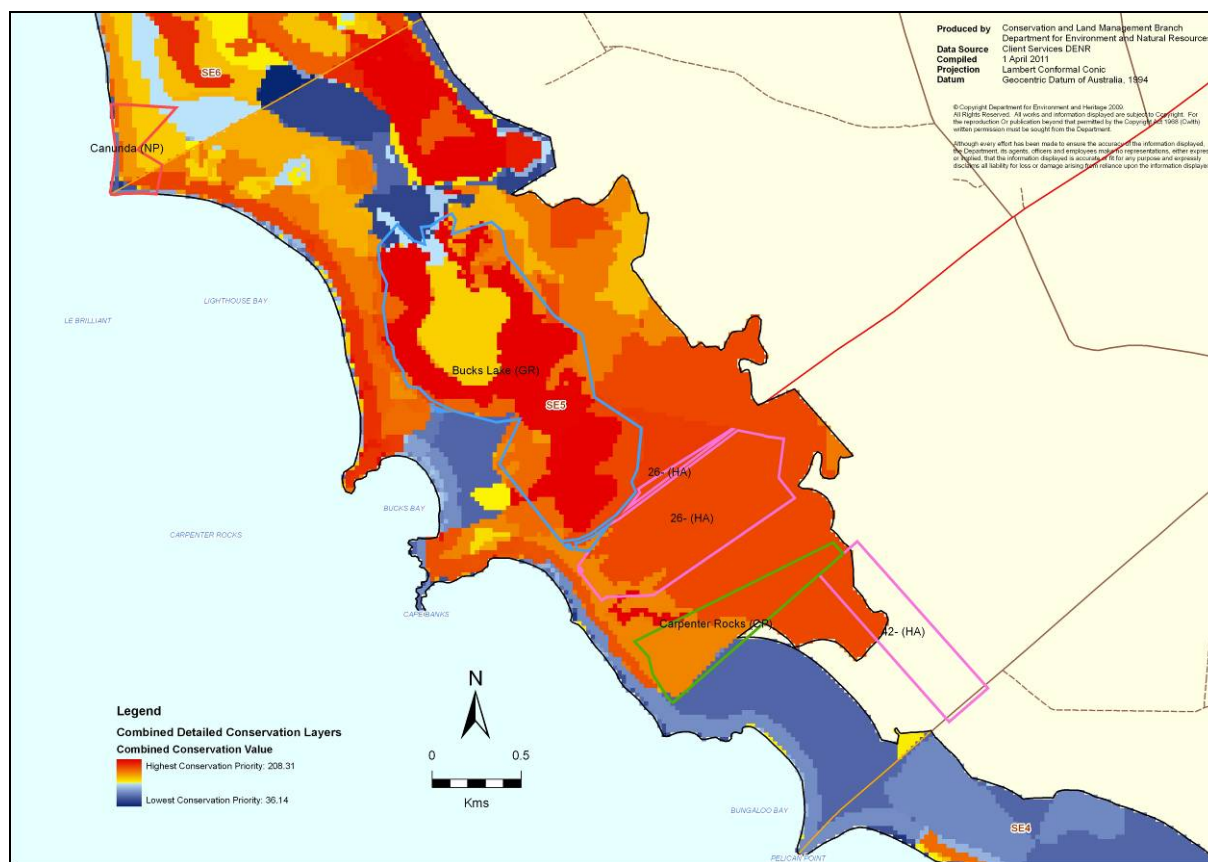
Conservation Analysis (GIS)

The total of conservation means shows this cell to have highest value in the region, 142.99. The entire cell, with the exception of two cleared areas, has high total values (conservation summary map below).

This high priority is a combination of a number of factors. Endemic floristic values are high throughout the dunes around Lighthouse Bay. Total number of threatened species is high in the open woodlands and also *Gabnia filum* sedgelands around and to the west of Bucks Lake; these same areas show medium to high total species numbers, (these values are surprisingly low for the rest of the cell). The Bucks Lake Game Reserve and surrounds provides valuable habitat for threatened bird species; valuable habitat for all bird species is widespread throughout the cell. The woodlands of the CP provide high value mammal habitat. Significant butterfly habitat is found throughout the cell, with highest values in the sedgelands. Focal species Orange-bellied Parrot (grassy shrublands, esp. CP), Swamp Antechinus and Swamp Skink (woodland) and Yellow Sedge Skipper (sedgelands) score highly in this cell. Vegetation metrics, of size, shape and connectivity are also high. Several registered Aboriginal heritage sites also contribute, while shoreline areas around Lighthouse Bay add viewscape values. The entire foreshore, <100m from

SE5 – Carpenters Rocks

low water mark is designated a significant geological feature, “Glenelg River and Lower South East Coast”.



Cell SE5 combined detailed conservation layer summary map.

Threat Analysis (GIS)

Total of threat summary layers is 62.24, which is average for this region. ORV activity, development zoning, land ownership and land use, weeds, and viewshed are the major contributors to the total.

Examination of the map detail of threat totals shows high threats near the shore and in the cleared land in the south of the cell, the land between Carpenter Rocks CP and Heritage Agreement 26001 and much of the vegetated area between Bucks Lake GR and the eastern border of the cell. These are areas with high threats primarily from ownership, use and zoning. Development zoning gives a simpler pattern overall, with only the narrow coastal zone showing low threat value, the rest being zoned primary industry. ORV activity is concentrated in the dunes and the saline mudflat areas NW of Bucks Lake.

Discussion of GIS Analysis

This small cell is the highest conservation priority area within the SE region: approximately 80% of the cell shows high value totals. Parts of the cell are protected in different ways: the dunes are zoned coastal on the development plan; Bucks Lake is a gazetted reserve, as is the tiny Carpenter Rocks Conservation Park; three areas are under heritage agreement – 26001, 26002, 42 (part); parts of the northern side of the cell are unallotted Crown land. Two high value areas remain unprotected in any way: the land between Carpenter Rocks CP and Heritage Agreement 26001 (containing the Kangaroo Island Pomaderris – EPBC listed as vulnerable) and much of the vegetated area between Bucks Lake GR and the eastern border of the cell. These are areas with

SE5 – Carpenters Rocks

high threats primarily from ownership, use and zoning. This analysis is a strong argument for a raised level of protection for these small patches.

The pattern of development zoning raises a related issue: as to whether primary industry is an appropriate zoning for a conservation park and a game reserve and heritage agreement land.

Adaptation to Climate Change: Threats for Cell SE5

(see also discussion of scenario in Section 4.11)

NOTE: the advice below is indicative of likely change and the direction of change, with implications for ecosystems. Dates, amounts and probabilities cannot be accurately calculated at this time. Thus advice on flood levels, for example, should not be used in engineering or development planning.

Climate change element/ scenario	Impacts and implications (for this cell)	Protect and manage habitat threats	Address landscape issues: fire, connectivity, refuges, hydrology
Combined climate changes and sea level rise throughout this cell	This cell presents a complex pattern of habitats sensitive to change.	Create a baseline for shoreline, dune and lake change by establishing a rectified aerial photographic record at an appropriate resolution.	
Sea level rise: 2030 : +c.20cm 2070: +c.80cm.	Rise in frequency of tidal flooding, threatens low land at Bungaloo Bay.	Monitor storm tide impacts.	
	Increase in storm foredune damage and beach recession in embayments, here, beach change may be rapid, because of low storage volumes of sand. Very low to non-existent dune elevations threaten surge overtopping, and rapid shoreline recession.	Establish beach profile monitoring at Bungaloo Bay, Bucks Bay and Lighthouse Bay, as baseline information for coastal change.	
	Beach and nearshore sand accumulation in lee of reefs may be reduced together with reef protection of the shore. This creates the potential for rapid shoreline change at Cape Banks Lighthouse and Pelican Point.	Maintain aerial imagery record to track shoreline changes.	
Storms: <i>Frequency</i> continues to show great variation on a decadal scale. <i>Intensity</i> of large	2030: Occasional storm tide flooding above highest known tides. 2070: Flooding will affect all swamps and adjacent low lying areas. Low land backing Bungaloo Bay appears vulnerable. Natural	Ongoing adaptive management of the sill on the Lake Bonney connection.	

SE5 – Carpenters Rocks

Climate change element/ scenario	Impacts and implications (for this cell)	Protect and manage habitat threats	Address landscape issues: fire, connectivity, refuges, hydrology
storms increases.	low corridor to the Bucks Lake could be affected by inundation of the Lake Bonney lowland.		
	Frequent storm damage to foredunes.	Active management of dune blowouts.	
Warmer average conditions: 2030:+0.3 to.6°C 2070:+1.5 to 2°C	(Impacts uncertain. Existing terrestrial vegetation is found in warmer conditions elsewhere)		Maintain connectivity of vegetation within the region.
Drier average conditions: 2030: -2% to 5% 2070: - 10% to 20%	Dune vegetation adapts well to drier conditions, but recovers more slowly from fire, disease and storm damage: dune mobilization becomes more likely.	Active weed control within dunes, together with management of blowouts.	
'Flashy' run off: Drier creeks, but larger rare floods	Drains and creeks may increase sediment load to coastal swamps (this depends on land management practices).	Maintain watching brief on sedimentation of high value Bucks Lake.	
Groundwater lowering; saline incursion:	The potential fall in groundwater pressure a significant threat to vegetation survival in freshwater swamps.	Adaptive management of plant assets.	Monitor salinity of coastal swamps.
Nearshore sea changes - temperature; acidity; wave climate: 2030: +0.3°C to + 0.6°C 2070: +1.0°C to + 1.50C	(Changes in upwellings timing and frequency has been discussed, but not projected)		

SE5 – Carpenters Rocks

Table 6.7. Recommended Actions and Priority for Cell SE5 – Carpenters Rocks

Component	Issue	Proposed Action	Priority of Action	Key Players
Pelican Point to Carpenters Rocks	Linear development has largely replaced the vegetated coastal reserve. Low lying development a hazard risk during storm tide events.	Limit encroachment of development onto coastal Crown land reserve. Restrict further ribbon development along the coast.	High (Cons/Threat)	Council, DPLG, CPB
	Development of numerous informal foot and vehicle tracks to the beach damages vegetation, destabilises dunes and introduces weeds and rubbish.	Efforts to reduce this impact where possible including fencing, interpretive signage, rationalising and formalising beach access and clear delineation of shore frontage properties.	Medium (Threat)	Council, community
	Coastal flint mine tenement over the northern Bucks Bay headland and the coast seaward of the Carpenters Rocks CP threatens shoreline stability.	Remove mine tenements.	Medium (Threat)	NRM, PIRSA
Clifftops	Informal access is adding to cliff instability.	Access to be clearly defined with signage, markers and access control fencing.	Medium (Cons/Threat)	DENR, Council, NRM, Community Groups
Lighthouse Bay beach and dunes	ORV activity and informal access is adding to dune instability.	Access to be clearly defined with signage, markers and access control fencing. Upgrade vehicle and pedestrian beach access tracks and ramps to protect against erosion damage and minimise environmental impact.	High (Cons/Threat)	Council, DENR, Community, SA Police, DTEI
		Monitor and actively deal with blow out development using brush matting, sand drift fences and seasonal planting.	High (Cons/Threat)	Community, NRM, DENR, CPB
	Vehicle use and unleashed dogs threaten shorebird activity.	Reduce pressure on habitat at shorebird nesting times by a seasonal vehicle ban.	High (Cons/Threat)	DENR, NRM, Council

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Component	Issue	Proposed Action	Priority of Action	Key Players
		Fence nests/ community monitoring	High (Cons/ Threat)	DENR, NRM Council, community,
		Raising community awareness through signage at major beach access points	High (Cons/ Threat)	DENR, Council, community, NRM
	Garden waste, weeds, litter and pests from the Carpenters Rocks dump threaten conservation values of the dunes.	Relocate refuse collection away from the coast and rehabilitate the site.	Medium (Threat)	Council, EPA
	Accelerating sea level rise threatens to reduce the sheltering effect of the reef on the Lighthouse Point tombolo, leading to rapid shoreline change	Maintain the coastal aerial imagery time series record to track changes.	Medium (cell)	DENR, NRM
Bungaloo Bay, Bucks Bay and Lighthouse Bay	Projected increase in sea level threatens storm foredune damage and beach recession in these embayments. Beach change may be rapid, because of low storage volumes of sand. Very low to non-existent dune elevations threaten surge overtopping, and rapid shoreline recession.	Establish beach profile monitoring at Bungaloo Bay, Bucks Bay and Lighthouse Bay, as baseline information for coastal change.	High (hazard)	DENR, NRM
Bucks Lake GR wetlands, sedgeland and surrounds	High conservation value habitat for birds, reptiles and butterflies. Also for the Swamp Skink, Southern Bell Frog and Yellowish Sedge-skipper focal species.	Fence the wetland and sedge communities? Ensure continuing flows from Lake Bonney? Gather further data on habitat and fauna and monitor health.	High (Cons/ Threat)	DENR, NRM, community
	Variation in temperature, rainfall and groundwater pressure as a result of climate change will strongly impact Bucks Lake	Careful monitoring of habitat and water quality (including salinity and turbidity) as the basis for adaptive management (including sill connection to Lake Bonney).	High (Cons/ Threat)	NRM, DENR

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Component	Issue	Proposed Action	Priority of Action	Key Players
Eucalyptus obliqua (Stringy bark) woodlands	High conservation value habitat for birds, reptiles and mammals. Also for the Orange-bellied Parrot and Swamp Antechinus focal species and also only remaining stand of Carpenters Rocks Gum.	Acquire vegetation blocks adjacent to CP and GR and include in national reserve system. Protect existing vegetation from weeds and fire threat.	High (Cons/Threat)	DENR, NRM, community
	Connectivity, patch size and shape (vegetation condition) should be protected by increasing protection of the areas outside of the CP and heritage agreements. Kangaroo Island Pomaderris (EPBC status vulnerable) in woodlands adjacent to CP.	DENR to consider purchasing land and incorporating into the CP. Landholders encouraged to protect high value land under heritage agreements.	Medium (Threat)	Council, DENR, landowners
Whole Cell	Primary Industry zoning and existing development threatens the CP, GR and heritage agreement land.	Consider including protected areas within a coastal zone, or conservation zone.	High (Cons/Threat)	Council, DPLG, NRM, community
	A patchwork of land ownership with various forms of protection and private unprotected land, all containing significant conservation values (see discussion of GIS analysis above)	Review protection of all lands in this cell with a view to extending protection to all valuable areas. Interpretation and community education on the value of the neighbouring habitat.	High (Cons/Threat)	DENR, NRM
	This cell presents a complex pattern of habitats subject to change.	Continue a rectified aerial imagery record at an appropriate resolution, in order to show change from current baseline.	Medium (Cons/Threat)	DENR, NRM

SE5 – Carpenters Rocks

Component	Issue	Proposed Action	Priority of Action	Key Players
	Potential for increased weed invasion from the township and residences along the coast.	Ongoing weed management and regular monitoring for alert weeds listed in Section 4.9. Education initiative targeting residences re: common garden species which become 'weeds' and alternatives for planting.	Medium (Cons/Threat)	Council; NRM; Community; DENR.
	Aboriginal Heritage sites recorded in this cell. Need for appropriate and sustainable management.	Consultation to appropriately manage sites in this area. Continue with Aboriginal Heritage trail and interpretation on the Cape Banks headland.	High (Cons)	Murrapeena Heritage Association Inc.; SE Aboriginal Focus Group; NRM; Council; Aboriginal Heritage Branch – DPC; Aboriginal Partnership Unit – DENR
	Lack of recognition of significant geological feature (Bridgewater formation).	Interpretation. Council to include map of the feature in its development plan.	Medium (Cons)	Council; Geological Society SA; NRM

BIOTA

Flora

Remnant vegetation area (ha)	546.7 ha, 72.9% of cell area
# flora surveys / records	14 surveys, 4 opportune sites, 24 herbarium record sites, 2 threatened plant population record sites, 2 reserve database record sites.
# flora in cell	297
# conservation rated flora in cell	5 recorded
# non-indigenous flora in cell	69 recorded
Significant CDCS floristic community	<i>Leucopogon parviflorus</i> / <i>Olearia axillaris</i> shrubland (>50% of known sites occur along SE coast).
Protected area	Canunda National Park, Carpenter Rocks Conservation Park, Bucks Lake Game Reserve (171.2ha in total).

Weeds

Species	Common Name	Status	Study rating
<i>Lycium ferocissimum</i>	African Boxthorn	D	9
<i>Thinopyrum junceiforme</i>	Sea Wheat-grass		8
<i>Coprosma repens</i>	New Zealand Mirror-bush		7

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Species	Common Name	Status	Study rating
<i>Euphorbia paralias</i>	Sea Spurge		4
<i>Senecio elegans</i>	Purple Groundsel		3
<i>Ammophila arenaria</i>	Marram Grass		2
<i>Aira cupaniana</i>	Small Hair-grass		
<i>Aira sp.</i>	Hair-grass		
<i>Allium triquetrum</i>	Three-cornered Garlic		
<i>Anagallis arvensis</i>	Pimpernel		
<i>Arctotheca calendula</i>	Cape Weed		
<i>Asphodelus fistulosus</i>	Onion Weed		
<i>Avellinia michelii</i>	Avellinia		
<i>Bromus diandrus</i>	Great Brome		
<i>Bromus hordeaceus ssp. hordeaceus</i>	Soft Brome		
<i>Cakile maritima ssp. maritima</i>	Two-horned Sea Rocket		
<i>Carduus tenuiflorus</i>	Slender Thistle		
<i>Centaureum erythraea</i>	Common Centaury		
<i>Centaureum sp.</i>	Centaury		
<i>Cerastium balearicum</i>	Chickweed		
<i>Cerastium glomeratum</i>	Common Mouse-ear Chickweed		
<i>Cirsium vulgare</i>	Spear Thistle		
<i>Conyza sp.</i>	Fleabane		
<i>Crepis sp.</i>	Hawksbeard		
<i>Cynosurus echinatus</i>	Rough Dog's-tail Grass		
<i>Dactylis glomerata</i>	Cocksfoot		
<i>Erodium cicutarium</i>	Cut-leaf Heron's-bill		
<i>Euphorbia pepus</i>	Petty Spurge		
<i>Festuca pratensis</i>	Meadow Fescue		
<i>Galium aparine</i>	Cleavers		
<i>Galium murale</i>	Small Bedstraw		
<i>Hirschfeldia incana</i>	Hoary Mustard		
<i>Holcus lanatus</i>	Yorkshire Fog		
<i>Hordeum sp.</i>			
<i>Hypochaeris glabra</i>	Smooth Cat's Ear		
<i>Hypochaeris radicata</i>	Rough Cat's Ear		
<i>Hypochaeris sp.</i>	Cat's Ear		
<i>Lagurus ovatus</i>	Hare's Tail Grass		
<i>Leontodon taraxacoides ssp. taraxacoides</i>	Lesser Hawkbit		
<i>Lolium rigidum</i>	Wimmera Ryegrass		
<i>Malus pumila</i>	Apple		
<i>Malva dendromorpha</i>	Tree Mallow		
<i>Marrubium vulgare</i>	Horehound		
<i>Medicago lupulina</i>	Black Medic		
<i>Medicago sp.</i>	Medic		
<i>Melilotus indicus</i>	King Island Melilot		
<i>Minuartia mediterranea</i>	Slender Sandwort		
<i>Myosotis discolor ssp. discolor</i>	Yellow-and-blue Forget-me-not		
<i>Oxalis corniculata ssp. corniculata</i>	Creeping Wood-sorrel		
<i>Phalaris minor</i>	Lesser Canary-grass		
<i>Plantago coronopus ssp. coronopus</i>	Bucks-horn Plantain		
<i>Plantago lanceolata var. lanceolata</i>	Ribwort		
<i>Poa pratensis</i>	Kentucky Blue-grass		
<i>Rapistrum rugosum ssp. rugosum</i>	Turnip Weed		
<i>Ricinus communis</i>	Castor Oil Plant		
<i>Rumex crispus</i>	Curled Dock		

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Species	Common Name	Status	Study rating
<i>Sambucus gaudichaudiana</i>	White Elderberry		
<i>Scabiosa atropurpurea</i>	Pincushion		
<i>Solanum aviculare</i>	Kangaroo Apple		
<i>Solanum nigrum</i>	Black Nightshade		
<i>Sonchus asper ssp. glaucescens</i>	Rough Sow-thistle		
<i>Sonchus oleraceus</i>	Common Sow-thistle		
<i>Sonchus oleraceus (NC)</i>	Common Sow-thistle		
<i>Trifolium campestre</i>	Hop Clover		
<i>Trifolium dubium</i>	Suckling Clover		
<i>Trifolium glomeratum</i>	Cluster Clover		
<i>Urtica urens</i>	Small Nettle		
<i>Vulpia fasciculata</i>	Sand Fescue		
<i>Vulpia muralis</i>	Wall Fescue		

D: Declared weed, WONS: Weeds of National Significance

Native flora

Species	Common Name	Aus status	SA status
<i>Eucalyptus splendens ssp. arcana</i>	Carpenters Rocks Manna Gum		V
<i>Pomaderris balmaturina ssp. balmaturina</i>	Kangaroo Island Pomaderris	V	V
<i>Veronica gracilis</i>	Slender Speedwell		V
<i>Caladenia necrophylla</i>	Late Spider-orchid		R
<i>Grevillea aquifolium</i>	Prickly Grevillea		R
<i>Acacia cupularis</i>	Cup Wattle		
<i>Acacia leiophylla</i>	Coast Golden Wattle		
<i>Acacia longifolia ssp. sophorae</i>	Coastal Wattle		
<i>Acacia melanoxylon</i>	Blackwood		
<i>Acacia myrtifolia (NC)</i>	Myrtle Wattle		
<i>Acacia myrtifolia var. myrtifolia (NC)</i>	Myrtle Wattle		
<i>Acacia pycnantha</i>	Golden Wattle		
<i>Acacia spinescens</i>	Spiny Wattle		
<i>Acacia verticillata ssp. ovoidea</i>	Prickly Moses		
<i>Acaena novae-zelandiae</i>	Biddy-biddy		
<i>Acrotriche cordata</i>	Blunt-leaf Ground-berry		
<i>Acrotriche serrulata</i>	Cushion Ground-berry		
<i>Actites megalocarpa</i>	Coast Sow-thistle		
<i>Agrostis avenacea var. avenacea (NC)</i>	Common Blown-grass		
<i>Ajuga australis f. A (A.G.Spooner 9058)</i>	Australian Bugle		
<i>Ajuga australis f. B (R.L.Taplin 972)</i>	Lesser Bugle		
<i>Allocasuarina muelleriana ssp. muelleriana</i>	Common Oak-bush		
<i>Allocasuarina verticillata</i>	Drooping Sheoak		
<i>Alyxia buxifolia</i>	Sea Box		
<i>Amyema pendula ssp. pendula</i>	Drooping Mistletoe		
<i>Apium prostratum var. filiforme</i>	Native Celery		
<i>Apium prostratum var. prostratum</i>	Native Celery		
<i>Apium sp.</i>	Celery		
<i>Apodasmia brownii</i>	Coarse Twine-rush		
<i>Arthropodium strictum</i>	Common Vanilla-lily		
<i>Asperula conferta</i>	Common Woodruff		
<i>Astroloma humifusum</i>	Cranberry Heath		
<i>Austrodanthonia caespitosa</i>	Common Wallaby-grass		
<i>Austrodanthonia eriantha</i>	Hill Wallaby-grass		
<i>Austrodanthonia geniculata</i>	Kneed Wallaby-grass		

SE5 – Carpenters Rocks

Species	Common Name	Aus status	SA status
<i>Austrodanthonia setacea</i>	Small-flower Wallaby-grass		
<i>Austrostipa flavescens</i>	Coast Spear-grass		
<i>Austrostipa mollis</i>	Soft Spear-grass		
<i>Austrostipa mundula</i>	Neat Spear-grass		
<i>Austrostipa pubinodis</i>	Long-shaft Spear-grass		
<i>Austrostipa</i> sp.	Spear-grass		
<i>Austrostipa stipoides</i>	Coast Spear-grass		
<i>Banksia marginata</i>	Silver Banksia		
<i>Baumea arthrophylla</i>	Swamp Twig-rush		
<i>Baumea juncea</i>	Bare Twig-rush		
<i>Baumea rubiginosa</i>	Soft Twig-rush		
<i>Beyeria lechenaultii</i>	Pale Turpentine Bush		
<i>Billardiera cymosa</i> (NC)	Sweet Apple-berry		
<i>Billardiera cymosa</i> ssp. <i>cymosa</i>	Sweet Apple-berry		
<i>Billardiera sericophora</i>	Silky Apple-berry		
<i>Boraginaceae</i> sp.	Borage Family		
<i>Bossiaea prostrata</i>	Creeping Bossiaea		
<i>Burchardia umbellata</i>	Milkmaids		
<i>Bursaria spinosa</i> ssp. <i>spinosa</i>	Sweet Bursaria		
<i>Caladenia dilatata</i> complex	Green-comb Spider-orchid		
<i>Caladenia latifolia</i>	Pink Caladenia		
<i>Carpobrotus rossii</i>	Native Pigface		
<i>Carpobrotus rossii</i> (NC)	Native Pigface		
<i>Cassytha glabella</i> f. <i>dispar</i>	Slender Dodder-laurel		
<i>Cassytha pubescens</i>	Downy Dodder-laurel		
<i>Cassytha</i> sp.	Dodder-laurel		
<i>Chamaescilla corymbosa</i> var. <i>corymbosa</i>	Blue Squill		
<i>Cladonia chlorophaea</i>			
<i>Cladonia rigida</i>			
<i>Clematis microphylla</i> var. <i>microphylla</i>	Old Man's Beard		
<i>Comesperma calymega</i>	Blue-spike Milkwort		
<i>Comesperma volubile</i>	Love Creeper		
<i>Convolvulus</i> sp.	Bindweed		
<i>Correa reflexa</i> (NC)	Common Correa		
<i>Correa reflexa</i> var. <i>reflexa</i>	Common Correa		
<i>Correa reflexa</i> var. <i>reflexa</i> (NC)	Common Correa		
<i>Correa reflexa</i> var. <i>scabridula</i>	Common Correa		
<i>Corybas</i> sp.	Helmet-orchid		
<i>Cruciferae</i> sp.	Cress Family		
<i>Cynoglossum australe</i>	Australian Hound's-tongue		
<i>Cyperus</i> sp.	Flat-sedge		
<i>Daucus glochidiatus</i>	Native Carrot		
<i>Daviesia ulicifolia</i> (NC)	Gorse Bitter-pea		
<i>Daviesia ulicifolia</i> ssp. <i>ulicifolia</i>	Gorse Bitter-pea		
<i>Deyeuxia quadriseta</i>	Reed Bent-grass		
<i>Dianella brevicaulis</i>	Short-stem Flax-lily		
<i>Dianella revoluta</i> var.			
<i>Dianella revoluta</i> var. <i>revoluta</i>	Black-anther Flax-lily		
<i>Dichelachne crinita</i>	Long-hair Plume-grass		
<i>Dichondra repens</i>	Kidney Weed		
<i>Dictyota dichotoma</i>			
<i>Dillwynia hispida</i>	Red Parrot-pea		
<i>Distichlis distichophylla</i>	Emu-grass		

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Species	Common Name	Aus status	SA status
<i>Drosera macrantha</i> ssp. <i>planchonii</i>	Climbing Sundew		
<i>Drosera</i> sp.	Sundew		
<i>Epilobium billardierianum</i> ssp. <i>billardierianum</i>	Robust Willow-herb		
<i>Epilobium hirtigerum</i>	Hairy Willow-herb		
<i>Epilobium</i> sp.	Willow-herb		
<i>Eucalyptus obliqua</i>	Messmate Stringybark		
<i>Eucalyptus obliqua</i> var. <i>obliqua</i> (NC)	Messmate Stringybark		
<i>Eucalyptus ovata</i> (NC)	Swamp Gum		
<i>Eucalyptus viminalis</i> ssp. <i>cygnetensis</i>	Rough-bark Manna Gum		
<i>Exocarpos cupressiformis</i>	Native Cherry		
<i>Exocarpos syrticola</i>	Coast Cherry		
<i>Ficinia nodosa</i>	Knobby Club-rush		
<i>Gabnia filum</i>	Thatching Grass		
<i>Gabnia trifida</i>	Cutting Grass		
<i>Galium compactum</i>	Compact Bedstraw		
<i>Galium</i> sp.	Bedstraw		
<i>Geranium potentilloides</i> var. <i>potentilloides</i>	Downy Geranium		
<i>Geranium retrorsum</i>	Grassland Geranium		
<i>Geranium solanderi</i> var. <i>solanderi</i>	Austral Geranium		
<i>Geranium</i> sp.	Geranium		
<i>Gonocarpus</i> sp.	Raspwort		
<i>Gonocarpus tetragynus</i>	Small-leaf Raspwort		
<i>Goodenia blackiana</i>	Native Primrose		
<i>Gramineae</i> sp.	Grass Family		
<i>Halosarcia</i> sp. (NC)	Samphire		
<i>Hibbertia sericea</i>	Silky Guinea-flower		
<i>Hibbertia sericea</i> var. <i>scabrifolia</i> (NC)	Rough-leaf Guinea-flower		
<i>Hibbertia sericea</i> var. <i>sericea</i> (NC)	Silky Guinea-flower		
<i>Hibbertia</i> sp.	Guinea-flower		
<i>Hydrocotyle hirta</i>	Hairy Pennywort		
<i>Hydrocotyle laxiflora</i>	Stinking Pennywort		
<i>Hydrocotyle</i> sp.	Pennywort		
<i>Hypericum gramineum</i>	Small St John's Wort		
<i>Hypolaena fastigiata</i>	Tassel Rope-rush		
<i>Isolepis cernua</i>	Nodding Club-rush		
<i>Isopogon ceratophyllus</i>	Horny Cone-bush		
<i>Juncus kraussii</i>	Sea Rush		
<i>Kennedia prostrata</i>	Scarlet Runner		
<i>Kunzea pomifera</i>	Muntries		
<i>Lachnagrostis aemula</i>	Blown-grass		
<i>Lachnagrostis billardierei</i> ssp. <i>billardierei</i>	Coast Blown-grass		
<i>Lachnagrostis filiformis</i>	Common Blown-grass		
<i>Lasiopetalum discolor</i>	Coast Velvet-bush		
<i>Lasiopetalum schulzenii</i>	Drooping Velvet-bush		
<i>Lawrenzia glomerata</i>	Clustered Lawrenzia		
<i>Lawrenzia spicata</i>	Salt Lawrenzia		
<i>Laxmannia orientalis</i>	Dwarf Wire-lily		
<i>Lepidosperma concavum</i>	Spreading Sword-sedge		
<i>Lepidosperma gladiatum</i>	Coast Sword-sedge		
<i>Lepidosperma laterale</i>	Tall Sword-sedge		
<i>Lepidosperma laterale</i> (NC)	Sharp Sword-sedge		
<i>Lepidosperma viscidum</i>	Sticky Sword-sedge		
<i>Leptocarpus tenax</i>	Slender Twine-rush		

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Species	Common Name	Aus status	SA status
<i>Leptospermum continentale</i>	Prickly Tea-tree		
<i>Leptospermum lanigerum</i>	Silky Tea-tree		
<i>Leucophyta brownii</i>	Coast Cushion Bush		
<i>Leucopogon lanceolatus</i> var. <i>lanceolatus</i>	Lance Beard-heath		
<i>Leucopogon parviflorus</i>	Coast Beard-heath		
<i>Linum marginale</i>	Native Flax		
<i>Lobelia anceps</i>	Angled Lobelia		
<i>Lobelia gibbosa</i>	Tall Lobelia		
<i>Logania ovata</i>	Oval-leaf Logania		
<i>Lomandra collina</i>	Sand Mat-rush		
<i>Lomandra longifolia</i>	Spiny-headed Mat-rush		
<i>Lomandra micrantha</i> ssp. <i>micrantha</i>	Small-flower Mat-rush		
<i>Lotus australis</i>	Austral Trefoil		
<i>Malva preissiana</i>	Australian Hollyhock		
<i>Melaleuca brevifolia</i>	Short-leaf Honey-myrtle		
<i>Melaleuca gibbosa</i>	Slender Honey-myrtle		
<i>Melaleuca halmaturorum</i>	Swamp Paper-bark		
<i>Melaleuca lanceolata</i>	Dryland Tea-tree		
<i>Melaleuca lanceolata</i> ssp. <i>lanceolata</i> (NC)	Dryland Tea-tree		
<i>Mentha</i> sp.	Mint		
<i>Microtis unifolia</i> (NC)	Common Onion-orchid		
<i>Moss</i> sp.			
<i>Muehlenbeckia adpressa</i>	Climbing Lignum		
<i>Muehlenbeckia gunnii</i>	Coastal Climbing Lignum		
<i>Myoporum insulare</i>	Common Boobialla		
<i>Myoporum</i> sp.			
<i>Olearia axillaris</i>	Coast Daisy-bush		
<i>Opercularia turpis</i>	Twiggy Stinkweed		
<i>Opercularia varia</i>	Variable Stinkweed		
<i>Oxalis perennans</i> (NC)	Native Sorrel		
<i>Ozothamnus ferrugineus</i>	Tree Everlasting		
<i>Ozothamnus turbinatus</i>	Coast Bush-everlasting		
<i>Parietaria debilis</i> (NC)	Smooth-nettle		
<i>Pelargonium australe</i>	Austral Stork's-bill		
<i>Pimelea glauca</i>	Smooth Riceflower		
<i>Pimelea serpyllifolia</i> ssp. <i>serpyllifolia</i>	Thyme Riceflower		
<i>Plantago</i> sp.	Plantain		
<i>Poa labillardieri</i> var. <i>labillardieri</i>	Common Tussock-grass		
<i>Poa poiiformis</i> var. <i>poiiformis</i>	Coast Tussock-grass		
<i>Pomaderris halmaturina</i> ssp.	Glenelg Pomaderris		
<i>Pomaderris oraria</i> (NC)	Coast Pomaderris		
<i>Pomaderris paniculosa</i> ssp. <i>paniculosa</i>	Mallee Pomaderris		
<i>Potamogeton tricarinatus</i>	Floating Pondweed		
<i>Pteridium esculentum</i>	Bracken Fern		
<i>Pultenaea hispidula</i>	Rusty Bush-pea		
<i>Pultenaea tenuifolia</i>	Narrow-leaf Bush-pea		
<i>Rhagodia candolleana</i> ssp.	Sea-berry Saltbush		
<i>Rhagodia candolleana</i> ssp. <i>candolleana</i>	Sea-berry Saltbush		
<i>Rumex</i> sp.	Dock		
<i>Samolus repens</i>	Creeping Brookweed		
<i>Scaevola aemula</i>	Fairy Fanflower		
<i>Scaevola albida</i>	Pale Fanflower		
<i>Scaevola albida</i> var. <i>albida</i>	Pale Fanflower		

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Species	Common Name	Aus status	SA status
<i>Scaevola albida</i> var. <i>pallida</i>	Coast Fanflower		
<i>Schoenoplectus pungens</i>	Spiky Club-rush		
<i>Schoenus apogon</i>	Common Bog-rush		
<i>Schoenus nitens</i>	Shiny Bog-rush		
<i>Sebaea ovata</i>	Yellow Sebaea		
<i>Selliera radicans</i>	Shiny Swamp-mat		
<i>Senecio anethifolius</i> (NC)	Feathery Groundsel		
<i>Senecio glomeratus</i> (NC)	Swamp Groundsel		
<i>Senecio minimus</i>	Fine-tooth Groundsel		
<i>Senecio pinnatifolius</i> (NC)	Variable Groundsel		
<i>Senecio pinnatifolius</i> var. <i>maritimus</i>	Variable Groundsel		
<i>Senecio</i> sp.	Groundsel		
<i>Sonchus hydrophilus</i>	Native Sow-thistle		
<i>Stackhousia aspericocca</i> ssp. <i>One-sided inflorescence</i> (W.R.Barker 697)	One-sided Candles		
<i>Stylidium graminifolium</i>	Grass Trigger-plant		
<i>Swainsona lessertii</i> folia	Coast Swainson-pea		
<i>Tetragonia implexicoma</i>	Bower Spinach		
<i>Tetragonia capillaris</i>	Hair Sedge		
<i>Thelymitra pauciflora</i>	Slender Sun-orchid		
<i>Thelymitra pauciflora</i> (NC)	Slender Sun-orchid		
<i>Themeda triandra</i>	Kangaroo Grass		
<i>Thomasia petalocalyx</i>	Paper-flower		
<i>Threlkeldia diffusa</i>	Coast Bonefruit		
<i>Thysanotus patersonii</i>	Twining Fringe-lily		
<i>Tricoryne tenella</i>	Tufted Yellow Rush-lily		
<i>Triglochin procerum</i> var. <i>procerum</i> (NC)	Water-ribbons		
<i>Triglochin</i> sp.	Arrowgrass/Water-ribbons		
<i>Urtica incisa</i>	Scrub Nettle		
<i>Urtica</i> sp.	Nettle		
<i>Veronica calycina</i>	Hairy Speedwell		
<i>Villarsia umbricola</i> var. <i>umbricola</i>	Lax Marsh-flower		
<i>Viola hederacea</i>	Ivy-leaf Violet		
<i>Viola hederacea</i> (NC)	Ivy-leaf Violet		
<i>Wahlenbergia gracilentia</i>	Annual Bluebell		

E: Endangered, V: Vulnerable, R: Rare

Fauna

# of fauna in cell	241 recorded - 199 birds, 10 butterflies, 13 mammals, 13 reptiles, 6 amphibians (an additional 18 butterflies and 1 reptile identified by experts as possibly occurring)
# of fauna surveys / records	8 surveys, 54 opportune sites, 2 reserve database sites
# of threatened fauna in cell	53 recorded
# of non-indigenous fauna	12 recorded (an additional invertebrate possible)

Non-indigenous fauna

Species	Common Name	Class	Record
<i>Alauda arvensis</i>	Eurasian Skylark	Aves	x
<i>Carduelis carduelis</i>	European Goldfinch	Aves	x
<i>Chloris chloris</i>	Common Greenfinch (European Greenfinch)	Aves	x

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Species	Common Name	Class	Record
<i>Columba livia</i>	Rock Dove (Feral Pigeon)	Aves	x
<i>Passer domesticus</i>	House Sparrow	Aves	x
<i>Sturnus vulgaris</i>	Common Starling	Aves	x
<i>Turdus merula</i>	Common Blackbird	Aves	x
<i>Pieris rapae rapae</i>	Cabbage White	Invertebrate	p
<i>Felis catus</i>	Cat (Feral Cat)	Mammalia	x
<i>Lepus capensis</i>	Brown Hare (European Hare)	Mammalia	x
<i>Mus musculus</i>	House Mouse	Mammalia	x
<i>Rattus rattus</i>	Black Rat (Ship Rat, Roof Rat)	Mammalia	x
<i>Vulpes vulpes</i>	Fox (Red Fox)	Mammalia	x

x: recorded, p: possibly there as suggested by R. Grund

Birds

Species	Common Name	Aus status	SA status
<i>Neophema chrysogaster</i>	Orange-bellied Parrot	CR/M	E
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	M	E
<i>Pandion cristatus</i>	Eastern Osprey		E
<i>Sternula albifrons</i>	Little Tern		E
<i>Sternula nereis</i>	Fairy Tern		E
<i>Botaurus poiciloptilus</i>	Australasian Bittern		V
<i>Calyptorhynchus funereus</i>	Yellow-tailed Black-Cockatoo		V
<i>Cladorhynchus leucocephalus</i>	Banded Stilt		V
<i>Coturnix ypsilophora</i>	Brown Quail		V
<i>Neophema chrysostoma</i>	Blue-winged Parrot		V
<i>Numenius madagascariensis</i>	Eastern Curlew	M	V
<i>Petroica phoenicea</i>	Flame Robin		V
<i>Thinornis rubricollis</i>	Hooded Plover		V
<i>Actitis hypoleucos</i>	Common Sandpiper	M	R
<i>Anas rhynchotis</i>	Australasian Shoveler		R
<i>Anhinga novaehollandiae</i>	Australasian Darter		R
<i>Ardea ibis</i>	Cattle Egret		R
<i>Arenaria interpres</i>	Ruddy Turnstone	M	R
<i>Bizjura lobata</i>	Musk Duck		R
<i>Calidris alba</i>	Sanderling	M	R
<i>Calidris melanotos</i>	Pectoral Sandpiper	M	R
<i>Calidris tenuirostris</i>	Great Knot	M	R
<i>Cereopsis novaehollandiae</i>	Cape Barren Goose		R
<i>Charadrius leschenaultii</i>	Greater Sand Plover (Large Sand Plover)	M	R
<i>Charadrius mongolus</i>	Lesser Sand Plover (Mongolian Plover)	M	R
<i>Egretta garzetta</i>	Little Egret		R
<i>Egretta sacra</i>	Eastern Reef Egret	M	R
<i>Falco peregrinus</i>	Peregrine Falcon		R
<i>Falcunculus frontatus</i>	Crested Shrike-tit		R
<i>Gallinago hardwickii</i>	Latham's Snipe (Japanese Snipe)	M	R
<i>Gerygone albogularis</i>	White-throated Gerygone		R
<i>Haematopus fuliginosus</i>	Sooty Oystercatcher		R
<i>Haematopus longirostris</i>	Australian Pied Oystercatcher		R
<i>Larus dominicanus</i>	Kelp Gull		R
<i>Limosa lapponica</i>	Bar-tailed Godwit	M	R
<i>Limosa limosa</i>	Black-tailed Godwit	M	R
<i>Numenius phaeopus</i>	Whimbrel	M	R
<i>Philomachus pugnax</i>	Ruff	M	R

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Species	Common Name	Aus status	SA status
<i>Plegadis falcinellus</i>	Glossy Ibis	M	R
<i>Pluvialis fulva</i>	Pacific Golden Plover	M	R
<i>Podiceps cristatus</i>	Great Crested Grebe		R
<i>Stagonopleura bella</i>	Beautiful Firetail		R
<i>Tringa brevipes</i>	Grey-tailed Tattler	M	R
<i>Xenus cinereus</i>	Terek Sandpiper	M	R
<i>Zootera lunulata</i>	Bassian Thrush (White's Thrush)		R
<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater		
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill		
<i>Acanthiza lineata</i>	Striated Thornbill		
<i>Acanthiza pusilla</i>	Brown Thornbill		
<i>Acanthiza reguloides</i>	Buff-rumped Thornbill		
<i>Acanthorhynchus tenuirostris</i>	Eastern Spinebill		
<i>Accipiter cirrocephalus</i>	Collared Sparrowhawk		
<i>Acrocephalus australis</i>	Australian Reed Warbler (Clamorous Reed-Warbler)		
<i>Anas castanea</i>	Chestnut Teal		
<i>Anas gracilis</i>	Grey Teal		
<i>Anas superciliosa</i>	Pacific Black Duck		
<i>Anthochaera carunculata</i>	Red Wattlebird		
<i>Anthochaera chrysoptera</i>	Little Wattlebird		
<i>Anthus novaeseelandiae</i>	Australasian Pipit (Richard's Pipit)		
<i>Aptenodytes patagonicus</i>	King Penguin		
<i>Apus pacificus</i>	Fork-tailed Swift		
<i>Aquila audax</i>	Wedge-tailed Eagle		
<i>Ardea alba</i>	Great Egret		
<i>Ardea modesta</i>	Eastern Great Egret		
<i>Ardea pacifica</i>	White-necked Heron (Pacific Heron)		
<i>Ardenna tenuirostris</i>	Short-tailed Shearwater (Mutton Bird)		
<i>Artamus cyanopterus</i>	Dusky Woodswallow		
<i>Artamus personatus</i>	Masked Woodswallow		
<i>Artamus superciliosus</i>	White-browed Woodswallow		
<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo		
<i>Cacomantis pallidus</i>	Pallid Cuckoo		
<i>Calamanthus fuliginosus</i>	Striated Fieldwren		
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	M	
<i>Calidris canutus</i>	Red Knot	M	
<i>Calidris ferruginea</i>	Curlew Sandpiper	M	
<i>Calidris ruficollis</i>	Red-necked Stint	M	
<i>Catharacta skua</i>	Great Skua		
<i>Chalcites basalus</i>	Horsfield's Bronze-cuckoo		
<i>Charadrius bicinctus</i>	Double-banded Plover		
<i>Charadrius ruficapillus</i>	Red-capped Plover (Red-capped Dotterel)		
<i>Chenonetta jubata</i>	Australian Wood Duck (Maned Duck)		
<i>Chlidonias hybrida</i>	Whiskered Tern	M	
<i>Chroicocephalus novaehollandiae</i>	Silver Gull		
<i>Chrysococcyx osculans</i>	Black-eared Cuckoo		
<i>Cincloramphus cruralis</i>	Brown Songlark		
<i>Circus approximans</i>	Swamp Harrier (Marsh Harrier)		
<i>Cisticola exilis</i>	Golden-headed Cisticola		
<i>Colluricincla harmonica</i>	Grey Shrike-thrush		
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike		
<i>Cormobates leucophaea</i>	White-throated Treecreeper		
<i>Corvus coronoides</i>	Australian Raven		

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Species	Common Name	Aus status	SA status
<i>Corvus mellori</i>	Little Raven		
<i>Corvus tasmanicus</i>	Forest Raven		
<i>Coturnix pectoralis</i>	Stubble Quail		
<i>Cracticus tibicen</i>	Australian Magpie		
<i>Cracticus torquatus</i>	Grey Butcherbird		
<i>Cygnus atratus</i>	Black Swan		
<i>Dacelo novaeguineae</i>	Laughing Kookaburra		
<i>Daphoenositta chrysoptera</i>	Varied Sittella		
<i>Daption capense</i>	Cape Petrel		
<i>Dasyornis broadbenti</i>	Rufous Bristlebird		ssp
<i>Dicaeum hirundinaceum</i>	Mistletoebird		
<i>Egretta novaehollandiae</i>	White-faced Heron		
<i>Elanus axillaris</i>	Black-shouldered Kite		
<i>Elseyornis melanops</i>	Black-fronted Dotterel (Black-fronted Plover)		
<i>Eolophus roseicapillus</i>	Galah		
<i>Eopsaltria australis</i>	Eastern Yellow Robin		
<i>Epthianura albifrons</i>	White-fronted Chat		
<i>Eudyptula minor</i>	Little Penguin (Fairy Penguin)		
<i>Falco berigora</i>	Brown Falcon		
<i>Falco cenchroides</i>	Nankeen Kestrel (Australian Kestrel)		
<i>Falco longipennis</i>	Australian Hobby		
<i>Fulica atra</i>	Eurasian Coot		
<i>Fulmarus glacialisoides</i>	Southern Fulmar		
<i>Gallinula tenebrosa</i>	Dusky Moorhen		
<i>Gallirallus philippensis</i>	Buff-banded Rail		
<i>Glossopsitta concinna</i>	Musk Lorikeet		
<i>Glossopsitta porphyrocephala</i>	Purple-crowned Lorikeet		
<i>Grallina cyanoleuca</i>	Magpie-lark		
<i>Haliastur spbenurus</i>	Whistling Kite		
<i>Himantopus himantopus</i>	Black-winged Stilt		
<i>Hirundapus caudacutus</i>	White-throated Needletail	M	
<i>Hirundo neoxena</i>	Welcome Swallow		
<i>Hydroprogne caspia</i>	Caspian Tern		
<i>Lalage sueurii</i>	White-winged Triller		
<i>Larus pacificus</i>	Pacific Gull		
<i>Lichenostomus chrysops</i>	Yellow-faced Honeyeater		
<i>Lichenostomus leucotis</i>	White-eared Honeyeater		
<i>Lichenostomus penicillatus</i>	White-plumed Honeyeater		
<i>Lichenostomus virescens</i>	Singing Honeyeater		
<i>Malurus cyaneus</i>	Superb Fairy-wren		
<i>Megalurus gramineus</i>	Little Grassbird		
<i>Melanodryas cucullata</i>	Hooded Robin		
<i>Melithreptus brevirostris</i>	Brown-headed Honeyeater		
<i>Melithreptus lunatus</i>	White-naped Honeyeater		
<i>Microcarbo melanoleucos</i>	Little Pied Cormorant		
<i>Morus serrator</i>	Australasian Gannet		
<i>Neochmia temporalis</i>	Red-browed Finch		
<i>Ninox novaeseelandiae</i>	Southern Boobook		
<i>Nycticorax caledonicus</i>	Nankeen Night Heron		
<i>Ocyphaps lophotes</i>	Crested Pigeon		
<i>Onychoprion anaethetus</i>	Bridled Tern (Bridal Tern)		
<i>Pachycephala olivacea</i>	Olive Whistler		ssp
<i>Pachycephala pectoralis</i>	Golden Whistler		

SE5 – Carpenters Rocks

Species	Common Name	Aus status	SA status
<i>Pachycephala rufiventris</i>	Rufous Whistler		
<i>Pardalotus punctatus</i>	Spotted Pardalote		
<i>Pardalotus striatus</i>	Striated Pardalote		
<i>Pelecanus conspicillatus</i>	Australian Pelican		
<i>Petrochelidon ariel</i>	Fairy Martin		
<i>Petrochelidon nigricans</i>	Tree Martin		
<i>Petroica boodang</i>	Scarlet Robin		ssp
<i>Pezoporus wallicus</i>	Ground Parrot		
<i>Phalacrocorax carbo</i>	Great Cormorant		
<i>Phalacrocorax fuscescens</i>	Black-faced Cormorant (Black-faced Shag)		
<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant		
<i>Phalacrocorax varius</i>	Pied Cormorant		
<i>Phaps chalcoptera</i>	Common Bronzewing		
<i>Phaps elegans</i>	Brush Bronzewing		
<i>Philemon corniculatus</i>	Noisy Firebird		
<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater		
<i>Phylidonyris pyrrhoptera</i>	Crescent Honeyeater		
<i>Platalea flavipes</i>	Yellow-billed Spoonbill		
<i>Platalea regia</i>	Royal Spoonbill		
<i>Platycercus elegans</i>	Crimson Rosella		
<i>Pluvialis squatarola</i>	Grey Plover	M	
<i>Podargus strigoides</i>	Tawny Frogmouth		
<i>Poliiocephalus poliocephalus</i>	Hoary-headed Grebe		
<i>Pomatostomus superciliosus</i>	White-browed Babbler		
<i>Pomatostomus temporalis</i>	Grey-crowned Babbler		ssp
<i>Porphyrio porphyrio</i>	Purple Swamphen (Purple Moorhen)		
<i>Porzana fluminea</i>	Australian Spotted Crake (Australian Crake)		
<i>Psephotus haematonotus</i>	Red-rumped Parrot		
<i>Rhipidura albiscapa</i>	Grey Fantail		
<i>Rhipidura leucophrys</i>	Willie Wagtail		
<i>Sericornis frontalis</i>	White-browed Scrubwren		
<i>Sterna striata</i>	White-fronted Tern		
<i>Stipiturus malachurus malachurus</i>	Southern Emu-wren		
<i>Strepera versicolor</i>	Grey Currawong		ssp
<i>Tachybaptus novaehollandiae</i>	Australasian Grebe (Little Grebe)		
<i>Tadorna tadornoides</i>	Australian Shelduck (Mountain Duck)		
<i>Thalassens bergii</i>	Crested Tern		
<i>Threskiornis molucca</i>	Australian White Ibis (Sacred Ibis)		
<i>Threskiornis spinicollis</i>	Straw-necked Ibis		
<i>Todiramphus sanctus</i>	Sacred Kingfisher		
<i>Tribonyx ventralis</i>	Black-tailed Native-hen		
<i>Trichoglossus haematodus</i>	Rainbow Lorikeet		
<i>Tringa nebularia</i>	Common Greenshank	M	
<i>Tringa stagnatilis</i>	Marsh Sandpiper	M	
<i>Tyto alba</i>	Barn Owl		
<i>Vanellus miles</i>	Masked Lapwing		
<i>Vanellus tricolor</i>	Banded Lapwing		
<i>Zosterops lateralis</i>	Silvereye		

CR: Critically endangered, E: Endangered, V: Vulnerable, R: Rare, M: Migratory

SE5 – Carpenters Rocks

Butterflies

Species	Common Name	Status*	Record
<i>Hesperilla donnyssa donnyssa</i> (pale form <i>flavescens</i>)	Yellowish Sedge-Skipper	E	ex?
<i>Jamenus icilius</i>	Icilius Hairstreak	E in SE	p
<i>Ogyris olane</i>	Olane Azure	E in SE	p
<i>Hesperilla cyrhsoticha cyclopsila</i>	Chrysotricha Sedge-skipper or Golden-haired Sedge-skipper	V	x
<i>Trapezites symmomus soma</i>	Symmomus Rush-skipper or Splendid Ochre	V	p
<i>Candalides heathi heathi</i>	Rayed Blue	R	p
<i>Delias aganippe</i>	Wood White	R	p
<i>Erina hyacinthina hyacinthina</i>	Dusky blue	R	x
<i>Lucia limbaria</i>	Small Copper	R	x
<i>Taractrocera papyria papyria</i>	White-banded Grass-dart	R	x
<i>Dispar compacta</i>	Barred Grass Skipper		x
<i>Erina acasta</i>	Blotched Dusky-blue		p
<i>Geitoneura klugii klugii</i>	Common Xenica	C	p
<i>Hesperilla donnyssa delos</i> (incl. form <i>diluta</i>)	Donnyssa skipper		x
<i>Hesperilla idothea idothea</i>			x
<i>Heteronympha merope merope</i>	Common Brown	C	x
<i>Heteronympha penelope</i>	Shouldered Brown		x
<i>Junonia villida calybe</i>	Meadow argus	Va	p
<i>Lampides boeticus</i>	Long-tailed Pea-blue		p
<i>Nacuduba biocellata biocellata</i>	Two-spotted Line-blue	LC	p
<i>Neolucia agricola agricola</i>	Fringed Heath-blue		p
<i>Ocybadistes walkeri hypochlorus</i>	Southern Grass-dart		p
<i>Ogyris amaryllis meridionalis</i>	Amaryllis Azure		p
<i>Theclinesstes albocincta</i>	Bitter-bush blue	LC	p
<i>Theclinesstes miskini miskini</i>	Wattle Blue		p
<i>Theclinesstes serpentata serpentata</i>	Salt-bush blue		p
<i>Vanessa itea</i>	Australian Admiral	Va	p
<i>Vanessa kershawi</i>	Australian Painted Lady	Va	x
<i>Zizina labradus labradus</i>	Common Grass Blue		p

*Vulnerability as per R. Grund, E: Endangered, V: Vulnerable, R: Rare

Va: Vagrant, LC: Locally common, C: Common

x: recorded, p: possibly there, ex?: probably extinct as suggested by R. Grund

Mammals

Species	Common Name	Aus status	SA status	Record
<i>Antechinus minimus</i>	Swamp Antechinus		E	x
<i>Wallabia bicolor</i>	Swamp Wallaby		V	x
<i>Rattus lutreolus</i>	Swamp Rat		R	x
<i>Vombatus ursinus</i>	Common Wombat		R	x
<i>Macropus fuliginosus</i>	Western Grey Kangaroo			x
<i>Nyctophilus geoffroyi</i>	Lesser Long-eared Bat			x
<i>Rattus fuscipes</i>	Bush Rat			x
<i>Tachyglossus aculeatus</i>	Short-beaked Echidna			x

E: Endangered, V: Vulnerable, R: Rare

x: recorded

SE5 – Carpenters Rocks

Reptiles

Species	Common Name	Aus status	SA status	Record
<i>Dermochelys coriacea</i>	Leathery Turtle	E	V	x
<i>Lissolepis coventryi</i>	Swamp Skink		E	x
<i>Delma impar</i>	Striped Snake-lizard	V		x
<i>Pseudemoia rawlinsoni</i>	Glossy Grass Skink		V	x
<i>Aprasia striolata</i>	Lined Worm-lizard			x
<i>Austrelaps superbus</i>	Lowland Copperhead			x
<i>Bassiana duperreyi</i>	Eastern Three-lined Skink			x
<i>Hemiergis peronii</i>	Four-toed Earless Skink			x
<i>Lampropholis guichenoti</i>	Garden Skink			x
<i>Notechis scutatus</i>	Eastern Tiger Snake	ssp		x
<i>Pogona barbata</i>	Eastern Bearded Dragon			x
<i>Pseudemoia entrecasteauxii</i>	Southern Grass Skink			x
<i>Tiliqua rugosa</i>	Sleepy Lizard			x
<i>Tiliqua nigrolutea</i>	Blotched Bluetongue			e

E: Endangered, V: Vulnerable, R: Rare

x: recorded, e: expected to be there (M. Hutchinson pers. comm. 2009)

Amphibians

Species	Common Name	Aus status	SA status	Record
<i>Crinia signifera</i>	Common Froglet			x
<i>Limnodynastes dumerilii</i>	Banjo Frog			x
<i>Limnodynastes peronii</i>	Striped Marsh Frog			x
<i>Limnodynastes tasmaniensis</i>	Spotted Marsh Frog			x
<i>Litoria ewingii</i>	Brown Tree Frog			x
<i>Neobatrachus sudelli</i>	Sudell's Frog			x

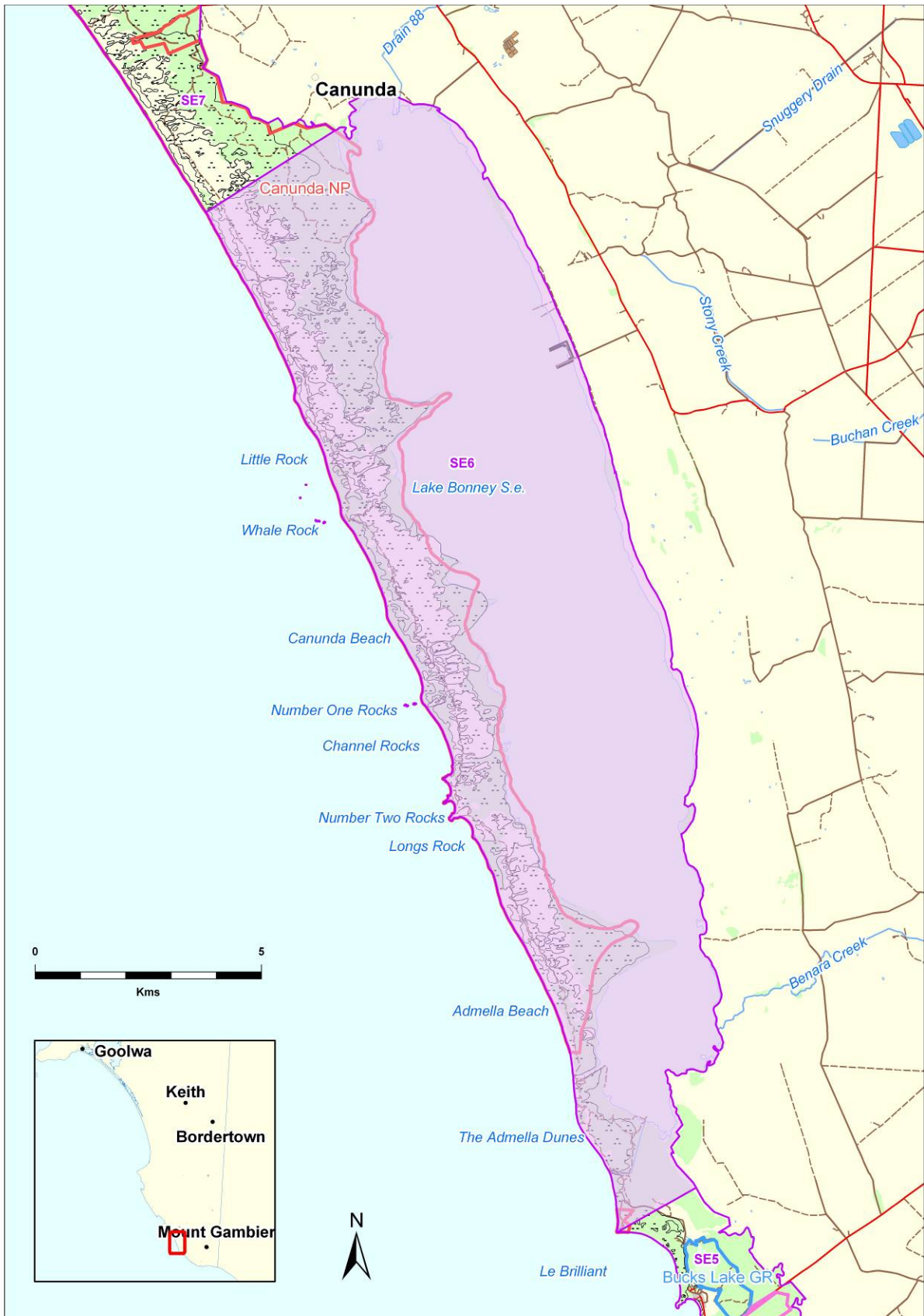
E: Endangered, V: Vulnerable, R: Rare

x: recorded

SE6 – Lake Bonney SE

6.3.6 Cell SE6 Lake Bonney SE

Shoreline length is 26.7km; area of cell is 12093.3ha.



SE6 – Lake Bonney SE

Landforms

The cell is dominated by the massive Holocene dune barrier, which separates Lake Bonney from the sea. Adjacent to the lake are numbers of small swamps and sedgeland, which are significant in the conservation value of the cell. Beach and dune conditions are similar in cells SE6 and 7, however SE6 includes coastal Lake Bonney (c.60% area of cell), immediately landward of the dune field. Lake Bonney was originally an estuary exiting through Bucks Lake, and when this exit closed became a lake. The artificial outlet channel through the dune was cut in 1958. Between the dunes and Lake Bonney there are a number of small freshwater lakes threatened by dune transgression, (stabilisation efforts have been made to protect these lakes).

Canunda beaches have the highest energy surf in the South East, as offshore gradients are steep and little wave energy is lost through shoaling. At the southern end of cell 6 reefs protect the shore, and some low aeolianite headlands are found between Cape Banks and Whale Rocks. The calcareous beach sands are medium to coarse and hence the foreshore is steep; the surf zone shows dissipative to intermediate conditions, usually with 2 inshore bars. Within the inner bar conditions are highly variable, along the shore and over short time spans, large rhythmic cusps are common.

Dune sand volumes are huge in Canunda: Short & Hesp estimate sand volumes of an order of 5x greater than in the Coorong and 3x greater than in the Robe Range. Sand has been driven ashore in high energy conditions throughout the Holocene; blowout formation and transgression has continued through the Holocene to the present day, (Short & Hesp, 1980, p.93, 94).

Transgressive dune fronts moving at c.2 - 6m./yr, (NPWSA 1986). The beach and dune sand mass blankets the partially submerged Robe Range, which outcrops frequently throughout the park. The massive transgressive dunes extend between 1 and 3 km inland; in the north the whole sand mass is, in places, over 5 km wide. In cell 6 the transgressive dunes frequently sit landward of aeolianite outcrop/ deflation basin crusts, and do not appear to have a dynamic connection with the modern foredune. One third of the surface of the dunes is de-vegetated. This appears to be due to high wave energy periodic damage to the foredune, followed by transgression; where the foredunes are protected by reefs, as at Number Two Rocks, the dunes are largely vegetated.

Behind the foredunes numbers of deflation basins with crusted small grey fine surficial sediment appear at a variety of altitudes, (a tidal overwash deposit, Zimmerman et al 1979), together with aeolianite outcrops.

Biota

There are 24 flora survey sites, 1 opportune flora site, 38 Herbarium record sites, 6 fauna survey sites, and 58 opportune fauna survey sites.

The dunes are vegetated with coastal shrubland: *Leucopogon parviflorus*, *Acacia longifolia* ssp. *sophorae*, *Olearia axillaris*, +/- *Myoporum insulare* tall shrubland over *Lepidosperma gladiatum*, *Pimelea serpyllifolia* ssp. *serpyllifolia*, *Isolepis nodosa* sedges over *Carpobrotus rossii*, *Clematis microphylla* var. *microphylla*. There are small patches of Spinifex grassland; also wetlands bordered by rushlands/ sedgelands in places.

193 fauna species have been recorded in the cell including 137 birds, 18 butterflies, 16 mammals, 15 reptiles and 7 amphibians. Listed species include the EPBC listed critically endangered Orange-bellied Parrot (*Neophema chrysogaster*); also the State endangered White-bellied Sea Eagle (*Haliaeetus leucogaster*), Eastern Osprey (*Pandion cristatus*), Swamp Antechinus (*Antechinus minimus*) and Swamp Skink (*Lissolepis coventryi*).

SE6 – Lake Bonney SE

Benthic Habitat

Irregular distribution of 3 benthic habitats along the shore: bare sand; heavy limestone/calcarene reef; and low profile platform reef. These 3 extend to c.1000 to 1400m offshore, where low profile platform reef extends along the shore.



Canunda Dunes; steep coarse sand beach; vegetated foredunes with grey clay crust in swales; transgressive dunes; small freshwater lake threatened by transgressive dunes. Lake Bonney in background. Photograph Coast Protection Board 2003.

Land Use/ Land Ownership

Canunda National Park (30% of the cell area). Lower South East Marine Park (Cape Buffon to Admella Beach). 70% of the cell area is unallotted Crown land, which includes Lake Bonney.

Luebbers research (1980) provided the basis for an assessment of Aboriginal sites in the park by Rhoades (1983); the density of sites within the park is such as to suggest the entire park should be considered an Aboriginal site, NPWSA 1986, p.38.

Values/ Uses (Field visits and local reports)

Fishing, ORV activities. Camping throughout the park. Coola Outstation ruins within the park. Aboriginal Heritage values throughout.

Threats (Field visits and local reports)

Recent aerial photography shows heavy impact of vehicle and foot traffic to many dunes and headland lookout points, with vegetation and soil loss: at the headlands this is usually terra rossa soil over calcrete layer within the Robe Range.

Dune transgression is threatening vegetation and small lakes SE of Lake Bonney, (NPWSA 1986). Between Whale Rock and Two Mile Rock unstable dunes were extensively fertilised and planted with marram by Dept Agric. in 1979 and 1983, with the aim of preventing further dune migration into small freshwater lakes. National Parks (1986, p.54) note that early descriptions of

SE6 – Lake Bonney SE

the area only mention small sections of bare sand, i.e. accounts by Goyder and the Henty brothers in 1864 and 1830. However Goyder records the dunes here and in SE7 were grazed by sheep, cattle and horses. The management of Lake Bonney and surrounds was discussed in Lands SA, 1991, s.2.

Cullen & Bird, 1980, p.B1, report here (and further north in the park) that many dunes were destabilised by 19C grazing and burning, and re-vegetation seen as contingent on rabbit and ORV control.

Opportunities

This project may provide the opportunity to review the management of the impact of ORVs within the park.

Lake Bonney is described as the largest freshwater lake in South Australia (Lands SA, 1991). It receives one of the highest ratings for biological value and wetland attributes by Slater and Farrington (2010). Historically the lake would have been brackish (Haynes et al. 2007) however water supply is now supplemented by several drains. Along with an overall freshening of the system, these inputs have also attributed to an overall decline in the water quality of the lake. The main contributing factor is wastewater from pulp and paper mills. The lake had its natural outlet to the sea at the southern end however artificial cuttings were made through the dunes in 1958 and 1972 (SEWC, 1984). The lake level is now controlled by a regulator on an artificial outlet. The main recommendations regarding Lake Bonney involve activities which will bring about an improvement in the water quality of the lake. Scientific monitoring has become a focus in the management of Lake Bonney. The EPA has collected information that suggests the quality of the lake is improving, however the EPA also recognises that following 60 years of pollution, it will take a long time to revert back to a healthy system (EPA, 2006). The use of wetland vegetation to filter inflows is currently being investigated by DENR (Slater and Farrington 2010).

Conservation Analysis (GIS)

The sum of conservation means gives this cell a low priority value (103.9), a result of extensive areas of low values in the de-vegetated dunes and the Lake Bonney water body reducing the total means for the cell. (The only high value layer for Lake Bonney was SE Wetlands, based on the SAWID assessment). However, parts of the Admella Dunes and the dunes bordering the northern end of Lake Bonney show very high total priority values due to endemic vegetation values and numbers of threatened plant species, numbers of plant species, habitat for reptiles and butterflies. This latter area includes small wetlands, which have high values as habitat for reptiles, including focal species Swamp Skink and Southern Bell Frog. The entire foreshore, <100m from low water mark is designated a significant geological feature, “Glenelg River and Lower South East Coast”.

Threat Analysis (GIS)

The total of threat layers gives cell SE6 a very low threat score, 38.386. Totals for vegetation block degradation, significant weeds and evidence of rabbit numbers in the northern part of the cell give medium values. Threat summary maps show a striking extensive concentration of ORV activity and weeds in the de-vegetated transgressive dunes from the northern boundary of the cell south to Whale Rock, at Number One Rocks and also multiple tracks at the beach and foredune in the Admella Dunes. Throughout the pattern of ORV damage, the role of the beach as the highway from which sidetracks head into the dunes is clear, from the mapped aerial photography data.

Adaptation to Climate Change: Threats for Cell SE6

(see also discussion of scenario in Section 4.11)

SE6 – Lake Bonney SE

NOTE: the advice below is indicative of likely change and the direction of change, with implications for ecosystems. Dates, amounts and probabilities cannot be accurately calculated at this time. Thus advice on flood levels, for example, should not be used in engineering or development planning.

Climate change element/ scenario	Impacts and implications (for this cell)	Protect and manage habitat threats	Address landscape issues: fire, connectivity, refuges, hydrology
Combined climate changes and sea level rise throughout this cell	This cell presents a complex pattern of habitats sensitive to change.	Create a baseline for shoreline, dune and lake change by establishing a rectified aerial photographic record at an appropriate resolution.	
Sea level rise: 2030 : +c.20cm 2070: +c.80cm.	Increase in storm foredune damage and beach recession. The partially buried calcarenite topography could well lead to an indented coastline, of reefs and embayments.	Maintain an aerial photographic record of shoreline change.	
	Foredune damage leads to dune de-stabilisation, and transport of sand across the barrier.	Active management of dune blowouts.	
Storms: <i>Frequency</i> continues to show great variation on a decadal scale. <i>Intensity</i> of large storms increases.	2030: Occasional storm tide flooding above highest known tides. 2070: Flooding will affect all swamps and adjacent low lying areas.	Manage sill height on tidal inlet to adjust to higher marine storm elevations as part of the adaptive management of Lake Bonney.	
	Frequent storm damage to foredunes.	Active management of dune blowouts.	
Warmer average conditions: 2030:+0.3 to.6°C 2070:+1.5 to 2°C	(Impacts uncertain. Existing terrestrial vegetation is found in warmer conditions elsewhere)		Maintain connectivity of vegetation within the region.
Drier average conditions: 2030: -2% to 5% 2070: - 10% to 20%	Dune vegetation adapts well to drier conditions, but recovers more slowly from fire, disease and storm damage: dune mobilization becomes more likely.	Active weed control within dunes.	
'Flashy' run off: Drier creeks, but larger rare floods	Drains and creeks may increase sediment load to coastal swamps and lakes (this depends on land management practices).	Maintain watching brief on sedimentation of Lake Bonney.	
Groundwater lowering; saline incursion:	Aridity and sea level rise a threat to perched freshwater table within the	Monitor salinity in small freshwater lakes. Adaptive management of plant	

SE6 – Lake Bonney SE

Climate change element/ scenario	Impacts and implications (for this cell)	Protect and manage habitat threats	Address landscape issues: fire, connectivity, refuges, hydrology
	dunes and back barrier swamp water tables.	assets.	
Nearshore sea changes - temperature; acidity; wave climate: 2030: +0.3°C to + 0.6°C 2070: +1.0°C to + 1.50°C	Persistent swell wave climate maintains shoreline response to wave climate. (Changes in upwellings timing and frequency has been discussed, but not projected).	Monitor shoreline change, see above.	

Table 6.8. Recommended Actions and Priority for Cell SE6 – Lake Bonney SE

Component	Issue	Proposed Action	Priority of Action	Key Players
Beaches and dunes	ORV activity remains high, with threats to vegetation, dune stability shorebird nesting and heritage sites. Activity is incompatible with the objects of Canunda NP.	Review access policy and trails; consider seasonal beach driving ban/ zoning to protect shorebirds.	High (Cons/ threat)	DENR, NRM, community
	Alteration to dune and regional water tables due to climate change.	Monitor habitat conditions in perched and back barrier lakes.	Medium (cell)	DENR, NRM
	High conservation value habitat for the endangered Orange-bellied Parrot focal species.	Protection of existing habitat and efforts to reduce disturbances.	High (Cons/ threat)	DENR, NRM
Weeds	Aggressive weeds recorded at isolated locations in the dunes along the length of the cell.	Eradication should be considered for those with limited distribution at present. Regular monitoring for alert weeds, listed in Section 4.9.	Medium (Cons/ threat)	DENR, NRM
Pest animals	Rabbit populations are recorded as high for the northern half of this cell, threatening coastal biodiversity.	Undertake rabbit control.	Medium (threat)	DENR, NRM

SE6 – Lake Bonney SE

Component	Issue	Proposed Action	Priority of Action	Key Players
Lake Bonney	High value habitat for the Southern Bell Frog focal species and other water dependent animals.	Improve existing habitat including water quality and fringing vegetation of the lake.	High (Cons)	DENR, EPA, Kimberly-Clark Australia
	Ongoing water quality issues threaten habitat values of the lake and restrict recreation activities.	Continue water quality monitoring and improvement plan.	Medium (cell)	EPA, Kimberly-Clark Australia
Whole Cell	Aboriginal Heritage sites recorded in this cell. Need for appropriate and sustainable management.	Consultation to appropriately manage sites in this area.	High (Cons)	Murrapeena Heritage Association Inc., SE Aboriginal Focus Group, NRM, Council, Aboriginal Heritage Branch – DPC, Aboriginal Partnership Unit – DENR
	This cell presents a complex pattern of habitats subject to change.	Continue a rectified aerial photographic record at an appropriate resolution, in order to show change from current baseline.	Medium (Cons/ threat)	DENR, NRM
	Lack of recognition of significant geological feature (Bridgewater formation).	Interpretation. Council to include map of the feature in its development plan.	Medium (Cons)	Council, Geological Society SA, NRM

BIOTA

Flora

Remnant vegetation area (ha)	2307 ha, 19.1% of cell area.
# flora surveys / records	24 surveys, 1 opportune site, 38 herbarium record sites.
# flora in cell	198 (includes some marine species)
# conservation rated flora in cell	15 recorded
# non-indigenous flora in cell	46 recorded
Significant CDCS floristic community	<i>Juncus kraussii</i> sedgeland (>50% of known sites occur along SE coast; <20 records along SA coast). <i>Leucopogon parviflorus</i> / <i>Olearia axillaris</i> shrubland (>50% of known sites occur along SE coast). <i>Olearia axillaris</i> / <i>Leucopogon parviflorus</i> shrubland (>50% of known sites occur along SE coast).
Protected area	Canunda National Park (3573.9ha in total)

SE6 – Lake Bonney SE

Weeds

Species	Common Name	Status	Study rating
<i>Arctotheca populifolia</i>	Beach Daisy		8
<i>Juncus acutus</i>	Sharp Rush		8
<i>Thinopyrum junceiforme</i>	Sea Wheat-grass		8
<i>Euphorbia paralias</i>	Sea Spurge		4
<i>Euphorbia terracina</i>	False Caper	D	4
<i>Limonium</i> sp.	Sea-lavender		4
<i>Senecio elegans</i>	Purple Groundsel		3
<i>Ammophila arenaria</i>	Marram Grass		2
<i>Aira</i> sp.	Hair-grass		
<i>Alopecurus myosuroides</i>	Slender Fox-tail		
<i>Alyssum linifolium</i>	Flax-leaf Alyssum		
<i>Anagallis arvensis</i>	Pimpernel		
<i>Anredera cordifolia</i>	Madeira Vine		
<i>Apium graveolens</i>	Celery		
<i>Atriplex prostrata</i>	Creeping Saltbush		
<i>Avellinia michelii</i>	Avellinia		
<i>Berula erecta</i>	Water Parsnip		
<i>Cakile maritima</i> ssp. <i>maritima</i>	Two-horned Sea Rocket		
<i>Carduus tenuiflorus</i>	Slender Thistle		
<i>Catapodium rigidum</i>	Rigid Fescue		
<i>Cerastium balearicum</i>	Chickweed		
<i>Cerastium glomeratum</i>	Common Mouse-ear Chickweed		
<i>Chenopodium glaucum</i>	Glaucous Goosefoot		
<i>Conyza albida</i>	Tall Fleabane		
<i>Dittrichia graveolens</i>	Stinkweed		
<i>Echium vulgare</i>	Viper's Bugloss		
<i>Galium divaricatum</i>	Slender Bedstraw		
<i>Hirschfeldia incana</i>	Hoary Mustard		
<i>Holcus lanatus</i>	Yorkshire Fog		
<i>Hypochaeris</i> sp.	Cat's Ear		
<i>Lagurus ovatus</i>	Hare's Tail Grass		
<i>Leontodon taraxacoides</i> ssp. <i>taraxacoides</i>	Lesser Hawkbit		
<i>Malva dendromorpha</i>	Tree Mallow		
<i>Minuartia mediterranea</i>	Slender Sandwort		
<i>Oenothera glazioviana</i>			
<i>Parapholis incurva</i>	Curly Ryegrass		
<i>Plantago lanceolata</i> var. <i>lanceolata</i>	Ribwort		
<i>Polypogon monspeliensis</i>	Annual Beard-grass		
<i>Rostraria cristata</i>	Annual Cat's-tail		
<i>Rumex obtusifolius</i>	Broad-leaf Dock		
<i>Sambucus gaudichaudiana</i>	White Elderberry		
<i>Solanum linnaeanum</i>	Apple Of Sodom		
<i>Sonchus oleraceus</i> (NC)	Common Sow-thistle		
<i>Valerianella eriocarpa</i>	Italian Corn-salad		
<i>Vulpia fasciculata</i>	Sand Fescue		
<i>Vulpia myuros</i> f. <i>myuros</i>	Rat's-tail Fescue		

D: Declared weed, WONS: Weeds of National Significance

Native flora*

Species	Common Name	Aus status	SA status
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SE6 – Lake Bonney SE

Species	Common Name	Aus status	SA status
<i>Euphrasia collina ssp. collina</i>	Purple Eyebright		V
<i>Juncus amabilis</i>			V
<i>Mazus pumilio</i>	Swamp Mazus		V
<i>Blechnum watsii</i>	Hard Water-fern		R
<i>Brachyscome graminea</i>	Grass Daisy		R
<i>Carex gunniana</i>	Mountain Sedge		R
<i>Cladium procerum</i>	Leafy Twig-rush		R
<i>Eucalyptus leucocylon ssp. megalocarpa</i>	Large-fruit Blue Gum		R
<i>Gabnia clarkei</i>	Tall Saw-sedge		R
<i>Haloragis brownii</i>	Swamp Raspwort		R
<i>Isoetes drummondii ssp. drummondii</i>	Plain Quillwort		R
<i>Leptinella reptans</i>	Creeping Cotula		R
<i>Melaleuca squarrosa</i>	Bottlebrush Tea-tree		R
<i>Myoporum parvifolium</i>	Creeping Boobialla		R
<i>Myriophyllum variifolium</i>	Varied Milfoil		R
<i>Acacia leiophylla</i>	Coast Golden Wattle		
<i>Acacia longifolia ssp. sophorae</i>	Coastal Wattle		
<i>Acacia melanoxylon</i>	Blackwood		
<i>Acacia myrtifolia var. myrtifolia (NC)</i>	Myrtle Wattle		
<i>Acacia pycnantha</i>	Golden Wattle		
<i>Acaena novae-zelandiae</i>	Biddy-biddy		
<i>Acianthus sp.</i>	Mosquito Orchid		
<i>Actites megalocarpa</i>	Coast Sow-thistle		
<i>Ajuga australis f. B (R.L. Taplin 972)</i>	Lesser Bugle		
<i>Alyxia buxifolia</i>	Sea Box		
<i>Angianthus preissianus</i>	Salt Angianthus		
<i>Apium prostratum var. filiforme</i>	Native Celery		
<i>Apium prostratum var. prostratum</i>	Native Celery		
<i>Apium sp.</i>	Celery		
<i>Apodasmia brownii</i>	Coarse Twine-rush		
<i>Asperula conferta</i>	Common Woodruff		
<i>Austrodanthonia pilosa</i>	Velvet Wallaby-grass		
<i>Austrofestuca littoralis</i>	Coast Fescue		
<i>Austrostipa flavescens</i>	Coast Spear-grass		
<i>Austrostipa scabra ssp. falcata</i>	Slender Spear-grass		
<i>Austrostipa sp.</i>	Spear-grass		
<i>Baumea arthrophylla</i>	Swamp Twig-rush		
<i>Baumea juncea</i>	Bare Twig-rush		
<i>Beyeria lechenaultii</i>	Pale Turpentine Bush		
<i>Bromus sp.</i>	Brome		
<i>Caladenia sp.</i>	Spider-orchid		
<i>Carex appressa</i>	Tall Sedge		
<i>Carex fascicularis</i>	Tassel Sedge		
<i>Carpobrotus rossii</i>	Native Pigface		
<i>Carpobrotus rossii (NC)</i>	Native Pigface		
<i>Chenopodium sp.</i>	Goosefoot		
<i>Clematis microphylla var. microphylla</i>	Old Man's Beard		
<i>Comesperma volubile</i>	Love Creeper		
<i>Correa reflexa var. reflexa (NC)</i>	Common Correa		
<i>Crassula sieberiana ssp. tetramera (NC)</i>	Australian Stonecrop		
<i>Cynoglossum australe</i>	Australian Hound's-tongue		
<i>Cynoglossum suaveolens</i>	Sweet Hound's-tongue		
<i>Cyperaceae sp.</i>	Sedge Family		

SE6 – Lake Bonney SE

Species	Common Name	Aus status	SA status
<i>Daucus glochidiatus</i>	Native Carrot		
<i>Dianella brevicaulis</i>	Short-stem Flax-lily		
<i>Dianella brevicaulis/ revoluta</i> var.	Black-anther Flax-lily		
<i>Dianella revoluta</i> var. <i>revoluta</i>	Black-anther Flax-lily		
<i>Dichelachne crinita</i>	Long-hair Plume-grass		
<i>Dichondra repens</i>	Kidney Weed		
<i>Distichlis distichophylla</i>	Emu-grass		
<i>Eleocharis acuta</i>	Common Spike-rush		
<i>Epilobium billardierianum</i> ssp. <i>billardierianum</i>	Robust Willow-herb		
<i>Epilobium billardierianum</i> ssp. <i>X intermedium</i>	Variable Willow-herb		
<i>Eucalyptus obliqua</i>	Messmate Stringybark		
<i>Eucalyptus ovata</i> var. <i>ovata</i>	Swamp Gum		
<i>Exocarpos syrticola</i>	Coast Cherry		
<i>Ficinia nodosa</i>	Knobby Club-rush		
<i>Gabnia filum</i>	Thatching Grass		
<i>Gabnia trifida</i>	Cutting Grass		
<i>Geranium</i> sp.	Geranium		
<i>Gonocarpus tetragynus</i>	Small-leaf Raspwort		
<i>Gramineae</i> sp.	Grass Family		
<i>Helichrysum leucopsidium</i>	Satin Everlasting		
<i>Herb</i> sp.			
<i>Hibbertia pallidiflora</i>	Round-leaf Guinea-flower		
<i>Hibbertia sericea</i>	Silky Guinea-flower		
<i>Hydrocotyle laxiflora</i>	Stinking Pennywort		
<i>Hydrocotyle plebeya</i>			
<i>Hydrocotyle</i> sp.	Pennywort		
<i>Isolepis cernua</i>	Nodding Club-rush		
<i>Juncus kraussii</i>	Sea Rush		
<i>Juncus pallidus</i>	Pale Rush		
<i>Kennedia prostrata</i>	Scarlet Runner		
<i>Kunzea pomifera</i>	Muntries		
<i>Lachnagrostis filiformis</i>	Common Blown-grass		
<i>Lasiopetalum schulzenii</i>	Drooping Velvet-bush		
<i>Lawrenca spicata</i>	Salt Lawrenca		
<i>Lepidosperma gladiatum</i>	Coast Sword-sedge		
<i>Leptospermum lanigerum</i>	Silky Tea-tree		
<i>Leucophyta brononii</i>	Coast Cushion Bush		
<i>Leucopogon lanceolatus</i> var. <i>lanceolatus</i>	Lance Beard-heath		
<i>Leucopogon parviflorus</i>	Coast Beard-heath		
<i>Lilaeopsis polyantha</i>	Australian Lilaeopsis		
<i>Lobelia anceps</i>	Angled Lobelia		
<i>Lotus australis</i>	Austral Trefoil		
<i>Melaleuca gibbosa</i>	Slender Honey-myrtle		
<i>Melaleuca halmaturorum</i>	Swamp Paper-bark		
<i>Melaleuca lanceolata</i>	Dryland Tea-tree		
<i>Moss</i> sp.			
<i>Muehlenbeckia adpressa</i>	Climbing Lignum		
<i>Myoporum insulare</i>	Common Boobialla		
<i>Myosotis australis</i>	Austral Forget-me-not		
<i>Myriophyllum salsugineum</i>	Lake Milfoil		
<i>Olearia axillaris</i>	Coast Daisy-bush		
<i>Olearia ramulosa</i>	Twiggy Daisy-bush		
<i>Orthoceras strictum</i>	Horned Orchid		

SE6 – Lake Bonney SE

Species	Common Name	Aus status	SA status
<i>Oxalis perennans</i> (NC)	Native Sorrel		
<i>Oxalis</i> sp.	Sorrel		
<i>Ozothamnus turbinatus</i>	Coast Bush-everlasting		
<i>Parietaria debilis</i> (NC)	Smooth-nettle		
<i>Pelargonium australe</i>	Austral Stork's-bill		
<i>Phragmites australis</i>	Common Reed		
<i>Phyllospora comosa</i>			
<i>Pimelea serpyllifolia</i> ssp. <i>serpyllifolia</i>	Thyme Riceflower		
<i>Poa labillardieri</i> var. <i>labillardieri</i>	Common Tussock-grass		
<i>Poa poiiformis</i> var. <i>poiiformis</i>	Coast Tussock-grass		
<i>Poa</i> sp.	Meadow-grass/Tussock-grass		
<i>Pomaderris oraria</i> (NC)	Coast Pomaderris		
<i>Pomaderris paniculosa</i> ssp. <i>paralia</i>	Coast Pomaderris		
<i>Rhagodia candolleana</i> ssp.	Sea-berry Saltbush		
<i>Rhagodia candolleana</i> ssp. <i>candolleana</i>	Sea-berry Saltbush		
<i>Sagina maritima</i>	Sea Pearlwort		
<i>Samolus repens</i>	Creeping Brookweed		
<i>Scaevola albida</i>	Pale Fanflower		
<i>Scaevola crassifolia</i>	Cushion Fanflower		
<i>Schoenoplectus pungens</i>	Spiky Club-rush		
<i>Schoenus nitens</i>	Shiny Bog-rush		
<i>Schoenus</i> sp.	Bog-rush		
<i>Sebaea ovata</i>	Yellow Sebaea		
<i>Selliera radicans</i>	Shiny Swamp-mat		
<i>Senecio biserratus</i>	Jagged Groundsel		
<i>Senecio glomeratus</i> ssp. <i>longifructus</i>	Swamp Groundsel		
<i>Senecio minimus</i>	Fine-tooth Groundsel		
<i>Senecio odoratus</i>	Scented Groundsel		
<i>Senecio picridioides</i>	Purple-leaf Groundsel		
<i>Senecio pinnatifolius</i> (NC)	Variable Groundsel		
<i>Senecio pinnatifolius</i> var. <i>lanceolatus</i>	Variable Groundsel		
<i>Senecio</i> sp.	Groundsel		
<i>Solanum laciniatum</i>	Cut-leaf Kangaroo-apple		
<i>Spinifex sericeus</i> (NC)	Rolling Spinifex		
<i>Sporobolus virginicus</i>	Salt Couch		
<i>Sporobolus virginicus</i> (NC)	Salt Couch		
<i>Stackhousia spathulata</i>	Coast Candles		
<i>Swainsona lessertiiifolia</i>	Coast Swainson-pea		
<i>Tetragonia implexicoma</i>	Bower Spinach		
<i>Threlkeldia diffusa</i>	Coast Bonefruit		
<i>Triglochin centrocarpum</i> (NC)	Dwarf Arrowgrass		
<i>Triglochin procerum</i> var. <i>procerum</i> (NC)	Water-ribbons		
<i>Urtica incisa</i>	Scrub Nettle		
<i>Villarsia umbricola</i> var. <i>umbricola</i>	Lax Marsh-flower		
<i>Wilsonia backhousei</i>	Narrow-leaf Wilsonia		

E: Endangered, V: Vulnerable, R: Rare

*note: includes some marine species

Fauna

# of fauna in cell	193 recorded – 137 birds, 18 butterflies, 16 mammals, 15 reptiles, 7 amphibians (an additional 7 butterflies and 1 reptile identified by experts as possibly occurring)
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SE6 – Lake Bonney SE

# of fauna surveys / records	6 surveys, 58 opportune sites
# of threatened fauna in cell	30 recorded
# of non-indigenous fauna	15 recorded

Non-indigenous fauna

Species	Common Name	Class	Record
<i>Alauda arvensis</i>	Eurasian Skylark	Aves	x
<i>Carduelis carduelis</i>	European Goldfinch	Aves	x
<i>Chloris chloris</i>	Common Greenfinch (European Greenfinch)	Aves	x
<i>Columba livia</i>	Rock Dove (Feral Pigeon)	Aves	x
<i>Passer domesticus</i>	House Sparrow	Aves	x
<i>Sturnus vulgaris</i>	Common Starling	Aves	x
<i>Turdus merula</i>	Common Blackbird	Aves	x
<i>Pieris rapae rapae</i>	Cabbage White	Invertebrate	x
<i>Danaus plexippus plexippus</i>	Wanderer, Monarch	Invertebrate	x
<i>Felis catus</i>	Cat (Feral Cat)	Mammalia	x
<i>Mus musculus</i>	House Mouse	Mammalia	x
<i>Oryctolagus cuniculus</i>	Rabbit (European Rabbit)	Mammalia	x
<i>Rattus norvegicus</i>	Brown Rat (Sewer Rat, Norway Rat)	Mammalia	x
<i>Rattus rattus</i>	Black Rat (Ship Rat, Roof Rat)	Mammalia	x
<i>Vulpes vulpes</i>	Fox (Red Fox)	Mammalia	x

x: recorded

Birds

Species	Common Name	Aus status	SA status
<i>Neophema chrysogaster</i>	Orange-bellied Parrot	CR/M	E
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	M	E
<i>Pandion cristatus</i>	Eastern Osprey		E
<i>Botaurus poiciloptilus</i>	Australasian Bittern		V
<i>Cladorhynchus leucocephalus</i>	Banded Stilt		V
<i>Neophema chrysostoma</i>	Blue-winged Parrot		V
<i>Stictonetta naevosa</i>	Freckled Duck		V
<i>Thinornis rubricollis</i>	Hooded Plover		V
<i>Anas rhynchos</i>	Australasian Shoveler		R
<i>Ardea ibis</i>	Cattle Egret		R
<i>Arenaria interpres</i>	Ruddy Turnstone	M	R
<i>Biziura lobata</i>	Musk Duck		R
<i>Calidris alba</i>	Sanderling	M	R
<i>Falco peregrinus</i>	Peregrine Falcon		R
<i>Gallinago hardwickii</i>	Latham's Snipe (Japanese Snipe)	M	R
<i>Haematopus fuliginosus</i>	Sooty Oystercatcher		R
<i>Haematopus longirostris</i>	Australian Pied Oystercatcher		R
<i>Neophema elegans</i>	Elegant Parrot		R
<i>Numenius phaeopus</i>	Whimbrel	M	R
<i>Oxyura australis</i>	Blue-billed Duck		R
<i>Podiceps cristatus</i>	Great Crested Grebe		R
<i>Porzana tabuensis</i>	Spotless Crake		R
<i>Stagonopleura bella</i>	Beautiful Firetail		R
<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater		
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill		
<i>Acanthiza pusilla</i>	Brown Thornbill		
<i>Accipiter cirrocephalus</i>	Collared Sparrowhawk		
<i>Anas castanea</i>	Chestnut Teal		

SE6 – Lake Bonney SE

Species	Common Name	Aus status	SA status
<i>Anas gracilis</i>	Grey Teal		
<i>Anas superciliosa</i>	Pacific Black Duck		
<i>Anthochaera carunculata</i>	Red Wattlebird		
<i>Anthochaera chrysoptera</i>	Little Wattlebird		
<i>Anthus novaeseelandiae</i>	Australasian Pipit (Richard's Pipit)		
<i>Apus pacificus</i>	Fork-tailed Swift		
<i>Aquila audax</i>	Wedge-tailed Eagle		
<i>Ardea alba</i>	Great Egret		
<i>Ardea modesta</i>	Eastern Great Egret		
<i>Ardea pacifica</i>	White-necked Heron (Pacific Heron)		
<i>Artamus cyanopterus</i>	Dusky Woodswallow		
<i>Aythya australis</i>	Hardhead (White-eyed Duck)		
<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo		
<i>Calamanthus fuliginosus</i>	Striated Fieldwren		
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	M	
<i>Calidris ferruginea</i>	Curlew Sandpiper	M	
<i>Calidris ruficollis</i>	Red-necked Stint	M	
<i>Chalcites basalus</i>	Horsfield's Bronze-cuckoo		
<i>Chalcites lucidus</i>	Shining Bronze-Cuckoo		
<i>Charadrius bicinctus</i>	Double-banded Plover		
<i>Charadrius ruficapillus</i>	Red-capped Plover (Red-capped Dotterel)		
<i>Chlidonias hybrida</i>	Whiskered Tern	M	
<i>Chroicocephalus novaehollandiae</i>	Silver Gull		
<i>Circus approximans</i>	Swamp Harrier (Marsh Harrier)		
<i>Cisticola exilis</i>	Golden-headed Cisticola		
<i>Colluricincla harmonica</i>	Grey Shrike-thrush		
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike		
<i>Corvus coronoides</i>	Australian Raven		
<i>Corvus mellori</i>	Little Raven		
<i>Coturnix pectoralis</i>	Stubble Quail		
<i>Cracticus tibicen</i>	Australian Magpie		
<i>Cracticus torquatus</i>	Grey Butcherbird		
<i>Cygnus atratus</i>	Black Swan		
<i>Dacelo novaeguineae</i>	Laughing Kookaburra		
<i>Dasyornis broadbenti</i>	Rufous Bristlebird		ssp
<i>Dromaius novaehollandiae</i>	Emu		
<i>Egretta novaehollandiae</i>	White-faced Heron		
<i>Elanus axillaris</i>	Black-shouldered Kite		
<i>Euseyornis melanops</i>	Black-fronted Dotterel (Black-fronted Plover)		
<i>Eolophus roseicapillus</i>	Galah		
<i>Eopsaltria australis</i>	Eastern Yellow Robin		
<i>Epthianura albifrons</i>	White-fronted Chat		
<i>Eudyptula minor</i>	Little Penguin (Fairy Penguin)		
<i>Falco berigora</i>	Brown Falcon		
<i>Falco cenchroides</i>	Nankeen Kestrel (Australian Kestrel)		
<i>Falco longipennis</i>	Australian Hobby		
<i>Fulica atra</i>	Eurasian Coot		
<i>Fulmarus glacialisoides</i>	Southern Fulmar		
<i>Gelochelidon nilotica</i>	Gull-billed Tern		
<i>Glossopsitta porphyrocephala</i>	Purple-crowned Lorikeet		
<i>Grallina cyanoleuca</i>	Magpie-lark		
<i>Haliaastur sphenurus</i>	Whistling Kite		
<i>Hieraaetus morphnoides</i>	Little Eagle		

SE6 – Lake Bonney SE

Species	Common Name	Aus status	SA status
<i>Himantopus himantopus</i>	Black-winged Stilt		
<i>Hirundapus caudacutus</i>	White-throated Needletail	M	
<i>Hirundo neoxena</i>	Welcome Swallow		
<i>Hydroprogne caspia</i>	Caspian Tern		
<i>Lichenostomus chrysops</i>	Yellow-faced Honeyeater		
<i>Lichenostomus virescens</i>	Singing Honeyeater		
<i>Malacorhynchus membranaceus</i>	Pink-eared Duck		
<i>Malurus cyaneus</i>	Superb Fairy-wren		
<i>Megalurus gramineus</i>	Little Grassbird		
<i>Microcarbo melanoleucos</i>	Little Pied Cormorant		
<i>Neochmia temporalis</i>	Red-browed Finch		
<i>Ninox novaeseelandiae</i>	Southern Boobook		
<i>Nycticorax caledonicus</i>	Nankeen Night Heron		
<i>Ocyphaps lophotes</i>	Crested Pigeon		
<i>Pachycephala olivacea</i>	Olive Whistler		ssp
<i>Pachycephala pectoralis</i>	Golden Whistler		
<i>Pachycephala rufiventris</i>	Rufous Whistler		
<i>Pelecanus conspicillatus</i>	Australian Pelican		
<i>Petroica boodang</i>	Scarlet Robin		ssp
<i>Phalacrocorax carbo</i>	Great Cormorant		
<i>Phalacrocorax fuscescens</i>	Black-faced Cormorant (Black-faced Shag)		
<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant		
<i>Phalacrocorax varius</i>	Pied Cormorant		
<i>Phaps chalcoptera</i>	Common Bronzewing		
<i>Phaps elegans</i>	Brush Bronzewing		
<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater		
<i>Platalea flavipes</i>	Yellow-billed Spoonbill		
<i>Platalea regia</i>	Royal Spoonbill		
<i>Pluvialis squatarola</i>	Grey Plover	M	
<i>Poliiocephalus poliocephalus</i>	Hoary-headed Grebe		
<i>Pomatostomus superciliosus</i>	White-browed Babbler		
<i>Porphyrio porphyrio</i>	Purple Swamphen (Purple Moorhen)		
<i>Porzana fluminea</i>	Australian Spotted Crake (Australian Crake)		
<i>Psephotus haematonotus</i>	Red-rumped Parrot		
<i>Recurvirostra novaehollandiae</i>	Red-necked Avocet		
<i>Rhipidura albiscapa</i>	Grey Fantail		
<i>Rhipidura leucophrys</i>	Willie Wagtail		
<i>Sericornis frontalis</i>	White-browed Scrubwren		
<i>Stipiturus malachurus</i>	Southern Emu-wren	ssp	ssp
<i>Strepera versicolor</i>	Grey Currawong		ssp
<i>Tachybaptus novaehollandiae</i>	Australasian Grebe (Little Grebe)		
<i>Tadorna tadornoides</i>	Australian Shelduck (Mountain Duck)		
<i>Thalasseus bergii</i>	Crested Tern		
<i>Threskiornis molucca</i>	Australian White Ibis (Sacred Ibis)		
<i>Threskiornis spinicollis</i>	Straw-necked Ibis		
<i>Tribonyx ventralis</i>	Black-tailed Native-hen		
<i>Tringa nebularia</i>	Common Greenshank	M	
<i>Vanellus miles</i>	Masked Lapwing		
<i>Zosterops lateralis</i>	Silvereye		

CR: Critically endangered, E: Endangered, V: Vulnerable, R: Rare, M: Migratory, ssp: sub-species

SE6 – Lake Bonney SE

Butterflies

Species	Common Name	Status*	Record
<i>Hesperilla donnysa donnysa</i> (pale form <i>flavescens</i>)	Yellowish Sedge-Skipper	E	ex?
<i>Heteronympha cordace wilsoni</i>	Bright-eyed Brown	E	p
<i>Jamennus icilius</i>	Icilius Hairstreak	E in SE	p
<i>Candalides heathi heathi</i>	Rayed Blue	R	p
<i>Lucia limbaria</i>	Small Copper	R	p
<i>Erina hyacinthina hyacinthina</i>	Dusky blue	R	x
<i>Taractrocera papyria papyria</i>	White-banded Grass-dart	R	x
<i>Tisiphone abeona albifascia</i>	Sword-grass brown	R	x
<i>Danaus chrysippus petilia</i>	Lesser Wanderer	Va	x
<i>Geitoneura klugii klugii</i>	Common Xenica	C	x
<i>Hesperilla donnysa delos</i> (incl. form <i>diluta</i>)	Donnysa skipper		x
<i>Hesperilla idothea idothea</i>			x
<i>Heteronympha merope merope</i>	Common Brown	C	x
<i>Heteronympha penelope</i>	Shouldered Brown		x
<i>Junonia villida cabybe</i>	Meadow argus	Va	x
<i>Lampides boeticus</i>	Long-tailed Pea-blue		x
<i>Nacaduba biocellata biocellata</i>	Two-spotted Line-blue	LC	p
<i>Theclinesstes albocincta</i>	Bitter-bush blue	LC	x
<i>Theclinesstes miskini miskini</i>	Wattle Blue		p
<i>Theclinesstes serpentata serpentata</i>	Salt-bush blue		x
<i>Vanessa itea</i>	Australian Admiral	Va	x
<i>Vanessa kershawi</i>	Australian Painted Lady	Va	x
<i>Zizina labradus labradus</i>	Common Grass Blue		x

*Vulnerability as per R. Grund, E: Endangered, V: Vulnerable, R: Rare

Va: Vagrant, LC: Locally common, C: Common

x: recorded, p: possibly there, ex?: possibly extinct, as suggested by R. Grund

Mammals

Species	Common Name	Aus status	SA status	Record
<i>Antechinus minimus</i>	Swamp Antechinus		E	x
<i>Wallabia bicolor</i>	Swamp Wallaby		V	x
<i>Macropus rufogriseus</i>	Red-necked Wallaby		R	x
<i>Rattus lutreolus</i>	Swamp Rat		R	x
<i>Vombatus ursinus</i>	Common Wombat		R	x
<i>Macropus fuliginosus</i>	Western Grey Kangaroo			x
<i>Nyctophilus geoffroyi</i>	Lesser Long-eared Bat			x
<i>Pseudocheirus peregrinus</i>	Common Ringtail Possum			x
<i>Rattus fuscipes</i>	Bush Rat			x
<i>Tachyglossus aculeatus</i>	Short-beaked Echidna			x

E: Endangered, V: Vulnerable, R: Rare

Reptiles

Species	Common Name	Aus status	SA status	Record
<i>Lissolepis coventryi</i>	Swamp Skink		E	x
<i>Aprasia striolata</i>	Lined Worm-lizard			x
<i>Austrelaps superbus</i>	Lowland Copperhead			x
<i>Bassiana duperreyi</i>	Eastern Three-lined Skink			x
<i>Chelodina longicollis</i>	Common Long-necked Tortoise			x
<i>Christinus marmoratus</i>	Marbled Gecko			x
<i>Hemiergis peronii</i>	Four-toed Earless Skink			x

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Species	Common Name	Aus status	SA status	Record
<i>Lerista bougainwillii</i>	Bougainville's Skink			x
<i>Menetia greyii</i>	Dwarf Skink			x
<i>Notechis scutatus</i>	Eastern Tiger Snake	ssp		x
<i>Pogona barbata</i>	Eastern Bearded Dragon			x
<i>Pseudemoia entrecasteauxii</i>	Southern Grass Skink			x
<i>Pseudonaja textilis</i>	Eastern Brown Snake			x
<i>Tiliqua nigrolutea</i>	Blotched Bluetongue			e
<i>Tiliqua rugosa</i>	Sleepy Lizard			x
<i>Tiliqua scincoides</i>	Eastern Bluetongue			x

E: Endangered, V: Vulnerable, R: Rare

x: recorded, e: expected to be there (M. Hutchinson pers. comm. 2009)

Amphibians

Species	Common Name	Aus status	SA status	Record
<i>Geocrinia laevis</i>	Smooth Frog		R	e
<i>Crinia signifera</i>	Common Froglet			x
<i>Limnodynastes dumerilii</i>	Banjo Frog			x
<i>Limnodynastes peronii</i>	Striped Marsh Frog			x
<i>Limnodynastes tasmaniensis</i>	Spotted Marsh Frog			x
<i>Litoria ewingii</i>	Brown Tree Frog			x
<i>Neobatrachus pictus</i>	Burrowing Frog			x
<i>Neobatrachus sudelli</i>	Sudell's Frog			x

E: Endangered, V: Vulnerable, R: Rare

x: recorded, e: expected to be there (M. Hutchinson pers. comm. 2009)

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6.3.7 Cell SE7 Canunda NP

Shoreline is 25.9km; the cell is 7585.6ha in area.



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Landforms

(Beach and dune conditions are similar in cells SE6 and 7).

This cell is composed of a large Holocene sand barrier overlying the late Pleistocene Robe Range: the barrier is over 5 km wide in places, and up to 60m in elevation; the underlying Robe Range is generally near to sea level.

Canunda beaches have the highest energy surf in the South East, as offshore gradients are steep and little wave energy is lost through shoaling. From Cape Buffon SE for 10km to near Geltwood Reef nearshore platforms and reefs and islands reduce the energy at the shoreline to some extent; while elsewhere reef protection is reduced to minimal levels. The calcareous beach sands are medium to coarse and hence the foreshore is steep; the surf zone shows dissipative to intermediate conditions, usually with 2 inshore bars. Within the inner bar conditions are highly variable, along the shore and over short time spans, and large beach and foredune changes are common.

79% of this cell is coastal dune and sand volumes are huge in Canunda NP, especially in Cell SE7: Short & Hesp (1980, p.93, 94), estimate sand volumes per unit alongshore of an order of five times greater than in the Coorong and three times greater than in the Robe Range. Sand has been driven ashore in high energy conditions throughout the Holocene; blowout formation and transgression has continued through the Holocene to the present day. Within the massive transgressive dunes some landform patterns are repeated through the cell: behind the unstable foredunes deflated areas are crusted with small grey fine sediment, and former lake beds appear at a variety of altitudes, together with aeolianite outcrops. Inland from the deflated areas, current bare transgressive dunes are common, advancing across vegetated parabolic Holocene dunes in their landward path. Today 19% of the dune surface is unvegetated.

The sand barrier traps a back-barrier wetland, and in the north of the cell Lake Frome CP wetland is included within the coastal boundary. The wetland is a permanent freshwater lake fed drainage waters through Lake Frome North Drain from Mullins Swamp (1913 & 1952) and through the Narrow Neck Drain. (The cutting from Lake Frome to the sea was made in 1885 and enlarged in 1908, 1915 and 1952: this reduced the lake from 1,000 ha to 36 ha.)



Canunda NP dunes near Oil Rig Square, Canunda Swamp in background. Dune blowouts centre right; grey deflated area and transgressive dunes middle left. Brown areas in the surf, showing a dinoflagellate population explosion in highly oxegenated surf. Photograph Coast Protection Board 2008.

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Biota

There are 22 flora survey sites, 6 opportune flora sites, 62 Herbarium record sites, 10 fauna survey sites, and 96 opportune fauna survey sites.

Coastal shrubland: *Leucopogon parviflorus*, *Acacia longifolia* ssp. *sophorae*, *Olearia axillaris*, +/-*Myoporum insulare* tall shrubland over *Lepidosperma gladiatum*, *Pimelea serpyllifolia* ssp. *serpyllifolia*, *Isolepis nodosa* sedges over *Carpobrotus rossii*, *Clematis microphylla* var. *microphylla*. There are also some small areas of *Juncus*/ *Isolepis* sedgeland. Lake Frome retains a variety of vegetation associations, including *Gabnia trifida*/ *Juncus kraussii*.

225 fauna species have been recorded in the cell including 155 birds, 31 butterflies, 19 mammals, 20 reptiles and 7 amphibians. Listed species include the EPBC listed critically endangered Orange-bellied Parrot (*Neophema chrysogaster*); also the State endangered White-bellied Sea Eagle (*Haliaeetus leucogaster*) and Little (*Sternula albifrons*) and Fairy (*Sternula nereis*) Terns, Swamp Antechinus (*Antechinus minimus*), Swamp Skink (*Lissolepis coventryi*) and Salamander Skink (*Nannoscincus maccoyi*).

Benthic Habitat

Low profile platform reef, with some areas of bare sand.

Land Use/ Land Ownership

Canunda NP and Lake Frome CP comprise 93% of the cell area. Lake Frome, with nearby Mullins Swamp, was included on the Register of the National Estate in 1993 because of its outstanding wetland conservation values. It is also listed as a Wetland of Importance in *A Directory of Important Wetlands in Australia*, fulfilling the first 3 criteria for inclusion in the national list of important wetlands. Namely: “1. It is a good example of a wetland type occurring within a biogeographic region in Australia. 2. It is a wetland which plays an important ecological role in the natural functioning of a major wetland system/ complex. 3. It is a wetland which is important as the habitat for animal taxa at a vulnerable stage in their life cycle, or provides a refuge where adverse conditions, such as drought, prevail.” With less than two percent of pre-European settlement wetlands remaining in the South East, the park management plan notes that Lake Frome Conservation Park is of particular importance in preserving what remains of the ‘natural’ landscape of coastal south-east South Australia. Lake Frome forms an important part of the drainage network controlled by the SE Water Conservation and Drainage Board.

Values/ Uses (Field visits and local reports)

NP is heavily used for recreational vehicles, sight-seeing and walking, camping, fishing and surfing. Aboriginal Heritage values throughout. High conservation values for the cell given the majority is protected within reserve.

Threats (Field visits and local reports)

Vehicle and foot damage to headland lookout points; vegetation and soil loss: usually terra rossa over calcrete layer within the Robe Range. Grasslands threatened by shrub incursion and inappropriate fire regime. Cullen & Bird, 1980, p.B1, report here that many dunes were destabilised by 19C grazing and burning: re-vegetation seen as contingent on rabbit and ORV control.

Opportunities

(From Slater and Farrington, 2010) Lake Frome is a wetland of national significance (Environment Australia, 2001) and contains five regionally rare vegetation associations (DENR, 2003). It is the highest scoring wetland for biological value and wetland attributes in the coastal study area. A large number of waterbirds have been recorded from the site, along with the

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nationally vulnerable Dwarf Galaxias. In conjunction with the nearby Mullins Swamp, Lake Frome has been considered as the most important wetland in the South East outside of Bool Lagoon (SEWC, 1984). However, the system does show signs of declining health, coupled with a trend toward habitat homogenisation via the spread of *Typha domingensis*. In response to these trends, hydrological restoration has been identified as a key objective in the Lake Frome CP Management Plan (DEH, 2003). Farrington (2009) investigated the wetland restoration feasibility in terms of depths and volumes of inundation, potential ecological impacts and flood management implications. A hydrological model has since been developed for the drainage catchments (Geoff Woods, DENR pers. comm. 2010) and monitoring infrastructure has been installed in order to more accurately assess drainage inflows and volume retention. Based on a ground-truthed digital elevation model, water could be retained to a depth of 1.5m AHD via an outlet regulator, without the need for levee banks. It would be possible to hold water up to 2.2m AHD without significant flooding back up any of the inflow drains, however large earthworks would be required for levee banks to protect surrounding, low-lying properties. Based on preliminary hydrological data, the volume of water required to fill the wetland basin up to a volume of 2.2m AHD has been delivered in eight out of the last ten years (Farrington, 2009) and so security of necessary inflows remains high despite an unprecedented period of low rainfall. Ongoing collection of groundwater and surface water data, including inflow volumes and salinity, form an extension of background investigations. In addition, the regular monitoring of vegetation is a priority site action for DENR. The greatest obstacle to hydrological restoration is opposition voiced by neighbouring property owners. A key recommendation for the restoration of Lake Frome is engagement of the local community and an evaluation of any concerns using data and information that has been and continues to be collected.

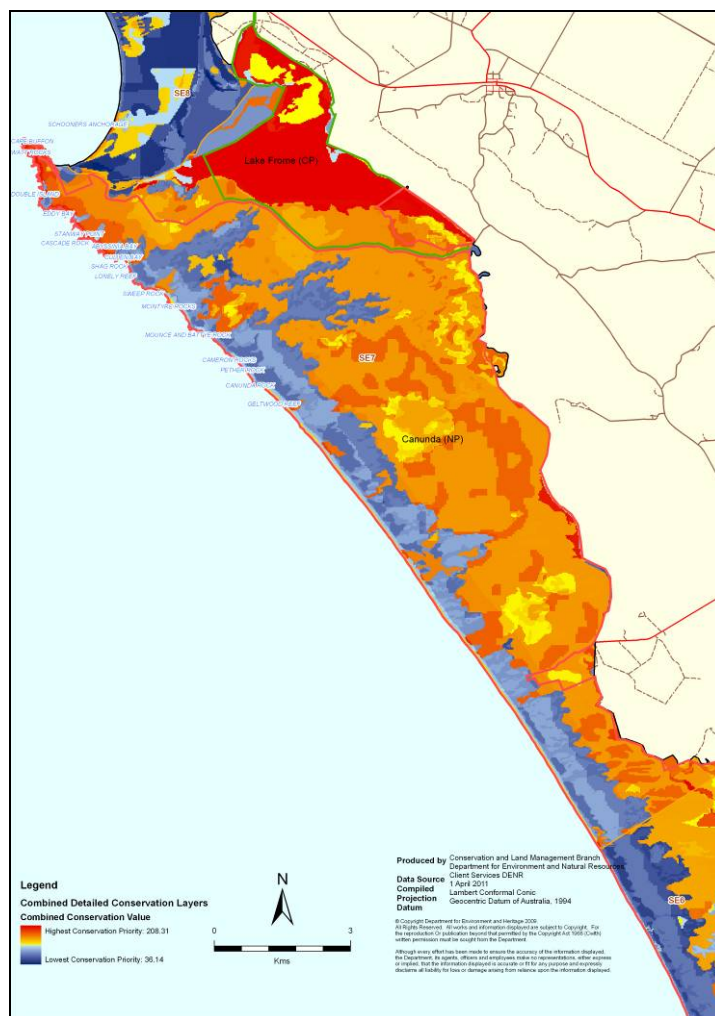
Conservation Analysis (GIS)

The summary of cell conservation means shows that this cell is the third highest conservation priority in the region (136.3). The bulk of the medium to medium high values are in the older inner vegetated dune areas (see conservation summary map below); the whole of Lake Frome Conservation Park exhibits very high values; a smaller area, from Cullen Bay to the Cape Buffon shows high totals within 150m of the vegetated cliff line. In contrast, the de-vegetated dunes on the slopes leading to the shoreline show low to medium low values.

Lake Frome CP records very high scores for threatened reptile habitat, butterfly habitat and habitat for 6 out of the 7 focal species – Orange Bellied Parrot, Fairy Tern, Swamp Antechinus (last viable population in SA; nb likes vegetation with a dense under storey, it is a late invader and hence is threatened by fire), Swamp Skink, Yellow Sedge Skipper and Southern Bell Frog.

The cell has high values for state rarity of vegetation communities; priority for the threatened status of flora is high throughout the vegetated dune areas; also the dunes accumulate the highest values for plant associations only found in this region within the state floristic survey. However, numbers of threatened species, and total numbers of species are not high, both in the wetland and the dunes. Significant habitat for butterfly species is recorded throughout the vegetated dunes and the Lake Frome swamp. Vegetation block metrics – size, shape and connectivity – all score highly. The entire foreshore, <100m from low water mark is designated a significant geological feature, “Glenelg River and Lower South East Coast”.

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Cell SE7 combined detailed conservation layer summary map.

Threat Analysis (GIS)

At 50.579 this cell shows an average total of mean threat values. Areas of high threat include the land between Southend and the northern park boundary, including Crown land, which has high threat scores for development zoning, land-use, existing development and land ownership; Cape Buffon has high scores for cliff instability, viewscape and viewshed, weeds and existing development; and an area of Crown Land Act Reserve in the southern part of the cell (Millicent Canunda waste refuse site), inset in the park boundary next to the Canunda Causeway road, has high scores for development zoning, land-use, waste treatment site and ORV impact.

Certain threats stand out more broadly: ORV threat scores are the highest in the region, as is the extent of unstable dunes, and this cell has a high threat rating for rabbits. [It appears likely that the area of unstable dunes may have been reduced in the last two decades: in 1990 the NP management plan stated that over 30% (estimate?) of the park was sand drift; today 19% is measured on aerial photography as unstable]. The distribution of significant weeds is moderate throughout, and the cell is entirely covered by SE Petroleum production and exploration licenses. Extensive quarrying has taken place near Lake Frome.

Adaptation to Climate Change: Threats for Cell SE7

(see also discussion of scenario in Section 4.11)

NOTE: the advice below is indicative of likely change and the direction of change, with implications for ecosystems. Dates, amounts and probabilities cannot be accurately calculated at

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this time. Thus advice on flood levels, for example, should not be used in engineering or development planning.

Climate change element/ scenario	Impacts and implications (for this cell)	Protect and manage habitat threats	Address landscape issues: fire, connectivity, refuges, hydrology
Combined climate changes and sea level rise throughout this cell	This cell presents a complex pattern of habitats sensitive to change.	Continue a rectified aerial photographic record at an appropriate resolution, in order to show change from current baseline.	
Sea level rise: 2030 : +c.20cm 2070: +c.80cm.	Increase in storm foredune damage and beach recession. The partially buried calcarenite topography could well lead to an indented coastline, of reefs and embayments.	Maintain an aerial photographic record of shoreline change.	
	Foredune damage leads to dune de-stabilisation, and transport of sand across the barrier.	Active management of dune blowouts.	
Storms: <i>Frequency</i> continues to show great variation on a decadal scale. <i>Intensity</i> of large storms increases.	2030: Occasional storm tide flooding above highest known tides. 2070: Flooding will affect all swamps and adjacent low lying areas.	Manage sill height on tidal inlet to adjust to higher marine storm elevations as part of the adaptive management of Lake Frome.	
	Frequent storm damage to foredunes.	Active management of dune blowouts.	
Warmer average conditions: 2030:+0.3 to .6°C 2070:+1.5 to 2°C	(Impacts uncertain. Existing terrestrial vegetation is found in warmer conditions elsewhere)		Maintain connectivity of vegetation within the region.
Drier average conditions: 2030: -2% to 5% 2070: - 10% to 20%	Dune vegetation adapts to drier conditions, but recovers more slowly from fire and storm damage: dune mobilization becomes more likely.	Active weed control within dunes.	
‘Flashy’ run off: Drier creeks, but larger rare floods	Drains and creeks may increase sediment load to coastal swamps and lakes (this depends on land management practices).	Maintain watching brief on sedimentation of Lake Frome.	
Groundwater lowering; saline incursion:	Aridity and sea level rise a threat to perched freshwater table within the dunes.	Monitor salinity in small freshwater lakes. Adaptive management of plant assets.	.
Nearshore sea	Persistent swell wave climate	Monitor shoreline	

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Climate change element/ scenario	Impacts and implications (for this cell)	Protect and manage habitat threats	Address landscape issues: fire, connectivity, refuges, hydrology
<p>changes - temperature; acidity; wave climate: 2030: +0.3°C to + 0.6°C</p> <p>2070: +1.0°C to + 1.50°C</p>	<p>maintains shoreline response to wave climate. (Changes in upwelling timing and frequency has been discussed, but not projected).</p>	<p>change, see above.</p>	



Erosion of clifftop dunes and dune transgression near McIntyre Rocks. Photograph Coast Protection Board 2008.

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Table 6.9. Recommended Actions and Priority for Cell SE7 – Canunda NP

Component	Issue	Proposed Action	Priority of Action	Key Players
Beaches and dunes	ORV activity remains high, with threats to vegetation, dune stability shorebird nesting and heritage sites. This activity is incompatible with the objects of Canunda NP.	Review access policy and trails; consider seasonal beach driving ban/ zoning to protect shorebirds.	High (Cons/ threat)	DENR; NRM
	High conservation value habitat for the endangered Orange-bellied Parrot focal species.	Protection of existing habitat and efforts to reduce disturbances.	High (Cons/ threat)	DENR; NRM
	Aggressive weeds recorded at isolated locations in the dunes along the length of the cell.	Eradication should be considered for those with limited distribution at present. Regular monitoring for alert weeds, listed in Section 4.9.	Medium (Cons/ threat)	DENR; NRM
Clifftops	Informal access is adding to cliff instability.	Access to be clearly defined with signage, markers and access control fencing.	Medium (cell)	DENR, NRM, Community Groups
Canunda NP within 500m of Southend, (includes Cape Buffon)	Proximity of the park to Southend places pressure on a part of the park with high total conservation values.	Undertake pest plant and weed control in this area.	High (Cons/ threat)	Council, NRM, Community, DENR
		Maintain vehicle and walking tracks that enter the park from the township and discourage inappropriate access.	High (Cons/ threat)	Council, NRM, Community, DENR
	Potential for increased weed invasion from the township.	Ongoing weed management and regular monitoring for alert weeds listed in Section 4.9. Education initiative targeting residences re: common garden species which become 'weeds' and alternatives for planting.	Medium (Cons/ Threat)	Council, NRM, Community, DENR

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Component	Issue	Proposed Action	Priority of Action	Key Players
Lake Frome CP	Analysis has identified this CP as the habitat of a number of focal species (including OBP, Swamp Antechinus, Swamp Skink, Southern Bell Frog and Yellowish Sedge Skipper) and with a high total conservation value. This conforms with earlier work on the value of the wetland within the region.	Interpretation campaign to build support for the protection of this habitat, through management of the hydrology of the wetland. In view of the value of this wetland re-examine the priority of levee construction to secure the values of the area.	High (Cons/ threat)	DENR, NRM
Pest animals	Rabbit populations are recorded as high for the entire cell, threatening efforts to stabilise dunes and revegetate denuded areas and competing with native fauna. Predation by fox and feral cats on native fauna.	Undertake rabbit, fox and cat control.	Medium (threat)	DENR, NRM
Whole Cell	Aboriginal Heritage sites recorded in this cell. Need for appropriate and sustainable management.	Consultation to appropriately manage sites in this area.	High (Cons)	Murrapeena Heritage Association Inc., SE Aboriginal Focus Group, NRM, Council, Aboriginal Heritage Branch – DPC, Aboriginal Partnership Unit – DENR
	This cell presents a complex pattern of habitats sensitive to change	Continue a rectified aerial photographic record at an appropriate resolution, in order to show change from current baseline.	High (Cons/ threat)	DENR, NRM
	Lack of recognition of significant geological feature (Bridgewater formation).	Interpretation. Council to include map of the feature in its development plan.	Medium (Cons)	Council, Geological Society SA, NRM

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BIOTA

Flora

Remnant vegetation area (ha)	5058.8 ha, 66.7% of cell area
# flora surveys / records	22 surveys, 6 opportune sites, 62 herbarium record sites, 1 threatened plant population record site.
# flora in cell	228
# conservation rated flora in cell	10 recorded (includes some marine species)
# non-indigenous flora in cell	58 recorded
Significant CDCS floristic community	<i>Juncus kraussii</i> sedgeland (>50% of known sites occur along SE coast; <20 records along SA coast). <i>Leucopogon parviflorus</i> / <i>Olearia axillaris</i> shrubland (>50% of known sites occur along SE coast).
Protected area	Canunda National Park, Lake Frome Conservation Park (7080.8ha in total).

Weeds

Species	Common Name	Status	Study rating
<i>Asparagus asparagoides</i> f. <i>Western Cape</i> (R.Taplin 1133)	Bridal Creeper	D	9
<i>Polygala myrtifolia</i>	Myrtle-leaf Milkwort		9
<i>Rhamnus alaternus</i>	Blowfly Bush		9
<i>Arctotheca populifolia</i>	Beach Daisy		8
<i>Thinopyrum junceiforme</i>	Sea Wheat-grass		8
<i>Coprosma repens</i>	New Zealand Mirror-bush		7
<i>Festuca arundinacea</i>	Tall Meadow Fescue		5
<i>Euphorbia paralias</i>	Sea Spurge		4
<i>Euphorbia terracina</i>	False Caper	D	4
<i>Senecio elegans</i>	Purple Groundsel		3
<i>Ammophila arenaria</i>	Marram Grass		2
<i>Acetosa sagittata</i>	Rambling Dock		
<i>Aira</i> sp.	Hair-grass		
<i>Alopecurus myosuroides</i>	Slender Fox-tail		
<i>Anagallis arvensis</i>	Pimpernel		
<i>Avellinia michelii</i>	Avellinia		
<i>Batrachium trichophyllum</i>	Water Buttercup		
<i>Cardale maritima</i> ssp. <i>maritima</i>	Two-horned Sea Rocket		
<i>Carduus tenuiflorus</i>	Slender Thistle		
<i>Catapodium rigidum</i>	Rigid Fescue		
<i>Cerastium balearicum</i>	Chickweed		
<i>Cerastium glomeratum</i>	Common Mouse-ear Chickweed		
<i>Cirsium</i> sp.	Thistle		
<i>Dactylis glomerata</i>	Cocksfoot		
<i>Ehrharta longiflora</i>	Annual Veldt Grass		
<i>Erodium cicutarium</i>	Cut-leaf Heron's-bill		
<i>Erophila verna</i> ssp. <i>praecox</i>	Early Whitlow Grass		
<i>Euphorbia pepylus</i>	Petty Spurge		
<i>Galium murale</i>	Small Bedstraw		
<i>Gomphocarpus fruticosus</i>	Narrow-leaf Cotton-bush		
<i>Holcus lanatus</i>	Yorkshire Fog		
<i>Hypochaeris</i> sp.	Cat's Ear		
<i>Isolepis marginata</i>	Little Club-rush		
<i>Juncus articulatus</i>	Jointed Rush		

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Species	Common Name	Status	Study rating
<i>Lagurus ovatus</i>	Hare's Tail Grass		
<i>Leontodon taraxacoides</i> ssp. <i>taraxacoides</i>	Lesser Hawkbit		
<i>Melilotus indicus</i>	King Island Melilot		
<i>Minuartia mediterranea</i>	Slender Sandwort		
<i>Parapholis incurva</i>	Curly Ryegrass		
<i>Phalaris aquatica</i>	Phalaris		
<i>Poa annua</i>	Winter Grass		
<i>Poa pratensis</i>	Kentucky Blue-grass		
<i>Polypogon maritimus</i>	Coast Beard-grass		
<i>Polypogon monspeliensis</i>	Annual Beard-grass		
<i>Rorippa nasturtium-aquaticum</i>	Watercress		
<i>Rostraria cristata</i>	Annual Cat's-tail		
<i>Sambucus gaudichaudiana</i>	White Elderberry		
<i>Sberardia arvensis</i>	Field Madder		
<i>Silybum marianum</i>	Variegated Thistle		
<i>Sonchus asper</i> ssp.	Rough Sow-thistle		
<i>Sonchus oleraceus</i>	Common Sow-thistle		
<i>Sonchus oleraceus</i> (NC)	Common Sow-thistle		
<i>Sorghum halepense</i>	Johnson Grass		
<i>Stellaria media</i>	Chickweed		
<i>Trifolium fragiferum</i> var. <i>fragiferum</i>	Strawberry Clover		
<i>Urtica urens</i>	Small Nettle		
<i>Vulpia myuros</i> f. <i>megalura</i>	Fox-tail Fescue		
<i>Vulpia myuros</i> f. <i>myuros</i>	Rat's-tail Fescue		

D: Declared weed, WONS: Weeds of National Significance

Native flora*

Species	Common Name	Aus status	SA status
<i>Caladenia richardsiorum</i>	Little Dip Spider-orchid	E	E
<i>Lachnagrostis scabra</i>	Ruddy Bent		V
<i>Scaevola calendulacea</i>	Dune Fanflower		V
<i>Veronica gracilis</i>	Slender Speedwell		V
<i>Cladium procerum</i>	Leafy Twig-rush		R
<i>Eucalyptus leucoxylon</i> ssp. <i>megalocarpa</i>	Large-fruit Blue Gum		R
<i>Gabnia clarkei</i>	Tall Saw-sedge		R
<i>Haloragis brownii</i>	Swamp Raspwort		R
<i>Melaleuca squarrosa</i>	Bottlebrush Tea-tree		R
<i>Spiranthes australis</i>	Austral Lady's Tresses		R
<i>Acacia longifolia</i> ssp. <i>sophorae</i>	Coastal Wattle		
<i>Acaena novae-zelandiae</i>	Biddy-biddy		
<i>Acianthus</i> sp.	Mosquito Orchid		
<i>Acrotriche affinis</i>	Ridged Ground-berry		
<i>Acrotriche cordata</i>	Blunt-leaf Ground-berry		
<i>Actites megalocarpa</i>	Coast Sow-thistle		
<i>Adriana klotzschii</i> (NC)	Coast Bitter-bush		
<i>Adriana quadripartita</i>	Coast Bitter-bush		
<i>Allocasuarina verticillata</i>	Drooping Sheoak		
<i>Alyxia buxifolia</i>	Sea Box		
<i>Aphanes australiana</i>	Australian Piert		
<i>Apium annuum</i>	Annual Celery		
<i>Apium prostratum</i> var. <i>filiforme</i>	Native Celery		
<i>Apium prostratum</i> var. <i>prostratum</i>	Native Celery		

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Species	Common Name	Aus status	SA status
<i>Apodasmia brownii</i>	Coarse Twine-rush		
<i>Asperula conferta</i>	Common Woodruff		
<i>Austrodanthonia racemosa</i> var. <i>racemosa</i>	Slender Wallaby-grass		
<i>Austrodanthonia setacea</i>	Small-flower Wallaby-grass		
<i>Austrofestuca littoralis</i>	Coast Fescue		
<i>Austrostipa flavescens</i>	Coast Spear-grass		
<i>Austrostipa scabra</i> ssp. <i>falcata</i>	Slender Spear-grass		
<i>Baumea arthropophylla</i>	Swamp Twig-rush		
<i>Baumea juncea</i>	Bare Twig-rush		
<i>Beyeria lechenaultii</i>	Pale Turpentine Bush		
<i>Billardiera cymosa</i> (NC)	Sweet Apple-berry		
<i>Caladenia latifolia</i>	Pink Caladenia		
<i>Calandrinia brevipedata</i>	Short-stalked Purslane		
<i>Carex appressa</i>	Tall Sedge		
<i>Carex gaudichaudiana</i>	Fen Sedge		
<i>Carpobrotus rossii</i>	Native Pigface		
<i>Carpobrotus rossii</i> (NC)	Native Pigface		
<i>Cassytha pubescens</i>	Downy Dodder-laurel		
<i>Cassytha</i> sp.	Dodder-laurel		
<i>Clematis microphylla</i> var. <i>microphylla</i>	Old Man's Beard		
<i>Comesperma volubile</i>	Love Creeper		
<i>Correa reflexa</i> (NC)	Common Correa		
<i>Correa reflexa</i> var. <i>reflexa</i> (NC)	Common Correa		
<i>Crassula colorata</i> var.	Dense Crassula		
<i>Crassula decumbens</i> var. <i>decumbens</i>	Spreading Crassula		
<i>Crassula sieberiana</i> ssp. <i>tetramera</i> (NC)	Australian Stonecrop		
<i>Cyperaceae</i> sp.	Sedge Family		
<i>Cyrtostylis reniformis</i>	Small Gnat-orchid		
<i>Cyrtostylis robusta</i>	Robust Gnat-orchid		
<i>Daucus glochidiatus</i>	Native Carrot		
<i>Dianella brevicaulis</i>	Short-stem Flax-lily		
<i>Dianella revoluta</i> var. <i>revoluta</i>	Black-anther Flax-lily		
<i>Dichondra repens</i>	Kidney Weed		
<i>Dodonaea viscosa</i> ssp. <i>spatulata</i>	Sticky Hop-bush		
<i>Eleocharis acuta</i>	Common Spike-rush		
<i>Epilobium billardierianum</i> ssp. <i>billardierianum</i>	Robust Willow-herb		
<i>Epilobium billardierianum</i> ssp. <i>X intermedium</i>	Variable Willow-herb		
<i>Eucalyptus ovata</i> (NC)	Swamp Gum		
<i>Eucalyptus ovata</i> var. <i>ovata</i>	Swamp Gum		
<i>Eucalyptus viminalis</i> ssp. <i>cygnetensis</i>	Rough-bark Manna Gum		
<i>Exocarpos syrticola</i>	Coast Cherry		
<i>Ficinia nodosa</i>	Knobby Club-rush		
<i>Gabnia trifida</i>	Cutting Grass		
<i>Galium compactum</i>	Compact Bedstraw		
<i>Galium</i> sp.	Bedstraw		
<i>Geranium potentilloides</i> var. <i>potentilloides</i>	Downy Geranium		
<i>Geranium retrorsum</i>	Grassland Geranium		
<i>Geranium</i> sp.	Geranium		
<i>Gnaphalium indutum</i> ssp. <i>indutum</i>	Tiny Cudweed		
<i>Gramineae</i> sp.	Grass Family		
<i>Halymenia plana</i>			
<i>Helichrysum leucopsidium</i>	Satin Everlasting		
<i>Helichrysum</i> sp. (NC)			

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Species	Common Name	Aus status	SA status
<i>Hemarthria uncinata</i> var. <i>uncinata</i>	Mat Grass		
<i>Herb</i> sp.			
<i>Hibbertia fasciculata</i>	Bundled Guinea-flower		
<i>Hibbertia pallidiflora</i>	Round-leaf Guinea-flower		
<i>Hibbertia sericea</i>	Silky Guinea-flower		
<i>Hydrocotyle capillaris</i>	Thread Pennywort		
<i>Hydrocotyle laxiflora</i>	Stinking Pennywort		
<i>Hydrocotyle</i> sp.	Pennywort		
<i>Isolepis cernua</i>	Nodding Club-rush		
<i>Isolepis fluitans</i>	Floating Club-rush		
<i>Juncus caespiticinus</i>	Grassy Rush		
<i>Juncus kraussii</i>	Sea Rush		
<i>Juncus pauciflorus</i>	Loose-flower Rush		
<i>Kennedia prostrata</i>	Scarlet Runner		
<i>Kunzea pomifera</i>	Muntries		
<i>Lachnagrostis filiformis</i>	Common Blown-grass		
<i>Lasiopetalum schulzenii</i>	Drooping Velvet-bush		
<i>Lepidosperma gladiatum</i>	Coast Sword-sedge		
<i>Leptospermum continentale</i>	Prickly Tea-tree		
<i>Leptospermum lanigerum</i>	Silky Tea-tree		
<i>Leucopogon lanceolatus</i> var. <i>lanceolatus</i>	Lance Beard-heath		
<i>Leucopogon parviflorus</i>	Coast Beard-heath		
<i>Leucopogon</i> sp.	Beard-heath		
<i>Lichen</i> sp.			
<i>Lomandra longifolia</i>	Spiny-headed Mat-rush		
<i>Lotus australis</i>	Austral Trefoil		
<i>Malva preissiana</i>	Australian Hollyhock		
<i>Melaleuca gibbosa</i>	Slender Honey-myrtle		
<i>Melaleuca lanceolata</i> ssp. <i>lanceolata</i> (NC)	Dryland Tea-tree		
<i>Microtis unifolia</i> complex	Onion-orchid		
<i>Mimulus repens</i>	Creeping Monkey-flower		
<i>Mitrasacme paradoxa</i> (NC)	Wiry Mitrewort		
<i>Moss</i> sp.			
<i>Muehlenbeckia adpressa</i>	Climbing Lignum		
<i>Myoporum insulare</i>	Common Boobialla		
<i>Myosotis australis</i>	Austral Forget-me-not		
<i>Olearia axillaris</i>	Coast Daisy-bush		
<i>Olearia ramulosa</i>	Twiggy Daisy-bush		
<i>Oxalis perennans</i>	Native Sorrel		
<i>Oxalis perennans</i> (NC)	Native Sorrel		
<i>Ozothamnus ferrugineus</i>	Tree Everlasting		
<i>Ozothamnus turbinatus</i>	Coast Bush-everlasting		
<i>Parietaria debilis</i> (NC)	Smooth-nettle		
<i>Pelargonium australe</i>	Austral Stork's-bill		
<i>Pimelea glauca</i>	Smooth Riceflower		
<i>Pimelea serpyllifolia</i> ssp. <i>serpyllifolia</i>	Thyme Riceflower		
<i>Plantago hispida</i>	Hairy Plantain		
<i>Plantago</i> sp.	Plantain		
<i>Poa clelandii</i>	Matted Tussock-grass		
<i>Poa poiiformis</i> var. <i>poiiformis</i>	Coast Tussock-grass		
<i>Poa</i> sp.	Meadow-grass/Tussock-grass		
<i>Poa tenera</i>	Slender Tussock-grass		
<i>Pomaderris balmaturina</i> ssp.	Glenelg Pomaderris		

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Species	Common Name	Aus status	SA status
<i>Pomaderris oraria</i> (NC)	Coast Pomaderris		
<i>Pomaderris paniculosa</i> ssp. <i>paniculosa</i>	Mallee Pomaderris		
<i>Pomaderris paniculosa</i> ssp. <i>paralia</i>	Coast Pomaderris		
<i>Poranthera microphylla</i> (NC)	Small Poranthera		
<i>Pteridium esculentum</i>	Bracken Fern		
<i>Pultenaea acerosa</i>	Bristly Bush-pea		
<i>Pultenaea stricta</i>	Erect Bush-pea		
<i>Pultenaea tenuifolia</i>	Narrow-leaf Bush-pea		
<i>Ranunculus amphitrichus</i>	Small River Buttercup		
<i>Rhagodia candolleana</i> ssp.	Sea-berry Saltbush		
<i>Rhagodia candolleana</i> ssp. <i>candolleana</i>	Sea-berry Saltbush		
<i>Sagina maritima</i>	Sea Pearlwort		
<i>Samolus repens</i>	Creeping Brookweed		
<i>Sarcocornia blackiana</i>	Thick-head Samphire		
<i>Scaevola albida</i>	Pale Fanflower		
<i>Scaevola albida</i> var. <i>pallida</i>	Coast Fanflower		
<i>Scaevola crassifolia</i>	Cushion Fanflower		
<i>Schenkia australis</i>	Spike Centaury		
<i>Schoenus apogon</i>	Common Bog-rush		
<i>Schoenus nitens</i>	Shiny Bog-rush		
<i>Sebaea ovata</i>	Yellow Sebaea		
<i>Senecio biserratus</i>	Jagged Groundsel		
<i>Senecio minimus</i>	Fine-tooth Groundsel		
<i>Senecio odoratus</i>	Scented Groundsel		
<i>Senecio odoratus</i> var. <i>odoratus</i> (NC)	Scented Groundsel		
<i>Senecio pinnatifolius</i> (NC)	Variable Groundsel		
<i>Senecio pinnatifolius</i> var. <i>maritimus</i>	Variable Groundsel		
<i>Senecio</i> sp.	Groundsel		
<i>Solanum laciniatum</i>	Cut-leaf Kangaroo-apple		
<i>Sonchus hydrophilus</i>	Native Sow-thistle		
<i>Spinifex sericeus</i> (NC)	Rolling Spinifex		
<i>Stackhousia spathulata</i>	Coast Candles		
<i>Swainsona lessertiifolia</i>	Coast Swainson-pea		
<i>Tetragonia implexicoma</i>	Bower Spinach		
<i>Triglochin centrocarpum</i> (NC)	Dwarf Arrowgrass		
<i>Urtica incisa</i>	Scrub Nettle		
<i>Villarsia reniformis</i>	Running Marsh-flower		
<i>Villarsia umbriicola</i> var.	Lax Marsh-flower		
<i>Zygophyllum billardierei</i>	Coast Twinleaf		

E: Endangered, V: Vulnerable, R: Rare

*note: includes some marine species

Fauna

# of fauna in cell	225 recorded – 155 birds, 31 butterflies, 19 mammals, 20 reptiles, 7 amphibians (an additional 7 butterflies identified by experts as possibly occurring)
# of fauna surveys / records	10 surveys, 96 opportune sites
# of threatened fauna in cell	37 recorded
# of non-indigenous fauna	15 recorded

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Non-indigenous fauna

Species	Common Name	Class	Record
<i>Alauda arvensis</i>	Eurasian Skylark	Aves	x
<i>Carduelis carduelis</i>	European Goldfinch	Aves	x
<i>Chloris chloris</i>	Common Greenfinch (European Greenfinch)	Aves	x
<i>Columba livia</i>	Rock Dove (Feral Pigeon)	Aves	x
<i>Passer domesticus</i>	House Sparrow	Aves	x
<i>Streptopelia chinensis</i>	Spotted Dove (Spotted turtle-dove)	Aves	x
<i>Sturnus vulgaris</i>	Common Starling	Aves	x
<i>Turdus merula</i>	Common Blackbird	Aves	x
<i>Pieris rapae rapae</i>	Cabbage White	Invertebrate	x
<i>Danaus plexippus plexippus</i>	Wanderer, Monarch	Invertebrate	x
<i>Felis catus</i>	Cat (Feral Cat)	Mammalia	x
<i>Mus musculus</i>	House Mouse	Mammalia	x
<i>Oryctolagus cuniculus</i>	Rabbit (European Rabbit)	Mammalia	x
<i>Rattus rattus</i>	Black Rat (Ship Rat, Roof Rat)	Mammalia	x
<i>Vulpes vulpes</i>	Fox (Red Fox)	Mammalia	x

x: recorded

Birds

Species	Common Name	Aus status	SA status
<i>Neophema chrysogaster</i>	Orange-bellied Parrot	CR/M	E
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	M	E
<i>Sternula albifrons</i>	Little Tern		E
<i>Sternula nereis</i>	Fairy Tern		E
<i>Botaurus poiciloptilus</i>	Australasian Bittern		V
<i>Calyptorhynchus funereus</i>	Yellow-tailed Black-Cockatoo		V
<i>Cladorhynchus leucocephalus</i>	Banded Stilt		V
<i>Lewinia pectoralis</i>	Lewin's Rail		V
<i>Neophema chrysostoma</i>	Blue-winged Parrot		V
<i>Thinornis rubricollis</i>	Hooded Plover		V
<i>Anbinga novaehollandiae</i>	Australasian Darter		R
<i>Ardea ibis</i>	Cattle Egret		R
<i>Arenaria interpres</i>	Ruddy Turnstone	M	R
<i>Biziura lobata</i>	Musk Duck		R
<i>Calidris alba</i>	Sanderling	M	R
<i>Egretta garzetta</i>	Little Egret		R
<i>Falco peregrinus</i>	Peregrine Falcon		R
<i>Gallinago hardwickii</i>	Latham's Snipe (Japanese Snipe)	M	R
<i>Haematopus fuliginosus</i>	Sooty Oystercatcher		R
<i>Haematopus longirostris</i>	Australian Pied Oystercatcher		R
<i>Myiagra inquieta</i>	Restless Flycatcher		R
<i>Neophema elegans</i>	Elegant Parrot		R
<i>Numenius phaeopus</i>	Whimbrel	M	R
<i>Plegadis falcinellus</i>	Glossy Ibis	M	R
<i>Podiceps cristatus</i>	Great Crested Grebe		R
<i>Porzana tabuensis</i>	Spotless Crake		R
<i>Stagonopleura bella</i>	Beautiful Firetail		R
<i>Zoothera lunulata</i>	Bassian Thrush (White's Thrush)		R
<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater		
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill		
<i>Acanthiza lineata</i>	Striated Thornbill		

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Species	Common Name	Aus status	SA status
<i>Acanthiza pusilla</i>	Brown Thornbill		
<i>Acanthorhynchus tenuirostris</i>	Eastern Spinebill		
<i>Acrocephalus australis</i>	Australian Reed Warbler (Clamorous Reed-Warbler)		
<i>Anas castanea</i>	Chestnut Teal		
<i>Anas gracilis</i>	Grey Teal		
<i>Anas superciliosa</i>	Pacific Black Duck		
<i>Anthochaera carunculata</i>	Red Wattlebird		
<i>Anthochaera chrysoptera</i>	Little Wattlebird		
<i>Anthus novaeseelandiae</i>	Australasian Pipit (Richard's Pipit)		
<i>Apus pacificus</i>	Fork-tailed Swift		
<i>Aquila audax</i>	Wedge-tailed Eagle		
<i>Ardea alba</i>	Great Egret		
<i>Ardea modesta</i>	Eastern Great Egret		
<i>Ardea pacifica</i>	White-necked Heron (Pacific Heron)		
<i>Ardenna tenuirostris</i>	Short-tailed Shearwater (Mutton Bird)		
<i>Artamus cyanopterus</i>	Dusky Woodswallow		
<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo		
<i>Calamanthus fuliginosus</i>	Striated Fieldwren		
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	M	
<i>Calidris ferruginea</i>	Curlew Sandpiper	M	
<i>Calidris ruficollis</i>	Red-necked Stint	M	
<i>Chalcites basalis</i>	Horsfield's Bronze-cuckoo		
<i>Chalcites lucidus</i>	Shining Bronze-Cuckoo		
<i>Charadrius bicinctus</i>	Double-banded Plover		
<i>Charadrius ruficapillus</i>	Red-capped Plover (Red-capped Dotterel)		
<i>Chlidonias hybrida</i>	Whiskered Tern	M	
<i>Chroicocephalus novaehollandiae</i>	Silver Gull		
<i>Circus approximans</i>	Swamp Harrier (Marsh Harrier)		
<i>Cisticola exilis</i>	Golden-headed Cisticola		
<i>Colluricincla harmonica</i>	Grey Shrike-thrush		
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike		
<i>Corvus coronoides</i>	Australian Raven		
<i>Corvus mellori</i>	Little Raven		
<i>Coturnix pectoralis</i>	Stubble Quail		
<i>Cracticus tibicen</i>	Australian Magpie		
<i>Cracticus torquatus</i>	Grey Butcherbird		
<i>Cygnus atratus</i>	Black Swan		
<i>Daption capense</i>	Cape Petrel		
<i>Dasyornis broadbenti</i>	Rufous Bristlebird		ssp
<i>Dromaius novaehollandiae</i>	Emu		
<i>Egretta novaehollandiae</i>	White-faced Heron		
<i>Elanus axillaris</i>	Black-shouldered Kite		
<i>Elsyornis melanops</i>	Black-fronted Dotterel (Black-fronted Plover)		
<i>Eolophus roseicapillus</i>	Galah		
<i>Eopsaltria australis</i>	Eastern Yellow Robin		
<i>Epthianura albifrons</i>	White-fronted Chat		
<i>Epthianura tricolor</i>	Crimson Chat		
<i>Erythrogonys cinctus</i>	Red-kneed Dotterel		
<i>Eudyptula minor</i>	Little Penguin (Fairy Penguin)		
<i>Falco berigora</i>	Brown Falcon		
<i>Falco cenchroides</i>	Nankeen Kestrel (Australian Kestrel)		
<i>Falco longipennis</i>	Australian Hobby		
<i>Fulica atra</i>	Eurasian Coot		

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Species	Common Name	Aus status	SA status
<i>Fulmarus glacialisoides</i>	Southern Fulmar		
<i>Gallinula tenebrosa</i>	Dusky Moorhen		
<i>Geopelia striata</i>	Peaceful Dove		
<i>Glossopsitta porphyrocephala</i>	Purple-crowned Lorikeet		
<i>Grallina cyanoleuca</i>	Magpie-lark		
<i>Haliastur sphenurus</i>	Whistling Kite		
<i>Himantopus himantopus</i>	Black-winged Stilt		
<i>Hirundapus caudacutus</i>	White-throated Needletail	M	
<i>Hirundo neoxena</i>	Welcome Swallow		
<i>Hydroprogne caspia</i>	Caspian Tern		
<i>Larus pacificus</i>	Pacific Gull		
<i>Lichenostomus chrysops</i>	Yellow-faced Honeyeater		
<i>Lichenostomus virescens</i>	Singing Honeyeater		
<i>Malurus cyaneus</i>	Superb Fairy-wren		
<i>Megalurus gramineus</i>	Little Grassbird		
<i>Microcarbo melanoleucos</i>	Little Pied Cormorant		
<i>Microeca fascinans</i>	Jacky Winter		ssp
<i>Morus serrator</i>	Australasian Gannet		
<i>Neochmia temporalis</i>	Red-browed Finch		
<i>Ninox novaeseelandiae</i>	Southern Boobook		
<i>Nycticorax caledonicus</i>	Nankeen Night Heron		
<i>Ocyphaps lophotes</i>	Crested Pigeon		
<i>Pachycephala olivacea</i>	Olive Whistler		ssp
<i>Pachycephala pectoralis</i>	Golden Whistler		
<i>Pachycephala rufiventris</i>	Rufous Whistler		
<i>Pardalotus punctatus</i>	Spotted Pardalote		
<i>Pelecanus conspicillatus</i>	Australian Pelican		
<i>Petrochelidon nigricans</i>	Tree Martin		
<i>Petroica boodang</i>	Scarlet Robin		ssp
<i>Phalacrocorax carbo</i>	Great Cormorant		
<i>Phalacrocorax fuscescens</i>	Black-faced Cormorant (Black-faced Shag)		
<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant		
<i>Phalacrocorax varius</i>	Pied Cormorant		
<i>Phaps chalcoptera</i>	Common Bronzewing		
<i>Phaps elegans</i>	Brush Bronzewing		
<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater		
<i>Platalea flavipes</i>	Yellow-billed Spoonbill		
<i>Platalea regia</i>	Royal Spoonbill		
<i>Platycercus elegans</i>	Crimson Rosella		
<i>Platycercus eximius</i>	Eastern Rosella		
<i>Pluvialis squatarola</i>	Grey Plover	M	
<i>Podargus strigoides</i>	Tawny Frogmouth		
<i>Poliiocephalus poliocephalus</i>	Hoary-headed Grebe		
<i>Pomatostomus superciliosus</i>	White-browed Babbler		
<i>Porphyrio porphyrio</i>	Purple Swamphen (Purple Moorhen)		
<i>Porzana fluminea</i>	Australian Spotted Crake (Australian Crake)		
<i>Psephotus haematonotus</i>	Red-rumped Parrot		
<i>Recurvirostra novaehollandiae</i>	Red-necked Avocet		
<i>Rhipidura albiscapa</i>	Grey Fantail		
<i>Rhipidura leucophrys</i>	Willie Wagtail		
<i>Sericornis frontalis</i>	White-browed Scrubwren		
<i>Sterna striata</i>	White-fronted Tern		
<i>Stipiturus malachurus</i>	Southern Emu-wren	ssp	ssp

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Species	Common Name	Aus status	SA status
<i>Strepera versicolor</i>	Grey Currawong		ssp
<i>Tachybaptus novaehollandiae</i>	Australasian Grebe, (Little Grebe)		
<i>Tadorna tadornoides</i>	Australian Shelduck (Mountain Duck)		
<i>Thalasseus bergii</i>	Crested Tern		
<i>Threskiornis molucca</i>	Australian White Ibis (Sacred Ibis)		
<i>Threskiornis spinicollis</i>	Straw-necked Ibis		
<i>Tribonyx ventralis</i>	Black-tailed Native-hen		
<i>Trichoglossus haematodus</i>	Rainbow Lorikeet		
<i>Vanellus miles</i>	Masked Lapwing		
<i>Zosterops lateralis</i>	Silvereye		

CR: Critically endangered, E: Endangered, V: Vulnerable, R: Rare, M: Migratory

Butterflies

Species	Common Name	Status*	Record
<i>Hesperilla donnysa donnysa (pale form flavescens)</i>	Yellowish Sedge-Skipper	E	x
<i>Heteronympha cordace wilsoni</i>	Bright-eyed Brown	E	p
<i>Hesperilla cyrhisoticha cyclopsila</i>	Chrysotricha Sedge-skipper or Golden-haired Sedge-skipper	V	x
<i>Oreixenica kershawi kanunda</i>	Striped Xenica	V	x
<i>Trapezites symmomus soma</i>	Symmomus Rush-skipper or Splendid Ochre	V	p
<i>Erina hyacinthina form josephina</i>	Common Dusky-blue	R	x
<i>Erina hyacinthina hyacinthina</i>	Dusky blue	R	x
<i>Taractrocera papyria papyria</i>	White-banded Grass-dart	R	x
<i>Tisiphone abeona albifascia</i>	Sword-grass brown	R	x
<i>Belenois java teutonia</i>	Caper White	Va	x
<i>Danans chrysippus petilia</i>	Lesser Wanderer	Va	x
<i>Erina acasta</i>	Blotched Dusky-blue		p
<i>Geitoneura klugii klugii</i>	Common Xenica	C	x
<i>Hesperilla donnysa</i>	Variable Sedge-skipper		x
<i>Hesperilla donnysa delos (incl. form diluta)</i>	Donnysa skipper		x
<i>Hesperilla idothea idothea</i>			x
<i>Heteronympha merope merope</i>	Common Brown	C	x
<i>Heteronympha penelope</i>	Shouldered Brown		x
<i>Junonia villida calybe</i>	Meadow argus	Va	x
<i>Lampides boeticus</i>	Long-tailed Pea-blue		x
<i>Nacuduba biocellata biocellata</i>	Two-spotted Line-blue	LC	p
<i>Neolucia agricola agricola</i>	Fringed Heath-blue		p
<i>Ocybadistes walkeri hypochlorus</i>	Southern Grass-dart		p
<i>Papilio demoleus sthenelus</i>	Chequered Swallowtail		p
<i>Theclinesibes albocincta</i>	Bitter-bush blue	LC	x
<i>Theclinesibes serpentata serpentata</i>	Salt-bush blue		x
<i>Vanessa itea</i>	Australian Admiral	Va	x
<i>Vanessa kershawi</i>	Australian Painted Lady	Va	x
<i>Zizina labradus labradus</i>	Common Grass Blue		x

*Vulnerability as per R. Grund, E: Endangered, V: Vulnerable, R: Rare

Va: Vagrant, LC: Locally common, C: Common

x: recorded, p: possibly there as suggested by R. Grund

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Mammals

Species	Common Name	Aus status	SA status	Record
<i>Antechinus minimus</i>	Swamp Antechinus		E	x
<i>Wallabia bicolor</i>	Swamp Wallaby		V	x
<i>Macropus rufogriseus</i>	Red-necked Wallaby		R	x
<i>Rattus lutreolus</i>	Swamp Rat		R	x
<i>Vombatus ursinus</i>	Common Wombat		R	x
<i>Chalinolobus morio</i>	Chocolate Wattled Bat			x
<i>Hydromys chrysogaster</i>	Water-rat			x
<i>Macropus fuliginosus</i>	Western Grey Kangaroo			x
<i>Nyctophilus geoffroyi</i>	Lesser Long-eared Bat			x
<i>Pseudocheirus peregrinus</i>	Common Ringtail Possum			x
<i>Rattus fuscipes</i>	Bush Rat			x
<i>Tachyglossus aculeatus</i>	Short-beaked Echidna			x
<i>Vespadelus regulus</i>	Southern Forest Bat			x
<i>Vespadelus vulturnus</i>	Little Forest Bat			x

E: Endangered, V: Vulnerable, R: Rare

Reptiles

Species	Common Name	Aus status	SA status	Record
<i>Lissolepis coventryi</i>	Swamp Skink		E	x
<i>Nannoscincus maccoyi</i>	Salamander skink		E	x
<i>Pseudemoia rawlinsoni</i>	Glossy Grass Skink		V	x
<i>Drysdalia coronoides</i>	White-lipped Snake		R	x
<i>Aprasia striolata</i>	Lined Worm-lizard			x
<i>Austrelaps superbus</i>	Lowland Copperhead			x
<i>Bassiana duperreyi</i>	Eastern Three-lined Skink			x
<i>Chelodina longicollis</i>	Common Long-necked Tortoise			x
<i>Christinus marmoratus</i>	Marbled Gecko			x
<i>Hemiernis peronii</i>	Four-toed Earless Skink			x
<i>Lerista bougainvillii</i>	Bougainville's Skink			x
<i>Liopholis whitii</i>	White's Skink			x
<i>Menetia greyii</i>	Dwarf Skink			x
<i>Notechis scutatus</i>	Eastern Tiger Snake	ssp		x
<i>Pogona barbata</i>	Eastern Bearded Dragon			x
<i>Pseudemoia entrecasteauxii</i>	Southern Grass Skink			x
<i>Pseudonaja textilis</i>	Eastern Brown Snake			x
<i>Tiliqua nigrolutea</i>	Blotched Bluetongue			x
<i>Tiliqua rugosa</i>	Sleepy Lizard			x
<i>Tiliqua scincoides</i>	Eastern Bluetongue			x

E: Endangered, V: Vulnerable, R: Rare

x: recorded

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Amphibians

Species	Common Name	Aus status	SA status	Record
<i>Geocrinia laevis</i>	Smooth Frog		R	x
<i>Crinia signifera</i>	Common Froglet			x
<i>Limnodynastes dumerilii</i>	Banjo Frog			x
<i>Limnodynastes peronii</i>	Striped Marsh Frog			x
<i>Limnodynastes tasmaniensis</i>	Spotted Marsh Frog			x
<i>Litoria ewingii</i>	Brown Tree Frog			x
<i>Neobatrachus pictus</i>	Burrowing Frog			x

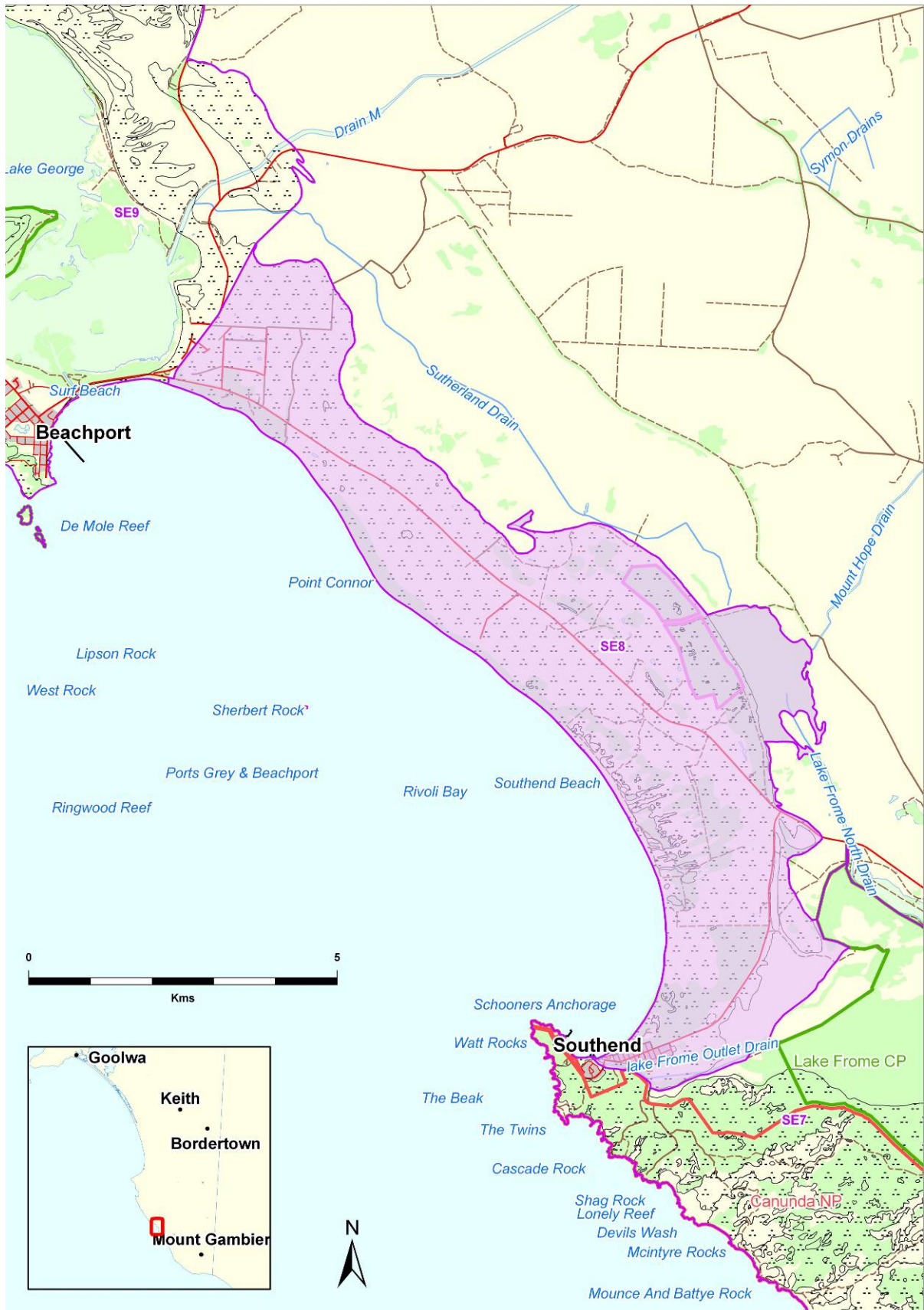
E: Endangered, V: Vulnerable, R: Rare

x: recorded

SE8 – Rivoli Bay

6.3.8 Cell SE8 Rivoli Bay

Shoreline 15.1 km. Area 3954.8 ha.



SE8 – Rivoli Bay

Landforms

The landforms of this cell consist entirely of a low nearly flat coastal plain, covered with low sub-parallel sand dune ridges (88% of this cell is coastal dune). The shoreline of this cell is composed of fine to medium sand beaches. The bay occupies the inter-barrier depression between the Robe and the Woakwine Ranges. It was formed during the Holocene breaching of the Robe Range, followed by the construction of over 80 beach ridges in front of the Woakwine Range, in a rapid progradation between 7,000 and 3,000 BP. Wave energy at the shore is reduced by the Robe Range reefs and the shallow conditions of the embayment to moderate to low energy conditions. The detail of wave refraction at reefs has led to 3 cusped forelands (1 large, Point Connor, and 2 small) within the bay.

The multiple beach ridges backing the bay record a continuous period of deposition; the modern foredune is a stable feature, except at ends of the bay. Extensive blow out development has occurred in one section of the dunes in the south of the bay, resulting from a period of overgrazing in the 1920's (Zimmerman in Short & Hesp, 1984, p.87). Calcarene surfaces are seen here in deflated depressions behind the foredune. Extensive planting with marram in the 1930's and subsequent planting of shrubs has largely stabilised these blown out dunes.

For the majority of the bay the shoreline is aligned with the crest pattern of the refracted swell; however, at the northern and southern ends littoral drift towards the middle of the bay occurs, with significant erosion at Southend and Beachport.

At Southend, drain construction has had an impact on shoreline change: here breakwater construction at the mouth of the Lake Frome drain blocks the littoral sand movement drifting into the bay, requiring periodic by-passing. It is also likely (not quantified) that peak flows in the Lake Frome outlet drain have moved small amounts of sediment from the shore into the Bay, beyond the wave-powered littoral transport system. [At the other end of the bay, (cell SE9) large amounts of sand have been removed from the littoral system by the construction of the inlet to Lake George, where c. 500,000m³ of sand have been transported into the lake by storm tides].

The coastal boundary also includes part of the sand dune barrier trapped sub-coastal wetland at Mullins Swamp, now joined to Lake Frome.



Beach ridges, Rivoli Bay. Mullins Swamp, rear right. Photograph Coast Protection Board 2008.

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Biota

There are 7 flora survey sites, 2 opportune flora sites, 22 Herbarium record sites, 1 fauna survey sites, and 31 opportune fauna survey sites. There 1017 ha. of remnant vegetation – 25.7% of the cell.

Sand dunes make up 88% of the cell, approximately ¼ of these are vegetated with open coastal shrubland: *Leucopogon parviflorus*, *Acacia longifolia* ssp. *sophorae*, *Olearia axillaris*, +/-*Myoporum insulare* tall shrubland over *Lepidosperma gladiatum*, *Pimelea serpyllifolia* ssp. *serpyllifolia*, *Isolepis nodosa* sedges over *Carpobrotus rossii*, *Clematis microphylla* var. *microphylla*. Small corridors of sedgeland are found in the inter-dunal troughs. Mullins Swamp is *Gabnia filum* sedgeland, with *Juncus kraussii* and *Melaleuca halmaturorum*.

95 fauna species have been recorded in the cell including 73 birds, 4 butterflies, 19 mammals, 20 reptiles and 4 amphibians. Listed species include the EPBC listed critically endangered Orange-bellied Parrot(*Neophema chrysogaster*) .

Benthic Habitat

Bare sand to 200m - 1200m. offshore, then low profile reef and heavy limestone reef. Scattered seagrass remnants throughout the bay.

Land Use/ Land Ownership

18% of the vegetated cell area is Crown Land Act Reserve (Mullins Swamp) (a total of 7% of the total cell area is Crown Land Act Reserve). Heritage Agreements 197001 and 197002 (dune shrubland adjacent Mullins Swamp) cover 15% of the cells vegetated area. Scattered unallotted Crown land parcels north of Southend and a narrow Crown land coastal reserve along the shoreline of Rivoli Bay comprise 6% of the total cell area. These scattered unallotted Crown land parcels are interspersed amongst a patchwork of privately owned allotments covering the dunes north of Southend. The majority of the unvegetated land in the cell is farmed or grazed.

Mullins Swamp, (with nearby Lake Frome) was included on the Register of the National Estate in 1993 because of its outstanding wetland conservation values.

Values/ Uses (Field visits and local reports)

Much of the dune ridge land has been cleared and grazed. 20th Century grazing damage initiated extensive blow out development in the southern half of the cell (stabilised by marram – Cullen & Bird 1982). Aboriginal Heritage values throughout.

Threats (Field visits and local reports)

ORV use on the beach threatens shorebird activity. In addition, wrack harvesting from within the bay impacts on shorebirds and the beach and nearshore ecosystems. Drain discharge into Rivoli Bay has likely led to the loss of extensive seagrass meadows that were recorded in historic records in proximity to Southend.

Opportunities

Mullins Swamp is an artificially permanent freshwater swamp in the South East and is described as an invaluable waterbird refuge with high bird habitat diversity (SEWCDB, 1984 in Slater and Farrington 2010). The site is scored in the mid-high range for biological value and wetland attributes. It has historically been considered as a single wetland unit incorporating Lake Frome (SEWC, 1984, Environment Australia, 2001) however, current management recognises Lake Frome and Mullins Swamp as discrete units. This is due to them having a different topography, hydrology and grazing regime as well as different tenure. In addition to the less common Crakes and Rails which frequent the swamp, the area is an important breeding site for Straw-necked Ibis. It also contains important emergent wetland habitat including fringing Cutting Grass sedgeland

SE8 – Rivoli Bay

and Silky Tea-tree shrubland (Bachmann, 2002). The hydrology of the area that contains Mullins Swamp has been highly modified through drainage works. A stop bank was created along the northern section of the swamp and this halted northerly flows, forming the sill of what now is Mullins Swamp, and redirecting flows southward toward Lake Frome via the Lake Frome North Drain. The Reedy Creek-Mount Hope Drain discharges into Mullins Swamp through the Mount Hope Cutting and is the primary source of water for the site. Mullins swamp and the inflow and outflow drain fall under the jurisdiction of the SEWCDB, however the swamp is leased and managed as a wildlife sanctuary. Hydrological management of the site is considered adequate for maintaining the biodiversity for which the site is recognised. However, water level changes over the past decade should be collated and investigated for trends of decline in association with declining groundwater in the region.

Opportunity to monitor water quality and volumes entering Rivoli Bay via the Lake Frome drain and utilise wetland polishing to improve water quality if required.

Conservation Analysis (GIS)

Total conservation values sum to 95.21, a low total within the region. The map of detailed summarized conservation values shows low values throughout the dune ridges, except within 200m of the shore where medium totals accrue. The main values within the cell are for numbers of threatened plant species, endemic plant communities within SA and extent of potential habitat for Orange Bellied Parrot.

The entire foreshore, c. <100m from low water mark. is designated a significant geological feature, “Glenelg River and Lower South East Coast”.

Only Mullins Swamp shows high total scores within the cell, these are for threatened plant associations, endemic plant associations, habitat for reptiles, habitat for focal species (Swamp Skink, Southern Bell Frog, and Yellow Sedge Skipper), vegetation connectivity, block shape and wetland significance in the SE. Surprisingly, the value for all birds and total threatened bird species for Mullins Swamp is low.

Threat Analysis (GIS)

Threat total summary score is 67.84, high. High threat totals are distributed throughout the cell, with only the two Heritage Agreement blocks showing medium totals; there is a patchy development of high to very high values through the dunes.

The main contributors to the high total are: ORV damage (there is a dense network of ORV track development through the dunes), land ownership, land use, development plan zoning (agriculture and rural residential), existing development (rural residence is significant at the two ends and in the middle of the cell), mining tenements (petroleum production licenses), vegetation block degradation and distribution of significant weeds, rabbit numbers (throughout the cell) and dune instability. Heritage Agreement 197, dune adjacent to Mullins Swamp, shows lower values than the rest of the dunes for weeds and vegetation block degradation.

Adaptation to Climate Change: Threats for Cell SE8

(see also discussion of scenario in Section 4.11)

NOTE: the advice below is indicative of likely change and the direction of change, with implications for ecosystems. Dates, amounts and probabilities cannot be accurately calculated at this time. Thus advice on flood levels, for example, should not be used in engineering or development planning.

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Climate change element/ scenario	Impacts and implications (for this cell)	Protect and manage habitat threats	Address landscape issues: fire, connectivity, refuges, hydrology
Combined climate changes and sea level rise throughout this cell	This cell presents a complex pattern of habitats sensitive to change.	Create a baseline for shoreline, dune and lake change by establishing a rectified aerial photographic record at an appropriate resolution.	
Sea level rise: 2030 : +c.20cm 2070: +c.80cm	Increase in storm foredune damage and beach recession.	Maintain an aerial photographic record of shoreline change within Rivoli Bay.	
	Acceleration of erosional processes at Southend and Beachport.	Use profiles to monitor these changes. Review sand budget within the whole bay.	
	Foredune damage leads to dune de-stabilisation, and transport of sand into and across the dune ridges.	Active management of dune blowouts, where conservation values are threatened, as at Mullins Swamp.	
Storms: <i>Frequency</i> continues to show great variation on a decadal scale. <i>Intensity</i> of large storms increases.	2030: Occasional storm tide flooding above highest known tides. 2070: Flooding will affect all swamps and adjacent low lying areas.	Manage valve on tidal inlet to adjust to higher marine storm elevations as part of the adaptive management of Lake Frome drain, and Mullins Swamp.	
	Frequent storm damage to foredunes.	Active management of dune blowouts.	
Warmer average conditions: 2030:+0.3 to .6°C 2070:+1.5 to 2°C	(Impacts uncertain. Existing terrestrial vegetation is found in warmer conditions elsewhere)		Maintain connectivity of vegetation within the region.
Drier average conditions: 2030: -2% to 5% 2070: - 10% to 20%	Dune vegetation adapts to drier conditions, but recovers more slowly from fire and storm damage: dune mobilization becomes more likely.	Active weed control within dunes.	
'Flashy' run off: Drier creeks, but larger rare floods	Drains and creeks may increase sediment load to coastal swamps and lakes (this depends on land management practices).	Maintain watching brief on sedimentation of Mullins Swamp.	
Groundwater lowering; saline incursion:	Groundwater lowering a threat to Mullins Swamp, and dune ridge vegetation.	Monitor seasonal water levels and salinity in Mullins Swamp. Adaptive management	

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Climate change element/ scenario	Impacts and implications (for this cell)	Protect and manage habitat threats	Address landscape issues: fire, connectivity, refuges, hydrology
		of habitats.	
<p>Nearshore sea changes - temperature; acidity; wave climate:</p> <p>2030: +0.3°C to +0.6°C</p> <p>2070: +1.0°C to +1.50°C</p>	(Changes in upwellings timing and frequency has been discussed, but not projected).	.	

Table 6.10. Recommended Actions and Priority for Cell SE8 – Rivoli Bay

Component	Issue	Proposed Action	Priority of Action	Key Players
Beach and Dunes	The moderate flora and habitat values of the foredunes are under threat as shown by the pattern of threat totals, and by climate change, as well as human modification to sediment transport processes at both ends of the bay.	Rationalise and reduce track access through the dunes from the beach and main road.	Medium (Cons/ threat)	NRM, Council
	Foredune ridges are an important record of changing conditions over the last 7,000 years.	Define and protect a representative area of the ridges from degradation.	Low (Cons)	Council
	Informal access tracks to the beach over the dunes at Southend damages vegetation and destabilises the dunes.	Upgrade vehicle and pedestrian beach access tracks and ramps to protect against erosion damage and minimise environmental impact. (eg access over dunes to beach from camping areas and dwellings in Southend).	Medium (Threat)	Council, community
Beach	Vehicle use threatens shorebird activity.	Reduce pressure on habitat at shorebird nesting times by a seasonal vehicle ban.	High (Cons/ Threat)	DENR, NRM, Council
		Fence nests/ community monitoring	High (Cons/ Threat)	DENR, NRM Council, community

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Component	Issue	Proposed Action	Priority of Action	Key Players
		Raising community awareness through signage at major beach access points	High (Cons/Threat)	DENR, NRM Council, community
	Wrack harvesting licence from the beach of Rivoli Bay threatens beach/ nearshore ecology.	Study of the impacts of wrack harvesting on shorebirds and beach invertebrates. Review of licence.	Medium (Cons/threat)	PIRSA, universities, proponent
Lake Frome drain	Provides an estuarine fish nursery habitat for commercial species including Flathead, King George Whiting and Yellow Eye Mullet.	Monitor water quality and gather data on provision of habitat in the drain.	Low (Cons)	SEWCDB, SARDI, DENR, universities
Mullins Swamp	This distinctive area comprises the only high total conservation values in the cell. An ongoing record of water levels is needed for effective management. Variability of quantity of inputs an issue.	Continue analysis of existing records, review monitoring program, and monitor as necessary.	High (Cons/threat)	Landowners, SEWCDB, NRM, DENR
Weeds	Aggressive weeds recorded at locations in the dunes and along roadsides and tracks throughout the cell. Potential for increased weed invasion from the townships and scattered dwellings.	Ongoing weed management and regular monitoring for alert weeds listed in Section 4.9. Education initiative targeting residences re: common garden species which become 'weeds' and alternatives for planting.	Medium (Cons/Threat)	Council, NRM, community, DENR
Whole cell	Spread of rural living/ commercial activity into the dunes, with impacts on foredunes.	Review extension of development plan coastal zone.	Medium (threat)	Council, DPLG
	This cell presents a complex pattern of habitats sensitive to change.	Continue a rectified aerial photographic record at an appropriate resolution, in order to show change from current baseline.	Medium (Cons/threat)	DENR, NRM

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Component	Issue	Proposed Action	Priority of Action	Key Players
	Aboriginal Heritage sites recorded in this cell. Need for appropriate and sustainable management.	Consultation to appropriately manage sites in this area.	High (Cons)	Murrapeena Heritage Association Inc., SE Aboriginal Focus Group, NRM, Council; Aboriginal Heritage Branch – DPC, Aboriginal Partnership Unit – DENR
	Lack of recognition of significant geological feature (Bridgewater formation).	Interpretation. Council to include map of the feature in its development plan.	Medium (Cons)	Council, Geological Society SA, NRM
Low lying ground landward of the dune barrier, (as far as Lake Frome)	Lidar survey suggests seawater inundation at times of storm within planning timeframes.	Scoping of timelines and implications for possible adaptation of infrastructure and planning zoning, notably sill construction and management of Lake Frome drain.	Medium (cell)	Council, NRM, DENR, DPLG, DTEI

BIOTA

Flora

Remnant vegetation area (ha)	1016.7 ha, 25.7% of cell area
# flora surveys / records	7 surveys, 2 opportune sites, 22 herbarium record sites, 1 reserve database record site.
# flora in cell	180 (includes some marine species)
# conservation rated flora in cell	9 recorded
# non-indigenous flora in cell	48 recorded
Significant CDCS floristic community	<i>Leucopogon parviflorus</i> / <i>Olearia axillaris</i> shrubland (>50% of known sites occur along SE coast). <i>Olearia axillaris</i> / <i>Leucopogon parviflorus</i> shrubland (>50% of known sites occur along SE coast).
Protected area	No protected areas in the cell

Weeds

Species	Common Name	Status	Study rating
<i>Lycium ferocissimum</i>	African Boxthorn	D	9
<i>Rhamnus alaternus</i>	Blowfly Bush		9
<i>Arctotheca populifolia</i>	Beach Daisy		8
<i>Ehrharta villosa var. maxima</i>	Pyp Grass		8
<i>Thinopyrum junceiforme</i>	Sea Wheat-grass		8

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Species	Common Name	Status	Study rating
<i>Coprosma repens</i>	New Zealand Mirror-bush		7
<i>Leptospermum laevigatum</i>	Coast Tea-tree		7
<i>Asparagus scandens</i>			6
<i>Argyranthemum frutescens ssp. foeniculaceum</i>	Teneriffe Daisy		5
<i>Cupressus macrocarpa</i>	Monterey Cypress		5
<i>Festuca arundinacea</i>	Tall Meadow Fescue		5
<i>Euphorbia paralias</i>	Sea Spurge		4
<i>Euphorbia terracina</i>	False Caper	D	4
<i>Senecio elegans</i>	Purple Groundsel		3
<i>Acacia longifolia ssp. longifolia</i>	Sallow Wattle		2
<i>Ammophila arenaria</i>	Marram Grass		2
<i>Anagallis arvensis</i>	Pimpernel		
<i>Atriplex prostrata</i>	Creeping Saltbush		
<i>Berula erecta</i>	Water Parsnip		
<i>Borago officinalis</i>	Borage		
<i>Bromus diandrus</i>	Great Brome		
<i>Cakile maritima ssp. maritima</i>	Two-horned Sea Rocket		
<i>Catapodium rigidum</i>	Rigid Fescue		
<i>Cerastium balearicum</i>	Chickweed		
<i>Chenopodium glaucum</i>	Glaucous Goosefoot		
<i>Cotula coronopifolia</i>	Water Buttons		
<i>Crassula natans var. minus</i>	Water Crassula		
<i>Dischisma arenarium</i>	Sand Dichisma		
<i>Ehrharta longiflora</i>	Annual Veldt Grass		
<i>Euphorbia pepus</i>	Petty Spurge		
<i>Galium murale</i>	Small Bedstraw		
<i>Hordeum glaucum</i>	Blue Barley-grass		
<i>Hypochaeris sp.</i>	Cat's Ear		
<i>Isolepis marginata</i>	Little Club-rush		
<i>Lagurus ovatus</i>	Hare's Tail Grass		
<i>Medicago lupulina</i>	Black Medic		
<i>Medicago polymorpha var. polymorpha</i>	Burr-medic		
<i>Minuartia mediterranea</i>	Slender Sandwort		
<i>Parapholis incurva</i>	Curly Ryegrass		
<i>Polypogon maritimus</i>	Coast Beard-grass		
<i>Retama raetam</i>	White Weeping Broom		
<i>Rorippa nasturtium-aquaticum</i>	Watercress		
<i>Rostraria cristata</i>	Annual Cat's-tail		
<i>Sambucus gaudichaudiana</i>	White Elderberry		
<i>Sonchus oleraceus (NC)</i>	Common Sow-thistle		
<i>Stellaria media</i>	Chickweed		
<i>Trifolium fragiferum var. fragiferum</i>	Strawberry Clover		
<i>Vulpia myuros f. myuros</i>	Rat's-tail Fescue		

D: Declared weed, WONS: Weeds of National Significance

Native flora*

Species	Common Name	Aus status	SA status
<i>Caladenia richardsiorum</i>	Little Dip Spider-orchid	E	E
<i>Ranunculus papulentus</i>	Large River Buttercup		V
<i>Scaevola calendulacea</i>	Dune Fanflower		V
<i>Eucalyptus leucoxylon ssp. megalocarpa</i>	Large-fruit Blue Gum		R
<i>Gabnia clarkei</i>	Tall Saw-sedge		R

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Species	Common Name	Aus status	SA status
<i>Haloragis brownii</i>	Swamp Raspwort		R
<i>Haloragis eichleri</i>	Eichler's Raspwort		R
<i>Leptinella reptans</i>	Creeping Cotula		R
<i>Leptorhynchos scaber</i>	Annual Buttons		R
<i>Acacia leiophylla</i>	Coast Golden Wattle		
<i>Acacia longifolia</i> ssp. <i>sophorae</i>	Coastal Wattle		
<i>Acaena novae-zeelandiae</i>	Biddy-biddy		
<i>Acrotriche affinis</i>	Ridged Ground-berry		
<i>Acrotriche cordata</i>	Blunt-leaf Ground-berry		
<i>Actites megalocarpa</i>	Coast Sow-thistle		
<i>Adriana klotzschii</i> (NC)	Coast Bitter-bush		
<i>Allocasuarina pusilla</i>	Dwarf Oak-bush		
<i>Allocasuarina verticillata</i>	Drooping Sheoak		
<i>Alyxia buxifolia</i>	Sea Box		
<i>Apium prostratum</i> var. <i>filiforme</i>	Native Celery		
<i>Apium prostratum</i> var. <i>prostratum</i>	Native Celery		
<i>Apodasmia brownii</i>	Coarse Twine-rush		
<i>Asteronema ferrugineum</i>			
<i>Austrofestuca littoralis</i>	Coast Fescue		
<i>Austrostipa</i> sp.	Spear-grass		
<i>Austrostipa stipoides</i>	Coast Spear-grass		
<i>Baumea arthrophylla</i>	Swamp Twig-rush		
<i>Baumea juncea</i>	Bare Twig-rush		
<i>Beyeria lechenaultii</i>	Pale Turpentine Bush		
<i>Caladenia latifolia</i>	Pink Caladenia		
<i>Carpobrotus rossii</i>	Native Pigface		
<i>Carpobrotus rossii</i> (NC)	Native Pigface		
<i>Carpobrotus</i> sp.	Pigface		
<i>Centrolepis polygyna</i>	Wiry Centrolepis		
<i>Cladosiphon filum</i>			
<i>Clematis microphylla</i> var. <i>microphylla</i>	Old Man's Beard		
<i>Comesperma volubile</i>	Love Creeper		
<i>Correa reflexa</i> var. <i>scabridula</i>	Common Correa		
<i>Cotula australis</i>	Common Cotula		
<i>Crassula decumbens</i> var. <i>decumbens</i>	Spreading Crassula		
<i>Crassula sieberiana</i> ssp. <i>tetramera</i> (NC)	Australian Stonecrop		
<i>Curdiea angustata</i>			
<i>Cynoglossum australe</i>	Australian Hound's-tongue		
<i>Daucus glochidiatus</i>	Native Carrot		
<i>Dianella brevicaulis</i>	Short-stem Flax-lily		
<i>Dichondra repens</i>	Kidney Weed		
<i>Dictyopteris nigricans</i>			
<i>Drosera pygmaea</i>	Tiny Sundew		
<i>Elisiella dispar</i>			
<i>Epilobium billardierianum</i> ssp. <i>billardierianum</i>	Robust Willow-herb		
<i>Epilobium</i> sp.	Willow-herb		
<i>Eucalyptus obliqua</i>	Messmate Stringybark		
<i>Exocarpos syrticola</i>	Coast Cherry		
<i>Ficinia nodosa</i>	Knobby Club-rush		
<i>Gabnia trifida</i>	Cutting Grass		
<i>Galium compactum</i>	Compact Bedstraw		
<i>Geranium potentilloides</i> var. <i>potentilloides</i>	Downy Geranium		
<i>Geranium retrorsum</i>	Grassland Geranium		

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Species	Common Name	Aus status	SA status
<i>Geranium solanderi</i> var. <i>solanderi</i>	Austral Geranium		
<i>Gnaphalium indutum</i> ssp. <i>indutum</i>	Tiny Cudweed		
<i>Gonocarpus tetragynus</i>	Small-leaf Raspwort		
<i>Gramineae</i> sp.	Grass Family		
<i>Gyrostemon thesioides</i>	Broom Wheel-fruit		
<i>Hemichroa pentandra</i>	Trailing Hemichroa		
<i>Herb</i> sp.			
<i>Heterocladia umbellifera</i>			
<i>Hydrocotyle capillaris</i>	Thread Pennywort		
<i>Hydrocotyle laxiflora</i>	Stinking Pennywort		
<i>Hydrocotyle plebeya</i>			
<i>Hymenena multipartita</i>			
<i>Isolepis cernua</i>	Nodding Club-rush		
<i>Isolepis inundata</i>	Swamp Club-rush		
<i>Juncus bufonius</i>	Toad Rush		
<i>Juncus holoschoenus</i>	Joint-leaf Rush		
<i>Juncus kraussii</i>	Sea Rush		
<i>Kunzea pomifera</i>	Muntries		
<i>Lasiopetalum schulzenii</i>	Drooping Velvet-bush		
<i>Lepidosperma canescens</i>	Hoary Rapier-sedge		
<i>Lepidosperma congestum</i>			
<i>Lepidosperma gladiatum</i>	Coast Sword-sedge		
<i>Leptorhynchus squamatus</i> ssp. <i>squamatus</i>	Scaly Buttons		
<i>Leptospermum continentale</i>	Prickly Tea-tree		
<i>Leptospermum lanigerum</i>	Silky Tea-tree		
<i>Leucophyta brownii</i>	Coast Cushion Bush		
<i>Leucopogon parviflorus</i>	Coast Beard-heath		
<i>Lobelia anceps</i>	Angled Lobelia		
<i>Lotus australis</i>	Austral Trefoil		
<i>Melaleuca lanceolata</i> ssp. <i>lanceolata</i> (NC)	Dryland Tea-tree		
<i>Muehlenbeckia adpressa</i>	Climbing Lignum		
<i>Myoporum insulare</i>	Common Boobialla		
<i>Myosotis australis</i>	Austral Forget-me-not		
<i>Myrionema strangulans</i>			
<i>Myriophyllum salsugineum</i>	Lake Milfoil		
<i>Olearia axillaris</i>	Coast Daisy-bush		
<i>Oxalis perennans</i> (NC)	Native Sorrel		
<i>Ozothamnus ferrugineus</i>	Tree Everlasting		
<i>Ozothamnus turbinatus</i>	Coast Bush-everlasting		
<i>Parietaria debilis</i> (NC)	Smooth-nettle		
<i>Pelargonium australe</i>	Austral Stork's-bill		
<i>Pelargonium</i> sp.	Storks-bill		
<i>Pimelea glauca</i>	Smooth Riceflower		
<i>Pimelea serpyllifolia</i> ssp. <i>serpyllifolia</i>	Thyme Riceflower		
<i>Poa poiformis</i> var. <i>poiformis</i>	Coast Tussock-grass		
<i>Pomaderris obcordata</i>	Wedge-leaf Pomaderris		
<i>Pomaderris paniculosa</i> ssp. <i>paniculosa</i>	Mallee Pomaderris		
<i>Potamogeton pectinatus</i>	Fennel Pondweed		
<i>Pultenaea acerosa</i>	Bristly Bush-pea		
<i>Pultenaea tenuifolia</i>	Narrow-leaf Bush-pea		
<i>Rhagodia candolleana</i> ssp. <i>candolleana</i>	Sea-berry Saltbush		
<i>Sagina maritima</i>	Sea Pearlwort		
<i>Samolus repens</i>	Creeping Brookweed		

SE8 – Rivoli Bay

Species	Common Name	Aus status	SA status
<i>Sarcocornia quinqueflora</i>	Beaded Samphire		
<i>Sarcobalia radula</i>			
<i>Schoenoplectus validus</i>	River Club-rush		
<i>Sebaea albidiflora</i>	White Sebaea		
<i>Selliera radicans</i>	Shiny Swamp-mat		
<i>Senecio biserratus</i>	Jagged Groundsel		
<i>Senecio minimus</i>	Fine-tooth Groundsel		
<i>Senecio odoratus</i>	Scented Groundsel		
<i>Senecio pinnatifolius</i> (NC)	Variable Groundsel		
<i>Spinifex sericeus</i> (NC)	Rolling Spinifex		
<i>Stackhousia spathulata</i>	Coast Candles		
<i>Stenopetalum lineare</i>	Narrow Thread-petal		
<i>Swainsona lessertiiifolia</i>	Coast Swainson-pea		
<i>Tetragonia implexicoma</i>	Bower Spinach		
<i>Threlkeldia diffusa</i>	Coast Bonefruit		
<i>Typha domingensis</i>	Narrow-leaf Bulrush		
<i>Ulva australis</i>			
<i>Ulva lactuca</i>			
<i>Urtica incisa</i>	Scrub Nettle		
<i>Wilsonia backhousei</i>	Narrow-leaf Wilsonia		
<i>Zygophyllum billardierei</i>	Coast Twinleaf		

E: Endangered, V: Vulnerable, R: Rare

*note: includes some marine species

Fauna

# of fauna in cell	95 recorded – 73 birds, 4 butterflies, 19 mammals, 20 reptiles, 4 amphibians (an additional 10 butterflies and 1 mammal identified by experts as possibly occurring)
# of fauna surveys / records	1 surveys, 31 opportune sites
# of threatened fauna in cell	22 recorded
# of non-indigenous fauna	12 recorded

Non-indigenous fauna

Species	Common Name	Class	Record
<i>Alauda arvensis</i>	Eurasian Skylark	Aves	x
<i>Anas platyrhynchos</i>	Northern Mallard	Aves	x
<i>Carduelis carduelis</i>	European Goldfinch	Aves	x
<i>Columba livia</i>	Rock Dove (Feral Pigeon)	Aves	x
<i>Passer domesticus</i>	House Sparrow	Aves	x
<i>Sturnus vulgaris</i>	Common Starling	Aves	x
<i>Turdus merula</i>	Common Blackbird	Aves	x
<i>Felis catus</i>	Cat (Feral Cat)	Mammalia	x
<i>Mus musculus</i>	House Mouse	Mammalia	x
<i>Rattus norvegicus</i>	Brown Rat (Sewer Rat, Norway Rat)	Mammalia	x
<i>Rattus rattus</i>	Black Rat (Ship Rat, Roof Rat)	Mammalia	x
<i>Vulpes vulpes</i>	Fox (Red Fox)	Mammalia	x

x: recorded

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Birds

Species	Common Name	Aus status	SA status
<i>Neophema chrysogaster</i>	Orange-bellied Parrot	CR/M	E
<i>Botaurus poiciloptilus</i>	Australasian Bittern		V
<i>Cladorhynchus leucocephalus</i>	Banded Stilt		V
<i>Neophema chrysostoma</i>	Blue-winged Parrot		V
<i>Numenius madagascariensis</i>	Eastern Curlew	M	V
<i>Thinornis rubricollis</i>	Hooded Plover		V
<i>Arenaria interpres</i>	Ruddy Turnstone	M	R
<i>Biziura lobata</i>	Musk Duck		R
<i>Calidris alba</i>	Sanderling	M	R
<i>Calidris melanotos</i>	Pectoral Sandpiper	M	R
<i>Gallinago hardwickii</i>	Latham's Snipe (Japanese Snipe)	M	R
<i>Haematopus fuliginosus</i>	Sooty Oystercatcher		R
<i>Haematopus longirostris</i>	Australian Pied Oystercatcher		R
<i>Plegadis falcinellus</i>	Glossy Ibis	M	R
<i>Pluvialis fulva</i>	Pacific Golden Plover	M	R
<i>Stagonopleura bella</i>	Beautiful Firetail		R
<i>Tringa brevipes</i>	Grey-tailed Tattler	M	R
<i>Tringa glareola</i>	Wood Sandpiper	M	R
<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater		
<i>Acanthiza pusilla</i>	Brown Thornbill		
<i>Anthochaera carunculata</i>	Red Wattlebird		
<i>Anthochaera chrysoptera</i>	Little Wattlebird		
<i>Ardea pacifica</i>	White-necked Heron (Pacific Heron)		
<i>Calamanthus fuliginosus</i>	Striated Fieldwren		
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	M	
<i>Calidris ferruginea</i>	Curlew Sandpiper	M	
<i>Calidris ruficollis</i>	Red-necked Stint	M	
<i>Charadrius bicinctus</i>	Double-banded Plover		
<i>Charadrius ruficapillus</i>	Red-capped Plover (Red-capped Dotterel)		
<i>Chroicocephalus novaehollandiae</i>	Silver Gull		
<i>Cincloramphus cruralis</i>	Brown Songlark		
<i>Cincloramphus mathewsi</i>	Rufous Songlark		
<i>Cisticola exilis</i>	Golden-headed Cisticola		
<i>Colluricincla harmonica</i>	Grey Shrike-thrush		
<i>Corvus mellori</i>	Little Raven		
<i>Coturnix pectoralis</i>	Stubble Quail		
<i>Cracticus tibicen</i>	Australian Magpie		
<i>Cygnus atratus</i>	Black Swan		
<i>Dasyornis broadbenti</i>	Rufous Bristlebird		ssp
<i>Elanus axillaris</i>	Black-shouldered Kite		
<i>Elseyornis melanops</i>	Black-fronted Dotterel (Black-fronted Plover)		
<i>Erythrogonys cinctus</i>	Red-kneed Dotterel		
<i>Endiptyula minor</i>	Little Penguin (Fairy Penguin)		
<i>Falco berigora</i>	Brown Falcon		
<i>Falco cenchroides</i>	Nankeen Kestrel (Australian Kestrel)		
<i>Fulmarus glacialisoides</i>	Southern Fulmar		
<i>Himantopus himantopus</i>	Black-winged Stilt		
<i>Hirundo neoxena</i>	Welcome Swallow		
<i>Hydroprogne caspia</i>	Caspian Tern		
<i>Larus pacificus</i>	Pacific Gull		
<i>Lichenostomus chrysops</i>	Yellow-faced Honeyeater		
<i>Lichenostomus virescens</i>	Singing Honeyeater		

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Species	Common Name	Aus status	SA status
<i>Malurus cyaneus</i>	Superb Fairy-wren		
<i>Ocyphaps lophotes</i>	Crested Pigeon		
<i>Pachycephala olivacea</i>	Olive Whistler		ssp
<i>Platalea regia</i>	Royal Spoonbill		
<i>Porphyrio porphyrio</i>	Purple Swampphen (Purple Moorhen)		
<i>Recurvirostra novaehollandiae</i>	Red-necked Avocet		
<i>Rhipidura albiscapa</i>	Grey Fantail		
<i>Rhipidura leucophrys</i>	Willie Wagtail		
<i>Sericornis frontalis</i>	White-browed Scrubwren		
<i>Threskiornis spinicollis</i>	Straw-necked Ibis		
<i>Tringa nebularia</i>	Common Greenshank	M	
<i>Tyto javanica</i>	Eastern Barn Owl		
<i>Vanellus miles</i>	Masked Lapwing		
<i>Zosterops lateralis</i>	Silvereye		

CR: Critically endangered, E: Endangered, V: Vulnerable, R: Rare, M: Migratory, ssp: sub-species

Butterflies

Species	Common Name	Status*	Record
<i>Hesperilla cyrhoticha cyclopsila</i>	Chrysotricha Sedge-skipper or Golden-haired Sedge-skipper	V	p
<i>Erina hyacinthina form josephina</i>	Common Dusky-blue	R	p
<i>Lucia limbaria</i>	Small Copper	R	p
<i>Geitoneura klugii klugii</i>	Common Xenica	C	p
<i>Hesperilla donnysa delos (incl. form diluta)</i>	Donnysa skipper		p
<i>Hesperilla idothea idothea</i>			p
<i>Heteronympha merope merope</i>	Common Brown	C	p
<i>Heteronympha penelope</i>	Shouldered Brown		p
<i>Lampides boeticus</i>	Long-tailed Pea-blue		p
<i>Nacuduba biocellata biocellata</i>	Two-spotted Line-blue	LC	p
<i>Neolucia agricola agricola</i>	Fringed Heath-blue		x
<i>Ocybadistes walkeri hypochlorus</i>	Southern Grass-dart		x
<i>Theclinesstes serpentata serpentata</i>	Salt-bush blue		x
<i>Zizina labradus labradus</i>	Common Grass Blue		x

*Vulnerability as per R. Grund, E: Endangered, V: Vulnerable, R: Rare

Va: Vagrant, LC: Locally common, C: Common

x: recorded, p: possibly there as suggested by R. Grund

Mammals

Species	Common Name	Aus status	SA status	Record
<i>Wallabia bicolor</i>	Swamp Wallaby		V	e
<i>Macropus fuliginosus</i>	Western Grey Kangaroo			x
<i>Rattus fuscipes</i>	Bush Rat			x

E: Endangered, V: Vulnerable, R: Rare

Reptiles

Species	Common Name	Aus status	SA status	Record
<i>Pseudemoia rawlinsoni</i>	Glossy Grass Skink		V	x
<i>Drysdalia coronoides</i>	White-lipped Snake		R	x
<i>Austrelaps superbus</i>	Lowland Copperhead			x
<i>Notechis scutatus</i>	Eastern Tiger Snake	ssp		x

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Species	Common Name	Aus status	SA status	Record
<i>Pseudonaja textilis</i>	Eastern Brown Snake			x
<i>Tiliqua nigrolutea</i>	Blotched Bluetongue			x
<i>Tiliqua rugosa</i>	Sleepy Lizard			x

E: Endangered, V: Vulnerable, R: Rare

x: recorded

Amphibians

Species	Common Name	Aus status	SA status	Record
<i>Geocrinia laevis</i>	Smooth Frog		R	e
<i>Crinia signifera</i>	Common Froglet			x
<i>Limnodynastes dumerilii</i>	Banjo Frog			x
<i>Limnodynastes peronii</i>	Striped Marsh Frog			x
<i>Litoria ewingii</i>	Brown Tree Frog			x

E: Endangered, V: Vulnerable, R: Rare

x: recorded, e: expected to be there (M. Hutchinson pers. comm. 2009)

6.3.9 Cell SE9 Lake St Clair, Lake George, Beachport

The area of the cell is 16515.8 ha. (49.7% water bodies); shoreline length is 33.12 km.



SE9 – Lake St George, Lake St Clair, Beachport

Landforms

This is a large cell of approximately 16 km² and like SE10, it is an undulating coastal plain: aeolianite headlands and reefs; beaches and extensive dune systems; and a low inter-barrier plain largely occupied by the coastal lakes, St Clair and George. Lake George was re-opened to the sea by a drainage cut in 1934, followed by 500,000 m³ of coastal sediments rapidly forming a massive inverse flood-tide delta, (Short & Hesp, 1984, p.91).

For the 7 km south from Nora Creina wave energy is low to medium, due to protection by nearshore (1 km) reefs; beach sands retain finer materials in these conditions; varying even to the very finest fragile silica rods at the extreme low energy of the northern end of Stinky Beach. Beaches are low gradient, intermediate to reflexive; foredunes are highly variable in form; and behind the foredune only moderate sized transgressive dunes are seen.

As wave energy increases to moderate towards the south of the cell, with reduction in offshore reef protection: sand grain sizes retained on the beach increase to medium to coarse, shore face slope angles increase, and volumes of sand in transgressive dunes increase. Near to Beachport calcarenite headlands and nearshore reefs increase in frequency. Transgression and sand storage are related to onshore transport factors during the Holocene to Recent. However, modern dune instability and movement are linked to the history of land use, and locally this has been documented by Armstrong, 1977, at 5-Mile and 10-Mile Drift, near Lake George, where the mid-19th century coach road was cut in the 1890's by sand drift, following grazing on the dunes.

Inland from the dune barriers the lowland between the Robe Range and the Woakwine Range (the inter-barrier corridor) is occupied by the shallow lakes St Clair and Lake George, the latter could now be regarded as an estuary, though with limited land run off, through the Woakwine Drain, and a restricted marine connection. Lake George forms an important part of the drainage network controlled by the SE Water Conservation and Drainage Board; this lake receives fresh water from Drain M, and salt water through its tidal channel; it is variably brackish and poor flows have led to periods of eutrophication in recent years. Lake St Clair, which lies below sea level, is shallow and hyper saline: a hydrologically closed lake with salt levels raised by evaporation.



Beachport, with Lake George in the distance. Photograph Coast Protection Board 2003.

SE9 – Lake St George, Lake St Clair, Beachport

Biota

There are 34 flora survey sites, 61 opportune flora sites, 73 Herbarium record sites, 13 fauna survey sites, and 127 opportune fauna survey sites. Only 21.4% of the total cell area is vegetated (lakes recorded as unvegetated), a total of 3529ha in remnant vegetation.

Dunes form 26.7% of the area of the cell, and 18% of the dunes are unvegetated. The dunes are mainly in tall *Leucopogon parviflorus* shrubland, with some stands of *Eucalyptus diversifolia* on the inner dunes; there are also small areas of tussock grassland. Lake St Clair CP preserves the only remnant of lakeside sedge swamp, including *Gabnia filum*, with adjacent stands of *Leptospermum lanceolata*. Supra-tidal sedges have tidal sediments found near the inlet to Lake George; this lake has some small stands of supra-tidal *Melaleuca balmaturorum* and also *Juncus* sedgeland at its edge.

Fauna recorded in the cell include 203 bird, 16 butterfly, 18 mammal, 15 reptile and 7 amphibian species. Listed threatened fauna include the EPBC listed critically endangered Orange-bellied Parrot (*Neophema chrysogaster*) and endangered Southern Brown Bandicoot (*Isodon obesulus obesulus*); also the State endangered White-bellied Sea Eagle (*Haliaeetus leucogaster*), Little (*Sternula albifrons*) and Fairy (*Sternula nereis*) Terns and Swamp Antechinus (*Antechinus minimus*).

Benthic Habitat

Bare sand with patchy seagrass off Beachport in Rivoli Bay; heavy limestone reef from Penguin Island CP to Euro Point, then bare sand to Stinky Beach, Nora Creina. Offshore there is low profile reef throughout.

Land Use/ Land Ownership

The township of Beachport dominates the southern end of the cell. Beachport is buffered from the Southern Ocean on the western side, by partially vegetated dunes that are dedicated to Council as Crown Land Act reserve. Beachport CP, Penguin Island CP and Lake St Clair CP capture 6.5% of the cell area within NPW Act reserve.

Lakes occupy 49.7% of this cell; both Lake George and Lake St Clair are unallotted Crown land. Unallotted Crown Land comprises 56.6% of the cell area. On the seaward side of the lakes, there is scattered residential development through to Nora Creina settlement at the northern end of the cell. Privately owned and cleared land between Lake George and the landward cell boundary, between the two lakes and around Lake St Clair, is used for grazing/ cropping. The exception being a small stand of remnant vegetation on the north-eastern shore of Lake St Clair which is protected by Lake St Clair CP.

Values/ Uses (Field visits and local reports)

Passive recreation in and around Lake George. Millicent Sand Buggy Club has a licence to use unallotted Crown Land parcel S100 H420900. Off-road vehicle use is high through the cell from Beachport to Nora Creina. Aboriginal Heritage values throughout.

Threats (Field visits and local reports)

It is evident that the health of the 2 large lakes, comprising half the area of the cell, relies on drainage management (Lake George), land use and climatic fluctuation (Lake George and Lake St Clair). Lake George is a 5900 ha artificial estuary that once supported an important fishery and acts as a significant refuge for waterbirds (Brookes and Aldridge 2007, Hobbs and de Jong 2008). Slater and Farrington (2010) score Lake George highly for wetland attributes, but it does not rate at all in terms of biological score for fish and amphibians. Historically the system was land-locked and primarily fed through rainfall, local runoff and freshwater springs. An outlet between Lake George and Rivoli Bay was constructed in 1934 and Drain M was completed in 1966. Drain M has since acted as a major source of inflows to the system. However, below average rainfall,

SE9 – Lake St George, Lake St Clair, Beachport

combined with sand deposition at the coastal interface over the past two decades has resulted in only negligible inflows from Drain M and isolation of large sections of the lake from the coastal outlet. As a result the lake is becoming more saline through evaporation and concentration of salts. In addition, eutrophication is a threatening process within the system, as occurred in 2008. Ongoing water quality monitoring of inflows is being undertaken as a priority action by DFW (Slater and Farrington 2010).

Marram grass has been extensively used in the past for rehabilitation of dunes near Beachport (following 19th Century damage by grazing).

Opportunities

Lower Drain M and its connecting drains (i.e. Sutherland Drain) near Beachport contain several important ecological assets including a recently discovered population of Australian Mudfish (*Neochanna cleaveri*) which had not been recorded in South Australia since 1972 (Hammer, 2009 in Slater and Farrington 2010). In terms of Nationally and State listed aquatic dependent fauna it is a close second to the Eight Mile Creek system with a high biological score. The section of drain downstream of the Princes Highway provides habitat for the last healthy wild population of Yarra Pygmy Perch (*Nannoperca obscura*) in South Australia as well as a healthy population of Southern Bell Frogs (*Litoria raniformis*). Several management actions have already been instigated by the SEWCDB to improve the way lower Drain M is managed to enhance habitat values for important species, in particular the Yarra Pygmy Perch. Two drought refuges were installed in the section of Drain M between Elgin Lane and Magerys Lane in May 2009 after observations of trigger levels for Yarra Pygmy Perch (water depth <1m) being reported in late Autumn 2009. Recent surveys conducted by DENR have indicated that Yarra Pygmy Perch and Southern Bell Frog populations in Lower Drain M are in healthy numbers with good evidence of recruitment (DENR, unpublished data, 2010).

Little is known about the recently discovered Australian Mudfish population however a baseline survey of the population was carried out over June-November 2010 via funding from the Department for Water, Land, Biodiversity and Conservation, after which management requirements should be better understood. A recent discovery of seven specimens in a private drain exiting Death Hole on Burks Island (Coleman, unpublished data, 2010) suggests that Death Hole and its connecting drain to Sutherland Drain may provide vital summer refuge for the population when Sutherland Drain completely dries. Connectivity between Death Hole and Lake George is likely to be important for completion of this species semi-diadromous life cycle (Slater and Farrington 2010).

The key recommendation for this section of drain is the development and implementation of a management and monitoring plan to ensure its current ecological values are maintained. A secondary priority is the installation of telemetered gauge stations at Drain M (adjacent Elgin Lane) and Sutherlands Drain with flow, level, EC and temperature logging capabilities (Slater and Farrington 2010).

Opportunity to better protect Aboriginal Heritage sites on public and private land. Improved ORV control will contribute to this.

Conservation Analysis (GIS)

The total of conservation means is medium to high, 128.54. The pattern of values is complex, reflecting topography and drainage: vegetated dunes and lakes show moderate to high values, although small saltmarsh areas at the southern end of Lake George and sedge swamp in Lake St Clair CP both show high totals. The lowest value areas are the cleared grazing lands on the southern and western sides of Lake St Clair, with moderate to low values on the de-vegetated parts of the dunes.

SE9 – Lake St George, Lake St Clair, Beachport

Notable conservation values include: threatened vegetation communities and species richness are widespread throughout the cell; viewscape is highly rated at the lakes and on the coastal slopes; Lake George rates highly for species richness, number of bird species and threatened bird species, threatened reptile habitat, as well as habitat for the Fairy Tern, Southern Bell Frog and Orange-bellied Parrot (focal species); Lake St Clair records high values for threatened fauna, numbers of bird species, threatened reptile habitat, as well as Fairy Tern and Southern Bell Frog. Both lakes score highly for wetland priority and it appears that, in part due to their extent – approx. 50% of the cell area, they make a major contribution to the total sum of conservation values.

Threat Analysis (GIS)

Threat means are 58.68, an average to high total. [In general the lake areas show the lowest threat totals, although the most significant threats to these - water and land management - are not part of this analysis]. Threat totals are high throughout the sand dunes. Viewscape, mining (SE Petroleum Production and exploration), vegetation block degradation, weeds and rabbits are notable contributors to this total. ORV damage is notable in the dunes NW of Beachport, including 5 Mile and 10 Mile drift. The Beachport Dump is located within the dune system adjacent to the Beachport Scenic Drive and the coastline. Notably, the southern half of Lake George shows a high potential for the development of acid sulfate soils.

Adaptation to Climate Change: Threats for Cell SE9

(See also discussion of scenario in Section 4.11

NOTE: the advice below is indicative of likely change and the direction of change, with implications for ecosystems. Dates, amounts and probabilities cannot be accurately calculated at this time. Thus advice on flood levels, for example, should not be used in engineering or development planning.

Climate change element/ scenario	Impacts and implications (for this cell)	Protect and manage habitat threats	Address landscape issues: fire, connectivity, refuges, hydrology
Combined climate changes and sea level rise throughout this cell	This cell presents a complex pattern of habitats sensitive to change.	Create a baseline for shoreline, dune and lake change by establishing a rectified aerial photographic record at an appropriate resolution.	
Sea level rise: 2030 : +c.20cm 2070: +c.80cm.	Increase in storm foredune damage and beach recession. Erosion between Post Office Rock and Nora Creina will lead to a more indented shoreline.	Maintain an aerial photographic record of shoreline change.	
	Acceleration of shoreline erosional processes at Beachport and Post Office Rock.	Use existing DENR profiles to monitor these changes. Adapt as necessary. Review sand budget within the whole of Rivoli Bay.	
	Foredune damage could lead	Active management of	

SE9 – Lake St George, Lake St Clair, Beachport

Climate change element/ scenario	Impacts and implications (for this cell)	Protect and manage habitat threats	Address landscape issues: fire, connectivity, refuges, hydrology
	to widespread dune de-stabilisation and transport of sand across dunes to the lakes.	dune blowouts, remove threats to dune stability.	
Storms: <i>Frequency</i> continues to show great variation on a decadal scale. <i>Intensity</i> of large storms increases.	2030: Occasional storm tide flooding above highest known tides. Lidar data suggests that marine incursion will ingress to Lake St Clair at a 2 metre inundation. 2070: Flooding will affect both large lakes swamps and adjacent low lying areas.	Manage gate on tidal inlet to adjust to higher marine storm elevations as part of the adaptive management of Lake George.	
	Frequent storm damage to foredunes.	Active management of dune blowouts.	
Warmer average conditions: 2030: +0.3 to 0.6°C 2070: +1.5 to 2°C	(Impacts uncertain. Existing terrestrial vegetation is found in warmer conditions elsewhere)		Maintain connectivity of vegetation within the region.
Drier average conditions: 2030: -2% to 5% 2070: - 10% to 20%	Dune vegetation adapts to drier conditions, but recovers more slowly from fire and storm damage allowing weed colonisation: dune mobilisation becomes more likely.	Active weed control within dunes.	
	Reduced runoff and increased evaporation threatens the lakes and lakeshore habitats.	Monitor seasonal water levels and salinity in both lakes. Adaptive management of ecological assets.	
'Flashy' run off: Drier creeks, but larger rare floods	Drains and creeks may increase sediment load to coastal swamps and lakes (this depends on land management practices).	Maintain watching brief on sedimentation of Lake George.	
Groundwater lowering; saline incursion:	Groundwater lowering a threat to Lakes St Clair and George.	Monitor seasonal water levels and salinity in both lakes. Adaptive management of ecological assets.	
Nearshore sea changes - temperature; acidity; wave climate: 2030: +0.3°C to + 0.6°C	(Changes in upwelling timing and frequency has been discussed, but not projected). Changes unlikely to affect swell wave climate, apart from increase in mean wave		

SE9 – Lake St George, Lake St Clair, Beachport

Climate change element/ scenario	Impacts and implications (for this cell)	Protect and manage habitat threats	Address landscape issues: fire, connectivity, refuges, hydrology
2070: +1.0°C to +1.50C	period.		

Table 6.11. Recommended Actions and Priority for Cell SE9 - Beachport

Component	Issue	Proposed Action	Priority of Action	Key Players
Beaches and dunes near Beachport	Change is rapid in this area, through beach erosion and dune instability. Change will accelerate through climate change sea level rise and increasing aridity.	Continue monitoring beach change through keeping up the profile record. Continue a rectified aerial photographic record at an appropriate resolution, in order to show change from current baseline.	High (hazard)	DENR, NRM, CPB
Council coastal reserve at Beachport (Bowman Scenic Drive).	ORV activity off delineated tracks. Informal access to beaches from the road and off defined tracks.	Upgrade vehicle and pedestrian beach access tracks and ramps to protect against erosion damage and minimise environmental impact. Rehabilitate denuded sand dune areas with appropriate sand stabilisation and revegetation.	Medium (threat)	Council, NRM, DENR
Beachport waste disposal site and green dump (now closed)	Rubbish attracts feral animals and invasive weeds present are spreading into the adjacent dunes.	Relocate rubbish dump away from the coastal zone and remove invasive weeds.	High (Threat)	Council, EPA
Native vegetation areas adjacent to Beachport	Exotic plant species, including garden escapes and feral animals are degrading the habitat.	Community education campaign to encourage residents and landholders adjoining the coast to remove invasive garden plants and replace with suitable non-invasive or indigenous species. Weed and pest plant control program.	High (Cons/ threat)	Council, NRM, DENR

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Component	Issue	Proposed Action	Priority of Action	Key Players
Coastal dunes and lake edges immediately north of Beachport CP, and between Euro Point and Lake George	These include vegetated dunes and an area of <i>M. balmaturorum</i> of high conservation value, bounded by the park and drifting sand dunes. Threatened by ORV activity and sand drift.	DENR to discuss preservation of this area with the landowner, by inclusion within the park or by heritage agreement.	Medium (Cons)	Landowners, DENR
Beachport to Nora Creina dunes and headlands.	ORV damage widespread.	Support local effort to close damaging informal tracks is important in this cell.	High (Cons/Threat)	Landowners, NRM, DENR
	Aggressive weeds recorded at isolated locations in the dunes throughout the cell.	Eradication should be considered for those with limited distribution at present. Regular monitoring for alert weeds, listed in Section 4.9.	Medium (Cons/threat)	DENR, NRM, landowners
Low lying trough between Guichen and Rivoli Bay, including Lakes George, St Clair and Eliza	Lidar survey suggests possible flooding by continuing and accelerating sea level rise within planning timeframes.	Scoping of timelines and implications for possible adaptation of infrastructure, and vulnerable habitats. Build higher storm tide level into adaptive management of gate at Lake George entrance.	Medium (cell)	DPC, DENR, Councils, NRM, DPLG
Lake George and Lake St Clair	Sediment blocking the marine connection to Lake George (together with low flows via Drain M) has led to periods of eutrophication; this threatens valuable lakeside habitats. Climate change threatens water levels in both lakes, salinity and sedimentation.	<ol style="list-style-type: none"> 1. As a temporary measure ensure marine connection through grading/dredging. 2. Establish a review of the management of the outlet, in view of the conservation values of the lake and its surrounds and sea level rise. 3. Establish monitoring baselines for water levels in both lakes, salinity, and sedimentation. 	Medium (cell)	SEWCDB, DENR, NRM

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Component	Issue	Proposed Action	Priority of Action	Key Players
	High conservation value habitat for birds and butterflies. Also for the Orange-bellied Parrot, Fairy Tern, Southern Bell Frog and Yellowish Sedge-skipper focal species.	Protect the fringing vegetation communities including sedges and Saltmarsh. Ensure continuing freshwater inflows. Gather further data on habitat and fauna and monitor health.	High (Cons/Threat)	DENR, SEWCDB, NRM, community
	Major infestation of Spiny Rush (<i>Juncus acuta</i>) around lake edges.	Develop a weed management plan for targeted control and protection of weed free areas.	Medium (cell)	DENR, NRM, landholders
Cliff tops Nora Creina to Beachport	Informal access is adding to cliff instability, vegetation degradation, and dune loss and damage to heritage sites.	Access to be clearly defined with signage, markers and access control fencing. Inappropriate access restricted.	High (Cons/Threat)	DENR, NRM, Community Groups
	Over winter bat colony cave in cliffs near 5-Mile Rocks.	Protect the site from degradation.	Medium (cell)	DENR, NRM
Whole cell	Aboriginal Heritage sites recorded in this cell. Need for appropriate and sustainable management.	Consultation to appropriately manage sites in this area.	High (Cons)	Murrapeena Heritage Association Inc., SE Aboriginal Focus Group, NRM, Council, Aboriginal Heritage Branch – DPC, Aboriginal Partnership Unit – DENR
	Lack of recognition of significant geological feature (Bridgewater formation).	Interpretation. Council to include map of the feature in its development plan.	Medium (Cons)	Council, Geological Society SA, NRM

BIOTA

Flora

Remnant vegetation area (ha)	3528.8 ha, 21.4% of cell area
# flora surveys / records	34 surveys, 61 opportune sites, 73 herbarium record sites, 2 threatened plant population record sites and 1 reserve database record.
# flora in cell	359 (includes some marine species)
# conservation rated flora in cell	7 recorded

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# non-indigenous flora in cell	79 recorded
Significant CDCS floristic community	<i>Leucopogon parviflorus</i> / <i>Olearia axillaris</i> shrubland (>50% of known sites occur along SE coast). <i>Olearia axillaris</i> / <i>Leucopogon parviflorus</i> shrubland (>50% of known sites occur along SE coast).
Protected area	Beachport, Lake St Clair and Penguin Island Conservation Parks (1068.9ha in total).

Weeds

Species	Common Name	Status	Study rating
<i>Asparagus asparagoides</i> (NC)	Bridal Creeper	WONS, D	9
<i>Dipogon lignosus</i>	Lavatory Creeper		9
<i>Lycium ferocissimum</i>	African Boxthorn	D	9
<i>Polygala myrtifolia</i>	Myrtle-leaf Milkwort		9
<i>Arctotheca populifolia</i>	Beach Daisy		8
<i>Ehrharta villosa</i> var. <i>maxima</i>	Pyp Grass		8
<i>Juncus acutus</i>	Sharp Rush		8
<i>Thinopyrum junceiforme</i>	Sea Wheat-grass		8
<i>Coprosma repens</i>	New Zealand Mirror-bush		7
<i>Leptospermum laevigatum</i>	Coast Tea-tree		7
<i>Asparagus scandens</i>			6
<i>Vinca major</i>	Blue Periwinkle		6
<i>Argyranthemum frutescens</i> ssp. <i>foeniculaceum</i>	Teneriffe Daisy		5
<i>Cupressus macrocarpa</i>	Monterey Cypress		5
<i>Festuca arundinacea</i>	Tall Meadow Fescue		5
<i>Euphorbia paralias</i>	Sea Spurge		4
<i>Euphorbia terracina</i>	False Caper	D	4
<i>Senecio elegans</i>	Purple Groundsel		3
<i>Ammophila arenaria</i>	Marram Grass		2
<i>Aira</i> sp.	Hair-grass		
<i>Anagallis arvensis</i>	Pimpernel		
<i>Apium graveolens</i>	Celery		
<i>Avellinia michelii</i>	Avellinia		
<i>Brassica</i> sp.			
<i>Briza minor</i>	Lesser Quaking-grass		
<i>Cakile edentula</i>	American Sea Rocket		
<i>Cakile maritima</i> ssp. <i>maritima</i>	Two-horned Sea Rocket		
<i>Cardamine hirsuta</i>	Hairy Bitter-cress		
<i>Carduus tenuiflorus</i>	Slender Thistle		
<i>Catapodium rigidum</i>	Rigid Fescue		
<i>Centaureum erythraea</i>	Common Centaury		
<i>Centranthus ruber</i> ssp. <i>ruber</i>	Red Valerian		
<i>Cerastium balearicum</i>	Chickweed		
<i>Cerastium glomeratum</i>	Common Mouse-ear Chickweed		
<i>Cirsium vulgare</i>	Spear Thistle		
<i>Dischisma arenarium</i>	Sand Dichisma		
<i>Euphorbia peplus</i>	Petty Spurge		
<i>Fumaria capreolata</i>	White-flower Fumitory		
<i>Galium murale</i>	Small Bedstraw		
<i>Gastridium phleoides</i>	Nit-grass		
<i>Geranium molle</i> var. <i>molle</i>	Soft Geranium		
<i>Gomphocarpus fruticosus</i>	Narrow-leaf Cotton-bush		
<i>Hainardia cylindrica</i>	Common Barb-grass		
<i>Holcus lanatus</i>	Yorkshire Fog		

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Species	Common Name	Status	Study rating
<i>Hordeum sp.</i>			
<i>Hypochaeris radicata</i>	Rough Cat's Ear		
<i>Hypochaeris sp.</i>	Cat's Ear		
<i>Isolepis marginata</i>	Little Club-rush		
<i>Lagurus ovatus</i>	Hare's Tail Grass		
<i>Leontodon taraxacoides ssp. taraxacoides</i>	Lesser Hawkbit		
<i>Lolium multiflorum</i>	Italian Ryegrass		
<i>Lotus angustissimus</i>	Slender Bird's-foot Trefoil		
<i>Malva dendromorpha</i>	Tree Mallow		
<i>Melianthus major</i>	Cape Honey-flower		
<i>Melilotus indicus</i>	King Island Melilot		
<i>Myosotis discolor ssp. discolor</i>	Yellow-and-blue Forget-me-not		
<i>Parapholis incurva</i>	Curly Ryegrass		
<i>Phalaris aquatica</i>	Phalaris		
<i>Plantago coronopus ssp. coronopus</i>	Bucks-horn Plantain		
<i>Polypogon maritimus</i>	Coast Beard-grass		
<i>Polypogon monspeliensis</i>	Annual Beard-grass		
<i>Ranunculus repens</i>	Creeping Buttercup		
<i>Reseda alba</i>	White Mignonette		
<i>Reseda lutea</i>	Cut-leaf Mignonette		
<i>Ricinus communis</i>	Castor Oil Plant		
<i>Rostraria cristata</i>	Annual Cat's-tail		
<i>Sambucus gaudichaudiana</i>	White Elderberry		
<i>Scabiosa atropurpurea</i>	Pincushion		
<i>Sherardia arvensis</i>	Field Madder		
<i>Sisymbrium sp.</i>	Wild Mustard		
<i>Solanum aviculare</i>	Kangaroo Apple		
<i>Solanum nigrum</i>	Black Nightshade		
<i>Sonchus oleraceus (NC)</i>	Common Sow-thistle		
<i>Spergularia sp.</i>	Sand-spurrey		
<i>Stellaria media</i>	Chickweed		
<i>Taraxacum officinale (NC)</i>	Dandelion		
<i>Trifolium sp.</i>	Clover		
<i>Vicia sativa ssp. nigra</i>	Narrow-leaf Vetch		
<i>Vulpia myuros f. myuros</i>	Rat's-tail Fescue		

D: Declared weed, WONS: Weeds of National Significance

Native flora*

Species	Common Name	Aus status	SA status
<i>Caladenia richardsiorum</i>	Little Dip Spider-orchid	EN	E
<i>Cuscuta tasmanica</i>	Tasmanian Dodder		V
<i>Scaevola calendulacea</i>	Dune Fanflower		V
<i>Eucalyptus leucoxydon ssp. megalocarpa</i>	Large-fruit Blue Gum		R
<i>Leptinella reptans</i>	Creeping Cotula		R
<i>Poa fax</i>	Scaly Poa		R
<i>Zoysia macrantha ssp. walshii</i>	Manila Grass		R
<i>Acacia cupularis</i>	Cup Wattle		
<i>Acacia leiophylla</i>	Coast Golden Wattle		
<i>Acacia leiophylla/ pycnantha</i>			
<i>Acacia longifolia ssp. sophorae</i>	Coastal Wattle		
<i>Acacia mearnsii</i>	Black Wattle		
<i>Acacia myrtifolia</i>	Myrtle Wattle		

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Species	Common Name	Aus status	SA status
<i>Acacia pycnantha</i>	Golden Wattle		
<i>Acacia verticillata</i> ssp. <i>ovoidea</i>	Prickly Moses		
<i>Acaena novae-zelandiae</i>	Biddy-biddy		
<i>Acrosorium ciliolatum</i>			
<i>Actites megalocarpa</i>	Coast Sow-thistle		
<i>Adriana klotzschii</i> (NC)	Coast Bitter-bush		
<i>Adriana quadripartita</i>	Coast Bitter-bush		
<i>Ajuga australis</i> f. B (R.L.Taplin 972)	Lesser Bugle		
<i>Allocasuarina verticillata</i>	Drooping Sheoak		
<i>Alyxia buxifolia</i>	Sea Box		
<i>Angianthus preissianus</i>	Salt Angianthus		
<i>Apalochlamys spectabilis</i>	Showy Firebush		
<i>Apium annuum</i>	Annual Celery		
<i>Apium prostratum</i> var. <i>filiforme</i>	Native Celery		
<i>Apium prostratum</i> var. <i>prostratum</i>	Native Celery		
<i>Apium</i> sp.	Celery		
<i>Apjohnia laetevirens</i>			
<i>Apodasmia brownii</i>	Coarse Twine-rush		
<i>Atriplex cinerea</i>	Coast Saltbush		
<i>Atriplex semibaccata</i>	Berry Saltbush		
<i>Austrofestuca littoralis</i>	Coast Fescue		
<i>Austrostipa exilis</i>	Heath Spear-grass		
<i>Austrostipa flavescens</i>	Coast Spear-grass		
<i>Austrostipa mundula</i>	Neat Spear-grass		
<i>Austrostipa</i> sp.	Spear-grass		
<i>Baumea juncea</i>	Bare Twig-rush		
<i>Beyeria lechenaultii</i>	Pale Turpentine Bush		
<i>Billardiera cymosa</i> ssp. <i>cymosa</i>	Sweet Apple-berry		
<i>Billardiera sericophora</i>	Silky Apple-berry		
<i>Billardiera</i> sp.	Apple-berry		
<i>Brongniartella australis</i>			
<i>Bryopsis plumosa</i>			
<i>Bursaria spinosa</i> ssp. <i>spinosa</i>	Sweet Bursaria		
<i>Caladenia latifolia</i>	Pink Caladenia		
<i>Caladenia prolata</i>	Shy Caladenia		
<i>Caladenia</i> sp.	Spider-orchid		
<i>Calandrinia brevipedata</i>	Short-stalked Purslane		
<i>Calystegia sepium</i> ssp. <i>roseata</i>	Large Bindweed		
<i>Carpobrotus rossii</i>	Native Pigface		
<i>Carpobrotus rossii</i> (NC)	Native Pigface		
<i>Carpobrotus</i> sp.	Pigface		
<i>Cassytha melantha</i>	Coarse Dodder-laurel		
<i>Cassytha pubescens</i>	Downy Dodder-laurel		
<i>Cassytha</i> sp.	Dodder-laurel		
<i>Caulerpa cactoides</i>			
<i>Centella cordifolia</i>	Native Centella		
<i>Centrolepis polygyna</i>	Wiry Centrolepis		
<i>Cladophora coelothrix</i>			
<i>Cladophora crinalis</i>			
<i>Cladophora lehmanniana</i>			
<i>Cladophora rhizoclonioidea</i>			
<i>Cladosiphon filum</i>			
<i>Clematis microphylla</i> var. <i>microphylla</i>	Old Man's Beard		

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Species	Common Name	Aus status	SA status
<i>Codium galeatum</i>			
<i>Codium perrinae</i>			
<i>Coeloclonium tasmanicum</i>			
<i>Colpomenia sinuosa</i>			
<i>Comesperma volubile</i>	Love Creeper		
<i>Corybas</i> sp.	Helmet-orchid		
<i>Cotula australis</i>	Common Cotula		
<i>Craspedocarpus ramentaceus</i>			
<i>Crassula sieberiana</i> ssp. <i>tetramera</i> (NC)	Australian Stonecrop		
<i>Curdiea obesa</i>			
<i>Cynoglossum australe</i>	Australian Hound's-tongue		
Cyperaceae sp.	Sedge Family		
<i>Cyrtostylis</i> sp.	Gnat-orchid		
<i>Daucus glochidiatus</i>	Native Carrot		
<i>Dianella brevicaulis</i>	Short-stem Flax-lily		
<i>Dianella brevicaulis/revoluta</i> var.	Black-anther Flax-lily		
<i>Dianella revoluta</i> var. <i>revoluta</i>	Black-anther Flax-lily		
<i>Dichelachne crinita</i>	Long-hair Plume-grass		
<i>Dichondra repens</i>	Kidney Weed		
<i>Distichlis distichophylla</i>	Emu-grass		
<i>Eleocharis gracilis</i>	Slender Spike-rush		
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	Ruby Saltbush		
<i>Epiglossum proliferum</i>			
<i>Epilobium billardierianum</i> ssp.	Robust Willow-herb		
<i>Epilobium billardierianum</i> ssp. <i>billardierianum</i>	Robust Willow-herb		
<i>Epilobium billardierianum</i> ssp. <i>X intermedium</i>	Variable Willow-herb		
<i>Eucalyptus arenacea</i>	Dune Stringybark		
<i>Eucalyptus baxteri</i>	Brown Stringybark		
<i>Eucalyptus diversifolia</i> (NC)	Coastal White Mallee		
<i>Eucalyptus diversifolia</i> ssp. <i>diversifolia</i>	Coastal White Mallee		
<i>Eucalyptus ovata</i> var. <i>grandiflora</i>	Swamp Gum		
<i>Euphrasia collina</i> ssp. <i>tetragona</i>	Coast Eyebright		
<i>Exocarpos cupressiformis</i>	Native Cherry		
<i>Exocarpos sparteus</i>	Slender Cherry		
<i>Exocarpos syrticola</i>	Coast Cherry		
<i>Ficinia nodosa</i>	Knobby Club-rush		
<i>Gahnia filum</i>	Thatching Grass		
<i>Gahnia trifida</i>	Cutting Grass		
<i>Galium compactum</i>	Compact Bedstraw		
<i>Galium migrans</i> (NC)	Loose Bedstraw		
<i>Gelidium asperum</i>			
<i>Geranium potentilloides</i> var. <i>potentilloides</i>	Downy Geranium		
<i>Geranium</i> sp.	Geranium		
<i>Gigartina densa</i>			
<i>Gigartina wehlii</i>			
<i>Gloiosaccion brownii</i>			
<i>Gnaphalium indutum</i> ssp. <i>indutum</i>	Tiny Cudweed		
<i>Goodenia humilis</i>	Swamp Goodenia		
Gramineae sp.	Grass Family		
<i>Hakea nodosa</i>	Yellow Hakea		
<i>Hakea rugosa</i>	Dwarf Hakea		
<i>Hakea vittata</i>	Limestone Needlebush		
<i>Haliptilon roseum</i>			

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Species	Common Name	Aus status	SA status
<i>Halopteryx funicularis</i>			
<i>Halopteryx paniculata</i>			
<i>Helichrysum leucopsidium</i>	Satin Everlasting		
<i>Helminthocladia densa</i>			
<i>Hemarthria uncinata</i> var. <i>uncinata</i>	Mat Grass		
<i>Hemichroa pentandra</i>	Trailing Hemichroa		
Herb sp.			
<i>Hibbertia sericea</i>	Silky Guinea-flower		
<i>Hinckesia mitchelliae</i>			
<i>Husseyia rubra</i>			
<i>Hydrocotyle laxiflora</i>	Stinking Pennywort		
<i>Hydrocotyle pterocarpa</i>	Wing Pennywort		
<i>Hydrocotyle</i> sp.	Pennywort		
<i>Hydrocotyle tripartita</i>	Three-part Pennywort		
<i>Hymenena multipartita</i>			
<i>Hymenocladia chondricola</i>			
<i>Hypolaena fastigiata</i>	Tassel Rope-rush		
<i>Ipomoea</i> sp.	Morning-glory/Cow-vine		
<i>Isolepis cernua</i>	Nodding Club-rush		
<i>Isolepis platycarpa</i>	Flat-fruit Club-rush		
<i>Isolepis</i> sp.	Club-rush		
<i>Jania micrarthrodia</i>			
<i>Juncus bufonius</i>	Toad Rush		
<i>Juncus kraussii</i>	Sea Rush		
<i>Kennedia prostrata</i>	Scarlet Runner		
<i>Kunzea pomifera</i>	Muntries		
<i>Lachnagrostis filiformis</i>	Common Blown-grass		
<i>Lasiopetalum discolor</i>	Coast Velvet-bush		
<i>Lasiopetalum schulzenii</i>	Drooping Velvet-bush		
<i>Laurencia filiformis</i> f. <i>filiformis</i>			
<i>Lawrenzia spicata</i>	Salt Lawrenzia		
<i>Lepidium foliosum</i>	Leafy Peppergrass		
<i>Lepidosperma congestum</i>			
<i>Lepidosperma gladiatum</i>	Coast Sword-sedge		
<i>Lepidosperma viscidum</i>	Sticky Sword-sedge		
<i>Lepilaena australis</i>	Austral Water-mat		
<i>Leptocarpus tenax</i>	Slender Twine-rush		
<i>Leptospermum lanigerum</i>	Silky Tea-tree		
<i>Leucophyta brownii</i>	Coast Cushion Bush		
<i>Leucopogon lanceolatus</i> var. <i>lanceolatus</i>	Lance Beard-heath		
<i>Leucopogon parviflorus</i>	Coast Beard-heath		
<i>Liagora harveyana</i>			
Lichen sp.			
<i>Lilaeopsis polyantha</i>	Australian Lilaeopsis		
<i>Lobelia anceps</i>	Angled Lobelia		
<i>Lophothalia verticillata</i>			
<i>Lotus australis</i>	Austral Trefoil		
<i>Macrocystis angustifolia</i>			
<i>Medeiothamnion balurus</i>			
<i>Melaleuca brevifolia</i>	Short-leaf Honey-myrtle		
<i>Melaleuca balmaturorum</i>	Swamp Paper-bark		
<i>Melaleuca lanceolata</i>	Dryland Tea-tree		
<i>Melaleuca lanceolata</i> ssp. <i>lanceolata</i> (NC)	Dryland Tea-tree		

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Species	Common Name	Aus status	SA status
<i>Melanema dumosum</i>			
<i>Metagoniolithon radiatum</i>			
<i>Metamastophora flabellata</i>			
<i>Microtis arenaria</i>	Notched Onion-orchid		
<i>Microtis unifolia complex</i>	Onion-orchid		
<i>Moss sp.</i>			
<i>Muehlenbeckia adpressa</i>	Climbing Lignum		
<i>Muehlenbeckia gunnii</i>	Coastal Climbing Lignum		
<i>Mycbodea aciculare</i>			
<i>Myoporum brevipes</i>	Warty Boobialla		
<i>Myoporum insulare</i>	Common Boobialla		
<i>Myosotis australis</i>	Austral Forget-me-not		
<i>Myosotis sp.</i>	Forget-me-not		
<i>Myriogramme gunniana</i>			
<i>Nizymania australis</i>			
<i>Olearia axillaris</i>	Coast Daisy-bush		
<i>Olearia ramulosa</i>	Twiggy Daisy-bush		
<i>Opercularia ovata</i>	Broad-leaf Stinkweed		
<i>Opercularia turpis</i>	Twiggy Stinkweed		
<i>Oxalis perennans (NC)</i>	Native Sorrel		
<i>Ozothamnus ferrugineus</i>	Tree Everlasting		
<i>Ozothamnus turbinatus</i>	Coast Bush-everlasting		
<i>Pachydictyon paniculatum</i>			
<i>Parietaria debilis (NC)</i>	Smooth-nettle		
<i>Pedobesia claviformis</i>			
<i>Pelargonium australe</i>	Austral Stork's-bill		
<i>Phyllangium divergens</i>	Wiry Mitrewort		
<i>Picris angustifolia ssp. angustifolia</i>	Coast Picris		
<i>Pimelea glauca</i>	Smooth Riceflower		
<i>Pimelea serpyllifolia ssp. serpyllifolia</i>	Thyme Riceflower		
<i>Plantago hispida</i>	Hairy Plantain		
<i>Platoma australicum</i>			
<i>Poa labillardieri var. labillardieri</i>	Common Tussock-grass		
<i>Poa poiiformis var. poiiformis</i>	Coast Tussock-grass		
<i>Poa sp.</i>	Meadow-grass/Tussock-grass		
<i>Podotheca angustifolia</i>	Sticky Long-heads		
<i>Polysiphonia isogona</i>			
<i>Pomaderris obcordata</i>	Wedge-leaf Pomaderris		
<i>Pomaderris paniculosa ssp.</i>			
<i>Pomaderris paniculosa ssp. paniculosa</i>	Mallee Pomaderris		
<i>Pomaderris paniculosa ssp. paralia</i>	Coast Pomaderris		
<i>Pomaderris sp.</i>	Pomaderris		
<i>Porphyra columbina</i>			
<i>Posidonia australis</i>	Southern Tapeweed		
<i>Pseudognaphalium luteoalbum</i>	Jersey Cudweed		
<i>Pterocladia lucida</i>			
<i>Pterostylis sanguinea</i>	Blood Greenhood		
<i>Pterothamnion nodiferum</i>			
<i>Ptilotus macrocephalus</i>	Feather-heads		
<i>Pultenaea acerosa</i>	Bristly Bush-pea		
<i>Pultenaea hispidula</i>	Rusty Bush-pea		
<i>Pultenaea stricta</i>	Erect Bush-pea		
<i>Pultenaea tenuifolia</i>	Narrow-leaf Bush-pea		

SE9 – Lake St George, Lake St Clair, Beachport

Species	Common Name	Aus status	SA status
<i>Ranunculus sessiliflorus</i> var. <i>sessiliflorus</i>	Annual Buttercup		
<i>Rhagodia candolleana</i> ssp.	Sea-berry Saltbush		
<i>Rhagodia candolleana</i> ssp. <i>candolleana</i>	Sea-berry Saltbush		
<i>Rhodymenia obtusa</i>			
<i>Rumex</i> sp.	Dock		
<i>Ruppia megacarpa</i>	Widgeon Grass		
<i>Ruppia polycarpa</i>	Widgeon Grass		
<i>Ruppia tuberosa</i>	Widgeon Grass		
<i>Sagina maritima</i>	Sea Pearlwort		
<i>Samolus repens</i>	Creeping Brookweed		
<i>Sarcocornia blackiana</i>	Thick-head Samphire		
<i>Sarcocornia quinqueflora</i>	Beaded Samphire		
<i>Scaevola aemula</i>	Fairy Fanflower		
<i>Scaevola angustata</i>	Coast Fanflower		
<i>Scaevola crassifolia</i>	Cushion Fanflower		
<i>Schoenoplectus pungens</i>	Spiky Club-rush		
<i>Schoenus nitens</i>	Shiny Bog-rush		
<i>Scinaia proliferata</i>			
<i>Scytosiphon lomentaria</i>			
<i>Sebaea albidiflora</i>	White Sebaea		
<i>Sebaea ovata</i>	Yellow Sebaea		
<i>Selliera radicans</i>	Shiny Swamp-mat		
<i>Senecio anethifolius</i> (NC)	Feathery Groundsel		
<i>Senecio biserratus</i>	Jagged Groundsel		
<i>Senecio cunninghamii</i> var. <i>cunninghamii</i> (NC)	Shrubby Groundsel		
<i>Senecio glomeratus</i> (NC)	Swamp Groundsel		
<i>Senecio glomeratus</i> ssp. <i>glomeratus</i>	Swamp Groundsel		
<i>Senecio glomeratus</i> ssp. <i>longifructus</i>	Swamp Groundsel		
<i>Senecio odoratus</i>	Scented Groundsel		
<i>Senecio odoratus</i> var. <i>odoratus</i> (NC)	Scented Groundsel		
<i>Senecio pinnatifolius</i> (NC)	Variable Groundsel		
<i>Senecio pinnatifolius</i> var. <i>lanceolatus</i>	Variable Groundsel		
<i>Senecio pinnatifolius</i> var. <i>maritimus</i>	Variable Groundsel		
<i>Senecio spanomerus</i>			
<i>Solanum laciniatum</i>	Cut-leaf Kangaroo-apple		
<i>Sonchus hydrophilus</i>	Native Sow-thistle		
<i>Sonderopelta coriacea</i>			
<i>Spinifex sericeus</i> (NC)	Rolling Spinifex		
<i>Sporobolus virginicus</i>	Salt Couch		
<i>Sporobolus virginicus</i> (NC)	Salt Couch		
<i>Sporochnus radiciformis</i>			
<i>Stackhousia spathulata</i>	Coast Candles		
<i>Streblonema fasciculatum</i>			
<i>Strepsithalia liagorae</i>			
<i>Suaeda australis</i>	Austral Seablite		
<i>Swainsona lessertiifolia</i>	Coast Swainson-pea		
<i>Tetragonia implexicoma</i>	Bower Spinach		
<i>Thelymitra</i> sp.	Sun-orchid		
<i>Threlkeldia diffusa</i>	Coast Bonefruit		
<i>Thysanotus juncifolius</i>	Rush Fringe-lily		
<i>Typha domingensis</i>	Narrow-leaf Bulrush		
<i>Ulva australis</i>			
<i>Wilsonia backhousei</i>	Narrow-leaf Wilsonia		

SE9 – Lake St George, Lake St Clair, Beachport

Species	Common Name	Aus status	SA status
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Zymurgia chondriopsidea

E: Endangered, V: Vulnerable, R: Rare

*note: includes some marine species

Fauna

# of fauna in cell	259 recorded - 203 birds, 16 butterflies, 18 mammals, 15 reptiles, 7 amphibians (an additional 12 butterflies identified by experts as possibly occurring)
# of fauna surveys / records	13 surveys, 127 opportune sites
# of threatened fauna in cell	55 recorded
# of non-indigenous fauna	16 recorded

Non-indigenous fauna

Species	Common Name	Class	Record
<i>Alauda arvensis</i>	Eurasian Skylark	Aves	x
<i>Carduelis carduelis</i>	European Goldfinch	Aves	x
<i>Chloris chloris</i>	Common Greenfinch (European Greenfinch)	Aves	x
<i>Columba livia</i>	Rock Dove (Feral Pigeon)	Aves	x
<i>Passer domesticus</i>	House Sparrow	Aves	x
<i>Streptopelia chinensis</i>	Spotted Dove (Spotted turtle-dove)	Aves	x
<i>Sturnus vulgaris</i>	Common Starling	Aves	x
<i>Turdus merula</i>	Common Blackbird	Aves	x
	Common Skylark	Aves	x
<i>Pieris rapae rapae</i>	Cabbage White	Invertebrate	x
<i>Danaus plexippus plexippus</i>	Wanderer, Monarch	Invertebrate	x
<i>Mus musculus</i>	House Mouse	Mammalia	x
<i>Oryctolagus cuniculus</i>	Rabbit (European Rabbit)	Mammalia	x
<i>Rattus norvegicus</i>	Brown Rat (Sewer Rat, Norway Rat)	Mammalia	x
<i>Rattus rattus</i>	Black Rat (Ship Rat, Roof Rat)	Mammalia	x
<i>Vulpes vulpes</i>	Fox (Red Fox)	Mammalia	x

x: recorded, p: possibly there as suggested by R. Grund

Birds

Species	Common Name	Aus status	SA status
<i>Neophema chrysogaster</i>	Orange-bellied Parrot	CR/M	E
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	M	E
<i>Sternula albifrons</i>	Little Tern		E
<i>Sternula nereis</i>	Fairy Tern		E
<i>Botaurus poiciloptilus</i>	Australasian Bittern		V
<i>Calyptorhynchus funereus</i>	Yellow-tailed Black-Cockatoo		V
<i>Cladorhynchus leucocephalus</i>	Banded Stilt		V
<i>Coturnix ypsilophora</i>	Brown Quail		V
<i>Lemnia pectoralis</i>	Lewin's Rail		V
<i>Neophema chrysostoma</i>	Blue-winged Parrot		V
<i>Numenius madagascariensis</i>	Eastern Curlew	M	V
<i>Petroica phoenicea</i>	Flame Robin		V
<i>Rostratula australis</i>	Australian Painted Snipe	V	V
<i>Stictonetta naevosa</i>	Freckled Duck		V

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Species	Common Name	Aus status	SA status
<i>Thinornis rubricollis</i>	Hooded Plover		V
<i>Actitis hypoleucos</i>	Common Sandpiper	M	R
<i>Anas rhynchotis</i>	Australasian Shoveler		R
<i>Anhinga novaehollandiae</i>	Australasian Darter		R
<i>Ardea ibis</i>	Cattle Egret		R
<i>Ardea intermedia</i>	Intermediate Egret		R
<i>Arenaria interpres</i>	Ruddy Turnstone	M	R
<i>Biziura lobata</i>	Musk Duck		R
<i>Calidris alba</i>	Sanderling	M	R
<i>Calidris subminuta</i>	Long-toed Stint	M	R
<i>Calidris tenuirostris</i>	Great Knot	M	R
<i>Charadrius leschenaultii</i>	Greater Sand Plover (Large Sand Plover)	M	R
<i>Charadrius mongolus</i>	Lesser Sand Plover (Mongolian Plover)	M	R
<i>Egretta garzetta</i>	Little Egret		R
<i>Egretta sacra</i>	Eastern Reef Egret	M	R
<i>Falco peregrinus</i>	Peregrine Falcon		R
<i>Gallinago hardwickii</i>	Latham's Snipe (Japanese Snipe)	M	R
<i>Gerygone albogularis</i>	White-throated Gerygone		R
<i>Haematopus fuliginosus</i>	Sooty Oystercatcher		R
<i>Haematopus longirostris</i>	Australian Pied Oystercatcher		R
<i>Larus dominicanus</i>	Kelp Gull		R
<i>Limosa lapponica</i>	Bar-tailed Godwit	M	R
<i>Myiagra inquieta</i>	Restless Flycatcher		R
<i>Neophema elegans</i>	Elegant Parrot		R
<i>Numenius phaeopus</i>	Whimbrel	M	R
<i>Oxyura australis</i>	Blue-billed Duck		R
<i>Plegadis falcinellus</i>	Glossy Ibis	M	R
<i>Pluvialis fulva</i>	Pacific Golden Plover	M	R
<i>Podiceps cristatus</i>	Great Crested Grebe		R
<i>Stagonopleura bella</i>	Beautiful Firetail		R
<i>Sterna hirundo</i>	Common Tern	M	R
<i>Tringa brevipes</i>	Grey-tailed Tattler	M	R
<i>Tringa glareola</i>	Wood Sandpiper	M	R
<i>Xenus cinereus</i>	Terek Sandpiper	M	R
<i>Zosterops lateralis</i>	Bassian Thrush (White's Thrush)		R
<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater		
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill		
<i>Acanthiza lineata</i>	Striated Thornbill		
<i>Acanthiza pusilla</i>	Brown Thornbill		
<i>Acanthorhynchus tenuirostris</i>	Eastern Spinebill		
<i>Accipiter cirrocephalus</i>	Collared Sparrowhawk		
<i>Aegotheles cristatus</i>	Australian Owlet-nightjar		
<i>Anas castanea</i>	Chestnut Teal		
<i>Anas gracilis</i>	Grey Teal		
<i>Anas superciliosa</i>	Pacific Black Duck		
<i>Anthochaera carunculata</i>	Red Wattlebird		
<i>Anthochaera chrysoptera</i>	Little Wattlebird		
<i>Anthus novaeseelandiae</i>	Australasian Pipit (Richard's Pipit)		
<i>Aphelocephala leucopsis</i>	Southern Whiteface		
<i>Apus pacificus</i>	Fork-tailed Swift		
<i>Aquila audax</i>	Wedge-tailed Eagle		
<i>Ardea alba</i>	Great Egret		
<i>Ardea modesta</i>	Eastern Great Egret		

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Species	Common Name	Aus status	SA status
<i>Ardenna tenuirostris</i>	Short-tailed Shearwater (Mutton Bird)		
<i>Artamus cyanopterus</i>	Dusky Woodswallow		
<i>Artamus personatus</i>	Masked Woodswallow		
<i>Artamus superciliosus</i>	White-browed Woodswallow		
<i>Aythya australis</i>	Hardhead (White-eyed Duck)		
<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo		
<i>Cacomantis pallidus</i>	Pallid Cuckoo		
<i>Calamanthus fuliginosus</i>	Striated Fieldwren		
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	M	
<i>Calidris canutus</i>	Red Knot	M	
<i>Calidris ferruginea</i>	Curlew Sandpiper	M	
<i>Calidris ruficollis</i>	Red-necked Stint	M	
<i>Chalcites basalis</i>	Horsfield's Bronze-cuckoo		
<i>Chalcites lucidus</i>	Shining Bronze-Cuckoo		
<i>Charadrius bicinctus</i>	Double-banded Plover		
<i>Charadrius ruficapillus</i>	Red-capped Plover (Red-capped Dotterel)		
<i>Charadrius veredus</i>	Oriental Plover	M	
<i>Chenonetta jubata</i>	Australian Wood Duck (Maned Duck)		
<i>Chlidonias hybrida</i>	Whiskered Tern	M	
<i>Chlidonias leucopterus</i>	White-winged Black Tern	M	
<i>Chroicocephalus novaehollandiae</i>	Silver Gull		
<i>Cincloramphus cruralis</i>	Brown Songlark		
<i>Circus approximans</i>	Swamp Harrier (Marsh Harrier)		
<i>Cisticola exilis</i>	Golden-headed Cisticola		
<i>Colluricincla harmonica</i>	Grey Shrike-thrush		
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike		
<i>Cormobates leucophaea</i>	White-throated Treecreeper		
<i>Corvus coronoides</i>	Australian Raven		
<i>Corvus mellori</i>	Little Raven		
<i>Corvus tasmanicus</i>	Forest Raven		
<i>Coturnix pectoralis</i>	Stubble Quail		
<i>Cracticus tibicen</i>	Australian Magpie		
<i>Cracticus torquatus</i>	Grey Butcherbird		
<i>Cygnus atratus</i>	Black Swan		
<i>Dacelo novaeguineae</i>	Laughing Kookaburra		
<i>Dasyornis broadbenti</i>	Rufous Bristlebird		ssp
<i>Dicaeum hirundinaceum</i>	Mistletoebird		
<i>Dromaius novaehollandiae</i>	Emu		
<i>Egretta novaehollandiae</i>	White-faced Heron		
<i>Elanus axillaris</i>	Black-shouldered Kite		
<i>Elsyornis melanops</i>	Black-fronted Dotterel (Black-fronted Plover)		
<i>Eolophus roseicapillus</i>	Galah		
<i>Eopsaltria australis</i>	Eastern Yellow Robin		
<i>Epthianura albifrons</i>	White-fronted Chat		
<i>Epthianura aurifrons</i>	Orange Chat		
<i>Erythrogonys cinctus</i>	Red-kneed Dotterel		
<i>Eudyptula minor</i>	Little Penguin (Fairy Penguin)		
<i>Falco berigora</i>	Brown Falcon		
<i>Falco cenchroides</i>	Nankeen Kestrel (Australian Kestrel)		
<i>Falco longipennis</i>	Australian Hobby		
<i>Fulica atra</i>	Eurasian Coot		
<i>Gallinula tenebrosa</i>	Dusky Moorhen		
<i>Gallirallus philippensis</i>	Buff-banded Rail		

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Species	Common Name	Aus status	SA status
<i>Gelochelidon nilotica</i>	Gull-billed Tern		
<i>Glossopsitta concinna</i>	Musk Lorikeet		
<i>Glyciphila melanops</i>	Tawny-crowned Honeyeater		
<i>Grallina cyanoleuca</i>	Magpie-lark		
<i>Haliastur sphenurus</i>	Whistling Kite		
<i>Himantopus himantopus</i>	Black-winged Stilt		
<i>Hirundapus caudacutus</i>	White-throated Needletail	M	
<i>Hirundo neoxena</i>	Welcome Swallow		
<i>Hydroprogne caspia</i>	Caspian Tern		
<i>Lalage sueurii</i>	White-winged Triller		
<i>Larus pacificus</i>	Pacific Gull		
<i>Lichenostomus virescens</i>	Singing Honeyeater		
<i>Malacorhynchus membranaceus</i>	Pink-eared Duck		
<i>Malurus cyaneus</i>	Superb Fairy-wren		
<i>Manorina melanocephala</i>	Noisy Miner		
<i>Megalurus gramineus</i>	Little Grassbird		
<i>Melanodryas cucullata</i>	Hooded Robin		
<i>Melithreptus brevirostris</i>	Brown-headed Honeyeater		
<i>Microcarbo melanoleucos</i>	Little Pied Cormorant		
<i>Microeca fascinans</i>	Jacky Winter		ssp
<i>Morus serrator</i>	Australasian Gannet		
<i>Neobornia temporalis</i>	Red-browed Finch		
<i>Ninox novaeseelandiae</i>	Southern Boobook		
<i>Ocyphaps lophotes</i>	Crested Pigeon		
<i>Pachycephala olivacea</i>	Olive Whistler		ssp
<i>Pachycephala pectoralis</i>	Golden Whistler		
<i>Pachycephala rufiventris</i>	Rufous Whistler		
<i>Pardalotus punctatus</i>	Spotted Pardalote		
<i>Pardalotus striatus</i>	Striated Pardalote		
<i>Pelecanus conspicillatus</i>	Australian Pelican		
<i>Petrochelidon ariel</i>	Fairy Martin		
<i>Petrochelidon nigricans</i>	Tree Martin		
<i>Petroica boodang</i>	Scarlet Robin		ssp
<i>Phaethon rubricauda</i>	Red-tailed Tropicbird		
<i>Phalacrocorax carbo</i>	Great Cormorant		
<i>Phalacrocorax fuscescens</i>	Black-faced Cormorant (Black-faced Shag)		
<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant		
<i>Phalacrocorax varius</i>	Pied Cormorant		
<i>Phaps chalcoptera</i>	Common Bronzewing		
<i>Phaps elegans</i>	Brush Bronzewing		
<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater		
<i>Platalea flavipes</i>	Yellow-billed Spoonbill		
<i>Platalea regia</i>	Royal Spoonbill		
<i>Platycercus eximius</i>	Eastern Rosella		
<i>Pluvialis squatarola</i>	Grey Plover	M	
<i>Podargus strigoides</i>	Tawny Frogmouth		
<i>Poliocephalus poliocephalus</i>	Hoary-headed Grebe		
<i>Pomatostomus superciliosus</i>	White-browed Babbler		
<i>Pomatostomus temporalis</i>	Grey-crowned Babbler		ssp
<i>Porphyrio porphyrio</i>	Purple Swamphen (Purple Moorhen)		
<i>Porzana fluminea</i>	Australian Spotted Crake (Australian Crake)		
<i>Psephotus haematonotus</i>	Red-rumped Parrot		
<i>Puhialis dominica</i>	Lesser Golder Plover	M	

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Species	Common Name	Aus status	SA status
<i>Recurvirostra novaehollandiae</i>	Red-necked Avocet		
<i>Rhipidura albiscapa</i>	Grey Fantail		
<i>Rhipidura leucophrys</i>	Willie Wagtail		
<i>Sericornis frontalis</i>	White-browed Scrubwren		
<i>Sterna striata</i>	White-fronted Tern		
<i>Stipiturus malachurus</i>	Southern Emu-wren	ssp	ssp
<i>Strepera versicolor</i>	Grey Currawong		ssp
<i>Tachybaptus novaehollandiae</i>	Australasian Grebe (Little Grebe)		
<i>Tadorna tadornoides</i>	Australian Shelduck (Mountain Duck)		
<i>Thalasseus bergii</i>	Crested Tern		
<i>Threskiornis molucca</i>	Australian White Ibis (Sacred Ibis)		
<i>Threskiornis spinicollis</i>	Straw-necked Ibis		
<i>Todiramphus pyrrhopygius</i>	Red-backed Kingfisher		
<i>Todiramphus sanctus</i>	Sacred Kingfisher		
<i>Tribonyx ventralis</i>	Black-tailed Native-hen		
<i>Tringa nebularia</i>	Common Greenshank	M	
<i>Tringa stagnatilis</i>	Marsh Sandpiper	M	
<i>Tyto javanica</i>	Eastern Barn Owl		
<i>Vanellus miles</i>	Masked Lapwing		
<i>Vanellus tricolor</i>	Banded Lapwing		
<i>Zosterops lateralis</i>	Silvereve		

CR: Critically endangered, E: Endangered, V: Vulnerable, R: Rare, M: Migratory, ssp: sub-species

Butterflies

Species	Common Name	Status*	Record
<i>Hesperilla donnyisa donnyisa</i> (pale form <i>flavescens</i>)	Yellowish Sedge-Skipper	E	ex?
<i>Jamenus icilius</i>	Icilius Hairstreak	E in SE	p
<i>Oreixenica kershawi kanunda</i>	Striped Xenica	V	p
<i>Hesperilla cyrhoticha cyclospila</i>	Chrysotricha Sedge-skipper or Golden-haired Sedge-skipper	V	x
<i>Lucia limbaria</i>	Small Copper	R	p
<i>Taractrocera papyria papyria</i>	White-banded Grass-dart	R	x
<i>Tisiphone abeona albifascia</i>	Sword-grass brown	R	x
<i>Erina hyacinthina form josephina</i>	Common Dusky-blue	R	x
<i>Erina hyacinthina hyacinthina</i>	Dusky blue	R	x
<i>Delias aganippe</i>	Wood White	R	p
<i>Heteronympha penelope</i>	Shouldered Brown		p
<i>Erina acasta</i>	Blotched Dusky-blue		p
<i>Lampides boeticus</i>	Long-tailed Pea-blue		p
<i>Nacuduba biocellata biocellata</i>	Two-spotted Line-blue	LC	p
<i>Neolucia agricola agricola</i>	Fringed Heath-blue		p
<i>Geitoneura klugii klugii</i>	Common Xenica	C	x
<i>Hesperilla donnyisa delos</i> (incl. form <i>diluta</i>)	Donnyisa skipper		x
<i>Hesperilla idothea idothea</i>			x
<i>Heteronympha merope merope</i>	Common Brown	C	x
<i>Junonia villida calybe</i>	Meadow argus	Va	x
<i>Theclinesibes albocincta</i>	Bitter-bush blue	LC	x
<i>Theclinesibes miskini miskini</i>	Wattle Blue		p
<i>Theclinesibes serpentata serpentata</i>	Salt-bush blue		p
<i>Vanessa itea</i>	Australian Admiral	Va	x
<i>Vanessa kershawi</i>	Australian Painted Lady	Va	x

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Species	Common Name	Status*	Record
<i>Zizina labradus labradus</i>	Common Grass Blue		x

*Vulnerability as per R. Grund, E: Endangered, V: Vulnerable, R: Rare

Va: Vagrant, LC: Locally common, C: Common

x: recorded, p: possibly there, ex?: possible extinct, as suggested by R. Grund

Mammals

Species	Common Name	Aus status	SA status	Record
<i>Isodon obesulus obesulus</i>	Southern Brown Bandicoot (SA mainland and KI ssp)	EN	V	x
<i>Antechinus minimus</i>	Swamp Antechinus		E	x
<i>Macropus rufogriseus</i>	Red-necked Wallaby		R	x
<i>Rattus lutreolus</i>	Swamp Rat		R	x
<i>Trichosurus vulpecula</i>	Common Brushtail Possum		R	x
<i>Cercartetus concinnus</i>	Western Pygmy-possum			x
<i>Macropus fuliginosus</i>	Western Grey Kangaroo			x
<i>Miniopterus schreibersii bassanii</i>	Large Bentwing-Bat			x
<i>Pseudocheirus peregrinus</i>	Common Ringtail Possum			x
<i>Rattus fuscipes</i>	Bush Rat			x
<i>Sminthopsis crassicaudata</i>	Fat-tailed Dunnart			x
<i>Tachyglossus aculeatus</i>	Short-beaked Echidna			x
<i>Vespadelus vulturinus</i>	Little Forest Bat			x

E: Endangered, V: Vulnerable, R: Rare

Reptiles

Species	Common Name	Aus status	SA status	Record
<i>Pseudemoia rawlinsoni</i>	Glossy Grass Skink		V	x
<i>Aprasia striolata</i>	Lined Worm-lizard			x
<i>Austrelaps superbus</i>	Lowland Copperhead			x
<i>Bassiana duperreyi</i>	Eastern Three-lined Skink			x
<i>Chelodina longicollis</i>	Common Long-necked Tortoise			x
<i>Ctenotus robustus</i>	Eastern Striped Skink			x
<i>Hemierys peronii</i>	Four-toed Earless Skink			x
<i>Lerista bougainvillii</i>	Bougainville's Skink			x
<i>Liopholis whitii</i>	White's Skink			x
<i>Menetia greyii</i>	Dwarf Skink			x
<i>Notechis scutatus</i>	Eastern Tiger Snake	ssp		x
<i>Pseudemoia entrecasteauxii</i>	Southern Grass Skink			x
<i>Pseudonaja textilis</i>	Eastern Brown Snake			x
<i>Tiliqua rugosa</i>	Sleepy Lizard			x
<i>Tiliqua scincoides</i>	Eastern Bluetongue			x

E: Endangered, V: Vulnerable, R: Rare

x: recorded

SE9 – Lake St George, Lake St Clair, Beachport

Amphibians

Species	Common Name	Aus status	SA status	Record
<i>Crinia signifera</i>	Common Froglet			x
<i>Limnodynastes dumerilii</i>	Banjo Frog			x
<i>Limnodynastes peronii</i>	Striped Marsh Frog			x
<i>Limnodynastes tasmaniensis</i>	Spotted Marsh Frog			x
<i>Litoria ewingii</i>	Brown Tree Frog			x
<i>Neobatrachus pictus</i>	Burrowing Frog			x
<i>Neobatrachus sudelli</i>	Sudell's Frog			x

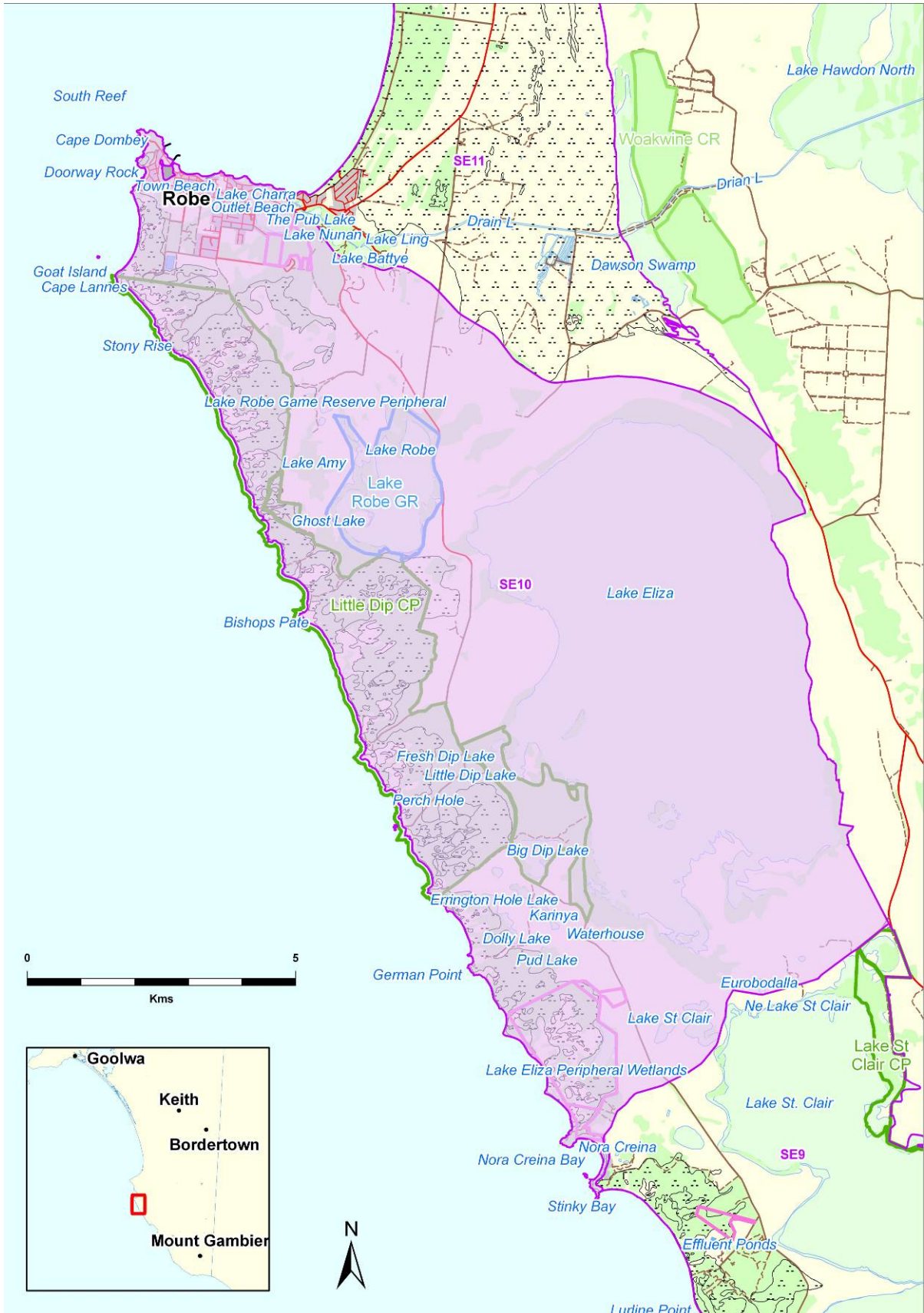
E: Endangered, V: Vulnerable, R: Rare

x: recorded

SE10 – Little Dip CP

6.3.10 Cell SE10 Little Dip CP

Area 12,534.7 ha. Length 33.23 km.



Landforms

This coastal cell is an undulating coastal plain with aeolianite headlands and reefs; beaches and extensive dune systems. A low plain extends from the Robe Range to the Woakwine Range, largely occupied by the coastal lakes, Lake Eliza and Lake Robe, (waterbodies comprise 36% of the area of the cell). Smaller unnamed lakes are found within the dunes and immediately landward of the dunes, where the calcarenite topographic surface dips below the water table, or in perched water tables above clay and organic matter. Topographic variation within this low plain reflects irregularity within both the Pleistocene calcarenite surface and overlying it, the Holocene dune surface.

The Robe Range is exposed in the reefs, low cliffs and headlands and low lying surfaces within the dunes. This Range has an irregular, partially submerged surface, but its configuration determines the modern coastal alignment. Over half the shoreline is protected by reefs, small islands, and shore platforms, which have been eroded in the calcarenite following the Post-Glacial transgression. Comparison of the position of the modern cliff edge near Cape Dombey, Robe, (D. Fotheringham, 2009) with a survey in 1890, shows a wide range of recent recession rates, with locally an increase of indentation of the coastline. Recession at active sites averaged 7cm/year.

A steep offshore gradient allows high wave energy to the reefs and islands, which serve to protect the many headlands and compartmentalised beaches. The beaches vary from low energy reflective beaches with a low tide terrace, to less protected moderate energy dissipative beaches. Almost all beaches have fine to medium calcareous sands. Foredunes vary greatly; while blow outs and transgression have been initiated behind most beaches and headlands. Short & Hesp, p.78 suggest some earlier large dune movements were due to dissipative conditions operating during the Holocene sea level rise, when large volumes of sand were swept ashore.

As wave energy increases to moderate towards the south of the cell, with reduction in reef protection, sand grain sizes retained on the beach increase to medium to coarse, shore face slope angles increase, and volumes of sand in transgressive dunes increase.

Both large lakes occupy hollows in the calcarenite surface. Lake Eliza is a shallow saline water body below sea level (salinity c. x2 sea water). The lake contains calcarenite islands and its floor includes gelatinous mud; there are freshwater springs near the shores. The lake is in an enclosed depression fed by springs and groundwater flow and salinity is raised through evaporation (and possible sub surface sea water inflow). Lake Robe is a smaller enclosed shallow saline lake.

Biota

There are 42 flora survey sites, 33 opportune flora sites, 109 Herbarium record sites, 12 fauna survey sites, and 164 opportune fauna survey sites. 3286 ha of this cell is remnant vegetation, 26% of the cell area. 177 bird, 8 butterfly, 20 mammal, 14 reptile and 6 amphibian species have been recorded in the cell. Listed fauna includes the EPBC listed critically endangered Orange-bellied Parrot (*Neophema chrysogaster*); also the State endangered White-bellied Sea Eagle (*Haliaeetus leucogaster*), Powerful Owl (*Ninox strenua*), Eastern Osprey (*Pandion cristatus*), Little (*Sternula albifrons*) and Fairy (*Sternula nereis*) Terns and Swamp Antechinus (*Antechinus minimus*).

In spite of extensive instability, some older dunes retain patches of well developed dune vegetation succession, with a range of foredune grasses, mid-dune low to medium open shrubland, through to hind dune tall closed tea-tree shrubland and medium closed eucalypt woodland. The shores of Lake Eliza and Lake Robe show a variety of associations including *Gahnia* and *Juncus* sedge associations, *Melaleuca* low forest, samphire shrubland and spinifex grassland. The diversity of flora communities and habitats supports a wide range of threatened and endemic fauna.

SE10 – Little Dip CP

Benthic Habitat

Reefs from Nora Creina to Cape Dombey and inshore sand off Robe.



Little Dip CP, Lake Robe centre, Lake Eliza (right). Photograph Coast Protection Board 2008.

Land Use/ Land Ownership

Little Dip Conservation Park includes the majority of the coastal dunes of this cell and equates to 16% of the total cell area. Upper South East Marine Park from Boatswains Point to Nora Creina. Lake Eliza is unallotted Crown land and Lake Robe is included within a Game Reserve. The township of Robe dominates the northern end of the cell. Approximately one fifth of the cell is largely cleared and used for grazing/ cropping.

Values/ Uses (Field visits and local reports)

Fishing, surfing, bush walking. Off-road vehicle use is high through the cell. Aboriginal Heritage values throughout.

Threats (Field visits and local reports)

ORV access to beaches and headlands within Little Dip Conservation Park imposes high potential management costs and conservation degradation.

Opportunities

Inclusion of lakes Eliza and Robe into Little Dip CP.

In addition to the thirteen LSE wetlands/wetland complexes currently listed in the DIWA (Environment Australia, 2001) and the six wetlands/wetland complexes identified by Taylor (2006) as worthy of DIWA listing, the LSEWI 2008/ 09 has identified a cluster of 42 individual coastal dune wetlands near Nora Creina which meet at least one criterion for consideration as a wetland complex of national significance (Billows 2009). These wetlands are listed in Table 7 in Billows 2009. With respect to the DIWA criteria, most are considered as good examples of a wetland type (i.e. coastal dune wetlands) occurring within a biogeographic region in Australia

SE10 – Little Dip CP

(Criterion 1). Several of these wetlands are also considered important as habitat for animal taxa at a vulnerable stage in their life cycles, or provide refuge when adverse conditions such as drought prevail (Criterion 3). As a wetland complex, these wetlands are a particularly unique geological and ecological feature of the South Australian coastline. Very few coastal dune wetlands (i.e. those occurring in dune swales of the coastal fringe) occur outside of the stretch of coast between Beachport and Robe. Within their own group, many of these wetlands have unique properties with respect to water quality (e.g. salinity), hydrologic regime and vegetation type, providing a broad diversity of habitats for wetland dependent fauna (Billows 2009).

Several of these wetlands have been assessed as Pristine or Intact from LSEWI field surveys and/or rated highly for Biological Condition Value and/or Ecological Significance (see Appendix 3 of Billows 2009). Many are well buffered from adjacent land use by coastal dune scrub and protected from livestock damage via fencing. Others are situated within the Little Dip Conservation Park. Biological records are poor for many of these wetlands due to a distinct lack of survey effort in this area, particularly on privately owned land. However, observations indicate that these wetlands are important habitat for a broad range of flora and fauna, including local and migratory waterbirds and waders (Billows 2009).

Conservation Analysis (GIS)

The total of conservation means is 123.02, average for the region. The detailed summary conservation layer shows an extremely complex pattern, although the highest values are found in well established dune vegetation and in narrow lake edge swamps. The intricate pattern of values also reflects the pattern of vegetation loss, through clearance and through dune blowout development.

All areas outside the urban land and the de-vegetated dunes show high values for vegetation associations and threatened plant and animal species. The lakes show moderate to high values, especially in the lakeside vegetation, for all birds and threatened bird species; lake edges for reptiles and threatened mammals. Butterfly habitat is widespread through the dunes and lake edges. Focal species show varied habitat through the cell: Orange bellied Parrot in the dunes; Fairy Tern and Southern Bell Frog in the lakes; Swamp Skink in the lake edges; and Yellow Sedge Skipper in the Gahnia sedge of the lakes edges. [Wetland assessment gives top rating to Lake Robe and a high rating to Lake Eliza].

Threat Analysis (GIS)

The total of threat summary means is an average one, 58.69.

The highest contributors to the means total are visual amenity, mining activities (tenements cover the entire cell), vegetation block degradation and distribution of significant weeds, dune instability and rabbit numbers. Valuable lakeside habitats are also threatened by land use and ownership. Existing development contributes to threat totals on the fringes of Robe and Nora Creina.

Adaptation to Climate Change: Threats for Cell SE10

(see also discussion of scenario in Section 4.11)

NOTE: the advice below is indicative of likely change and the direction of change, with implications for ecosystems. Dates, amounts and probabilities cannot be accurately calculated at this time. Thus advice on flood levels, for example, should not be used in engineering or development planning.

SE10 – Little Dip CP

Climate change element/ scenario	Impacts and implications (for this cell)	Protect and manage habitat threats	Address landscape issues: fire, connectivity, refuges, hydrology
Combined climate changes and sea level rise throughout this cell	This cell presents a complex pattern of habitats sensitive to change.	Create a baseline for shoreline, dune and lake change by establishing a rectified aerial photographic record.	
Sea level rise: 2030 : +c.20cm 2070: +c.80cm.	Increase in beach recession, storm foredune damage and dune instability. Loss of small cliff-backed pocket beaches.	Maintain an aerial photographic record of change.	
	Acceleration of calcarenite cliff erosion.	Monitor cliff top erosion and retreat.	
	Foredune damage could lead to widespread dune destabilisation and transport of sand across dunes to the lakes and farmland.	Active management of dune blowouts, remove threats to dune stability.	
Storms: <i>Frequency</i> continues to show great variation on a decadal scale. <i>Intensity</i> of large storms increases.	2030: Occasional storm tide flooding above highest known tides. Lidar data suggests that marine incursion will ingress to Lake Eliza at a 2 metre inundation. 2070: Flooding will affect both large lakes swamps and adjacent low lying areas.	Manage sill on drain L tidal inlet to adjust to higher marine storm elevations as part of the adaptive management of estuarine environment and lakes.	
	Frequent storm damage to foredunes.	Active management of dune blowouts.	
Warmer average conditions: 2030:+0.3 to .6°C 2070:+1.5 to 2°C	(Impacts uncertain. Existing terrestrial vegetation is found in warmer conditions elsewhere)		Maintain connectivity of vegetation within the region.
Drier average conditions: 2030: -2% to 5% 2070: - 10% to 20%	Dune vegetation adapts to drier conditions, but recovers more slowly from fire and storm damage allowing weed colonisation, notably exotic grasses: dune mobilisation becomes more likely. Reduced runoff and increased evaporation threatens the lakes and lakeshore habitats.	Active weed control within dunes Monitor seasonal water levels and salinity in lakes. Adaptive management of ecological assets.	
'Flashy' run off: Drier creeks, but larger rare floods	Drains and creeks may increase sediment load to coastal swamps and lakes (this depends on land	Maintain watching brief on sedimentation of lakes.	

SE10 – Little Dip CP

Climate change element/ scenario	Impacts and implications (for this cell)	Protect and manage habitat threats	Address landscape issues: fire, connectivity, refuges, hydrology
	management practices).		
Groundwater lowering; saline incursion:	Groundwater lowering a threat to Lakes Eliza and Robe: lowering freshwater pressure and increasing saline water pressure.	Monitor seasonal water levels and salinity in both lakes. Adaptive management of ecological assets.	Lakes represent an obvious change in regional groundwater change. Lowering of regional water table (and perched water tables in dunes) a threat to all habitats.
Nearshore sea changes - temperature; acidity; wave climate: 2030: +0.3°C to + 0.6°C 2070: +1.0°C to + 1.50C	Changes are unlikely to affect swell wave climate, apart from increase in mean wave period. (Changes in upwelling timing and frequency has been discussed, but not projected).		

Table 6.12. Recommended Actions and Priority for Cell SE10 – Little Dip CP

Component	Issue	Proposed Action	Priority of Action	Key Players
Beaches adjacent to Robe township	Pedestrian and vehicle access degrades slopes and adjacent vegetation.	Upgrade access tracks and ramps to minimise damage.	Medium. (cell)	NRM, Council
Cliffs and foreshore reserves within Guichen Bay	High pedestrian usage impacts to tracks and vegetation.	Track maintenance and weed control in reserves. Restriction of access to cliff edges.	Medium. (cell)	NRM, Council, community groups
Robe Town Beach	Long term erosive trend threatens beach and adjacent reserves.	Ensure continued monitoring of DENR beach profiles. Work with CPB on appropriate strategies for mitigation, including beach nourishment.	Medium (hazard)	Council, DENR, CPB
Cliff top reserves: Cape Dombey to Cape Lannes	Natural processes of cliff recession likely to accelerate as sea level rise reduces to protection by reefs; erosion poses a threat to visitors.	Regular monitoring of cliff top sites. Re-establish cliff erosion marker points. Maintain / establish warnings and rails.	Medium. (hazard)	Council

SE10 – Little Dip CP

Component	Issue	Proposed Action	Priority of Action	Key Players
	Degradation of native vegetation on unstable cliff-top dunes.	Weed and pest plant control. Review ORV activity and impact.	High (Cons/threat)	NRM, Council, community groups
Coastal dunes between Robe township and Little Dip CP	Discharge of treated effluent to dunes from Robe STP.	Investigate and take action to stop this occurrence.	High (Cons/threat)	Council, DFW, EPA
	Blown litter in dunes from Council rubbish dump. Rubbish attracts feral animals and invasive weeds present are spreading into the adjacent dunes.	Re-locate rubbish dump away from coast.	High (Cons/threat)	Council, EPA
Coastal reserve and native vegetation areas adjacent to Robe	Invasion of areas of native vegetation by garden escape species.	Community education campaign to encourage Robe residents and landholders adjoining the coast to remove invasive garden plants and replace with suitable non-invasive or indigenous species.	High (Cons/threat)	NRM, Council
	Degradation of vegetation by weeds and pest animals.	Weed and pest plant and animal control program.	High (Cons/threat)	NRM, Council, community groups
Dune areas south of and near to Robe and in Little Dip CP	These are cliff top dunes, no longer replenished by beach sand. Vegetation damage leads to dune movement, weed invasion and habitat fragmentation. These dunes show high total conservation values and high total threat values.	Encourage and facilitate regeneration of denuded / disturbed areas Rehabilitate denuded sand dune areas with appropriate sand stabilisation and revegetation.	High (Cons/threat)	NRM, Council
	Recent weed survey shows a proliferation of invasive alert list weeds in this area.	Design and implementation of a high priority weed control strategy. Regular monitoring for alert weeds, listed in Section 4.9.	High (Cons/threat)	DENR, NRM, Council, community
Little Dip CP	ORV damage to areas of high value vegetation and habitat.	Limit ORV activity to defined areas as per management plan.	High (Cons/threat)	DENR

SE10 – Little Dip CP

Component	Issue	Proposed Action	Priority of Action	Key Players
Lakes Robe and Eliza and other coastal lakes	High value vegetation associations and habitat value: has low economic value, but in private hands, zoned primary industry, with a land use coding of grazing. Threatened by grazing and ORV activity.	Consider including Lakes Robe and Eliza together with valuable lakeside vegetation remnants in Little Dip CP.	High (Cons/ threat)	DENR
		Work with private landholders to fence wetland and sedge communities. Gather further data on habitat / fauna and monitor health.	High (Cons/ threat)	DENR, NRM, community, landholders
	Long term changes in rainfall, temperature and saline groundwater pressure threaten changes in all lake levels and salinity, as a result of climate change.	Monitor changes in the physical conditions of the lakes.	Medium (cell)	DENR, NRM
Nora Creina	Invasion of areas of native vegetation by garden escape species.	Community education campaign to encourage residents and landholders adjoining the coast to remove invasive garden plants and replace with suitable non-invasive or indigenous species.	Medium. (threat)	NRM, Council, shack and land owners
	Dumping of green waste on foredunes.	Educate community about appropriate disposal of green waste.	Medium. (cell)	NRM, Council
Cliffs and beaches from Nora Creina to German Point and Errington Hole	Hazardous tracks and beach access. Lack of undisturbed shorebird habitat in this sub-region.	Restrict access	Medium. (threat)	NRM, DENR, landowners
Low lying trough between Guichen and Rivoli Bays, including Lakes George, St Clair and Eliza	Flooding by continuing and accelerating sea level rise.	Scoping of timelines and implications for possible adaptation of infrastructure.	Medium. (cell)	DPC, DENR, Councils, NRM

SE10 – Little Dip CP

Component	Issue	Proposed Action	Priority of Action	Key Players
Whole cell	Aboriginal Heritage sites recorded in this cell. Need for appropriate and sustainable management.	Consultation to appropriately manage sites in this area.	High (Cons)	Murrapeena Heritage Association Inc., SE Aboriginal Focus Group, NRM, Council, Aboriginal Heritage Branch – DPC, Aboriginal Partnership Unit – DENR
	This cell presents a complex pattern of habitats sensitive to change	Continue a rectified aerial photographic record at an appropriate resolution, in order to show change from current baseline.	Medium (Cons/ threat)	DENR, NRM
	Lack of recognition of significant geological feature (Bridgewater formation).	Interpretation. Council to include map of the feature in its development plan.	Medium (Cons)	Council, Geological Society SA, NRM

BIOTA

Flora

Remnant vegetation area (ha)	3286.1 ha, 26.2% of cell area
# flora surveys / records	42 surveys, 33 opportune sites, 109 herbarium record sites, 5 threatened plant population record sites and 4 reserve database record sites.
# flora in cell	910 (includes some marine species)
# conservation rated flora in cell	17 recorded
# non-indigenous flora in cell	187 recorded
Significant CDCS floristic community	<i>Leucopogon parviflorus</i> / <i>Olearia axillaris</i> shrubland (>50% of known sites occur along SE coast). <i>Olearia axillaris</i> / <i>Leucopogon parviflorus</i> shrubland (>50% of known sites occur along SE coast).
Protected area	Little Dip Conservation Park, Lake Robe Game Reserve (2438.6ha in total).

Weeds

Species	Common Name	Status	Study rating
<i>Asparagus asparagoides</i> (NC)	Bridal Creeper	WONS, D	9
<i>Dipogon lignosus</i>	Lavatory Creeper		9
<i>Lycium ferocissimum</i>	African Boxthorn	D	9
<i>Polygala myrtifolia</i>	Myrtle-leaf Milkwort		9
<i>Rhamnus alaternus</i>	Blowfly Bush		9
<i>Ehrharta villosa</i> var. <i>maxima</i>	Pyp Grass		8

SE10 – Little Dip CP

Species	Common Name	Status	Study rating
<i>Gazania linearis</i>	Gazania		8
<i>Thinopyrum junceiforme</i>	Sea Wheat-grass		8
<i>Coprosma repens</i>	New Zealand Mirror-bush		7
<i>Leptospermum laevigatum</i>	Coast Tea-tree		7
<i>Chrysanthemoides monilifera ssp. monilifera</i>	Boneseed	WONS, D	6
<i>Vinca major</i>	Blue Periwinkle		6
<i>Argyranthemum frutescens ssp. foeniculaceum</i>	Teneriffe Daisy		5
<i>Cupressus macrocarpa</i>	Monterey Cypress		5
<i>Delairea odorata</i>	Cape Ivy		5
<i>Pennisetum clandestinum</i>	Kikuyu		5
<i>Sparaxis bulbifera</i>	Sparaxis		5
<i>Euphorbia paralias</i>	Sea Spurge		4
<i>Euphorbia terracina</i>	False Caper	D	4
<i>Limonium companyonis</i>	Sea-lavender		4
<i>Limonium sp.</i>	Sea-lavender		4
<i>Olea europaea ssp. europaea</i>	Olive	D	4
<i>Senecio elegans</i>	Purple Groundsel		3
<i>Tamarix aphylla (NC)</i>	Athel Pine	WONS, D	3
<i>Ammophila arenaria</i>	Marram Grass		2
<i>Rosa canina</i>	Dog Rose	D	2
<i>Zantedeschia aethiopica</i>	White Arum Lily		2
<i>Acanthus mollis</i>	Bear's Breach		
<i>Agrostis capillaris</i>	Brown-top Bent		
<i>Aira cupaniana</i>	Small Hair-grass		
<i>Aira elegantissima</i>	Delicate Hair-grass		
<i>Aira sp.</i>	Hair-grass		
<i>Allium neapolitanum</i>	Naples Onion		
<i>Allium triquetrum</i>	Three-cornered Garlic		
<i>Abyssum linifolium</i>	Flax-leaf Alyssum		
<i>Anagallis arvensis</i>	Pimpernel		
<i>Anchusa capensis</i>	Cape Forget-me-not		
<i>Arrhenatherum elatius var. bulbosum</i>	False Oat-grass		
<i>Asphodelus fistulosus</i>	Onion Weed		
<i>Atriplex prostrata</i>	Creeping Saltbush		
<i>Avellinia michelii</i>	Avellinia		
<i>Avena barbata</i>	Bearded Oat		
<i>Avena fatua</i>	Wild Oat		
<i>Avena sativa</i>	Cultivated Oat		
<i>Briza minor</i>	Lesser Quaking-grass		
<i>Bromus diandrus</i>	Great Brome		
<i>Bromus hordeaceus ssp. hordeaceus</i>	Soft Brome		
<i>Bromus madritensis</i>	Compact Brome		
<i>Bromus rubens</i>	Red Brome		
<i>Buglossoides arvensis</i>	Sheepweed		
<i>Cakile edentula</i>	American Sea Rocket		
<i>Cakile maritima ssp. maritima</i>	Two-horned Sea Rocket		
<i>Carduus tenuiflorus</i>	Slender Thistle		
<i>Catapodium rigidum</i>	Rigid Fescue		
<i>Centaurea melitensis</i>	Malta Thistle		
<i>Centaureum erythraea</i>	Common Centaury		
<i>Centaureum sp.</i>	Centaury		
<i>Centaureum tenuiflorum</i>	Branched Centaury		
<i>Centaureum tenuiflorum (NC)</i>	Branched Centaury		

SE10 – Little Dip CP

Species	Common Name	Status	Study rating
<i>Cerastium balearicum</i>	Chickweed		
<i>Cerastium glomeratum</i>	Common Mouse-ear Chickweed		
<i>Cerastium pumilum</i>	Chickweed		
<i>Chasmanthe floribunda</i> var. <i>floribunda</i>	African Corn-flag		
<i>Chenopodium glaucum</i>	Glaucous Goosefoot		
<i>Chenopodium murale</i>	Nettle-leaf Goosefoot		
<i>Cirsium vulgare</i>	Spear Thistle		
<i>Conium maculatum</i>	Hemlock		
<i>Conyza bonariensis</i>	Flax-leaf Fleabane		
<i>Conyza</i> sp.	Fleabane		
<i>Cotula coronopifolia</i>	Water Buttons		
<i>Crassula natans</i> var. <i>minus</i>	Water Crassula		
<i>Cuscuta planiflora</i>	Small-seed Alfalfa-dodder		
<i>Cymbalaria muralis</i> ssp. <i>muralis</i>	Ivy-leaf Toadflax		
<i>Cynodon dactylon</i> (NC)	Couch		
<i>Cynodon dactylon</i> var. <i>dactylon</i>	Couch		
<i>Cyperus rotundus</i> ssp. <i>rotundus</i>	Nut-grass		
<i>Dimorphotheca pluvialis</i>	Cape Marigold		
<i>Echium plantagineum</i>	Salvation Jane		
<i>Echium simplex</i>			
<i>Ehrharta longiflora</i>	Annual Veldt Grass		
<i>Erodium cicutarium</i>	Cut-leaf Heron's-bill		
<i>Erodium moschatum</i>	Musky Herons-bill		
<i>Euphorbia peplus</i>	Petty Spurge		
<i>Fumaria muralis</i> ssp. <i>muralis</i>	Wall Fumitory		
<i>Galium murale</i>	Small Bedstraw		
<i>Galium spurium</i>	Bedstraw		
<i>Geranium molle</i> var. <i>molle</i>	Soft Geranium		
<i>Gomphocarpus fruticosus</i>	Narrow-leaf Cotton-bush		
<i>Gracilariopsis lemaneiformis</i>			
<i>Hainardia cylindrica</i>	Common Barb-grass		
<i>Hirschfeldia incana</i>	Hoary Mustard		
<i>Holcus lanatus</i>	Yorkshire Fog		
<i>Hordeum leporinum</i>	Wall Barley-grass		
<i>Hordeum marinum</i>	Sea Barley-grass		
<i>Hordeum</i> sp.			
<i>Hornungia procumbens</i>	Oval Purse		
<i>Hypochaeris glabra</i>	Smooth Cat's Ear		
<i>Hypochaeris radicata</i>	Rough Cat's Ear		
<i>Hypochaeris</i> sp.	Cat's Ear		
<i>Iris germanica</i>	Flag Iris		
<i>Isolepis marginata</i>	Little Club-rush		
<i>Lagurus ovatus</i>	Hare's Tail Grass		
<i>Leontodon taraxacoides</i> ssp. <i>taraxacoides</i>	Lesser Hawkbit		
<i>Lepidium didymum</i>	Lesser Swine's-cress		
<i>Lobularia maritima</i>	Sweet Alyssum		
<i>Lolium loliaceum</i>	Stiff Ryegrass		
<i>Lolium perenne</i>	Perennial Ryegrass		
<i>Lolium rigidum</i>	Wimmera Ryegrass		
<i>Lotus angustissimus</i>	Slender Bird's-foot Trefoil		
<i>Lotus preslii</i>	Greater Bird's-foot Trefoil		
<i>Lotus subbiflorus</i>	Hairy Bird's-foot Trefoil		
<i>Lotus uliginosus</i> (NC)	Greater Bird's-foot Trefoil		

SE10 – Little Dip CP

Species	Common Name	Status	Study rating
<i>Lycianthes rantonnetii</i>			
<i>Malva dendromorpha</i>	Tree Mallow		
<i>Marrubium vulgare</i>	Horehound		
<i>Medicago lupulina</i>	Black Medic		
<i>Medicago polymorpha</i> var. <i>polymorpha</i>	Burr-medic		
<i>Medicago</i> sp.	Medic		
<i>Melilotus indicus</i>	King Island Melilot		
<i>Mentha pulegium</i>	Pennyroyal		
<i>Minuartia mediterranea</i>	Slender Sandwort		
<i>Moraea flaccida</i>	One-leaf Cape Tulip		
<i>Oenothera stricta</i> ssp. <i>stricta</i>	Common Evening Primrose		
<i>Ornithogalum arabicum</i>	Star Of Africa		
<i>Oxalis pes-caprae</i>	Soursob		
<i>Papaver rhoeas</i>	Field Poppy		
<i>Papaver somniferum</i> ssp. (NC)	Opium Poppy		
<i>Papaver somniferum</i> ssp. <i>setigerum</i> (NC)	Small-flower Opium Poppy		
<i>Parapholis incurva</i>	Curly Ryegrass		
<i>Paraserianthes lophantha</i>	Cape Leeuwin Wattle		
<i>Phalaris aquatica</i>	Phalaris		
<i>Phalaris</i> sp.	Canary Grass		
<i>Plantago coronopus</i> ssp.	Bucks-horn Plantain		
<i>Poa annua</i>	Winter Grass		
<i>Poa annua</i> (NC)	Winter Grass		
<i>Poa bulbosa</i>	Bulbous Meadow-grass		
<i>Poa infirma</i>	Winter Grass		
<i>Poa pratensis</i>	Kentucky Blue-grass		
<i>Polycarpon tetraphyllum</i>	Four-leaf Allseed		
<i>Polypogon maritimus</i>	Coast Beard-grass		
<i>Polypogon monspeliensis</i>	Annual Beard-grass		
<i>Polypogon viridis</i>	Water Bent		
<i>Prunus dulcis</i>	Almond		
<i>Rapistrum rugosum</i> ssp. <i>rugosum</i>	Turnip Weed		
<i>Reichardia tingitana</i>	False Sowthistle		
<i>Reseda lutea</i>	Cut-leaf Mignonette		
<i>Reseda</i> sp.	Mignonette		
<i>Rorippa nasturtium-aquaticum</i>	Watercress		
<i>Rostraria cristata</i>	Annual Cat's-tail		
<i>Rostraria pumila</i>	Tiny Bristle-grass		
<i>Rumex crispus</i>	Curled Dock		
<i>Rumex pulcher</i> ssp. <i>pulcher</i>	Fiddle Dock		
<i>Sagina apetala</i>	Annual Pearlwort		
<i>Sambucus gaudichaudiana</i>	White Elderberry		
<i>Scabiosa atropurpurea</i>	Pincushion		
<i>Senecio vulgaris</i>	Common Groundsel		
<i>Sherardia arvensis</i>	Field Madder		
<i>Silene atocioides</i>	Moss Campion		
<i>Silene conica</i>	Striated Catchfly		
<i>Silene gallica</i> var. <i>gallica</i>	French Catchfly		
<i>Silene nocturna</i>	Mediterranean Catchfly		
<i>Silene vulgaris</i>	Bladder Campion		
<i>Sisymbrium</i> sp.	Wild Mustard		
<i>Solanum linnaeanum</i>	Apple Of Sodom		
<i>Solanum nigrum</i>	Black Nightshade		

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Species	Common Name	Status	Study rating
<i>Sonchus oleraceus</i>	Common Sow-thistle		
<i>Sonchus oleraceus</i> (NC)	Common Sow-thistle		
<i>Stellaria media</i>	Chickweed		
<i>Stenotaphrum secundatum</i>	Buffalo Grass		
<i>Tamarix ramosissima</i>			
<i>Taraxacum officinale</i>	Dandelion		
<i>Taraxacum officinale</i> (NC)	Dandelion		
<i>Thymelaea passerina</i>	Thymelaea		
<i>Trifolium campestre</i>	Hop Clover		
<i>Trifolium fragiferum</i> var. <i>fragiferum</i>	Strawberry Clover		
<i>Trifolium glomeratum</i>	Cluster Clover		
<i>Trifolium scabrum</i>	Rough Clover		
<i>Trifolium tomentosum</i>	Woolly Clover		
<i>Urtica urens</i>	Small Nettle		
<i>Verbascum virgatum</i>	Twiggy Mullein		
<i>Vulpia bromoides</i>	Squirrel-tail Fescue		
<i>Vulpia ciliata</i>	Fringed Fescue		
<i>Vulpia fasciculata</i>	Sand Fescue		
<i>Vulpia muralis</i>	Wall Fescue		
<i>Vulpia myuros</i> f. <i>megalura</i>	Fox-tail Fescue		
<i>Vulpia myuros</i> f. <i>myuros</i>	Rat's-tail Fescue		
<i>Vulpia</i> sp.	Fescue		

D: Declared weed, WONS: Weeds of National Significance

Native flora*

Species	Common Name	Aus status	SA status
<i>Caladenia richardsiorum</i>	Little Dip Spider-orchid	EN	E
<i>Cuscuta tasmanica</i>	Tasmanian Dodder		V
<i>Olearia glandulosa</i>	Swamp Daisy-bush		V
<i>Scaevola calendulacea</i>	Dune Fanflower		V
<i>Baumea laxa</i>	Lax Twig-rush		R
<i>Carex gunniana</i>	Mountain Sedge		R
<i>Eucalyptus fasciculosa</i>	Pink Gum		R
<i>Eucalyptus leucoxylon</i> ssp. <i>megalocarpa</i>	Large-fruit Blue Gum		R
<i>Gabnia clarkei</i>	Tall Saw-sedge		R
<i>Haloragis eichleri</i>	Eichler's Raspwort		R
<i>Hydrocotyle comocarpa</i>	Fringe-fruit Pennywort		R
<i>Lachnagrostis robusta</i>	Tall Blown-grass		R
<i>Leptinella reptans</i>	Creeping Cotula		R
<i>Spiranthes australis</i>	Austral Lady's Tresses		R
<i>Viminaria juncea</i>	Native Broom		R
<i>Wurmbea latifolia</i> ssp. <i>vanessae</i>	Broad-leaf Nancy		R
<i>Zoysia macrantha</i> ssp. <i>walshii</i>	Manila Grass		R
<i>Acacia cupularis</i>	Cup Wattle		
<i>Acacia leiophylla</i>	Coast Golden Wattle		
<i>Acacia ligulata</i>	Umbrella Bush		
<i>Acacia longifolia</i> ssp. <i>sophorae</i>	Coastal Wattle		
<i>Acacia paradoxa</i>	Kangaroo Thorn		
<i>Acacia pycnantha</i>	Golden Wattle		
<i>Acaena novae-zelandiae</i>	Biddy-biddy		
<i>Acianthus</i> sp.	Mosquito Orchid		
<i>Acrocarpia paniculata</i>			

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Species	Common Name	Aus status	SA status
<i>Acrosorium ciliolatum</i>			
<i>Acrothamnion preissii</i>			
<i>Acrotriche affinis</i>	Ridged Ground-berry		
<i>Acrotriche cordata</i>	Blunt-leaf Ground-berry		
<i>Acrotylus australis</i>			
<i>Actites megalocarpa</i>	Coast Sow-thistle		
<i>Adriana klotzschii</i> (NC)	Coast Bitter-bush		
<i>Adriana quadripartita</i>	Coast Bitter-bush		
<i>Agrostis billardieri</i> var. (NC)	Blown-grass		
<i>Abnfeldtiopsis humilis</i>			
<i>Ajuga australis</i> f. B (R.L.Taplin 972)	Lesser Bugle		
<i>Alleynea bicornis</i>			
<i>Allocasuarina verticillata</i>	Drooping Sheoak		
<i>Alyxia buxifolia</i>	Sea Box		
<i>Amansia pinnatifida</i>			
<i>Amansia serrata</i>			
<i>Amphibolis antarctica</i>	Sea Nymph		
<i>Amyema melaleuca</i>	Tea-tree Mistletoe		
<i>Angianthus preissianus</i>	Salt Angianthus		
<i>Anotrichium crinitum</i>			
<i>Anotrichium elongatum</i>			
<i>Antithamnion armatum</i>			
<i>Antithamnion gracilentum</i>			
<i>Antithamnion hanovioides</i>			
<i>Antithamnion verticale</i>			
<i>Antithamnionella ternifolia</i>			
<i>Antrocentrum nigrescens</i>			
<i>Apalochlamys spectabilis</i>	Showy Firebush		
<i>Aphanes australiana</i>	Australian Piert		
<i>Apium annuum</i>	Annual Celery		
<i>Apium prostratum</i> var.	Native Celery		
<i>Apium prostratum</i> var. <i>filiforme</i>	Native Celery		
<i>Apium prostratum</i> var. <i>prostratum</i>	Native Celery		
<i>Apium</i> sp.	Celery		
<i>Apjohnia laetevirens</i>			
<i>Apodasmia brownii</i>	Coarse Twine-rush		
<i>Apoglossum spathulatum</i>			
<i>Areschougia congesta</i>			
<i>Arthrocardia flabellata</i> ssp. <i>australiana</i>			
<i>Asparagopsis armata</i>			
<i>Asparagopsis taxiformis</i>			
<i>Asteronema ferrugineum</i>			
<i>Atriplex cinerea</i>	Coast Saltbush		
<i>Audouinella caespitosa</i>			
<i>Audouinella daviesii</i>			
<i>Audouinella floridula</i>			
<i>Audouinella humilis</i>			
<i>Audouinella porphyrae</i>			
<i>Audouinella unifila</i>			
<i>Austrodanthonia caespitosa</i>	Common Wallaby-grass		
<i>Austrodanthonia geniculata</i>	Kneed Wallaby-grass		
<i>Austrofestuca littoralis</i>	Coast Fescue		
<i>Austrostipa flavescens</i>	Coast Spear-grass		

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Species	Common Name	Aus status	SA status
<i>Austrostipa mollis</i> group	Soft Spear-grass		
<i>Austrostipa nodosa</i>	Tall Spear-grass		
<i>Austrostipa scabra</i> ssp. <i>falcata</i>	Slender Spear-grass		
<i>Austrostipa</i> sp.	Spear-grass		
<i>Austrostipa stipoides</i>	Coast Spear-grass		
<i>Ballia callitricha</i>			
<i>Banksia marginata</i>	Silver Banksia		
<i>Baumea arthropophylla</i>	Swamp Twig-rush		
<i>Baumea juncea</i>	Bare Twig-rush		
<i>Beyeria lechenaultii</i>	Pale Turpentine Bush		
<i>Billardiera cymosa</i> (NC)	Sweet Apple-berry		
<i>Billardiera cymosa</i> ssp. <i>cymosa</i>	Sweet Apple-berry		
<i>Billardiera</i> sp.	Apple-berry		
<i>Billardiera versicolor</i>	Yellow-flower Apple-berry		
<i>Blidingia marginata</i>			
<i>Blidingia minima</i>			
<i>Botryocladia sonderi</i>			
<i>Bromus</i> sp.	Brome		
<i>Brongniartella australis</i>			
<i>Bryopsis gemellipara</i>			
<i>Bryopsis plumosa</i>			
<i>Bursaria spinosa</i> ssp. <i>spinosa</i>	Sweet Bursaria		
<i>Caladenia carnea</i>	Pink Fingers		
<i>Caladenia latifolia</i>	Pink Caladenia		
<i>Caladenia prolata</i>	Shy Caladenia		
<i>Calandrinia brevipedata</i>	Short-stalked Purslane		
<i>Calliblepharis planicaulis</i>			
<i>Callipsyigma wilsonis</i>			
<i>Callithamnion confertum</i>			
<i>Callithamnion violaceum</i>			
<i>Callophycus laxus</i>			
<i>Callophyllis cervicornis</i>			
<i>Callophyllis lambertii</i>			
<i>Callophyllis rangiferina</i>			
<i>Calystegia sepium</i> ssp. <i>roseata</i>	Large Bindweed		
<i>Camontagnea oxyclada</i>			
<i>Capreolia implexa</i>			
<i>Carpobrotus modestus</i> / <i>rossii</i>	Native Pigface		
<i>Carpobrotus rossii</i>	Native Pigface		
<i>Carpobrotus rossii</i> (NC)	Native Pigface		
<i>Carpobrotus</i> sp.	Pigface		
<i>Carpoglossum confluens</i>			
<i>Carpopeltis phyllophora</i>			
<i>Cassytha melantha</i>	Coarse Dodder-laurel		
<i>Cassytha pubescens</i>	Downy Dodder-laurel		
<i>Cassytha</i> sp.	Dodder-laurel		
<i>Caulerpa brownii</i>			
<i>Caulerpa cactoides</i>			
<i>Caulerpa flexilis</i>			
<i>Caulerpa flexilis</i> var. <i>muelleri</i>			
<i>Caulerpa longifolia</i>			
<i>Caulerpa longifolia</i> f. <i>crispata</i>			
<i>Caulerpa obscura</i>			

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Species	Common Name	Aus status	SA status
<i>Caulerpa papillosa</i>			
<i>Caulerpa scalpelliformis</i>			
<i>Caulerpa sedoides</i>			
<i>Caulerpa simpliciuscula</i>			
<i>Caulocystis cephalornithos</i>			
<i>Centroceras clavulatum</i>			
<i>Centrolepis polygyna</i>	Wiry Centrolepis		
<i>Ceramium excellens</i>			
<i>Ceramium macilentum</i>			
<i>Ceramium monacanthum</i>			
<i>Ceramium puberulum</i>			
<i>Ceramium pusillum</i>			
<i>Ceramium rubrum</i>			
<i>Ceramium tasmanicum</i>			
<i>Chaetomorpha capillaris</i>			
<i>Chaetomorpha coliformis</i>			
<i>Chaetomorpha indica</i>			
<i>Chamaesyce drummondii</i> (NC)	Caustic Weed		
<i>Champia affinis</i>			
<i>Champia viridis</i>			
<i>Champia zostericola</i>			
<i>Chara</i> sp.			
<i>Chauviniella coriifolia</i>			
<i>Chlanidophora microphylla</i>			
<i>Chlorodesmis baculifera</i>			
<i>Chondria bulbosa</i>			
<i>Chondria curdieana</i>			
<i>Chondria incrassata</i>			
<i>Chondria subfasciculata</i>			
<i>Chondria succulenta</i>			
<i>Chondrophyucus paniculatus</i>			
<i>Chondrophyucus tumidus</i>			
<i>Chordaria cladosiphon</i>			
<i>Chrysocephalum apiculatum</i>	Common Everlasting		
<i>Cirrularia nanus</i>			
<i>Cladophora coelothrix</i>			
<i>Cladophora crinalis</i>			
<i>Cladophora feredayi</i>			
<i>Cladophora lehmanniana</i>			
<i>Cladophora</i> sp.			
<i>Cladophora valonioides</i>			
<i>Cladosiphon filum</i>			
<i>Cladosiphon vermicularis</i>			
<i>Cladostephus spongiosus</i>			
<i>Cladurus elatus</i>			
<i>Clematis microphylla</i> var. <i>microphylla</i>	Old Man's Beard		
<i>Codium australicum</i>			
<i>Codium duthieae</i>			
<i>Codium fragile</i> ssp. <i>novae-zelandiae</i>			
<i>Codium fragile</i> ssp. <i>tasmanicum</i>			
<i>Codium galeatum</i>			
<i>Codium lucasii</i>			
<i>Codium muelleri</i>			

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Species	Common Name	Aus status	SA status
<i>Codium perrinae</i>			
<i>Codium pomoides</i>			
<i>Coeloclonium tasmanicum</i>			
<i>Coeloclonium verticillatum</i>			
<i>Colacodasya australica</i>			
<i>Colpomenia peregrina</i>			
<i>Colpomenia sinuosa</i>			
<i>Comesperma volubile</i>	Love Creeper		
<i>Compositae sp.</i>	Daisy Family		
<i>Convolvulus erubescens (NC)</i>	Australian Bindweed		
<i>Corallina officinalis</i>			
<i>Cordylecladia furcellata</i>			
<i>Correa reflexa var. scabridula</i>	Common Correa		
<i>Corybas despectans</i>	Coast Helmet-orchid		
<i>Corybas sp.</i>	Helmet-orchid		
<i>Corynophlaea cystophorae</i>			
<i>Cotula vulgaris var. australasica</i>	Slender Cotula		
<i>Craspedocarpus ramentaceus</i>			
<i>Crassilingua marginifera</i>			
<i>Crassula colligata ssp. lamprosperma</i>			
<i>Crassula decumbens var. decumbens</i>	Spreading Crassula		
<i>Crassula helmsii</i>	Swamp Crassula		
<i>Crassula sieberiana ssp. tetramera (NC)</i>	Australian Stonecrop		
<i>Crouania mucosa</i>			
<i>Cryptonemia digitata</i>			
<i>Cryptonemia undulata</i>			
<i>Curdiea angustata</i>			
<i>Cutleria multifida</i>			
<i>Cynoglossum australe</i>	Australian Hound's-tongue		
<i>Cynoglossum sp.</i>	Hound's-tongue		
<i>Cyperaceae sp.</i>	Sedge Family		
<i>Cyrtostylis reniformis</i>	Small Gnat-orchid		
<i>Cyrtostylis robusta</i>	Robust Gnat-orchid		
<i>Cystophora botryocystis</i>			
<i>Cystophora congesta</i>			
<i>Cystophora cuspidata</i>			
<i>Cystophora grevillei</i>			
<i>Cystophora intermedia</i>			
<i>Cystophora monilifera</i>			
<i>Cystophora moniliformis</i>			
<i>Cystophora platylobium</i>			
<i>Cystophora racemosa</i>			
<i>Cystophora retorta</i>			
<i>Cystophora siliquosa</i>			
<i>Cystophora subfarcinata</i>			
<i>Danthonia pilosa var. pilosa (NC)</i>	Velvet Wallaby-grass		
<i>Danthonia sp. (NC)</i>	Wallaby-grass		
<i>Dasya ceramioides</i>			
<i>Dasya clavigera</i>			
<i>Dasya divergens</i>			
<i>Dasya extensa</i>			
<i>Dasya haffiae</i>			
<i>Dasyclonium flaccidum</i>			

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Species	Common Name	Aus status	SA status
<i>Dasyclonium incisum</i>			
<i>Dasyphila preissii</i>			
<i>Dasyphloea insignis</i>			
<i>Dasythamiella dasyura</i>			
<i>Daucus glochidiatus</i>	Native Carrot		
<i>Daucus</i> sp.	Carrot		
<i>Desmarestia ligulata</i>			
<i>Deyouzia quadriseta</i>	Reed Bent-grass		
<i>Dianella brevicaulis</i>	Short-stem Flax-lily		
<i>Dianella brevicaulis/ revoluta</i> var.	Black-anther Flax-lily		
<i>Dianella revoluta</i> var. <i>revoluta</i>	Black-anther Flax-lily		
<i>Diapse ptilota</i>			
<i>Dichelachne crinita</i>	Long-hair Plume-grass		
<i>Dichondra repens</i>	Kidney Weed		
<i>Dicranema revolutum</i>			
<i>Dictyomenia harveyana</i>			
<i>Dictyomenia tridens</i>			
<i>Dictyopteris muelleri</i>			
<i>Dictyopteris nigricans</i>			
<i>Dictyota alternifida</i>			
<i>Dictyota dichotoma</i>			
<i>Dictyota diemensis</i>			
<i>Dilophus gunnianus</i>			
<i>Diplocladia patersonis</i>			
<i>Distichlis distichophylla</i>	Emu-grass		
<i>Dodonaea viscosa</i> ssp.	Sticky Hop-bush		
<i>Dodonaea viscosa</i> ssp. <i>spatulata</i>	Sticky Hop-bush		
<i>Doxodasya bolbochaete</i>			
<i>Doxodasya lanuginosa</i>			
<i>Drewiana nitella</i>			
<i>Durvillaea potatorum</i>			
<i>Echinothamnion hookeri</i>			
<i>Echinothamnion hystrix</i>			
<i>Ecklonia radiata</i>			
<i>Ectocarpus siliculosus</i>			
<i>Eleocharis acuta</i>	Common Spike-rush		
<i>Elisiella dispar</i>			
<i>Elymus scaber</i> var. <i>scaber</i>	Native Wheat-grass		
<i>Elymus scaber</i> var. <i>scaber</i> (NC)	Native Wheat-grass		
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	Ruby Saltbush		
<i>Enteromorpha clathrata</i>			
<i>Enteromorpha compressa</i>			
<i>Epiglossum proliferum</i>			
<i>Epiglossum smithiae</i>			
<i>Epilobium billardierianum</i> ssp. <i>billardierianum</i>	Robust Willow-herb		
<i>Epilobium billardierianum</i> ssp. <i>cinereum</i>	Variable Willow-herb		
<i>Epilobium billardierianum</i> ssp. <i>X intermedium</i>	Variable Willow-herb		
<i>Erodium</i> sp.	Heron's-bill/Crowfoot		
<i>Erythroclonium muelleri</i>			
<i>Erythrotrichia carnea</i>			
<i>Erythrymenia minuta</i>			
<i>Eucalyptus diversifolia</i> (NC)	Coastal White Mallee		
<i>Eucalyptus diversifolia</i> ssp. <i>diversifolia</i>	Coastal White Mallee		

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Species	Common Name	Aus status	SA status
<i>Eucalyptus leucoxylon</i> ssp. <i>leucoxylon</i>	South Australian Blue Gum		
<i>Eucalyptus obliqua</i>	Messmate Stringybark		
<i>Eucalyptus viminalis</i> ssp. <i>cygnetensis</i>	Rough-bark Manna Gum		
<i>Euptilocladia spongiosa</i>			
<i>Euptilocladia villosa</i>			
<i>Euptilota articulata</i>			
<i>Eutaxia microphylla</i>	Common Eutaxia		
<i>Exocarpos cupressiformis</i>	Native Cherry		
<i>Exocarpos syrticola</i>	Coast Cherry		
<i>Feldmannia lebelii</i>			
<i>Ficinia nodosa</i>	Knobby Club-rush		
<i>Frankenia pauciflora</i> var. <i>gunnii</i>	Southern Sea-heath		
<i>Gabnia filum</i>	Thatching Grass		
<i>Gabnia trifida</i>	Cutting Grass		
<i>Galium compactum</i>	Compact Bedstraw		
<i>Galium gaudichaudii</i> (NC)	Rough Bedstraw		
<i>Galium gaudichaudii</i> ssp. <i>gaudichaudii</i>	Rough Bedstraw		
<i>Galium migrans</i> (NC)	Loose Bedstraw		
<i>Gelidium asperum</i>			
<i>Gelidium australe</i>			
<i>Gelidium crinale</i>			
<i>Gelidium pusillum</i>			
<i>Geranium potentilloides</i> var. <i>potentilloides</i>	Downy Geranium		
<i>Geranium retrorsum</i>	Grassland Geranium		
<i>Geranium solanderi</i> var. <i>solanderi</i>	Austral Geranium		
<i>Geranium</i> sp.	Geranium		
<i>Gigartina densa</i>			
<i>Gigartina disticha</i>			
<i>Gigartina muelleriana</i>			
<i>Gigartina sonderi</i>			
<i>Giraudia robusta</i>			
<i>Gloiophyllis barkeriae</i>			
<i>Gloiosaccion brownii</i>			
<i>Glossophora nigricans</i>			
<i>Gnaphalium indutum</i> ssp. <i>indutum</i>	Tiny Cudweed		
<i>Gonatogenia subulata</i>			
<i>Goodia lotifolia</i> var. <i>lotifolia</i> (NC)	Golden-tip		
<i>Goodia medicaginea</i>	Western Golden-tip		
<i>Gracilaria cliftonii</i>			
<i>Gramineae</i> sp.	Grass Family		
<i>Grateloupia ovata</i>			
<i>Griffithsia elegans</i>			
<i>Griffithsia gunniana</i>			
<i>Griffithsia monilis</i> var. <i>cincta</i>			
<i>Griffithsia monilis</i> var. <i>monilis</i>			
<i>Griffithsia pilalysa</i>			
<i>Griffithsia pulvinata</i>			
<i>Griffithsia tegetes</i>			
<i>Gymnogongrus crenulatus</i>			
<i>Gyrostemon thesioides</i>	Broom Wheel-fruit		
<i>Hakea vittata</i>	Limestone Needlebush		
<i>Haliptilon roseum</i>			
<i>Haloplegma duperreyi</i>			

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Species	Common Name	Aus status	SA status
<i>Haloplegma preissii</i>			
<i>Halopteris funicularis</i>			
<i>Halopteris paniculata</i>			
<i>Halosarcia</i> sp. (NC)	Samphire		
<i>Halymenia plana</i>			
<i>Haplodasya tomentosa</i>			
<i>Haplodasya urceolata</i>			
<i>Haraldiophyllum erosum</i>			
<i>Helichrysum leucopsideum</i>	Satin Everlasting		
<i>Heliotropium europaeum</i>	Common Heliotrope		
<i>Helminthocladia australis</i>			
<i>Helminthocladia densa</i>			
<i>Helminthocladia dotyi</i>			
<i>Hemarthria uncinata</i> var. <i>uncinata</i>	Mat Grass		
<i>Hemichroa diandra</i>	Mallee Hemichroa		
<i>Hemichroa pentandra</i>	Trailing Hemichroa		
<i>Hemineura frondosa</i>			
<i>Herb</i> sp.			
<i>Herpopteros fallax</i>			
<i>Herposiphonia versicolor</i>			
<i>Heterocladia umbellifera</i>			
<i>Heterodoxia denticulata</i>			
<i>Heterosiphonia australis</i>			
<i>Heterosiphonia gunniana</i>			
<i>Heterosiphonia muelleri</i>			
<i>Heterosiphonia wrangelioides</i>			
<i>Heterothamnion episiliquosum</i>			
<i>Hibbertia riparia</i> (NC)	Guinea-flower		
<i>Hibbertia sericea</i>	Silky Guinea-flower		
<i>Hibbertia sericea</i> var. (NC)	Silky Guinea-flower		
<i>Hibbertia sericea</i> var. <i>sericea</i> (NC)	Silky Guinea-flower		
<i>Hincksia granulosa</i>			
<i>Hincksia mitchelliae</i>			
<i>Hincksia sandriana</i>			
<i>Hirsutioballia laricina</i>			
<i>Husseyia rubra</i>			
<i>Hydrocotyle capillaris</i>	Thread Pennywort		
<i>Hydrocotyle hirta</i>	Hairy Pennywort		
<i>Hydrocotyle laxiflora</i>	Stinking Pennywort		
<i>Hydrocotyle medicaginoidea</i>	Medic Pennywort		
<i>Hydrocotyle plebeia</i>			
<i>Hydrocotyle</i> sp.	Pennywort		
<i>Hymenena affinis</i>			
<i>Hymenena curdieana</i>			
<i>Hymenena endiviaefolia</i>			
<i>Hymenena multipartita</i>			
<i>Hymenocladia chondricola</i>			
<i>Hypericum gramineum</i>	Small St John's Wort		
<i>Hypnea filiformis</i>			
<i>Hypnea ramentacea</i>			
<i>Hypneocolax stellaris</i> ssp. <i>orientalis</i>			
<i>Hypolaena fastigiata</i>	Tassel Rope-rush		
<i>Hypoxis glabella</i> var. <i>glabella</i>	Tiny Star		

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Species	Common Name	Aus status	SA status
<i>Imperata cylindrica</i>	Blady Grass		
<i>Involucrana crassa</i>			
<i>Involucrana meredithiana</i>			
<i>Isolepis cernua</i>	Nodding Club-rush		
<i>Isolepis platycarpa</i>	Flat-fruit Club-rush		
<i>Janczewskaia tasmanica</i>			
<i>Jania micrarthrodia</i>			
<i>Juncus bufonius</i>	Toad Rush		
<i>Juncus caespiticus</i>	Grassy Rush		
<i>Juncus kraussii</i>	Sea Rush		
<i>Kennedia prostrata</i>	Scarlet Runner		
<i>Kraftia dichotoma</i>			
<i>Kunzea pomifera</i>	Muntries		
<i>Lachnagrostis aemula</i>	Blown-grass		
<i>Lachnagrostis billardierei</i> ssp. <i>billardierei</i>	Coast Blown-grass		
<i>Lachnagrostis filiformis</i>	Common Blown-grass		
<i>Lasiopetalum discolor</i>	Coast Velvet-bush		
<i>Lasiopetalum schulzenii</i>	Drooping Velvet-bush		
<i>Lasiothalia hirsuta</i>			
<i>Laurencia arbuscula</i>			
<i>Laurencia botryoides</i>			
<i>Laurencia clavata</i>			
<i>Laurencia elata</i>			
<i>Laurencia filiformis</i> f. <i>dendritica</i>			
<i>Laurencia filiformis</i> f. <i>filiformis</i>			
<i>Lawrenca spicata</i>	Salt Lawrenceia		
<i>Leathesia difformis</i>			
<i>Leathesia intermedia</i>			
<i>Lenormandia latifolia</i>			
<i>Lenormandia marginata</i>			
<i>Lenormandia muelleri</i>			
<i>Lenormandia pardalis</i>			
<i>Lenormandia spectabilis</i>			
<i>Lepidosperma congestum</i>			
<i>Lepidosperma congestum</i> (NC)	Clustered Sword-sedge		
<i>Lepidosperma gladiatum</i>	Coast Sword-sedge		
<i>Lepidosperma longitudinale</i>	Pithy Sword-sedge		
<i>Lepilaena australis</i>	Austral Water-mat		
<i>Lepilaena cylindrocarpa</i>	Long-fruit Water-mat		
<i>Lepilaena preissii</i>	Slender Water-mat		
<i>Leptocarpus tenax</i>	Slender Twine-rush		
<i>Leptoceras menziesii</i>	Hare Orchid		
<i>Leptophyllis conferta</i>			
<i>Leptosomia rosea</i>			
<i>Leptospermum continentale</i>	Prickly Tea-tree		
<i>Leptospermum lanigerum</i>	Silky Tea-tree		
<i>Leucophyta brownii</i>	Coast Cushion Bush		
<i>Leucopogon parviflorus</i>	Coast Beard-heath		
<i>Liagora harveyana</i>			
<i>Liagora wilsoniana</i>			
<i>Lilaeopsis polyantha</i>	Australian Lilaeopsis		
<i>Linum marginale</i>	Native Flax		
<i>Lobelia anceps</i>	Angled Lobelia		

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Species	Common Name	Aus status	SA status
<i>Logania crassifolia</i>	Coast Logania		
<i>Logania ovata</i>	Oval-leaf Logania		
<i>Lomentaria australis</i>			
<i>Lomentaria monochlamydea</i>			
<i>Lomentaria pyramidalis</i>			
<i>Lophothalia bormocladus</i>			
<i>Lophothamnion hirtum</i>			
<i>Lophurella pericladus</i>			
<i>Lotus australis</i>	Austral Trefoil		
<i>Macrocystis angustifolia</i>			
<i>Macrothamnion pellucidum</i>			
<i>Macrothamnion secundum</i>			
<i>Malva preissiana</i>	Australian Hollyhock		
<i>Mastophoropsis canaliculata</i>			
<i>Medeiothamnion halurus</i>			
<i>Medeiothamnion protensum</i>			
<i>Melaleuca acuminata</i> ssp. <i>acuminata</i>	Mallee Honey-myrtle		
<i>Melaleuca brevifolia</i>	Short-leaf Honey-myrtle		
<i>Melaleuca gibbosa</i>	Slender Honey-myrtle		
<i>Melaleuca halmaturorum</i>	Swamp Paper-bark		
<i>Melaleuca lanceolata</i>	Dryland Tea-tree		
<i>Melaleuca lanceolata</i> ssp. <i>lanceolata</i> (NC)	Dryland Tea-tree		
<i>Melanema dumosum</i>			
<i>Melanthalia concinna</i>			
<i>Melanthalia obtusata</i>			
<i>Melobesia membranacea</i>			
<i>Mesophyllum macroblastum</i>			
<i>Metagoniolithon radiatum</i>			
<i>Metagoniolithon stelliferum</i>			
<i>Metamastophora flabellata</i>			
<i>Micropeuce feredayae</i>			
<i>Micropeuce glomerulifera</i>			
<i>Microseris lanceolata</i>	Yam Daisy		
<i>Microtis arenaria</i>	Notched Onion-orchid		
<i>Microtis unifolia</i> complex	Onion-orchid		
<i>Moss</i> sp.			
<i>Muehlenbeckia adpressa</i>	Climbing Lignum		
<i>Muehlenbeckia gunnii</i>	Coastal Climbing Lignum		
<i>Muellerena wattsii</i>			
<i>Mychodea acanthymenia</i>			
<i>Mychodea aciculare</i>			
<i>Mychodea carnososa</i>			
<i>Mychodea disticha</i>			
<i>Mychodea hamata</i>			
<i>Mychodea marginifera</i>			
<i>Mychodea pusilla</i>			
<i>Mychodea ramulosa</i>			
<i>Myoporum insulare</i>	Common Boobialla		
<i>Myosotis australis</i>	Austral Forget-me-not		
<i>Myriodesma barveyanum</i>			
<i>Myriodesma integrifolium</i>			
<i>Myriodesma leptophyllum</i>			
<i>Myriogloea sciurus</i>			

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Species	Common Name	Aus status	SA status
<i>Myriogramme gunniana</i>			
<i>Myrionema strangulans</i>			
<i>Myriophyllum muelleri</i>	Hooded Milfoil		
<i>Myriophyllum salsugineum</i>	Lake Milfoil		
<i>Myriophyllum sp.</i>	Milfoil		
<i>Nitospinosa littledipensis</i>			
<i>Nitospinosa pristoidea</i>			
<i>Nitraria billardierei</i>	Nitre-bush		
<i>Nizymania australis</i>			
<i>Nizymania conferta</i>			
<i>Nizymania furcata</i>			
<i>Notbeia anomala</i>			
<i>Olearia axillaris</i>	Coast Daisy-bush		
<i>Olearia ramulosa</i>	Twiggy Daisy-bush		
<i>Olearia tubuliflora</i>	Rayless Daisy-bush		
<i>Ophioglossum lusitanicum</i>	Austral Adder's-tongue		
<i>Orchidaceae sp.</i>	Orchid Family		
<i>Oxalis perennans</i>	Native Sorrel		
<i>Oxalis perennans (NC)</i>	Native Sorrel		
<i>Ozothamnus ferrugineus</i>	Tree Everlasting		
<i>Ozothamnus turbinatus</i>	Coast Bush-everlasting		
<i>Pachydictyon polycladum</i>			
<i>Panicum effusum var. effusum</i>	Hairy Panic		
<i>Parietaria debilis</i>	Smooth-nettle		
<i>Parietaria debilis (NC)</i>	Smooth-nettle		
<i>Pelargonium australe</i>	Austral Stork's-bill		
<i>Peritbalia caudata</i>			
<i>Petalonia fascia</i>			
<i>Peyssonnelia capensis</i>			
<i>Peyssonnelia novae-hollandiae</i>			
<i>Phacelocarpus alatus</i>			
<i>Phacelocarpus apodus</i>			
<i>Phacelocarpus complanatus</i>			
<i>Phacelocarpus peperocarpus</i>			
<i>Phytymophora amansioides</i>			
<i>Phloiocaulon foecundum</i>			
<i>Phloiocaulon spectabile</i>			
<i>Phragmites australis</i>	Common Reed		
<i>Phyllospora comosa</i>			
<i>Pimelea glauca</i>	Smooth Riceflower		
<i>Pimelea serpyllifolia ssp. serpyllifolia</i>	Thyme Riceflower		
<i>Platoma australicum</i>			
<i>Platoma foliosum</i>			
<i>Platyclinia crenulata</i>			
<i>Platyclinia stipitata</i>			
<i>Platysiphonia delicata</i>			
<i>Platysiphonia victoriae</i>			
<i>Plocamium angustum</i>			
<i>Plocamium cartilagineum</i>			
<i>Plocamium costatum</i>			
<i>Plocamium dilatatum</i>			
<i>Plocamium mertensii</i>			
<i>Plocamium patagiatum</i>			

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Species	Common Name	Aus status	SA status
<i>Plocamium preissianum</i>			
<i>Poa crassicaudex</i>	Thick-stem Tussock-grass		
<i>Poa labillardieri</i> var. <i>labillardieri</i>	Common Tussock-grass		
<i>Poa poiiformis</i> var. <i>poiiformis</i>	Coast Tussock-grass		
<i>Poa</i> sp.	Meadow-grass/Tussock-grass		
<i>Podotheca angustifolia</i>	Sticky Long-heads		
<i>Pollexfenia lobata</i>			
<i>Pollexfenia pedicellata</i>			
<i>Polycerea nigrescens</i>			
<i>Polycoelia laciniata</i>			
<i>Polysiphonia australiensis</i>			
<i>Polysiphonia brodiei</i>			
<i>Polysiphonia crassiuscula</i>			
<i>Polysiphonia daveyae</i>			
<i>Polysiphonia decipiens</i>			
<i>Polysiphonia infestans</i>			
<i>Polysiphonia isogona</i>			
<i>Polysiphonia scopulorum</i>			
<i>Polysiphonia subtilissima</i>			
<i>Pomaderris obcordata</i>	Wedge-leaf Pomaderris		
<i>Pomaderris paniculosa</i> ssp.			
<i>Pomaderris paniculosa</i> ssp. <i>paniculosa</i>	Mallee Pomaderris		
<i>Pomaderris paniculosa</i> ssp. <i>paralia</i>	Coast Pomaderris		
<i>Poranthera microphylla</i> (NC)	Small Poranthera		
<i>Porphyra columbina</i>			
<i>Porphyra lucasii</i>			
<i>Posidonia australis</i>	Southern Tapeweed		
<i>Posidonia coriacea</i>	Leathery Tapeweed		
<i>Potamogeton pectinatus</i>	Fennel Pondweed		
<i>Protokuetzingia australasica</i>			
<i>Pseudochlorodesmis australis</i>			
<i>Pseudognaphalium luteoalbum</i>	Jersey Cudweed		
<i>Psilothallia siliculosa</i>			
<i>Pterocladia lucida</i>			
<i>Pterostylis pedunculata</i>	Maroon-hood		
<i>Pterostylis</i> sp.	Greenhood		
<i>Pterothamnion nodiferum</i>			
<i>Ptilocladia pulchra</i>			
<i>Ptilocladia vestita</i>			
<i>Ptilonia australasica</i>			
<i>Ptilonia subulifera</i>			
<i>Ptilotus macrocephalus</i>	Feather-heads		
<i>Pultenaea acerosa</i>	Bristly Bush-pea		
<i>Pultenaea hispidula</i>	Rusty Bush-pea		
<i>Pultenaea tenuifolia</i>	Narrow-leaf Bush-pea		
<i>Ralfsia verrucosa</i>			
<i>Ranunculus sessiliflorus</i> var. <i>sessiliflorus</i>	Annual Buttercup		
<i>Rhabdonia clavigera</i>			
<i>Rhabdonia verticillata</i>			
<i>Rhagodia candolleana</i> ssp. <i>candolleana</i>	Sea-berry Saltbush		
<i>Rhizoclonium riparium</i>			
<i>Rhizoclonium tortuosum</i>			
<i>Rhodocallis elegans</i>			

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Species	Common Name	Aus status	SA status
<i>Rhodoglossum gigartinooides</i>			
<i>Rhodophyllis multipartita</i>			
<i>Rhodymenia foliifera</i>			
<i>Rhodymenia leptophylla</i>			
<i>Rhodymenia obtusa</i>			
<i>Robea costata</i>			
<i>Rumex</i> sp.	Dock		
<i>Ruppia megacarpa</i>	Widgeon Grass		
<i>Ruppia polycarpa</i>	Widgeon Grass		
<i>Ruppia tuberosa</i>	Widgeon Grass		
<i>Sagina maritima</i>	Sea Pearlwort		
<i>Samolus repens</i>	Creeping Brookweed		
<i>Sarcocornia blackiana</i>	Thick-head Samphire		
<i>Sarcocornia quinqueflora</i>	Beaded Samphire		
<i>Sarcodia marginata</i>			
<i>Sarcomenia delesserioides</i>			
<i>Sarcothalia crassifolia</i>			
<i>Sarcothalia insidiosa</i>			
<i>Sarcothalia radula</i>			
<i>Sarcotrichia tenera</i>			
<i>Sargassum decipiens</i>			
<i>Sargassum fallax</i>			
<i>Sargassum linearifolium</i>			
<i>Sargassum verruculosum</i>			
<i>Sargassum vestitum</i>			
<i>Scaberia agardhii</i>			
<i>Scaevola aemula</i>	Fairy Fanflower		
<i>Scaevola angustata</i>	Coast Fanflower		
<i>Scaevola crassifolia</i>	Cushion Fanflower		
<i>Scaevola humilis</i>	Inland Fanflower		
<i>Schizymenia dubyi</i>			
<i>Schoenoplectus pungens</i>	Spiky Club-rush		
<i>Schoenus nitens</i>	Shiny Bog-rush		
<i>Scytosiphon lomentaria</i>			
<i>Sebaea albidiflora</i>	White Sebaea		
<i>Sebaea ovata</i>	Yellow Sebaea		
<i>Seirococcus axillaris</i>			
<i>Selaginella gracillima</i>	Tiny Selaginella		
<i>Selliera radicans</i>	Shiny Swamp-mat		
<i>Senecio biserratus</i>	Jagged Groundsel		
<i>Senecio glomeratus</i> (NC)	Swamp Groundsel		
<i>Senecio glomeratus</i> ssp. <i>glomeratus</i>	Swamp Groundsel		
<i>Senecio glomeratus</i> ssp. <i>longifructus</i>	Swamp Groundsel		
<i>Senecio minimus</i>	Fine-tooth Groundsel		
<i>Senecio odoratus</i>	Scented Groundsel		
<i>Senecio odoratus</i> var. <i>odoratus</i> (NC)	Scented Groundsel		
<i>Senecio picridioides</i>	Purple-leaf Groundsel		
<i>Senecio pinnatifolius</i> (NC)	Variable Groundsel		
<i>Senecio pinnatifolius</i> var. <i>lanceolatus</i>	Variable Groundsel		
<i>Senecio pinnatifolius</i> var. <i>maritimus</i>	Variable Groundsel		
<i>Senecio</i> sp.	Groundsel		
<i>Senecio spanomerus</i>			
<i>Senecio tenuiflorus</i> (NC)	Woodland Groundsel		

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Species	Common Name	Aus status	SA status
<i>Shepleya verticillata</i>			
<i>Shepleya wattsi</i>			
<i>Solanum laciniatum</i>	Cut-leaf Kangaroo-apple		
<i>Solanum simile</i>	Kangaroo Apple		
<i>Solieria robusta</i>			
<i>Sonchus hydrophilus</i>	Native Sow-thistle		
<i>Sonderella linearis</i>			
<i>Sonderopelta coriacea</i>			
<i>Sphacelaria bracteata</i>			
<i>Sphacelaria carpoglossi</i>			
<i>Sphacelaria reinkei</i>			
<i>Spinifex sericeus</i> (NC)	Rolling Spinifex		
<i>Spongites yendoi</i>			
<i>Spongoclonium brownianum</i>			
<i>Spongoclonium conspicuum</i>			
<i>Spongoclonium fasciculatum</i>			
<i>Sporobolus virginicus</i>	Salt Couch		
<i>Sporobolus virginicus</i> (NC)	Salt Couch		
<i>Sporochnus comosus</i>			
<i>Sporocladopsis novae-zelandiae</i>			
<i>Spyridia dasyoides</i>			
<i>Stackhousia aspericocca</i> ssp. <i>One-sided inflorescence</i> (W.R.Barker 697)	One-sided Candles		
<i>Stackhousia monogyna</i>	Creamy Candles		
<i>Stackhousia spathulata</i>	Coast Candles		
<i>Stenogramme interrupta</i>			
<i>Suaeda australis</i>	Austral Seablite		
<i>Swainsona lessertifolia</i>	Coast Swainson-pea		
<i>Synarthrophyton patena</i>			
<i>Tecticornia pergranulata</i> ssp. <i>pergranulata</i>	Black-seed Samphire		
<i>Tetragonia implexicoma</i>	Bower Spinach		
<i>Thamnoclonium dichotomum</i>			
<i>Thelymitra antennifera</i>	Lemon Sun-orchid		
<i>Thelymitra rubra</i>	Salmon Sun-orchid		
<i>Threlkeldia diffusa</i>	Coast Bonefruit		
<i>Thuretia australasica</i>			
<i>Thuretia quercifolia</i>			
<i>Tinocladia australis</i>			
<i>Triglochin centrocarpum</i> (NC)	Dwarf Arrowgrass		
<i>Triglochin striata</i>	Streaked Arrowgrass		
<i>Trithamnion vulgare</i>			
<i>Typha domingensis</i>	Narrow-leaf Bulrush		
<i>Ulva australis</i>			
<i>Ulva lactuca</i>			
<i>Ulva taeniata</i>			
<i>Ulvaria oxysperma</i>			
<i>Urtica incisa</i>	Scrub Nettle		
<i>Villarsia umbricola</i> var. <i>umbricola</i>	Lax Marsh-flower		
<i>Wilsonia backhousei</i>	Narrow-leaf Wilsonia		
<i>Wilsonia humilis</i>	Silky Wilsonia		
<i>Wilsonia rotundifolia</i>	Round-leaf Wilsonia		
<i>Wollastoniella myriophylloides</i>			
<i>Wrangelia nobilis</i>			

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Species	Common Name	Aus status	SA status
<i>Wrangelia plumosa</i>			
<i>Wrangelia velutina</i>			
<i>Xanthorrhoea caespitosa</i>	Sand-heath Yacca		
<i>Zonaria angustata</i>			
<i>Zonaria crenata</i>			
<i>Zonaria turneriana</i>			
<i>Zygophyllum billardierei</i>	Coast Twinleaf		
<i>Zymurgia chondriopsidea</i>			

E: Endangered, V: Vulnerable, R: Rare

*note: includes some marine species

Fauna

# of fauna in cell	225 recorded – 177 birds, 8 butterflies, 20 mammals, 14 reptiles, 6 amphibians (an additional 21 butterflies and 1 mammal identified by experts as possibly occurring)
# of fauna surveys / records	12 surveys, 164 opportune sites, 2 reserve database record sites
# of threatened fauna in cell	42 recorded
# of non-indigenous fauna	15 recorded (an additional 2 invertebrate and 1 mammal possible)

Non-indigenous fauna

Species	Common Name	Class	Record
<i>Alanda arvensis</i>	Eurasian Skylark	Aves	x
<i>Anas platyrhynchos</i>	Northern Mallard	Aves	x
<i>Carduelis carduelis</i>	European Goldfinch	Aves	x
<i>Chloris chloris</i>	Common Greenfinch (European Greenfinch)	Aves	x
<i>Columba livia</i>	Rock Dove (Feral Pigeon)	Aves	x
<i>Passer domesticus</i>	House Sparrow	Aves	x
<i>Streptopelia chinensis</i>	Spotted Dove (Spotted turtle-dove)	Aves	x
<i>Sturnus vulgaris</i>	Common Starling	Aves	x
<i>Turdus merula</i>	Common Blackbird	Aves	x
<i>Pieris rapae rapae</i>	Cabbage White	Invertebrate	p
<i>Danaus plexippus plexippus</i>	Wanderer, Monarch	Invertebrate	p
<i>Bos taurus</i>	Cattle (European Cattle)	Mammalia	x
<i>Felis catus</i>	Cat (Feral Cat)	Mammalia	x
<i>Mus musculus</i>	House Mouse	Mammalia	x
<i>Oryctolagus cuniculus</i>	Rabbit (European Rabbit)	Mammalia	x
<i>Rattus norvegicus</i>	Brown Rat (Sewer Rat, Norway Rat)	Mammalia	e
<i>Rattus rattus</i>	Black Rat (Ship Rat, Roof Rat)	Mammalia	x
<i>Vulpes vulpes</i>	Fox (Red Fox)	Mammalia	x

x: recorded, p: possibly there as suggested by R. Grund

Birds

Species	Common Name	Aus status	SA status
<i>Neophema chrysogaster</i>	Orange-bellied Parrot	CR/M	E
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	M	E
<i>Ninox strenua</i>	Powerful Owl		E
<i>Pandion cristatus</i>	Eastern Osprey		E
<i>Sternula albifrons</i>	Little Tern		E

SE10 – Little Dip CP

Species	Common Name	Aus status	SA status
<i>Sternula nereis</i>	Fairy Tern		E
<i>Calyptorhynchus funereus</i>	Yellow-tailed Black-Cockatoo		V
<i>Cladorhynchus leucocephalus</i>	Banded Stilt		V
<i>Coturnix ypsilophora</i>	Brown Quail		V
<i>Lewinia pectoralis</i>	Lewin's Rail		V
<i>Neophema chrysostoma</i>	Blue-winged Parrot		V
<i>Petroica phoenicea</i>	Flame Robin		V
<i>Rostratula australis</i>	Australian Painted Snipe	V	V
<i>Stictonetta naevosa</i>	Freckled Duck		V
<i>Thinornis rubricollis</i>	Hooded Plover		V
<i>Actitis hypoleucos</i>	Common Sandpiper	M	R
<i>Anas rhynchotis</i>	Australasian Shoveler		R
<i>Ardea ibis</i>	Cattle Egret		R
<i>Ardea intermedia</i>	Intermediate Egret		R
<i>Arenaria interpres</i>	Ruddy Turnstone	M	R
<i>Biziura lobata</i>	Musk Duck		R
<i>Calidris alba</i>	Sanderling	M	R
<i>Calidris subminuta</i>	Long-toed Stint	M	R
<i>Egretta garzetta</i>	Little Egret		R
<i>Egretta sacra</i>	Eastern Reef Egret	M	R
<i>Falco peregrinus</i>	Peregrine Falcon		R
<i>Gallinago hardwickii</i>	Latham's Snipe (Japanese Snipe)	M	R
<i>Haematopus fuliginosus</i>	Sooty Oystercatcher		R
<i>Haematopus longirostris</i>	Australian Pied Oystercatcher		R
<i>Neophema elegans</i>	Elegant Parrot		R
<i>Numenius phaeopus</i>	Whimbrel	M	R
<i>Oxyura australis</i>	Blue-billed Duck		R
<i>Pluvialis fulva</i>	Pacific Golden Plover	M	R
<i>Podiceps cristatus</i>	Great Crested Grebe		R
<i>Stagonopleura bella</i>	Beautiful Firetail		R
<i>Zootera lunulata</i>	Bassian Thrush (White's Thrush)		R
<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater		
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill		
<i>Acanthiza lineata</i>	Striated Thornbill		
<i>Acanthiza pusilla</i>	Brown Thornbill		
<i>Accipiter cirrocephalus</i>	Collared Sparrowhawk		
<i>Anas castanea</i>	Chestnut Teal		
<i>Anas gracilis</i>	Grey Teal		
<i>Anas superciliosa</i>	Pacific Black Duck		
<i>Anthochaera carunculata</i>	Red Wattlebird		
<i>Anthochaera chrysoptera</i>	Little Wattlebird		
<i>Anthus novaeseelandiae</i>	Australasian Pipit (Richard's Pipit)		
<i>Apus pacificus</i>	Fork-tailed Swift		
<i>Aquila audax</i>	Wedge-tailed Eagle		
<i>Ardea alba</i>	Great Egret		
<i>Ardea modesta</i>	Eastern Great Egret		
<i>Ardea pacifica</i>	White-necked Heron (Pacific Heron)		
<i>Ardenna tenuirostris</i>	Short-tailed Shearwater (Mutton Bird)		
<i>Artamus cyanopterus</i>	Dusky Woodswallow		
<i>Aythya australis</i>	Hardhead (White-eyed Duck)		
<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo		
<i>Calamanthus fuliginosus</i>	Striated Fieldwren		
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	M	

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Species	Common Name	Aus status	SA status
<i>Calidris ferruginea</i>	Curlew Sandpiper	M	
<i>Calidris ruficollis</i>	Red-necked Stint	M	
<i>Chalcites basalis</i>	Horsfield's Bronze-cuckoo		
<i>Chalcites lucidus</i>	Shining Bronze-Cuckoo		
<i>Charadrius bicinctus</i>	Double-banded Plover		
<i>Charadrius ruficapillus</i>	Red-capped Plover (Red-capped Dotterel)		
<i>Chlidonias hybrida</i>	Whiskered Tern	M	
<i>Chroicocephalus novaehollandiae</i>	Silver Gull		
<i>Cincloramphus mathewsi</i>	Rufous Songlark		
<i>Circus approximans</i>	Swamp Harrier (Marsh Harrier)		
<i>Colluricincla harmonica</i>	Grey Shrike-thrush		
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike		
<i>Corcorax melanorhynchos</i>	White-winged Chough		
<i>Corvus coronoides</i>	Australian Raven		
<i>Corvus mellori</i>	Little Raven		
<i>Corvus tasmanicus</i>	Forest Raven		
<i>Coturnix pectoralis</i>	Stubble Quail		
<i>Cracticus tibicen</i>	Australian Magpie		
<i>Cracticus torquatus</i>	Grey Butcherbird		
<i>Cygnus atratus</i>	Black Swan		
<i>Daption capense</i>	Cape Petrel		
<i>Dasyornis broadbenti</i>	Rufous Bristlebird		ssp
<i>Dromains novaehollandiae</i>	Emu		
<i>Drymodes brunneopygia</i>	Southern Scrub-robin		
<i>Egretta novaehollandiae</i>	White-faced Heron		
<i>Elanus axillaris</i>	Black-shouldered Kite		
<i>Euseyornis melanops</i>	Black-fronted Dotterel (Black-fronted Plover)		
<i>Eolophus roseicapillus</i>	Galah		
<i>Eopsaltria australis</i>	Eastern Yellow Robin		
<i>Epthianura albifrons</i>	White-fronted Chat		
<i>Erythrogonys cinctus</i>	Red-kneed Dotterel		
<i>Eudyptula minor</i>	Little Penguin (Fairy Penguin)		
<i>Eurystomus orientalis</i>	Dollarbird		
<i>Falco berigora</i>	Brown Falcon		
<i>Falco cenchroides</i>	Nankeen Kestrel (Australian Kestrel)		
<i>Falco longipennis</i>	Australian Hobby		
<i>Fulica atra</i>	Eurasian Coot		
<i>Gallinula tenebrosa</i>	Dusky Moorhen		
<i>Gelochelidon nilotica</i>	Gull-billed Tern		
<i>Geopelia striata</i>	Peaceful Dove		
<i>Glossopsitta concinna</i>	Musk Lorikeet		
<i>Glossopsitta porphyrocephala</i>	Purple-crowned Lorikeet		
<i>Grallina cyanoleuca</i>	Magpie-lark		
<i>Haliastur sphenurus</i>	Whistling Kite		
<i>Himantopus himantopus</i>	Black-winged Stilt		
<i>Hirundapus caudacutus</i>	White-throated Needletail	M	
<i>Hirundo neoxena</i>	Welcome Swallow		
<i>Hydroprogne caspia</i>	Caspian Tern		
<i>Larus pacificus</i>	Pacific Gull		
<i>Lichenostomus chrysops</i>	Yellow-faced Honeyeater		
<i>Lichenostomus fuscus</i>	Fuscous Honeyeater		
<i>Lichenostomus leucotis</i>	White-eared Honeyeater		
<i>Lichenostomus penicillatus</i>	White-plumed Honeyeater		

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Species	Common Name	Aus status	SA status
<i>Lichenostomus virescens</i>	Singing Honeyeater		
<i>Malacorhynchus membranaceus</i>	Pink-eared Duck		
<i>Malurus cyaneus</i>	Superb Fairy-wren		
<i>Manorina melanocephala</i>	Noisy Miner		
<i>Megalurus gramineus</i>	Little Grassbird		
<i>Microcarbo melanoleucos</i>	Little Pied Cormorant		
<i>Morus serrator</i>	Australasian Gannet		
<i>Neobornia temporalis</i>	Red-browed Finch		
<i>Ninox novaeseelandiae</i>	Southern Boobook		
<i>Nycticorax caledonicus</i>	Nankeen Night Heron		
<i>Ocyphaps lophotes</i>	Crested Pigeon		
<i>Pachycephala olivacea</i>	Olive Whistler		ssp
<i>Pachycephala pectoralis</i>	Golden Whistler		
<i>Pardalotus punctatus</i>	Spotted Pardalote		
<i>Pardalotus striatus</i>	Striated Pardalote		
<i>Pelecanus conspicillatus</i>	Australian Pelican		
<i>Petrochelidon nigricans</i>	Tree Martin		
<i>Petroica boodang</i>	Scarlet Robin		ssp
<i>Phaethon rubricauda</i>	Red-tailed Tropicbird		
<i>Phalacrocorax carbo</i>	Great Cormorant		
<i>Phalacrocorax fuscescens</i>	Black-faced Cormorant (Black-faced Shag)		
<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant		
<i>Phalacrocorax varius</i>	Pied Cormorant		
<i>Phaps chalcoptera</i>	Common Bronzewing		
<i>Phaps elegans</i>	Brush Bronzewing		
<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater		
<i>Platalea regia</i>	Royal Spoonbill		
<i>Platycercus elegans</i>	Crimson Rosella		
<i>Podargus strigoides</i>	Tawny Frogmouth		
<i>Poliocephalus poliocephalus</i>	Hoary-headed Grebe		
<i>Pomatostomus superciliosus</i>	White-browed Babbler		
<i>Pomatostomus temporalis</i>	Grey-crowned Babbler		ssp
<i>Porphyrio porphyrio</i>	Purple Swamphe (Purple Moorhen)		
<i>Porzana fluminea</i>	Australian Spotted Crake (Australian Crake)		
<i>Porzana pusilla</i>	Baillon's Crake		
<i>Psephotus haematonotus</i>	Red-rumped Parrot		
<i>Recurvirostra novaehollandiae</i>	Red-necked Avocet		
<i>Rhipidura albiscapa</i>	Grey Fantail		
<i>Rhipidura leucophrys</i>	Willie Wagtail		
<i>Sericornis frontalis</i>	White-browed Scrubwren		
<i>Smicronis brevirostris</i>	Weebill		
<i>Stipiturus malachurus</i>	Southern Emu-wren	ssp	ssp
<i>Stipiturus malachurus malachurus</i>	Southern Emu-wren		
<i>Strepera versicolor</i>	Grey Currawong		ssp
<i>Tachybaptus novaehollandiae</i>	Australasian Grebe (Little Grebe)		
<i>Tadorna tadornoides</i>	Australian Shelduck (Mountain Duck)		
<i>Thalasseus bergii</i>	Crested Tern		
<i>Threskiornis molucca</i>	Australian White Ibis (Sacred Ibis)		
<i>Threskiornis spinicollis</i>	Straw-necked Ibis		
<i>Tribonyx ventralis</i>	Black-tailed Native-hen		
<i>Trichoglossus haematodus</i>	Rainbow Lorikeet		
<i>Tringa nebularia</i>	Common Greenshank	M	
<i>Tringa stagnatilis</i>	Marsh Sandpiper	M	

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Species	Common Name	Aus status	SA status
<i>Tyto javanica</i>	Eastern Barn Owl		
<i>Vanellus miles</i>	Masked Lapwing		
<i>Vanellus tricolor</i>	Banded Lapwing		
<i>Zosterops lateralis</i>	Silvereye		

CR: Critically endangered, E: Endangered, V: Vulnerable, R: Rare, M: Migratory, ssp: sub-species

Butterflies

Species	Common Name	Status*	Record
<i>Jamennus icilius</i>	Icilius Hairstreak	E in SE	p
<i>Hesperilla donnysa donnysa</i> (pale form <i>flavescens</i>)	Yellowish Sedge-Skipper	E	x
<i>Anisynta cynone cynone</i>	Mottled Grass-skipper	V	x
<i>Hesperilla cyrbsoticha cyclospila</i>	Chrysotricha Sedge-skipper or Golden-haired Sedge-skipper	V	x
<i>Taractrocera papyria papyria</i>	White-banded Grass-dart	R	p
<i>Tisiphone abeona albifascia</i>	Sword-grass brown	R	p
<i>Lucia limbaria</i>	Small Copper	R	p
<i>Erina hyacinthina form josephina</i>	Common Dusky-blue	R	x
<i>Delias aganippe</i>	Wood White	R	p
<i>Danaus chrysippus petilia</i>	Lesser Wanderer	Va	p
<i>Geitoneura klugii klugii</i>	Common Xenica	C	p
<i>Heteronympha merope merope</i>	Common Brown	C	p
<i>Heteronympha penelope</i>	Shouldered Brown		p
<i>Junonia villida calybe</i>	Meadow argus	Va	p
<i>Vanessa itea</i>	Australian Admiral	Va	p
<i>Vanessa kershawi</i>	Australian Painted Lady	Va	p
<i>Erina acasta</i>	Blotched Dusky-blue		p
<i>Lampides boeticus</i>	Long-tailed Pea-blue		p
<i>Nacuduba biocellata biocellata</i>	Two-spotted Line-blue	LC	p
<i>Neolucia agricola agricola</i>	Fringed Heath-blue		p
<i>Ogyris amaryllis meridionalis</i>	Amaryllis Azure		p
<i>Theclinessthes miskini miskini</i>	Wattle Blue		p
<i>Theclinessthes serpentata serpentata</i>	Salt-bush blue		p
<i>Zizina labradus labradus</i>	Common Grass Blue		p
<i>Hesperilla donnysa delos</i> (incl. form <i>diluta</i>)	Donnysa skipper		x
<i>Hesperilla idothea idothea</i>			x
<i>Ocybadistes walkeri hypochlorus</i>	Southern Grass-dart		x
<i>Theclinessthes albocincta</i>	Bitter-bush blue	LC	x

*Vulnerability as per R. Grund, E: Endangered, V: Vulnerable, R: Rare

Va: Vagrant, LC: Locally common, C: Common

x: recorded, p: possibly there as suggested by R. Grund

Mammals

Species	Common Name	Aus status	SA status	Record
<i>Antechinus minimus</i>	Swamp Antechinus		E	x
<i>Antechinus flavipes</i>	Yellow-footed Antechinus		V	x
<i>Rattus lutreolus</i>	Swamp Rat		R	x
<i>Trichosurus vulpecula</i>	Common Brushtail Possum		R	x
<i>Vombatus ursinus</i>	Common Wombat		R	x
<i>Cercartetus concinnus</i>	Western Pygmy-possum			x
<i>Hydromys chrysogaster</i>	Water-rat			x
<i>Macropus fuliginosus</i>	Western Grey Kangaroo			x

SE10 – Little Dip CP

Species	Common Name	Aus status	SA status	Record
<i>Miniopterus australis</i>	Little Bent-wing Bat			x
<i>Pseudocheirus peregrinus</i>	Common Ringtail Possum			x
<i>Rattus fuscipes</i>	Bush Rat			x
<i>Sminthopsis crassicaudata</i>	Fat-tailed Dunnart			x
<i>Vespadelus vulturnus</i>	Little Forest Bat			x

E: Endangered, V: Vulnerable, R: Rare

Reptiles

Species	Common Name	Aus status	SA status	Record
<i>Aprasia striolata</i>	Lined Worm-lizard			x
<i>Austrelaps superbus</i>	Lowland Copperhead			x
<i>Bassiana duperreyi</i>	Eastern Three-lined Skink			x
<i>Chelodina longicollis</i>	Common Long-necked Tortoise			x
<i>Hemiergis peronii</i>	Four-toed Earless Skink			x
<i>Lampropholis guichenoti</i>	Garden Skink			x
<i>Lerista bougainvillii</i>	Bougainville's Skink			x
<i>Morethia obscura</i>	Mallee Snake-eye			x
<i>Notechis scutatus</i>	Eastern Tiger Snake	ssp		x
<i>Pogona barbata</i>	Eastern Bearded Dragon			x
<i>Pseudemoia entrecasteauxii</i>	Southern Grass Skink			x
<i>Pseudonaja textilis</i>	Eastern Brown Snake			x
<i>Tiliqua nigrolutea</i>	Blotched Bluetongue			x
<i>Tiliqua rugosa</i>	Sleepy Lizard			x

E: Endangered, V: Vulnerable, R: Rare

x: recorded

Amphibians

Species	Common Name	Aus status	SA status	Record
<i>Crinia signifera</i>	Common Froglet			x
<i>Limnodynastes dumerilii</i>	Banjo Frog			x
<i>Limnodynastes peronii</i>	Striped Marsh Frog			x
<i>Litoria ewingii</i>	Brown Tree Frog			x
<i>Neobatrachus pictus</i>	Burrowing Frog			x
<i>Neobatrachus sudelli</i>	Sudell's Frog			x

E: Endangered, V: Vulnerable, R: Rare

x: recorded

SE11 – Guichen Bay

6.3.11 Cell SE11 Guichen Bay

Area 5,490.3 ha. Length 11.83 km.



SE11 – Guichen Bay

Landforms

This cell is entirely a low, nearly flat coastal plain, of 82 dune ridges and a beach of fine to medium sands. The landforms around Guichen Bay provide a significant record of late Holocene to Recent coastal sedimentation (Short & Hesp 1984, p.73). Lower levels of the Robe Range and possible breaching, allowed the rising late Holocene seas to flood the inter-range depression in front of the Woakwine Range. Large quantities of sand were swept into this depression and low energy shoaling waves constructed a series of low beach ridges, dated between 7,000 and 3,000 BP, (Thom et al, 1981). This the largest sediment trap of marine sands on the South East coast, and 86% of this cell is classified coastal dune. The current foredune is stable, with small scale storm blowouts and human damage. Between the dune ridges and the Woakwine Range, small backbarrier swamps, such as Dawson Swamp and McInnes Wetland, are trapped.

Beaches are reflective to intermediate around Guichen Bay, with low beachface angles and fine/medium carbonate sands. Energy is lowest at the two ends of the bay; at Robe the pattern of refracted swell slowly drives sand past small indentations to create minor beach management problems.



Beach ridges Guichen Bay. Photograph Coast Protection Board 2003.

Biota

There are 8 flora survey sites, 13 Herbarium record sites, 3 fauna survey sites, and 41 opportune fauna survey sites. 19.7% of the cell is vegetated, a total of 1084ha.

The partly grazed dunes are clothed in shrubs and grasses: tall to medium shrubland of *Leucopogon parviflorus*, *Acacia longiflora* var. *sophorae*, *Olearia axillaris*+/- *Myoporum insulare*. *Lepidosperma gladiatum* and *Isolepis nodosa* is common in the interdune swales. McInnes Swamp retains *Leptospermum lanigerum* shrubland. Stands of *Eucalyptus diversifolia* and *Melaleuca balmaturorum* are found near the outlet of drain L.

151 fauna species have been recorded in the cell including 125 birds, 7 butterflies, 8 mammals, 4 reptiles and 7 amphibians. Listed threatened species include the State endangered White-bellied

SE11 – Guichen Bay

Sea Eagle (*Haliaeetus leucogaster*), Eastern Osprey (*Pandion cristatus*), and Little (*Sternula albifrons*) and Fairy (*Sternula nereis*) Terns.

Benthic Habitat

Inshore bare sand runs out to low profile reef some 300 to 600m into Guichen Bay. A large patch of bare sand off Robe encloses a number of areas of heavy limestone reef.

Land Use/ Land Ownership

Predominantly grazing land use throughout. Guichen Bay CP lies adjacent to the coast (acquired 1967, see 'Small Coastal Parks Management Plan', 1994) and has no road access. It protects only 127 ha of the vegetated dune ridges that are the dominant feature of the cell as described above. Upper South East Marine Park (Boatswains Point to Nora Creina) extends the length of the cell. Robe lakes and connecting Drain L are dedicated Crown land to the South East Water Conservation and Drainage Board. The Long Beach residential part of Robe is nestled in the southern corner of the cell, separated from the main township by the lakes and drain. South of the CP, a narrow unallotted Crown land reserve extends around Guichen Bay and connects to a Crown land reserve at the Robe end of Long Beach which is in the care and control of Council.

Values/ Uses (Field visits and local reports)

Long Beach is heavily utilised for recreation and is a highly travelled stretch of beach by vehicles. Majority of the cell is used for grazing and cropping. Aboriginal Heritage values throughout.

Threats (Field visits and local reports)

Remnant coastal vegetation and the conservation park are threatened by pest plant and animal incursion from adjacent primary production land. Inappropriate Primary Industry and Residential (Coastal)(Frenchman Bay) development plan zoning of the foredune ridges. Native vegetation around the Robe Lakes and Beacon Hill seriously threatened by weed invasion.

Opportunities

Development of a strategy to preserve a transect across the time series geological record of beach ridges, from the coast to the Woakwine Range.

(The following is an extract from Slater and Farrington 2010) “There are historic records of Southern Bell Frog in Drain L, which crosses Cell SE11 to the Robe lakes and then Guichen Bay. Anecdotal reports from local landowners suggest the species may still be present in the area. A detailed frog survey should be carried out of these drains to assess if the Southern Bell Frog is still present (this should involve a minimum of three site visits and the use of frog recording devices). Recent surveys have recorded Southern Pygmy Perch from this site (Hammer, 2009). The connectivity of the site to Reedy Creek Wilmot Drain suggests that Dwarf Galaxias would still be present in Drain L and K albeit in low numbers. However, this would need to be confirmed via more thorough survey effort. In addition, a detailed survey of Drain L and K for fish and amphibians is required to identify key refuge areas or sites that could be suitable refuge creation.”

Conservation Analysis (GIS)

The sum of conservation means for Guichen Bay is low within the region, 84.82. The bulk of the cell is taken up with cleared and grazed dune ridges of low conservation value, with only the uncleared foredunes showing moderate to high conservation values; a further kilometre from the shore, some partially cleared land has moderate totals. This pattern is reflected in the Guichen Bay CP, which was grazed until 1967. However, the detail shows there are a number of state rare *Leucopogon* shrubland associations within the dunes, also there are extensive areas of habitat suitable for the Orange Bellied Parrot in this part of the cell.

SE11 – Guichen Bay

Tiny areas of wetland, such as McInnes Swamp, trapped behind the dune ridge barrier, and around small lakes near the mouth of drain L, are high value exceptions to this pattern. Here habitat for the focal species Swamp Skink, Southern Bell Frog and Yellowish Sedge-skipper, together with a moderate overall wetland value score, raises the total.

Threat Analysis (GIS)

Guichen Bay has the highest total of threat summary means in the region, 74.69. High threat values are distributed throughout the cell, with no part having medium or low totals.

Development zoning is a high average as primary industry zoning is extensive; private land ownership is extensive with the exception of the foredune which is unallotted Crown land or park; many residential dwellings within the Guichen Bay dune ridges raise the total for existing development; land use and mining; significant weeds are widely distributed through the partially cleared dunes; numbers of feral animals and dune instability, all make significant contribution to this total.

Adaptation to Climate Change: Threats for cell SE11

(see also discussion of scenario in Section 4.11)

NOTE: the advice below is indicative of likely change and the direction of change, with implications for ecosystems. Dates, amounts and probabilities cannot be accurately calculated at this time. Thus advice on flood levels, for example, should not be used in engineering or development planning.

Climate change element/ scenario	Impacts and implications (for this cell)	Protect and manage habitat threats	Address landscape issues: fire, connectivity, refuges, hydrology
Combined climate changes and sea level rise throughout this cell	This cell presents a complex pattern of habitats sensitive to change.	Create a baseline for shoreline, dune and lake change by establishing a rectified aerial photographic record at an appropriate resolution.	
Sea level rise: 2030 : +c.20cm 2070: +c.80cm.	Increase in beach recession, storm foredune damage and dune instability. Loss of small cliff-backed pocket beaches at the northern and southern ends of the bay.	Maintain an aerial photographic record of change. Create buffer zone to allow dune retreat where feasible.	The creation of buffer zones to allow retreat of tide dependant ecosystems a regional issue with local implications.
	Acceleration of calcarenite cliff erosion.	Continue to monitor recession and address hazards as required.	
	Foredune damage could lead to widespread dune destabilisation and transport of sand across dunes to the lakes and farmland.	Active management of dune blowouts.	
Storms: <i>Frequency</i> continues to show great variation on a	2030: Occasional storm tide flooding above highest known tides. Lidar data suggests that marine incursion will ingress to	Manage sill on drain L tidal inlet to adjust to higher marine storm elevations as part of	

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Climate change element/ scenario	Impacts and implications (for this cell)	Protect and manage habitat threats	Address landscape issues: fire, connectivity, refuges, hydrology
decadal scale. <i>Intensity</i> of large storms increases.	Dawson Swamp at a 2.7 metre inundation. 2070: Flooding will affect both large lakes swamps and adjacent low lying areas.	the adaptive management of estuarine environment and lakes.	
	Frequent storm damage to foredunes.	Active management of dune blowouts.	
Warmer average conditions: 2030:+0.3 to 0.6°C 2070:+1.5 to 2°C	(Impacts uncertain. Existing terrestrial vegetation is found in warmer conditions elsewhere)		Maintain connectivity of vegetation within the region.
Drier average conditions: 2030: -2% to 5% 2070: - 10% to 20%	Dune vegetation adapts to drier conditions, but recovers more slowly from fire and storm damage allowing weed colonisation, notably exotic grasses: dune mobilization becomes more likely.	Active weed control within dunes.	Ensure vegetated dune areas are on region fire plan.
	Reduced runoff and increased evaporation threatens the lakes and lakeshore habitats.	Monitor seasonal water levels and salinity in lakes. Adaptive management of ecological assets.	
'Flashy' run off: Drier creeks, but larger rare floods	Drains and creeks may increase sediment load to coastal swamps and lakes (this depends on land management practices).	Maintain watching brief on sedimentation of lakes.	
Groundwater lowering; saline incursion:	Groundwater lowering a threat to Lakes Eliza and Robe: lowering freshwater pressure and increasing saline water pressure.	Monitor seasonal water levels and salinity in both lakes. Adaptive management of ecological assets.	Lakes represent any obvious changes in regional groundwater levels. Lowering of regional water table (and perched water tables in dunes) a threat to all habitats.
Nearshore sea changes - temperature; acidity; wave climate: 2030: +0.3°C to + 0.6°C 2070: +1.0°C to + 1.50C	Changes are unlikely to affect swell wave climate, apart from increase in mean wave period. (Changes in upwelling timing and frequency has been discussed, but not projected).		

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Table 6.13. Recommended Actions and Priority for Cell SE11 – Guichen Bay

Component	Issue	Proposed Action	Priority of Action	Key Players
Foredune beach ridge system.	Storm and human damage to native vegetation (State listed rare shrubland associations), resulting in local blowouts and foredune transgression.	Prompt rehabilitation of damaged areas.	High (Cons/threat)	DENR, NRM, Council, landowners
	Development should be minimised to protect remnant habitat and geoscience values.	Minimise development on the foredunes and dune ridge system through maintenance of area of coastal zoning.	Medium (cell)	Council, DPLG
	Invasive weeds in remnant coastal vegetation.	Undertake pest plant control in coastal scrub reserve of Long Beach.	Medium (threat)	Council, NRM, DENR
Coastal reserve and native vegetation areas adjacent to Long Beach residential area	Garden species invading native vegetation.	Community education campaign to encourage Robe residents and landholders adjoining the coast to remove invasive garden plants and replace with suitable non-invasive or indigenous species.	High (Cons/threat)	NRM, Council, landowners
Long Beach	Low energy sump for ocean based litter.	Continue regular litter survey to assist collection of data to meet national responsibilities under international legal obligations.	Medium (cell)	PIRSA, Commonwealth (Marine), Council, community
	High beach vehicle usage with potential to impact beach meiofauna and beach nesting birds, facilitate damage to foredunes and a hazard to other recreational users.	Review this usage, with a view to zoning the beach. Consider seasonal closure.	Medium (threat)	NRM, Council, DTEI
	Combination of sea level rise and other climate change effects potentially leads to rapid shoreline change	Monitor this by ensuring that DENR profiles are updated regularly.	Medium (hazard)	DENR

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Component	Issue	Proposed Action	Priority of Action	Key Players
Dune ridge system from shore to Woakwine Range	Potential for loss of geoscience research site through intrusive development and landuse.	Zoning of a 200m corridor across the dune ridge system, to allow farming, but prevent major sediment disturbance.	Medium (cell)	Council, CPB, DPLG
Robe Lakes	Vegetation around the lakes and Drain-L heavily infested with invasive weeds.	Restrict further spread of weeds from heavily infested areas. Weed strategy development and action on weed removal.	High (Cons/ threat)	NRM, Council, landowners
Whole cell	Aboriginal Heritage sites recorded in this cell. Need for appropriate and sustainable management.	Consultation to appropriately manage sites in this area.	High (Cons)	Murrapeena Heritage Association Inc., SE Aboriginal Focus Group, NRM, Council, Aboriginal Heritage Branch – DPC, Aboriginal Partnership Unit – DENR
	Lack of recognition of significant geological feature (Bridgewater formation).	Interpretation. Council to include map of the feature in its development plan.	Medium (Cons)	Council, Geological Society SA, NRM
	Changes to dunes and swamps, and shoreline recession likely to result with the continuation of climate change.	Continue a rectified aerial photographic record at an appropriate resolution, in order to show change from current baseline.	Medium (Cons/ threat)	DENR, NRM

BIOTA

Flora

Remnant vegetation area (ha)	1083.6 ha, 19.7% of cell area
# flora surveys / records	8 surveys, 13 herbarium record sites
# flora in cell	94
# conservation rated flora in cell	2 recorded
# non-indigenous flora in cell	26 recorded
Significant CDCS floristic community	<i>Lepidosperma gladiatum</i> shrubland (<20 records along SA coast) <i>Leucopogon parviflorus</i> / <i>Olearia axillaris</i> shrubland (>50% of known sites occur along SE coast). <i>Olearia axillaris</i> / <i>Leucopogon parviflorus</i> shrubland (>50% of

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known sites occur along SE coast).

Protected area Guichen Bay Conservation Park (127.1ha in total)

Weeds

Species	Common Name	Status	Study rating
<i>Dipogon lignosus</i>	Lavatory Creeper		9
<i>Lycium ferocissimum</i>	African Boxthorn	D	9
<i>Rhamnus alaternus</i>	Blowfly Bush		9
<i>Thinopyrum junceiforme</i>	Sea Wheat-grass		8
<i>Euphorbia paralias</i>	Sea Spurge		4
<i>Euphorbia terracina</i>	False Caper	D	4
<i>Senecio elegans</i>	Purple Groundsel		3
<i>Ammophila arenaria</i>	Marram Grass		2
<i>Anagallis arvensis</i>	Pimpernel		
<i>Bromus diandrus</i>	Great Brome		
<i>Cakile maritima</i> ssp. <i>maritima</i>	Two-horned Sea Rocket		
<i>Cerastium balearicum</i>	Chickweed		
<i>Erodium cicutarium</i>	Cut-leaf Heron's-bill		
<i>Galium murale</i>	Small Bedstraw		
<i>Hordeum leporinum</i>	Wall Barley-grass		
<i>Hypochaeris radicata</i>	Rough Cat's Ear		
<i>Lagurus ovatus</i>	Hare's Tail Grass		
<i>Melilotus indicus</i>	King Island Melilot		
<i>Parapholis incurva</i>	Curly Ryegrass		
<i>Polygogon maritimus</i>	Coast Beard-grass		
<i>Reichardia tingitana</i>	False Sowthistle		
<i>Rostraria cristata</i>	Annual Cat's-tail		
<i>Sonchus oleraceus</i> (NC)	Common Sow-thistle		
<i>Stellaria media</i>	Chickweed		
<i>Vulpia fasciculata</i>	Sand Fescue		
<i>Vulpia myuros</i> f. <i>myuros</i>	Rat's-tail Fescue		

D: Declared weed, WONS: Weeds of National Significance

Native flora

Species	Common Name	Aus status	SA status
<i>Scaevola calendulacea</i>	Dune Fanflower		V
<i>Brachyscome graminea</i>	Grass Daisy		R
<i>Acacia longifolia</i> ssp. <i>sophorae</i>	Coastal Wattle		
<i>Acacia paradoxa</i>	Kangaroo Thorn		
<i>Acaena novae-zelandiae</i>	Biddy-biddy		
<i>Actites megalocarpa</i>	Coast Sow-thistle		
<i>Apalochlamys spectabilis</i>	Showy Firebush		
<i>Apium prostratum</i> var. <i>prostratum</i>	Native Celery		
<i>Austrostipa exilis</i>	Heath Spear-grass		
<i>Austrostipa</i> sp.	Spear-grass		
<i>Bursaria spinosa</i> ssp. <i>spinosa</i>	Sweet Bursaria		
<i>Caladenia latifolia</i>	Pink Caladenia		
<i>Carex fascicularis</i>	Tassel Sedge		
<i>Carpobrotus rossii</i> (NC)	Native Pigface		
<i>Centella cordifolia</i>	Native Centella		
<i>Clematis microphylla</i> var. <i>microphylla</i>	Old Man's Beard		
<i>Comesperma volubile</i>	Love Creeper		

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Species	Common Name	Aus status	SA status
<i>Crassula decumbens</i> var. <i>decumbens</i>	Spreading Crassula		
<i>Crassula sieberiana</i> ssp. <i>tetramera</i> (NC)	Australian Stonecrop		
<i>Daucus glochidiatus</i>	Native Carrot		
<i>Dianella brevicaulis</i>	Short-stem Flax-lily		
<i>Dianella revoluta</i> var. <i>revoluta</i>	Black-anther Flax-lily		
<i>Dichondra repens</i>	Kidney Weed		
<i>Ficinia nodosa</i>	Knobby Club-rush		
<i>Galium migrans</i> (NC)	Loose Bedstraw		
<i>Geranium potentilloides</i> var. <i>potentilloides</i>	Downy Geranium		
<i>Geranium solanderi</i> var. <i>solanderi</i>	Austral Geranium		
<i>Geranium</i> sp.	Geranium		
<i>Gnaphalium indutum</i> ssp. <i>indutum</i>	Tiny Cudweed		
<i>Helichrysum leucopsideum</i>	Satin Everlasting		
<i>Hydrocotyle laxiflora</i>	Stinking Pennywort		
<i>Kunzea pomifera</i>	Muntries		
<i>Lasiopetalum schulzenii</i>	Drooping Velvet-bush		
<i>Lepidosperma gladiatum</i>	Coast Sword-sedge		
<i>Leptospermum lanigerum</i>	Silky Tea-tree		
<i>Leucophyta brownii</i>	Coast Cushion Bush		
<i>Leucopogon parviflorus</i>	Coast Beard-heath		
<i>Melaleuca balmaturorum</i>	Swamp Paper-bark		
<i>Melaleuca lanceolata</i>	Dryland Tea-tree		
<i>Moss</i> sp.			
<i>Muehlenbeckia adpressa</i>	Climbing Lignum		
<i>Muehlenbeckia gunnii</i>	Coastal Climbing Lignum		
<i>Myoporum insulare</i>	Common Boobialla		
<i>Myosotis australis</i>	Austral Forget-me-not		
<i>Olearia axillaris</i>	Coast Daisy-bush		
<i>Ozothamnus ferrugineus</i>	Tree Everlasting		
<i>Ozothamnus turbinatus</i>	Coast Bush-everlasting		
<i>Parietaria debilis</i> (NC)	Smooth-nettle		
<i>Pelargonium australe</i>	Austral Stork's-bill		
<i>Pimelea serpyllifolia</i> ssp. <i>serpyllifolia</i>	Thyme Riceflower		
<i>Poa poiformis</i> var. <i>poiformis</i>	Coast Tussock-grass		
<i>Podotheca angustifolia</i>	Sticky Long-heads		
<i>Pultenaea tenuifolia</i>	Narrow-leaf Bush-pea		
<i>Rhagodia candolleana</i> ssp. <i>candolleana</i>	Sea-berry Saltbush		
<i>Sagina maritima</i>	Sea Pearlwort		
<i>Scaevola crassifolia</i>	Cushion Fanflower		
<i>Schoenus nitens</i>	Shiny Bog-rush		
<i>Selliera radicans</i>	Shiny Swamp-mat		
<i>Senecio anethifolius</i> (NC)	Feathery Groundsel		
<i>Senecio biserratus</i>	Jagged Groundsel		
<i>Senecio pinnatifolius</i> (NC)	Variable Groundsel		
<i>Sonchus hydrophilus</i>	Native Sow-thistle		
<i>Spinifex hirsutus</i>	Rolling Spinifex		
<i>Spinifex sericeus</i> (NC)	Rolling Spinifex		
<i>Swainsona lessertii</i>	Coast Swainson-pea		
<i>Tetragonia implexicoma</i>	Bower Spinach		
<i>Threlkeldia diffusa</i>	Coast Bonefruit		
<i>Zygophyllum billardierei</i>	Coast Twinleaf		

E: Endangered, V: Vulnerable, R: Rare

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Fauna

# of fauna in cell	151 recorded – 125 birds, 7 butterflies, 8 mammals, 4 reptiles, 7 amphibians (an additional 13 butterflies, 1 mammal and 1 reptile identified by experts as possibly occurring)
# of fauna surveys / records	3 surveys, 41 opportune sites
# of threatened fauna in cell	27 recorded
# of non-indigenous fauna	12 recorded (an additional invertebrate possible)

Non-indigenous fauna

Species	Common Name	Class	Record
<i>Alauda arvensis</i>	Eurasian Skylark	Aves	x
<i>Carduelis carduelis</i>	European Goldfinch	Aves	x
<i>Chloris chloris</i>	Common Greenfinch (European Greenfinch)	Aves	x
<i>Columba livia</i>	Rock Dove (Feral Pigeon)	Aves	x
<i>Passer domesticus</i>	House Sparrow	Aves	x
<i>Streptopelia chinensis</i>	Spotted Dove (Spotted turtle-dove)	Aves	x
<i>Sturnus vulgaris</i>	Common Starling	Aves	x
<i>Turdus merula</i>	Common Blackbird	Aves	x
<i>Pieris rapae rapae</i>	Cabbage White	Invertebrate	p
<i>Mus musculus</i>	House Mouse	Mammalia	x
<i>Oryctolagus cuniculus</i>	Rabbit (European Rabbit)	Mammalia	x
<i>Rattus rattus</i>	Black Rat (Ship Rat, Roof Rat)	Mammalia	x
<i>Vulpes vulpes</i>	Fox (Red Fox)	Mammalia	x

x: recorded, p: possibly there as suggested by R. Grund

Birds

Species	Common Name	Aus status	SA status
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	M	E
<i>Pandion cristatus</i>	Eastern Osprey		E
<i>Sternula albifrons</i>	Little Tern		E
<i>Sternula nereis</i>	Fairy Tern		E
<i>Calyptorhynchus funereus</i>	Yellow-tailed Black-Cockatoo		V
<i>Thinornis rubricollis</i>	Hooded Plover		V
<i>Actitis hypoleucos</i>	Common Sandpiper	M	R
<i>Anas rhynchos</i>	Australasian Shoveler		R
<i>Ardea intermedia</i>	Intermediate Egret		R
<i>Arenaria interpres</i>	Ruddy Turnstone	M	R
<i>Biziura lobata</i>	Musk Duck		R
<i>Calidris tenuirostris</i>	Great Knot	M	R
<i>Egretta garzetta</i>	Little Egret		R
<i>Falco peregrinus</i>	Peregrine Falcon		R
<i>Gallinago hardwickii</i>	Latham's Snipe (Japanese Snipe)	M	R
<i>Haematopus fuliginosus</i>	Sooty Oystercatcher		R
<i>Haematopus longirostris</i>	Australian Pied Oystercatcher		R
<i>Limosa lapponica</i>	Bar-tailed Godwit	M	R
<i>Myiagra inquieta</i>	Restless Flycatcher		R
<i>Pluvialis fulva</i>	Pacific Golden Plover	M	R
<i>Podiceps cristatus</i>	Great Crested Grebe		R
<i>Stagonopleura bella</i>	Beautiful Firetail		R
<i>Tringa brevipes</i>	Grey-tailed Tattler	M	R
<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater		

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Species	Common Name	Aus status	SA status
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill		
<i>Acanthiza lineata</i>	Striated Thornbill		
<i>Acanthiza pusilla</i>	Brown Thornbill		
<i>Accipiter cirrocephalus</i>	Collared Sparrowhawk		
<i>Anas castanea</i>	Chestnut Teal		
<i>Anas gracilis</i>	Grey Teal		
<i>Anas superciliosa</i>	Pacific Black Duck		
<i>Anthochaera carunculata</i>	Red Wattlebird		
<i>Anthochaera chrysoptera</i>	Little Wattlebird		
<i>Apus pacificus</i>	Fork-tailed Swift		
<i>Ardea modesta</i>	Eastern Great Egret		
<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo		
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	M	
<i>Calidris canutus</i>	Red Knot	M	
<i>Calidris ferruginea</i>	Curlew Sandpiper	M	
<i>Calidris ruficollis</i>	Red-necked Stint	M	
<i>Chalcites basalis</i>	Horsfield's Bronze-cuckoo		
<i>Chalcites lucidus</i>	Shining Bronze-Cuckoo		
<i>Charadrius bicinctus</i>	Double-banded Plover		
<i>Charadrius ruficapillus</i>	Red-capped Plover (Red-capped Dotterel)		
<i>Chlidonias hybrida</i>	Whiskered Tern	M	
<i>Chlidonias leucopterus</i>	White-winged Black Tern	M	
<i>Chroicocephalus novaehollandiae</i>	Silver Gull		
<i>Circus approximans</i>	Swamp Harrier (Marsh Harrier)		
<i>Colluricincla harmonica</i>	Grey Shrike-thrush		
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike		
<i>Corvus mellori</i>	Little Raven		
<i>Cracticus tibicen</i>	Australian Magpie		
<i>Cracticus torquatus</i>	Grey Butcherbird		
<i>Cygnus atratus</i>	Black Swan		
<i>Dasyornis broadbenti</i>	Rufous Bristlebird		ssp
<i>Egretta novaehollandiae</i>	White-faced Heron		
<i>Elanus axillaris</i>	Black-shouldered Kite		
<i>Euseyornis melanops</i>	Black-fronted Dotterel (Black-fronted Plover)		
<i>Eolophus roseicapillus</i>	Galah		
<i>Eopsaltria australis</i>	Eastern Yellow Robin		
<i>Epthianura albifrons</i>	White-fronted Chat		
<i>Erythrogonys cinctus</i>	Red-kneed Dotterel		
<i>Falco berigora</i>	Brown Falcon		
<i>Falco cenchroides</i>	Nankeen Kestrel (Australian Kestrel)		
<i>Falco longipennis</i>	Australian Hobby		
<i>Gallinula tenebrosa</i>	Dusky Moorhen		
<i>Gallirallus philippensis</i>	Buff-banded Rail		
<i>Geopelia striata</i>	Peaceful Dove		
<i>Glossopsitta concinna</i>	Musk Lorikeet		
<i>Grallina cyanoleuca</i>	Magpie-lark		
<i>Haliastur sphenurus</i>	Whistling Kite		
<i>Hirundo neoxena</i>	Welcome Swallow		
<i>Hydroprogne caspia</i>	Caspian Tern		
<i>Larus pacificus</i>	Pacific Gull		
<i>Lichenostomus chrysopterus</i>	Yellow-faced Honeyeater		
<i>Lichenostomus virescens</i>	Singing Honeyeater		
<i>Malurus cyaneus</i>	Superb Fairy-wren		

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Species	Common Name	Aus status	SA status
<i>Megalurus gramineus</i>	Little Grassbird		
<i>Microcarbo melanoleucos</i>	Little Pied Cormorant		
<i>Microeca fascians</i>	Jacky Winter		ssp
<i>Neochmia temporalis</i>	Red-browed Finch		
<i>Nycticorax caledonicus</i>	Nankeen Night Heron		
<i>Ocyphaps lophotes</i>	Crested Pigeon		
<i>Onychoprion anaethetus</i>	Bridled Tern (Bridal Tern)		
<i>Pachycephala pectoralis</i>	Golden Whistler		
<i>Pardalotus punctatus</i>	Spotted Pardalote		
<i>Pardalotus striatus</i>	Striated Pardalote		
<i>Pelecanus conspicillatus</i>	Australian Pelican		
<i>Petrochelidon nigricans</i>	Tree Martin		
<i>Petroica boodang</i>	Scarlet Robin		ssp
<i>Phalacrocorax carbo</i>	Great Cormorant		
<i>Phalacrocorax fuscescens</i>	Black-faced Cormorant (Black-faced Shag)		
<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant		
<i>Phalacrocorax varius</i>	Pied Cormorant		
<i>Phaps chalcoptera</i>	Common Bronzewing		
<i>Phaps elegans</i>	Brush Bronzewing		
<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater		
<i>Platalea regia</i>	Royal Spoonbill		
<i>Poliiocephalus poliocephalus</i>	Hoary-headed Grebe		
<i>Pomatostomus superciliosus</i>	White-browed Babbler		
<i>Porzana fluminea</i>	Australian Spotted Crake (Australian Crake)		
<i>Rhipidura albiscapa</i>	Grey Fantail		
<i>Rhipidura leucophrys</i>	Willie Wagtail		
<i>Sericornis frontalis</i>	White-browed Scrubwren		
<i>Stipiturus malacurus</i>	Southern Emu-wren	ssp	ssp
<i>Strepera versicolor</i>	Grey Currawong		ssp
<i>Tadorna tadornoides</i>	Australian Shelduck (Mountain Duck)		
<i>Thalasseus bergii</i>	Crested Tern		
<i>Threskiornis molucca</i>	Australian White Ibis (Sacred Ibis)		
<i>Threskiornis spinicollis</i>	Straw-necked Ibis		
<i>Tribonyx ventralis</i>	Black-tailed Native-hen		
<i>Trichoglossus haematodus</i>	Rainbow Lorikeet		
<i>Tringa nebularia</i>	Common Greenshank	M	
<i>Tringa stagnatilis</i>	Marsh Sandpiper	M	
<i>Tyto javanica</i>	Eastern Barn Owl		
<i>Vanellus miles</i>	Masked Lapwing		
<i>Zosterops lateralis</i>	Silvereye		

CR: Critically endangered, E: Endangered, V: Vulnerable, R: Rare, M: Migratory, ssp: sub-species

Butterflies

Species	Common Name	Status*	Record
<i>Jamenus icilius</i>	Icilius Hairstreak	E in SE	p
<i>Hesperilla donnysa donnysa (pale form flavescens)</i>	Yellowish Sedge-Skipper	E	x
<i>Ogyris olane</i>	Olane Azure	E in SE	x
<i>Anisynta cynone cynone</i>	Mottled Grass-skipper	V	x
<i>Hesperilla cyrsoticha cyclospila</i>	Chrysotricha Sedge-skipper or Golden-haired Sedge-skipper	V	x
<i>Lucia limbaria</i>	Small Copper	R	p
<i>Erina hyacinthina form josephina</i>	Common Dusky-blue	R	x

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Species	Common Name	Status*	Record
<i>Ocybadistes walkeri hypochlorus</i>	Southern Grass-dart		p
<i>Delias aganippe</i>	Wood White	R	p
<i>Geitoneura klugii klugii</i>	Common Xenica	C	p
<i>Hesperilla donnysa delos (incl. form diluta)</i>	Donnysa skipper		x
<i>Hesperilla idothea idothea</i>			x
<i>Heteronympha merope merope</i>	Common Brown	C	p
<i>Heteronympha penelope</i>	Shouldered Brown		p
<i>Nacuduba biocellata biocellata</i>	Two-spotted Line-blue	LC	p
<i>Ogyris amaryllis meridionalis</i>	Amaryllis Azure		p
<i>Theclinessthes miskini miskini</i>	Wattle Blue		p
<i>Theclinessthes serpentata serpentata</i>	Salt-bush blue		p
<i>Vanessa kershawi</i>	Australian Painted Lady	Va	p
<i>Zizina labradus labradus</i>	Common Grass Blue		p

*Vulnerability as per R. Grund, E: Endangered, V: Vulnerable, R: Rare

Va: Vagrant, LC: Locally common, C: Common

x: recorded, p: possibly there, as suggested by R. Grund

Mammals

Species	Common Name	Aus status	SA status	Record
<i>Rattus lutreolus</i>	Swamp Rat		R	x
<i>Vombatus ursinus</i>	Common Wombat		R	x
<i>Macropus giganteus</i>	Eastern Grey Kangaroo			x
<i>Pseudocheirus peregrinus</i>	Common Ringtail Possum			e
<i>Rattus fuscipes</i>	Bush Rat			x

E: Endangered, V: Vulnerable, R: Rare

x: recorded, e: expected to be there (C Kemper pers. comm. 2009)

Reptiles

Species	Common Name	Aus status	SA status	Record
<i>Pseudonaja textilis</i>	Eastern Brown Snake			e
<i>Pseudemoia entrecasteauxii</i>	Southern Grass Skink			x
<i>Tiliqua nigrolutea</i>	Blotched Bluetongue			x
<i>Tiliqua rugosa</i>	Sleepy Lizard			x
<i>Tiliqua scincoides</i>	Eastern Bluetongue			x

E: Endangered, V: Vulnerable, R: Rare

x: recorded, e: expected to be there (M. Hutchinson pers. comm. 2009)

Amphibians

Species	Common Name	Aus status	SA status	Record
<i>Litoria raniformis</i>	Southern Bell Frog	V	V	x
<i>Pseudophryne semimarmorata</i>	Marbled Toadlet		V	x
<i>Crinia signifera</i>	Common Froglet			x
<i>Limnodynastes dumerilii</i>	Banjo Frog			x
<i>Limnodynastes peronii</i>	Striped Marsh Frog			x
<i>Litoria ewingii</i>	Brown Tree Frog			x
<i>Neobatrachus pictus</i>	Burrowing Frog			x

E: Endangered, V: Vulnerable, R: Rare

x: recorded

SE12 – Cape Jaffa

6.3.12 Cell SE12 Cape Jaffa

Area 955.6 ha. Length 20.89 km.



SE12 – Cape Jaffa

Landforms

This cell is entirely a low coastal plain, with an irregular surface of calcarenite and Holocene sands. The beach and dune morphology which characterise this cell has been dominated by the shallow offshore reefs, composed of Robe Range calcarenite. These reefs ensure that wave energy is normally low and the beaches reflective. In the late Holocene the low wave energy almost certainly led to low volumes of sand being transported onshore and the deposition of stable dune ridges, not transgressive dunefields. The modern beaches show coarse to medium sand, with maintenance of relatively steep beachface angles. The dunes rise steeply from the beach due to the topography of the underlying calcarenite. The plan form of the shoreline shows minor inflexions, or crenulations, with larger reefs opposite the horns of a crenulation.

At the southern end of the cell there is a low narrow dune complex, beach and shallow offshore gradient; a medium energy, reef protected, shore. Wave energy increases slightly at the middle of the cell, with increasing damage to the foredune; the dune complex is slightly wider, and it is higher, with some blow outs. Short & Hesp (1984, p.71) attribute widening to grazing damage and dune movement between 1945 and 1975.



Cape Thomas (Baudin Rocks lie adjacent offshore). Photograph Coast Protection Board 2008.

Biota

There are 8 flora survey sites, 15 Herbarium record sites, 1 fauna survey sites, and 24 opportune survey sites. 372ha of vegetated land.

Dunes of Bernoulli CR in tall shrubland of *Leucopogon parviflorus* over *Olearia axillaris*, *Acacia longifolia* and *Myoporum insulare*. South of this reserve there is only patchy dune vegetation. 103 fauna species have been recorded in the cell including 96 birds, 2 butterflies, 3 mammals and 2 reptiles. Listed threatened fauna include the EPBC listed critically endangered Orange-bellied Parrot (*Neophema chrysogaster*); also the State endangered White-bellied Sea Eagle (*Haliaeetus leucogaster*) and Little (*Sternula albifrons*) and Fairy (*Sternula nereis*) Terns.

SE12 – Cape Jaffa

Benthic Habitat

This is almost continuous calcarenite reef, with some patches of inshore sand.

Land Use/ Land Ownership

Predominantly grazing land use throughout with only a very narrow coastal unallotted Crown land strip from Boatswain Point to Bernoulli Conservation Reserve at the northern end of the cell. The CR comprises 28% of the cell area but includes the majority (66%) of the cells vegetation. Baudin Rocks to the SW of Cape Thomas are declared a Conservation Park. The Cadara Swamp in the middle of the cell is mostly contained within a Crown Leasehold allotment.

Values/ Uses (Field visits and local reports)

The southern half of this narrow cell is mostly cleared of native vegetation, with only a thin band of dune present up to Bernoulli CR. Predominant uses are grazing/ cropping and nearshore recreational fishing. Aboriginal Heritage values throughout.

Threats (Field visits and local reports)

Polygala reported extensively in Bernoulli CR. The narrow coastal reserve from Boatswain Point to Cadara Swamp is at threat from sea level rise, grazing pressure on the landward side and weed invasion.

Opportunities

Baudin Rocks Conservation Park provides habitat for a number of bird species and is also a haul out site for NZ Fur Seals and Australian Sea Lions. A unique visitor experience via a short boat ride from Cape Jaffa or Robe. Bernoulli CR should be extended south to capture the dunes and Cadara Swamp. The CR could be used as a trial site for Polygala control methods given the extent and density throughout.

Conservation Analysis (GIS)

The total of conservation means, 84.39 is low for the region. The combined detailed map of totals of conservation values shows low values throughout the cell.

Leucopogon tall shrubland in the dune areas give high totals for endemic floristic vegetation; scenic amenity is moderate to high throughout the cell; and significant geological sites (significant geological feature “Glenelg River and Lower South East Coast”) are high along the foreshore.

Threat Analysis (GIS)

The total of threat summary layers is high, 65.09. Few parts of this cell drop below medium threat level, and the southern half is almost entirely high in totals, reflecting zoning, land use, land ownership and existing development. Throughout the cell, viewscape, existing development, distribution of significant weeds, numbers of feral animals all add to the threat total.

Adaptation to Climate Change: Threats for cell SE12

(See also discussion of scenario in Section 4.11)

NOTE: the advice below is indicative of likely change and the direction of change, with implications for ecosystems. Dates, amounts and probabilities cannot be accurately calculated at this time. Thus advice on flood levels, for example, should not be used in engineering or development planning.

SE12 – Cape Jaffa

Climate change element/ scenario	Impacts and implications (for this cell)	Protect and manage habitat threats	Address landscape issues: fire, connectivity, refuges, hydrology
Combined climate changes and sea level rise throughout this cell	This cell presents a pattern of dune habitats sensitive to change.	Create a baseline for shoreline, dune and lake change by establishing a rectified aerial photographic record at an appropriate resolution.	
Sea level rise: 2030 : +c.20cm 2070: +c.80cm.	Increase in beach recession, storm foredune damage and dune ridge instability. Loss of small cliff-backed pocket beaches. Foredune damage could lead to widespread dune de-stabilisation and transport of sand across dunes to the adjacent farmland. Shoreline recession in many places will continue as far as the calcarenite bluff at the back of the beach: thus, a change in the character of the shoreline, from narrow low energy beach to low cliffs.	Active management of dune blowouts. Maintain an aerial photographic record of change. Create buffer zone to allow dune retreat where feasible.	The creation of buffer zones to allow retreat of tide dependant ecosystems a regional issue with local implications.
Storms: <i>Frequency</i> continues to show great variation on a decadal scale. <i>Intensity</i> of large storms increases.	2030: Occasional storm tide flooding above highest known tides. 2070: Frequent storm damage to foredunes.	Active management of dune blowouts.	
Warmer average conditions: 2030:+0.3 to .6°C 2070:+1.5 to 2°C	(Impacts uncertain. Existing terrestrial vegetation is found in warmer conditions elsewhere)		Maintain connectivity of vegetation within the region.
Drier average conditions: 2030: -2% to 5% 2070: - 10% to 20%	Dune vegetation adapts to drier conditions, but recovers more slowly from fire and storm damage allowing weed colonisation, notably exotic grasses: dune mobilization becomes more likely.	Active weed control within dunes.	
Groundwater lowering; saline incursion:	Groundwater lowering a threat to dune vegetation.	Adaptive management of ecological assets.	Lowering of regional water table (and perched water tables in dunes) a threat to all habitats.
Nearshore sea	Changes are unlikely to affect		

SE12 – Cape Jaffa

Climate change element/ scenario	Impacts and implications (for this cell)	Protect and manage habitat threats	Address landscape issues: fire, connectivity, refuges, hydrology
<p>changes - temperature; acidity; wave climate: 2030: +0.3°C to + 0.6°C</p> <p>2070: +1.0°C to + 1.50C</p>	<p>swell wave climate, apart from increase in mean wave period. (Changes in upwelling timing and frequency has been discussed, but not projected)</p>		

Table 6.14. Recommended Actions and Priority for Cell SE12 – Cape Jaffa

Component	Issue	Proposed Action	Priority of Action	Key Players
Whole cell	The combined effect of climate changes threatens shoreline and dune recession.	Continue a rectified aerial photographic record at an appropriate resolution, in order to show change from current baseline.	Medium (Cons/ threat)	DENR
	Lack of biological data.	Conduct flora and fauna surveys to improve knowledge of this cell	Medium (cell)	DENR, NRM, community
Bernoulli Conservation Reserve	Very high threat from invasive alert list weeds.	Review the weed management in this reserve, with a view to experimentation in control.	High (threat)	DENR, NRM
Dunes throughout cell	Physical damage by ORV to small dune areas challenges resilience of these unstable areas.	Access control	Medium (threat)	DENR, DTEI, Council, NRM
	Climate change represents a major threat to dune stability through storm foredune damage and weed invasion.	Active dune management to slow dune movement and degradation. Create dune retreat buffer zone on land use and development plans..	Medium (threat)	DENR, Council, NRM

SE12 – Cape Jaffa

Component	Issue	Proposed Action	Priority of Action	Key Players
Coastal vegetation around Boatswains Point settlement and adjoining Crown land.	Damage to coastal vegetation by exotic plant and weed infestation.	Undertake pest plant and animal control.	Medium (threat)	Council, DENR, NRM, landholders
Baudin Rocks	Important haul out site for fur-seals and sea-lions. Also important for seabirds and waders.	Protect the habitat value of the islands. Monitor for impacts of SLR.	Medium (threat)	DENR, NRM
	Alert list weeds and feral bird species (pigeons and starlings) present.	Consider eradication given isolation.	Medium (cell)	DENR, NRM
Heritage	Aboriginal Heritage sites recorded in this cell. Need for appropriate and sustainable management.	Consultation to appropriately manage sites in this area.	High (Cons)	Murrapeena Heritage Association Inc., SE Aboriginal Focus Group, NRM, Council, Aboriginal Heritage Branch – DPC, Aboriginal Partnership Unit – DENR
	Lack of recognition of significant geological feature (Bridgewater formation).	Interpretation. Council to include map of the feature in its development plan.	Medium (Cons)	Council, Geological Society SA, NRM

BIOTA

Flora

Remnant vegetation area (ha)	372 ha, 55.2% of cell area
# flora surveys / records	8 surveys, 15 herbarium record sites
# flora in cell	114
# conservation rated flora in cell	0 recorded
# non-indigenous flora in cell	41 recorded
Significant CDCS floristic community	<i>Leucopogon parviflorus</i> / <i>Olearia axillaris</i> shrubland (>50% of known sites occur along SE coast).
Protected area	Bernouilli Conservation Reserve, Baudin Rock Conservation Park (272ha in total)

SE12 – Cape Jaffa

Weeds

Species	Common Name	Status	Study rating
<i>Asparagus asparagoides</i> (NC)	Bridal Creeper	WONS, D	9
<i>Dipogon lignosus</i>	Lavatory Creeper		9
<i>Polygala myrtifolia</i>	Myrtle-leaf Milkwort		9
<i>Thinopyrum junceiforme</i>	Sea Wheat-grass		8
<i>Argyranthemum frutescens</i> ssp. <i>foeniculaceum</i>	Teneriffe Daisy		5
<i>Argyranthemum frutescens</i> ssp. <i>frutescens</i>	Marguerite Daisy		5
<i>Euphorbia paralias</i>	Sea Spurge		4
<i>Limonium hyblaenum</i>			4
<i>Senecio angulatus</i>	Cape Ivy		3
<i>Senecio elegans</i>	Purple Groundsel		3
<i>Ammophila arenaria</i>	Marram Grass		2
<i>Aira cupaniana</i>	Small Hair-grass		
<i>Anagallis arvensis</i>	Pimpernel		
<i>Arctotheca calendula</i>	Cape Weed		
<i>Avellinia michelii</i>	Avellinia		
<i>Briza minor</i>	Lesser Quaking-grass		
<i>Cakile maritima</i> ssp. <i>maritima</i>	Two-horned Sea Rocket		
<i>Catapodium rigidum</i>	Rigid Fescue		
<i>Cerastium balearicum</i>	Chickweed		
<i>Cerastium glomeratum</i>	Common Mouse-ear Chickweed		
<i>Cerastium pumilum</i>	Chickweed		
<i>Dischisma arenarium</i>	Sand Dichisma		
<i>Ehrharta longiflora</i>	Annual Veldt Grass		
<i>Ferraria crispa</i> ssp. <i>crispa</i>	Black Flag		
<i>Galium murale</i>	Small Bedstraw		
<i>Geranium molle</i> var. <i>molle</i>	Soft Geranium		
<i>Hypochaeris glabra</i>	Smooth Cat's Ear		
<i>Isolepis marginata</i>	Little Club-rush		
<i>Juncus capitatus</i>	Dwarf Rush		
<i>Lagurus ovatus</i>	Hare's Tail Grass		
<i>Lolium perenne</i>	Perennial Ryegrass		
<i>Minuartia mediterranea</i>	Slender Sandwort		
<i>Moenchia erecta</i>	Erect Chickweed		
<i>Osteospermum fruticosum</i>	Trailing African Daisy		
<i>Reseda lutea</i>	Cut-leaf Mignonette		
<i>Rostraria cristata</i>	Annual Cat's-tail		
<i>Sonchus oleraceus</i> (NC)	Common Sow-thistle		
<i>Stellaria media</i>	Chickweed		
<i>Trifolium dubium</i>	Suckling Clover		
<i>Vulpia bromoides</i>	Squirrel-tail Fescue		
<i>Vulpia myuros</i> f. <i>myuros</i>	Rat's-tail Fescue		

D: Declared weed, WONS: Weeds of National Significance

Native flora

Species	Common Name	Aus status	SA status
<i>Acacia longifolia</i> ssp. <i>sophorae</i>	Coastal Wattle		
<i>Acacia pycnantha</i>	Golden Wattle		
<i>Acaena novae-zelandiae</i>	Biddy-biddy		
<i>Acaena</i> sp.	Sheep's Burr		
<i>Actites megalocarpa</i>	Coast Sow-thistle		

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Species	Common Name	Aus status	SA status
<i>Allocasuarina verticillata</i>	Drooping Sheoak		
<i>Amyema melaleuca</i>	Tea-tree Mistletoe		
<i>Aphanes australiana</i> (NC)	Australian Piert		
<i>Aphelia pumilio</i>	Dwarf Aphelia		
<i>Arthropodium strictum</i>	Common Vanilla-lily		
<i>Atriplex cinerea</i>	Coast Saltbush		
<i>Austrodanthonia geniculata</i>	Kneed Wallaby-grass		
<i>Austrostipa exilis</i>	Heath Spear-grass		
<i>Banksia marginata</i>	Silver Banksia		
<i>Billardiera cymosa</i> (NC)	Sweet Apple-berry		
<i>Bursaria spinosa</i> ssp. <i>spinosa</i>	Sweet Bursaria		
<i>Caladenia latifolia</i>	Pink Caladenia		
<i>Calandrinia brevipedata</i>	Short-stalked Purslane		
<i>Carpobrotus rossii</i> (NC)	Native Pigface		
<i>Centrolepis aristata</i>	Pointed Centrolepis		
<i>Centrolepis strigosa</i> ssp. <i>strigosa</i>	Hairy Centrolepis		
<i>Cheilanthes austrotenuifolia</i>	Annual Rock-fern		
<i>Clematis microphylla</i> var. <i>microphylla</i>	Old Man's Beard		
<i>Corybas</i> sp.	Helmet-orchid		
<i>Crassula closiana</i>	Stalked Crassula		
<i>Crassula sieberiana</i> ssp. <i>tetramera</i> (NC)	Australian Stonecrop		
<i>Cynoglossum australe</i>	Australian Hound's-tongue		
<i>Daucus glochidiatus</i>	Native Carrot		
<i>Dianella brevicaulis</i>	Short-stem Flax-lily		
<i>Dichondra repens</i>	Kidney Weed		
<i>Dodonaea viscosa</i> ssp. <i>spatulata</i>	Sticky Hop-bush		
<i>Drosera peltata</i>	Pale Sundew		
<i>Euchiton sphaericus</i>	Annual Cudweed		
<i>Ficinia nodosa</i>	Knobby Club-rush		
<i>Geranium retrorsum</i>	Grassland Geranium		
<i>Helicbrysum leucopsidium</i>	Satin Everlasting		
<i>Hyalosperma demissum</i>	Dwarf Sunray		
<i>Hydrocotyle callicarpa</i>	Tiny Pennywort		
<i>Hydrocotyle foveolata</i>	Yellow Pennywort		
<i>Hydrocotyle laxiflora</i>	Stinking Pennywort		
<i>Kunzea pomifera</i>	Muntries		
<i>Lepidosperma gladiatum</i>	Coast Sword-sedge		
<i>Leucopogon parviflorus</i>	Coast Beard-heath		
<i>Levenhookia dubia</i>	Hairy Stylewort		
<i>Lichen</i> sp.			
<i>Melaleuca lanceolata</i> ssp. <i>lanceolata</i> (NC)	Dryland Tea-tree		
<i>Millotia muelleri</i>	Common Bow-flower		
<i>Mitrasacme paradoxa</i> (NC)	Wiry Mitrewort		
<i>Moss</i> sp.			
<i>Muehlenbeckia gunnii</i>	Coastal Climbing Lignum		
<i>Myosotis australis</i>	Austral Forget-me-not		
<i>Olearia axillaris</i>	Coast Daisy-bush		
<i>Oxalis perennans</i> (NC)	Native Sorrel		
<i>Parietaria debilis</i> (NC)	Smooth-nettle		
<i>Pelargonium australe</i>	Austral Stork's-bill		
<i>Picris angustifolia</i> ssp. <i>angustifolia</i>	Coast Picris		
<i>Pimelea serpyllifolia</i> ssp. <i>serpyllifolia</i>	Thyme Riceflower		
<i>Poa poiformis</i> var. <i>poiformis</i>	Coast Tussock-grass		

SE12 – Cape Jaffa

Species	Common Name	Aus status	SA status
<i>Podotheca angustifolia</i>	Sticky Long-heads		
<i>Poranthera microphylla</i> (NC)	Small Poranthera		
<i>Pterostylis pedunculata</i>	Maroon-hood		
<i>Ranunculus sessiliflorus</i> var.	Annual Buttercup		
<i>Rhagodia candolleana</i> ssp. <i>candolleana</i>	Sea-berry Saltbush		
<i>Schoenus apogon</i>	Common Bog-rush		
<i>Senecio picridioides</i>	Purple-leaf Groundsel		
<i>Senecio pinnatifolius</i> (NC)	Variable Groundsel		
<i>Siloxerus multiflorus</i>	Small Wrinklewort		
<i>Swainsona lessertii</i> folia	Coast Swainson-pea		
<i>Tetragonia implexicoma</i>	Bower Spinach		
<i>Threlkeldia diffusa</i>	Coast Bonefruit		
<i>Wahlenbergia gracilentia</i>	Annual Bluebell		
<i>Zygophyllum billardierei</i>	Coast Twinleaf		
<i>Zygophyllum billardierei</i> (NC)	Coast Twinleaf		

E: Endangered, V: Vulnerable, R: Rare

Fauna

# of fauna in cell	103 recorded - 96 birds, 2 butterflies, 3 mammals, 2 reptiles, 0 amphibians (an additional 16 butterflies, 2 mammals and 1 reptile identified by experts as possibly occurring)
# of fauna surveys / records	1 survey, 24 opportune sites
# of threatened fauna in cell	16 recorded
# of non-indigenous fauna	9 recorded (an additional invertebrate and mammal possible)

Non-indigenous fauna

Species	Common Name	Class	Record
<i>Alauda arvensis</i>	Eurasian Skylark	Aves	x
<i>Carduelis carduelis</i>	European Goldfinch	Aves	x
<i>Chloris chloris</i>	Common Greenfinch (European Greenfinch)	Aves	x
<i>Columba livia</i>	Rock Dove (Feral Pigeon)	Aves	x
<i>Passer domesticus</i>	House Sparrow	Aves	x
<i>Streptopelia chinensis</i>	Spotted Dove (Spotted turtle-dove)	Aves	x
<i>Sturnus vulgaris</i>	Common Starling	Aves	x
<i>Turdus merula</i>	Common Blackbird	Aves	x
<i>Pieris rapae rapae</i>	Cabbage White	Invertebrate	p
<i>Mus musculus</i>	House Mouse	Mammalia	e

x: recorded, p: possibly there as suggested by R. Grund

Birds

Species	Common Name	Aus status	SA status
<i>Neophema chrysogaster</i>	Orange-bellied Parrot	CR/M	E
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	M	E
<i>Sternula albifrons</i>	Little Tern		E
<i>Sternula nereis</i>	Fairy Tern		E
<i>Calyptorhynchus funereus</i>	Yellow-tailed Black-Cockatoo		V
<i>Numenius madagascariensis</i>	Eastern Curlew	M	V
<i>Thinornis rubricollis</i>	Hooded Plover		V
<i>Actitis hypoleucos</i>	Common Sandpiper	M	R

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Species	Common Name	Aus status	SA status
<i>Arenaria interpres</i>	Ruddy Turnstone	M	R
<i>Biziura lobata</i>	Musk Duck		R
<i>Calidris alba</i>	Sanderling	M	R
<i>Charadrius leschenaultii</i>	Greater Sand Plover (Large Sand Plover)	M	R
<i>Haematopus fuliginosus</i>	Sooty Oystercatcher		R
<i>Haematopus longirostris</i>	Australian Pied Oystercatcher		R
<i>Pluvialis fulva</i>	Pacific Golden Plover	M	R
<i>Tringa brevipes</i>	Grey-tailed Tattler	M	R
<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater		
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill		
<i>Acanthiza pusilla</i>	Brown Thornbill		
<i>Anas castanea</i>	Chestnut Teal		
<i>Anthochaera carunculata</i>	Red Wattlebird		
<i>Anthochaera chrysoptera</i>	Little Wattlebird		
<i>Anthus novaeseelandiae</i>	Australasian Pipit (Richard's Pipit)		
<i>Apus pacificus</i>	Fork-tailed Swift		
<i>Aquila audax</i>	Wedge-tailed Eagle		
<i>Ardenna tenuirostris</i>	Short-tailed Shearwater (Mutton Bird)		
<i>Artamus cyanopterus</i>	Dusky Woodswallow		
<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo		
<i>Calamanthus fuliginosus</i>	Striated Fieldwren		
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	M	
<i>Calidris canutus</i>	Red Knot	M	
<i>Calidris ferruginea</i>	Curlew Sandpiper	M	
<i>Calidris ruficollis</i>	Red-necked Stint	M	
<i>Chalcites basalis</i>	Horsfield's Bronze-cuckoo		
<i>Chalcites lucidus</i>	Shining Bronze-Cuckoo		
<i>Charadrius bicinctus</i>	Double-banded Plover		
<i>Charadrius ruficapillus</i>	Red-capped Plover (Red-capped Dotterel)		
<i>Chroicocephalus novaehollandiae</i>	Silver Gull		
<i>Cinchoramphus cruralis</i>	Brown Songlark		
<i>Circus approximans</i>	Swamp Harrier (Marsh Harrier)		
<i>Colluricincla harmonica</i>	Grey Shrike-thrush		
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike		
<i>Corvus mellori</i>	Little Raven		
<i>Coturnix pectoralis</i>	Stubble Quail		
<i>Cracticus tibicen</i>	Australian Magpie		
<i>Cygnus atratus</i>	Black Swan		
<i>Dasyornis broadbenti</i>	Rufous Bristlebird		ssp
<i>Egretta novaehollandiae</i>	White-faced Heron		
<i>Elanus axillaris</i>	Black-shouldered Kite		
<i>Eolophus roseicapillus</i>	Galah		
<i>Eopsaltria australis</i>	Eastern Yellow Robin		
<i>Eudyptula minor</i>	Little Penguin (Fairy Penguin)		
<i>Falco berigora</i>	Brown Falcon		
<i>Falco cenchroides</i>	Nankeen Kestrel (Australian Kestrel)		
<i>Falco longipennis</i>	Australian Hobby		
<i>Geopelia striata</i>	Peaceful Dove		
<i>Glossopsitta concinna</i>	Musk Lorikeet		
<i>Glossopsitta porphyrocephala</i>	Purple-crowned Lorikeet		
<i>Grallina cyanoleuca</i>	Magpie-lark		
<i>Hirundo neoxena</i>	Welcome Swallow		
<i>Hydroprogne caspia</i>	Caspian Tern		

SE12 – Cape Jaffa

Species	Common Name	Aus status	SA status
<i>Lichenostomus virescens</i>	Singing Honeyeater		
<i>Malurus cyaneus</i>	Superb Fairy-wren		
<i>Microcarbo melanoleucos</i>	Little Pied Cormorant		
<i>Morus serrator</i>	Australasian Gannet		
<i>Ocyphaps lophotes</i>	Crested Pigeon		
<i>Pelecanus conspicillatus</i>	Australian Pelican		
<i>Petrochelidon nigricans</i>	Tree Martin		
<i>Phalacrocorax carbo</i>	Great Cormorant		
<i>Phalacrocorax fuscescens</i>	Black-faced Cormorant (Black-faced Shag)		
<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant		
<i>Phalacrocorax varius</i>	Pied Cormorant		
<i>Phaps chalcoptera</i>	Common Bronzewing		
<i>Phaps elegans</i>	Brush Bronzewing		
<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater		
<i>Platalea regia</i>	Royal Spoonbill		
<i>Poliiocephalus poliocephalus</i>	Hoary-headed Grebe		
<i>Pomatostomus superciliosus</i>	White-browed Babbler		
<i>Rhipidura albiscapa</i>	Grey Fantail		
<i>Rhipidura leucophrys</i>	Willie Wagtail		
<i>Sericornis frontalis</i>	White-browed Scrubwren		
<i>Tadorna tadornoides</i>	Australian Shelduck (Mountain Duck)		
<i>Thalasseus bergii</i>	Crested Tern		
<i>Threskiornis molucca</i>	Australian White Ibis (Sacred Ibis)		
<i>Threskiornis spinicollis</i>	Straw-necked Ibis		
<i>Tyto javanica</i>	Eastern Barn Owl		
<i>Vanellus miles</i>	Masked Lapwing		
<i>Zosterops lateralis</i>	Silvereye		

CR: Critically endangered, E: Endangered, V: Vulnerable, R: Rare, M: Migratory, ssp: sub-species

Butterflies

Species	Common Name	Status*	Record
<i>Hesperilla donnysa donnysa</i> (pale form <i>flavescens</i>)	Yellowish Sedge-Skipper	E	ex?
<i>Hesperilla cyrsoticha cyclopsila</i>	Chrysotricha Sedge-skipper or Golden-haired Sedge-skipper	V	ex?
<i>Taractrocera papyria papyria</i>	White-banded Grass-dart	R	x
<i>Delias aganippe</i>	Wood White	R	p
<i>Geitoneura klugii klugii</i>	Common Xenica	C	p
<i>Hesperilla donnysa delos</i> (incl. form <i>diluta</i>)	Donnysa skipper		x
<i>Heteronympha merope merope</i>	Common Brown	C	p
<i>Heteronympha penelope</i>	Shouldered Brown		p
<i>Junonia villida cabybe</i>	Meadow argus	Va	p
<i>Lampides boeticus</i>	Long-tailed Pea-blue		p
<i>Nacuduba biocellata biocellata</i>	Two-spotted Line-blue	LC	p
<i>Neolucia agricola agricola</i>	Fringed Heath-blue		p
<i>Ocybadistes walkeri hypochlorus</i>	Southern Grass-dart		p
<i>Ogyris amaryllis meridionalis</i>	Amaryllis Azure		p
<i>Theclinesibes albocincta</i>	Bitter-bush blue	LC	p
<i>Theclinesibes serpentata serpentata</i>	Salt-bush blue		p
<i>Vanessa itea</i>	Australian Admiral	Va	p
<i>Zizina labradus labradus</i>	Common Grass Blue		p

*Vulnerability as per R. Grund, E: Endangered, V: Vulnerable, R: Rare

Va: Vagrant, LC: Locally common, C: Common

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x: recorded, p: possibly there, ex?: possibly extinct, as suggested by R. Grund

Mammals

Species	Common Name	Aus status	SA status	Record
<i>Cercartetus concinnus</i>	Western Pygmy-possum			e
<i>Miniopterus planiceps</i>				x
<i>Miniopterus schreibersii</i>		ssp		x

E: Endangered, V: Vulnerable, R: Rare

x: recorded, e: expected to be there (C Kemper pers. comm. 2009)

Reptiles

Species	Common Name	Aus status	SA status	Record
<i>Hemierygis peronii</i>	Four-toed Earless Skink			x
<i>Pseudonaja textilis</i>	Eastern Brown Snake			e
<i>Tiliqua rugosa</i>	Sleepy Lizard			x

E: Endangered, V: Vulnerable, R: Rare

x: recorded, e: expected to be there (M. Hutchinson pers. comm. 2009)

Amphibians

No amphibian species recorded

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6.3.13 Cell SE13 Kingston SE

Area 3,750 ha. Length 23.85 km.



SE13 – Kingston SE

Landforms

This cell extends from Cape Jaffa to Long Beach Road immediately north of Kingston and faces Lacepede Bay: It is a flat coastal plain.

The features of the modern beach and dunes appear to rely entirely on the extreme low wave energy of this coastal unit. Deep water swell wave energy is entirely dissipated on the shallow reefs of Lacepede Bay; Sprigg (1979) maps the ‘Lacepede’ beach, dune and lunette association as a Pleistocene feature, now drowned by Holocene sea level rise, paralleling the modern beach, some 8 km offshore. Sediment movement alongshore appears to depend on tidal currents, locally generated wind waves and storm surges. Subaqueous sand waves arranged transverse obliquely to the shoreline and extending several hundred metres into the bay, appear to drift slowly from Cape Jaffa into Lacepede Bay. Where the sand waves attach to the beach pronounced shoreline protrusions occur, (Short & Hesp, 1984, p.57 and fig.19, p.33). Short attributes the shallows of Lacepede Bay to the regional upward tilting to the east and calcarenite reefs.

The extensive dune, swamp and lake complex between Cape Jaffa and Kingston has been formed, following Holocene sea level rise, by sand drifting alongshore into Lacepede Bay: Short points out that almost all this sand mass is in the form of a series of re-curved spit deposits. Between and behind sandy spit deposits are swamp and lake deposits, trapped and protected by the dune ridges. Butchers Gap Drain represents a modern drainage modification of these naturally poorly drained coastal swamps.

The beaches throughout this cell are of medium to coarse calcareous sands, and the beaches are reflective with medium beach face angles. Foredunes are stable. As nearshore sand waves migrate across the bay, beach protrusions will move also, causing local beach accretion and erosion.



Butcher Gap Drain entering Butchers Lake. Photograph Coast Protection Board 2008.

SE13 – Kingston SE

Biota

There are 4 flora survey sites, 21 Herbarium record sites, and 43 opportune fauna survey sites. 1199 ha. is remnant vegetation, 32% of the cell.

The dune areas are mixed *Leucopogon parviflora* shrubland; the wetland/ ephemeral lakes are salinas with samphire at their edges; within the study area, Maria creek is mostly edge vegetation, otherwise intertidal or stranded samphire.

160 fauna species have been recorded in this cell including 137 birds, 4 butterflies, 7 mammals, 6 reptiles and 6 amphibians. Listed threatened species include the EPBC listed critically endangered Orange-bellied Parrot (*Neophema chrysogaster*) and the State endangered White-bellied Sea Eagle (*Haliaeetus leucogaster*).

Benthic Habitat

From Kings Camp, Cape Jaffa, to beyond Kingston, this entire cell is dense seagrass with small 'ribs' of bare sand. A small intertidal reef west of Cape Jaffa jetty.

Land Use/ Land Ownership

The southern end of the cell is dominated by the Cape Jaffa marina development, which substantially increases the residential density of the Cape Jaffa (Kings Camp) settlement. The ephemeral wetland complex extending from Cape Jaffa to Kingston is mostly on private property used for grazing. The exception being the Butchers Lake and Salt Lake wetlands which are protected within the Butchers Gap Conservation Park. Butchers Gap Drain (SEWCDB) flows into Butchers Lake and is cut through the park dunes to the sea.

A narrow unallotted Crown land reserve extends from the marina to Kingston, interrupted by a gap at approximately the mid point. Kingston's ribbon residential development from Pinks Beach to Wyomi has unallotted Crown land on the landward side and Crown Land Act reserve, dedicated to Council, on the seaward side. This Crown land captures the small amount of vegetation that remains in the Kingston end of the cell. Small rural and Deferred Urban zoned allotments and the Kingston residential area fill most of the northern end of the cell to Maria Creek and beyond to the cell boundary. The Maria Creek wetland is dedicated to the care and control of Council as a Crown Land reserve.

Values/ Uses (Field visits and local reports)

The Cape Jaffa marina development is a major local land use change currently in progress. The long, sandy beach is used as a thoroughfare between Kingston and Cape Jaffa. Aboriginal Heritage values throughout.

Threats (Field visits and local reports)

The extent of the development adjacent to the marina presses at the edges of valuable fauna habitat in the small wetlands. These wetlands stretch to Kingston and are afforded little protection from the threats of land use, pest plant and animals and modification.

Opportunities

Butchers Gap Complex (inc Hog Lake, Salt Lake and Butchers Lake). This complex of lakes lies on the inland side of the coastal dunes between Cape Jaffa and Kingston. Slater and Farrington (2010) score most of the wetlands in the mid-range of values. Butchers Lake, within Butchers Gap Conservation Park, is described as a coastal lake with peripheral samphire, saltwater tea tree and coastal scrub. The swamps associated with Butchers Gap are cut by the Butchers Gap Drain and suggestions have been made that placement of a weir at the outlet would contribute to a more extensive and permanent wetland area (SEWCDB, 1984). This idea has been pursued recently by the Friends of Butchers Gap Conservation Park

SE13 – Kingston SE

and preliminary discussions have been held involving DENR and SEWCDB staff (Slater and Farrington 2010).

Conservation Analysis (GIS)

106.54, the sum of conservation means, is low for this region.

Priority based on numbers of threatened plant species is high and although moderate totals are seen for species richness, numbers of threatened bird species, numbers of threatened reptile species and viewscape, no other conservation layer totals stand out.

Nevertheless, within the cell the pattern of high and low conservation totals is complex, with the small wetlands within and behind the low sand dune ridges showing high totals adjacent to very low totals: the high value areas being due to reptile and focal species habitat: Swamp Skink and Southern Bell Frog. Wetlands at Hog Lake and SE towards the Cape Jaffa marina show high values; wetlands of the Butchers Gap CP show medium high values. The northern end of Maria Swamp wetland has been included as an extension of the boundary because of its coast adapted plant species; it shares many high conservation values with a number of inter-dunal wetlands in the west and south of the cell, including threatened fauna habitat, notably the Southern Bell Frog and the Swamp Skink. These areas stand out because of their high conservation value totals.

The dunes and sand ridges within 600m of the shore, from Wyomi Beach for some 12km to the SE show medium to medium high values; further inland the dunes have been cleared and give low conservation totals.

Threat Analysis (GIS)

73.60 is the second largest total of threat summary means within the SE region.

Several variables contribute to the large threat total: off road vehicle damage, development zoning, land ownership, viewshed, viewscape, existing development, land use, vegetation block degradation, the distribution of significant weeds, as well as numbers of rabbits. ORV tracks are found widely across the cell and the concentration along the dunes and sand ridges of northern parts of Butchers Gap CP is notable. Development zoning gives the potential for loss of significant reptile habitat on the eastern edge of the marina development. While zoning preserves the coastal strip, most conservation values are in the landward edge of the coastal zone, in the small wetlands zoned for primary industry. Butchers Gap CP and areas north within the cell are threatened by SE Petroleum Production licenses.

All parts of the cell give high threat totals: no areas of low threat total are found on the combined map, only Butchers Gap CP shows a substantial area of medium to high threat.

Adaptation to Climate Change: Threats for cell SE13

(see also discussion of scenario in Section 4.11

NOTE: the advice below is indicative of likely change and the direction of change, with implications for ecosystems. Dates, amounts and probabilities cannot be accurately calculated at this time. Thus advice on flood levels, for example, should not be used in engineering or development planning.

Climate change element/ scenario	Impacts and implications (for this cell)	Protect and manage habitat threats	Address landscape issues: fire, connectivity, refuges, hydrology
Combined climate changes and sea level rise	This cell presents a complex pattern of habitats sensitive to change.	Create a baseline for shoreline, dune and lake change by establishing a	

SE13 – Kingston SE

Climate change element/ scenario	Impacts and implications (for this cell)	Protect and manage habitat threats	Address landscape issues: fire, connectivity, refuges, hydrology
throughout this cell		rectified aerial photographic record at an appropriate resolution. .	
Sea level rise: 2030 : +c.20cm 2070: +c.80cm.	Increase in beach recession, storm foredune damage and dune instability. Acceleration of calcarenite cliff erosion. Foredune damage could lead to widespread dune de-stabilisation and transport of sand across dunes to swamps lakes.	Active management of dune blowouts. Maintain an aerial photographic record of change. Create buffer zone to allow dune retreat where feasible.	The creation of buffer zones to allow retreat of tide dependant ecosystems a regional issue with local implications.
Storms: <i>Frequency</i> continues to show great variation on a decadal scale. <i>Intensity</i> of large storms increases.	2030: Occasional storm tide flooding above highest known tides. 2070: Flooding will affect both swamps and adjacent low lying areas. At the 2m inundation many connections between floodwaters occurs (Lidar survey).	Manage sill on Butchers Gap drain tidal inlet to adjust to higher marine storm elevations as part of the adaptive management of the swamps and the drain outlet.	
	Frequent storm damage to foredunes.	Active management of dune blowouts.	
Warmer average conditions: 2030:+0.3 to .6°C 2070:+1.5 to 2°C	(Impacts uncertain. Existing terrestrial vegetation is found in warmer conditions elsewhere)		Maintain connectivity of vegetation within the region.
Drier average conditions: 2030: -2% to 5% 2070: - 10% to 20%	Dune vegetation adapts to drier conditions, but recovers more slowly from fire and storm damage allowing weed colonisation, notably exotic grasses: dune mobilization becomes more likely.	Active weed control within dunes. Manage blowouts.	
	Reduced runoff and increased evaporation threatens seasonal lakes and lakeshore habitats.	Monitor seasonal water levels in lakes. Adaptive management of ecological assets.	
‘Flashy’ run off: Drier creeks, but larger rare floods	Drains and creeks may increase sediment load to coastal swamps and lakes (this depends on land management practices).	Maintain watching brief on sedimentation of lakes and swamps.	
Groundwater lowering; saline	Groundwater lowering a seasonal threat to valuable	Adaptive management of ecological assets.	Lowering of regional water table

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Climate change element/ scenario	Impacts and implications (for this cell)	Protect and manage habitat threats	Address landscape issues: fire, connectivity, refuges, hydrology
incursion:	swamp areas, and to dune habitats. Salt ground water an issue as sea level rises.		(and perched water tables in dunes) a threat to all habitats.
Nearshore sea changes - temperature; acidity; wave climate: 2030: +0.3°C to +0.6°C 2070: +1.0°C to +1.50°C	Because of nearshore shoaling, changes are unlikely to affect swell wave climate, apart from increase in mean wave period because of distant origin of swell. (Changes in upwelling timing and frequency has been discussed, but not projected).		

Table 6.15. Recommended Actions and Priority for Cell SE13 - Kingston SE

Component	Issue	Proposed Action	Priority of Action	Key Players
Whole cell	Climate induced changes threaten rapid alteration to beach, dune and swamps. De-stabilisation of dune areas will lead to landform retreat.	Maintain a time series of high resolution rectified aerial photographs to monitor change. Review land use and development plans to allow for dune retreat.	Medium (Cons/ threat)	DENR, NRM, Council
Beach at Cape Jaffa	Interruption of alongshore sand movement by marina breakwater at Cape Jaffa.	Monitor erosion east of the marina and undertake sand bypassing as required.	Medium (cell)	Council, marina proponent
Dunes adjacent to Kingston and Cape Jaffa	Spread of domestic garden plants into dunes.	Encourage residents of Kingston and Cape Jaffa to remove invasive garden plants and replace with suitable non-invasive or indigenous species. Regular monitoring for red alert weeds, listed in Section 4.9.	Medium (threat)	Council, NRM
	Informal pedestrian access is adding to dune instability at Kingston.	Access to be clearly defined with signage, markers and access control fencing. Upgrade vehicle and pedestrian beach access tracks and ramps to protect against erosion	Medium (Cons/ Threat)	DENR, Council, NRM, Community Groups

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Component	Issue	Proposed Action	Priority of Action	Key Players
		damage and minimise environmental impact.		
Dunes and sand ridges within and adjacent to Butchers Gap CP	ORV activity impacting on the conservation values of both the dunes and the adjacent wetlands.	Access control to prevent ORV activity in the park and adjacent dunes.	High (Cons/threat)	DENR, Friends of Butchers Gap, Council
Sub coastal wetlands at western end of cell	Marina development zoning threatens high wetland conservation values.	Review zoning at periphery of Cape Jaffa Marina zone.	Medium (Cons/threat)	Council, CPB, DPLG
Butchers Gap CP wetland	Wetland values threatened by low flows from the land and rapid outflow to the sea. Sea level rise will lead to frequent saline water incursion through the drain at times of spring tide and storm surge.	Pursue examination of consequences of placing a weir at the mouth of the Butchers Gap Drain.	Medium (Cons/threat)	DENR, Friends of Butchers Gap, SEWCDB
Beach	Extensive ORV activity threatens dunes and beach fauna.	Limit ORV activity on the beach to defined areas between Kingston and Cape Jaffa.	Medium. (Cons/threat)	Council, DTEI
Beach at Kingston	Negative attitude to seagrass wrack accumulation along foreshore.	Provide community education/interpretive material to Kingston residents and visitors about the benefits of seagrasses.	Medium (cell)	Council
Low lying land behind coastal dunes, and running north to Coorong	Lidar survey suggests possible early incursion of storm tides, due to sea level rise.	Scoping of timelines and implications for possible adaptation of infrastructure.	Medium (cell)	DPC, DENR, Councils, NRM, DPLG
Heritage	Aboriginal Heritage sites recorded in this cell. Need for appropriate and sustainable management.	Consultation to appropriately manage sites in this area.	High (Cons)	Murrapeena Heritage Association Inc., SE Aboriginal Focus Group, NRM, Council, Aboriginal Heritage Branch – DPC, Aboriginal

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Component	Issue	Proposed Action	Priority of Action	Key Players
				Partnership Unit – DENR
	Lack of recognition of significant geological feature (Bridgewater formation).	Interpretation. Council to include map of the feature in its development plan.	Medium (Cons)	Council, Geological Society SA, NRM

BIOTA

Flora

Remnant vegetation area (ha)	1199 ha, 32% of cell area
# flora surveys / records	4 surveys, 21 herbarium record sites, 1 reserve database site.
# flora in cell	224 (includes some marine species)
# conservation rated flora in cell	9 recorded
# non-indigenous flora in cell	56 recorded
Significant CDCS floristic community	<i>Leucopogon parviflorus</i> / <i>Olearia axillaris</i> shrubland (>50% of known sites occur along SE coast).
Protected area	Butcher Gap Conservation Park (180ha in total)

Weeds

Species	Common Name	Status	Study rating
<i>Juncus acutus</i>	Sharp Rush		8
<i>Thinopyrum junceiforme</i>	Sea Wheat-grass		8
<i>Coprosma repens</i>	New Zealand Mirror-bush		7
<i>Leptospermum laevigatum</i>	Coast Tea-tree		7
<i>Polygala virgata</i>			7
<i>Euphorbia paralias</i>	Sea Spurge		4
<i>Euphorbia terracina</i>	False Caper	D	4
<i>Limonium companyonis</i>	Sea-lavender		4
<i>Senecio elegans</i>	Purple Groundsel		3
<i>Sporobolus africanus</i>	Rat-tail Grass		3
<i>Ammophila arenaria</i>	Marram Grass		2
<i>Aira elegantissima</i>	Delicate Hair-grass		
<i>Allium ampeloprasum</i>	Wild Leek		
<i>Anagallis arvensis</i>	Pimpernel		
<i>Anchusa arvensis</i>	Bugloss		
<i>Aster subulatus</i>	Aster-weed		
<i>Atriplex prostrata</i>	Creeping Saltbush		
<i>Brassica tournefortii</i>	Wild Turnip		
<i>Bromus diandrus</i>	Great Brome		
<i>Bromus hordeaceus ssp. hordeaceus</i>	Soft Brome		
<i>Cakile maritima ssp. maritima</i>	Two-horned Sea Rocket		
<i>Cerastium glomeratum</i>	Common Mouse-ear Chickweed		
<i>Chenopodium glaucum</i>	Glaucous Goosefoot		
<i>Conium maculatum</i>	Hemlock		
<i>Cuscuta suaveolens</i>	Fringed Dodder		
<i>Daucus carota</i>	Carrot		
<i>Dischisma arenarium</i>	Sand Dichisma		
<i>Dischisma capitatum</i>	Woolly-head Dichisma		

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Species	Common Name	Status	Study rating
<i>Ehrharta erecta</i>	Panic Veldt Grass		
<i>Galium murale</i>	Small Bedstraw		
<i>Glaucium corniculatum</i>	Bristly Horned-poppy		
<i>Hirschfeldia incana</i>	Hoary Mustard		
<i>Isolepis marginata</i>	Little Club-rush		
<i>Lagurus ovatus</i>	Hare's Tail Grass		
<i>Limonium binervosum</i>	Dwarf Sea-lavender		
<i>Medicago lupulina</i>	Black Medic		
<i>Melianthus major</i>	Cape Honey-flower		
<i>Misopates orontium</i>	Lesser Snapdragon		
<i>Paspalum distichum</i>	Water Couch		
<i>Plantago coronopus ssp. coronopus</i>	Bucks-horn Plantain		
<i>Polygogon monspeliensis</i>	Annual Beard-grass		
<i>Populus alba</i>	White Poplar		
<i>Reseda alba</i>	White Mignonette		
<i>Reseda lutea</i>	Cut-leaf Mignonette		
<i>Romulea rosea var. australis</i>	Common Onion-grass		
<i>Rostraria cristata</i>	Annual Cat's-tail		
<i>Scabiosa atropurpurea</i>	Pincushion		
<i>Setaria palmifolia</i>			
<i>Setaria parviflora</i>	Slender Pigeon-grass		
<i>Silene vulgaris</i>	Bladder Champion		
<i>Sonchus oleraceus</i>	Common Sow-thistle		
<i>Tribolium acutiflorum</i>			
<i>Tribolium oblitterum</i>			
<i>Vicia cracca</i>	Tufted Vetch		
<i>Vulpia myuros f. megalura</i>	Fox-tail Fescue		
<i>Vulpia myuros f. myuros</i>	Rat's-tail Fescue		

D: Declared weed, WONS: Weeds of National Significance

Native flora*

Species	Common Name	Aus status	SA status
<i>Caladenia audasii</i>	Audas' Spider-orchid	E	E
<i>Ozothamnus pholidotus</i>	Scaly Haeckeria		V
<i>Amphibromus macrorbinus</i>	Long-nosed Swamp Wallaby-grass		R
<i>Atriplex australasica</i>			R
<i>Eucalyptus fasciculosa</i>	Pink Gum		R
<i>Gastrodia sesamoides</i>	Potato Orchid		R
<i>Lachnagrostis robusta</i>	Tall Blown-grass		R
<i>Wurmbea latifolia ssp. vanessae</i>	Broad-leaf Nancy		R
<i>Zoysia macrantha ssp. walshii</i>	Manila Grass		R
<i>Acacia longifolia ssp. sophorae</i>	Coastal Wattle		
<i>Acaena novae-zeelandiae</i>	Biddy-biddy		
<i>Actites megalocarpa</i>	Coast Sow-thistle		
<i>Adriana klotzschii (NC)</i>	Coast Bitter-bush		
<i>Adriana quadripartita</i>	Coast Bitter-bush		
<i>Agrostis avenacea var. avenacea (NC)</i>	Common Blown-grass		
<i>Allocasuarina verticillata</i>	Drooping Sheoak		
<i>Amansia pinnatifida</i>			
<i>Amyema melaleucae</i>	Tea-tree Mistletoe		
<i>Apium annuum</i>	Annual Celery		
<i>Apium prostratum var.</i>	Native Celery		

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<i>Species</i>	Common Name	Aus status	SA status
<i>Apium prostratum</i> var. <i>filiforme</i>	Native Celery		
<i>Apium prostratum</i> var. <i>prostratum</i>	Native Celery		
<i>Apodasmia brownii</i>	Coarse Twine-rush		
<i>Areschougia congesta</i>			
<i>Atriplex cinerea</i>	Coast Saltbush		
<i>Atriplex semibaccata</i>	Berry Saltbush		
<i>Atriplex suberecta</i>	Lagoon Saltbush		
<i>Austrostipa flavescens</i>	Coast Spear-grass		
<i>Banksia marginata</i>	Silver Banksia		
<i>Baumea juncea</i>	Bare Twig-rush		
<i>Bossiaea prostrata</i>	Creeping Bossiaea		
<i>Carpobrotus rossii</i> (NC)	Native Pigface		
<i>Carpoglossum confluens</i>			
<i>Cassutha melantha</i>	Coarse Dodder-laurel		
<i>Caulerpa scalpelliformis</i>			
<i>Centrolepis polygyna</i>	Wiry Centrolepis		
<i>Chaetomorpha coliformis</i>			
<i>Chiracanthia arborea</i>			
<i>Chlorodesmis baculifera</i>			
<i>Chondria bulbosa</i>			
<i>Chorizandra enodis</i>	Black Bristle-rush		
<i>Chrysocephalum apiculatum</i>	Common Everlasting		
<i>Cladosiphon filum</i>			
<i>Cladurus elatus</i>			
<i>Clematis microphylla</i> var. <i>microphylla</i>	Old Man's Beard		
<i>Codium galeatum</i>			
<i>Comesperma polygaloides</i>	Mauve Milkwort		
<i>Comesperma volubile</i>	Love Creeper		
<i>Cotula vulgaris</i> var. <i>australasica</i>	Slender Cotula		
<i>Crassula decumbens</i> var. <i>decumbens</i>	Spreading Crassula		
<i>Crassula sieberiana</i> ssp. <i>tetramera</i> (NC)	Australian Stonecrop		
<i>Cynoglossum australe</i>	Australian Hound's-tongue		
<i>Cystophora botryocystis</i>			
<i>Cystophora platylobium</i>			
<i>Cystophora racemosa</i>			
<i>Darwinia micropetala</i>	Small Darwinia		
<i>Dasyclonium flaccidum</i>			
<i>Dasyphila preissii</i>			
<i>Daucus glochidiatus</i>	Native Carrot		
<i>Dianella brevicaulis</i>	Short-stem Flax-lily		
<i>Dianella revoluta</i> var. <i>revoluta</i>	Black-anther Flax-lily		
<i>Dichondra repens</i>	Kidney Weed		
<i>Distichlis distichophylla</i>	Emu-grass		
<i>Dodonaea viscosa</i> ssp. <i>spatulata</i>	Sticky Hop-bush		
<i>Epiglossum smithiae</i>			
<i>Epilobium billardierianum</i> ssp. <i>billardierianum</i>	Robust Willow-herb		
<i>Epilobium billardierianum</i> ssp. <i>cinereum</i>	Variable Willow-herb		
<i>Epilobium billardierianum</i> ssp. <i>X intermedium</i>	Variable Willow-herb		
<i>Eucalyptus leucoxyloides</i> ssp. <i>pruinosa</i>	Inland South Australian Blue Gum		
<i>Euptilota articulata</i>			
<i>Ficinia nodosa</i>	Knobby Club-rush		

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<i>Species</i>	Common Name	Aus status	SA status
<i>Frankenia pauciflora</i> var. <i>gunnii</i>	Southern Sea-heath		
<i>Gabnia filum</i>	Thatching Grass		
<i>Gabnia trifida</i>	Cutting Grass		
<i>Galium gaudichaudii</i> (NC)	Rough Bedstraw		
<i>Geranium potentilloides</i> var. <i>potentilloides</i>	Downy Geranium		
<i>Geranium retrorsum</i>	Grassland Geranium		
<i>Gloiosaccion brownii</i>			
<i>Gonatogenia subulata</i>			
<i>Hakea nodosa</i>	Yellow Hakea		
<i>Hakea rugosa</i>	Dwarf Hakea		
<i>Hakea vittata</i>	Limestone Needlebush		
<i>Hemichroa pentandra</i>	Trailing Hemichroa		
<i>Heterosiphonia wrangelioides</i>			
<i>Hibbertia sericea</i>	Silky Guinea-flower		
<i>Hydrocotyle laxiflora</i>	Stinking Pennywort		
<i>Imperata cylindrica</i>	Blady Grass		
<i>Isolepis cernua</i>	Nodding Club-rush		
<i>Juncus caespiticus</i>	Grassy Rush		
<i>Juncus kraussii</i>	Sea Rush		
<i>Juncus pauciflorus</i>	Loose-flower Rush		
<i>Lachnagrostis filiformis</i>	Common Blown-grass		
<i>Lawrenzia glomerata</i>	Clustered Lawrenzia		
<i>Lawrenzia spicata</i>	Salt Lawrenzia		
<i>Leiocarpa tomentosa</i>	Woolly Plover-daisy		
<i>Lejolisia aegagropila</i>			
<i>Lepidium pseudohyssopifolium</i>			
<i>Lepidosperma gladiatum</i>	Coast Sword-sedge		
<i>Lepidosperma viscidum</i>	Sticky Sword-sedge		
<i>Lepilaena cylindrocarpa</i>	Long-fruit Water-mat		
<i>Lepilaena preissii</i>	Slender Water-mat		
<i>Leptospermum lanigerum</i>	Silky Tea-tree		
<i>Leptospermum myrsinoides</i>	Heath Tea-tree		
<i>Leucopogon parviflorus</i>	Coast Beard-heath		
<i>Leucopogon woodsii</i>	Nodding Beard-heath		
<i>Lichen</i> sp.			
<i>Lobelia anceps</i>	Angled Lobelia		
<i>Medeiothamnion repens</i>			
<i>Melaleuca brevifolia</i>	Short-leaf Honey-myrtle		
<i>Melaleuca gibbosa</i>	Slender Honey-myrtle		
<i>Melaleuca balmaturorum</i>	Swamp Paper-bark		
<i>Melaleuca lanceolata</i>	Dryland Tea-tree		
<i>Moss</i> sp.			
<i>Muehlenbeckia adpressa</i>	Climbing Lignum		
<i>Muehlenbeckia gunnii</i>	Coastal Climbing Lignum		
<i>Myoporum insulare</i>	Common Boobialla		
<i>Myosotis australis</i>	Austral Forget-me-not		
<i>Olearia axillaris</i>	Coast Daisy-bush		
<i>Olearia ciliata</i> var. <i>ciliata</i>	Fringed Daisy-bush		
<i>Parietaria debilis</i> (NC)	Smooth-nettle		
<i>Pelargonium australe</i>	Austral Stork's-bill		
<i>Phacelocarpus sessilis</i>			
<i>Phloiocaulon spectabile</i>			
<i>Phyllota remota</i>	Slender Phyllota		

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<i>Species</i>	Common Name	Aus status	SA status
<i>Picris angustifolia ssp. angustifolia</i>	Coast Picris		
<i>Pimelea serpyllifolia ssp. serpyllifolia</i>	Thyme Riceflower		
<i>Plocamium mertensii</i>			
<i>Poa poiiformis var. poiiformis</i>	Coast Tussock-grass		
<i>Poa sp.</i>	Meadow-grass/Tussock-grass		
<i>Polycerea nigrescens</i>			
<i>Pomaderris paniculosa ssp. paniculosa</i>	Mallee Pomaderris		
<i>Posidonia sinuosa</i>	Narrow-leaf Tapeweed		
<i>Pratia irrigua</i>	Salt Pratia		
<i>Puccinellia stricta var. stricta</i>	Australian Saltmarsh-grass		
<i>Pultenaea tenuifolia</i>	Narrow-leaf Bush-pea		
<i>Rhagodia candolleana ssp. candolleana</i>	Sea-berry Saltbush		
<i>Ruppia megacarpa</i>	Widgeon Grass		
<i>Samolus repens</i>	Creeping Brookweed		
<i>Sarcocornia quinqueflora</i>	Beaded Samphire		
<i>Sargassum varians</i>			
<i>Scaevola angustata</i>	Coast Fanflower		
<i>Schoenoplectus pungens</i>	Spiky Club-rush		
<i>Schoenus nitens</i>	Shiny Bog-rush		
<i>Selliera radicans</i>	Shiny Swamp-mat		
<i>Senecio biserratus</i>	Jagged Groundsel		
<i>Senecio glomeratus ssp. longifructus</i>	Swamp Groundsel		
<i>Senecio picridioides</i>	Purple-leaf Groundsel		
<i>Senecio pinnatifolius (NC)</i>	Variable Groundsel		
<i>Senecio pinnatifolius var. lanceolatus</i>	Variable Groundsel		
<i>Senecio spanomerus</i>			
<i>Solanum laciniatum</i>	Cut-leaf Kangaroo-apple		
<i>Solieria robusta</i>			
<i>Sonchus hydrophilus</i>	Native Sow-thistle		
<i>Sporobolus virginicus</i>	Salt Couch		
<i>Sporobolus comosus</i>			
<i>Stylidium graminifolium</i>	Grass Trigger-plant		
<i>Suaeda australis</i>	Austral Seablite		
<i>Swainsona lessertiifolia</i>	Coast Swainson-pea		
<i>Tecticornia halocnemoides ssp. halocnemoides</i>	Grey Samphire		
<i>Tetragonia implexicoma</i>	Bower Spinach		
<i>Thamnochloa dichotomum</i>			
<i>Urtica incisa</i>	Scrub Nettle		
<i>Vittadinia australasica var. australasica</i>	Sticky New Holland Daisy		
<i>Vittadinia dissecta var. birta</i>	Dissected New Holland Daisy		
<i>Wollastoniella myriophylloides</i>			
<i>Wrangelia australis</i>			
<i>Zonaria crenata</i>			

E: Endangered, V: Vulnerable, R: Rare

*note: list includes some marine species

Fauna

# of fauna in cell	160 recorded - 137 birds, 4 butterflies, 7 mammals, 6 reptiles, 6 amphibians (an additional 6 butterflies and 1 reptile identified by experts as possibly occurring)
# of fauna surveys / records	0 surveys, 43 opportune sites
# of threatened fauna in cell	28 recorded

SE13 – Kingston SE

# of non-indigenous fauna	10 recorded (an additional invertebrate possible)
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Non-indigenous fauna

Species	Common Name	Class	Record
<i>Alauda arvensis</i>	Eurasian Skylark	Aves	x
<i>Carduelis carduelis</i>	European Goldfinch	Aves	x
<i>Chloris chloris</i>	Common Greenfinch (European Greenfinch)	Aves	x
<i>Passer domesticus</i>	House Sparrow	Aves	x
<i>Streptopelia chinensis</i>	Spotted Dove (Spotted turtle-dove)	Aves	x
<i>Sturnus vulgaris</i>	Common Starling	Aves	x
<i>Turdus merula</i>	Common Blackbird	Aves	x
<i>Pieris rapae rapae</i>	Cabbage White	Invertebrate	p
<i>Mus musculus</i>	House Mouse	Mammalia	x
<i>Rattus rattus</i>	Black Rat (Ship Rat, Roof Rat)	Mammalia	x
<i>Vulpes vulpes</i>	Fox (Red Fox)	Mammalia	x

x: recorded, p: possibly there as suggested by R. Grund

Birds

Species	Common Name	Aus status	SA status
<i>Neophema chrysogaster</i>	Orange-bellied Parrot	CR/M	E
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	M	E
<i>Calyptorhynchus funereus</i>	Yellow-tailed Black-Cockatoo		V
<i>Cladorhynchus leucocephalus</i>	Banded Stilt		V
<i>Coturnix ypsilophora</i>	Brown Quail		V
<i>Grus rubicunda</i>	Brolga		V
<i>Lewinia pectoralis</i>	Lewin's Rail		V
<i>Neophema chrysostoma</i>	Blue-winged Parrot		V
<i>Numenius madagascariensis</i>	Eastern Curlew	M	V
<i>Petroica phoenicea</i>	Flame Robin		V
<i>Thinornis rubricollis</i>	Hooded Plover		V
<i>Actitis hypoleucos</i>	Common Sandpiper	M	R
<i>Anas rhynchos</i>	Australasian Shoveler		R
<i>Arenaria interpres</i>	Ruddy Turnstone	M	R
<i>Biziura lobata</i>	Musk Duck		R
<i>Calidris alba</i>	Sanderling	M	R
<i>Cereopsis novaehollandiae</i>	Cape Barren Goose		R
<i>Charadrius leschenaultii</i>	Greater Sand Plover (Large Sand Plover)	M	R
<i>Gallinago hardwickii</i>	Latham's Snipe (Japanese Snipe)	M	R
<i>Neophema elegans</i>	Elegant Parrot		R
<i>Stagonopleura bella</i>	Beautiful Firetail		R
<i>Acantbagenys rufogularis</i>	Spiny-cheeked Honeyeater		
<i>Acantbiza chrysorrhoa</i>	Yellow-rumped Thornbill		
<i>Acantbiza lineata</i>	Striated Thornbill		
<i>Acantbiza pusilla</i>	Brown Thornbill		
<i>Acantborhynchus tenuirostris</i>	Eastern Spinebill		
<i>Accipiter cirrocephalus</i>	Collared Sparrowhawk		
<i>Anas castanea</i>	Chestnut Teal		
<i>Anas gracilis</i>	Grey Teal		
<i>Anas superciliosa</i>	Pacific Black Duck		
<i>Anas superciliosa</i> × <i>anas platyrhynchos</i>	Pacific Black Duck/Mallard Hybrid		
<i>Anthochaera carunculata</i>	Red Wattlebird		
<i>Anthochaera chrysoptera</i>	Little Wattlebird		

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Species	Common Name	Aus status	SA status
<i>Anthus novaeseelandiae</i>	Australasian Pipit (Richard's Pipit)		
<i>Aphelocephala leucopsis</i>	Southern Whiteface		
<i>Apus pacificus</i>	Fork-tailed Swift		
<i>Aquila audax</i>	Wedge-tailed Eagle		
<i>Artamus cyanopterus</i>	Dusky Woodswallow		
<i>Barnardius zonarius</i>	Australian Ringneck (Ring-necked Parrot)		
<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo		
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	M	
<i>Calidris ruficollis</i>	Red-necked Stint	M	
<i>Chalcites basalus</i>	Horsfield's Bronze-cuckoo		
<i>Chalcites lucidus</i>	Shining Bronze-Cuckoo		
<i>Charadrius bicinctus</i>	Double-banded Plover		
<i>Charadrius ruficapillus</i>	Red-capped Plover (Red-capped Dotterel)		
<i>Chroicocephalus novaehollandiae</i>	Silver Gull		
<i>Cincloramphus cruralis</i>	Brown Songlark		
<i>Circus approximans</i>	Swamp Harrier (Marsh Harrier)		
<i>Circus assimilis</i>	Spotted Harrier		
<i>Cisticola exilis</i>	Golden-headed Cisticola		
<i>Colluricincla harmonica</i>	Grey Shrike-thrush		
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike		
<i>Cormobates leucophaea</i>	White-throated Treecreeper		
<i>Corvus mellori</i>	Little Raven		
<i>Coturnix pectoralis</i>	Stubble Quail		
<i>Cracticus tibicen</i>	Australian Magpie		
<i>Cracticus torquatus</i>	Grey Butcherbird		
<i>Cygnus atratus</i>	Black Swan		
<i>Daption capense</i>	Cape Petrel		
<i>Dasyornis broadbenti</i>	Rufous Bristlebird		ssp
<i>Dendrocygna eytoni</i>	Plumed Whistling-Duck		
<i>Dromaius novaehollandiae</i>	Emu		
<i>Egretta novaehollandiae</i>	White-faced Heron		
<i>Elanus axillaris</i>	Black-shouldered Kite		
<i>Eolophus roseicapillus</i>	Galah		
<i>Eopsaltria australis</i>	Eastern Yellow Robin		
<i>Epthianura albifrons</i>	White-fronted Chat		
<i>Falco berigora</i>	Brown Falcon		
<i>Falco cenchroides</i>	Nankeen Kestrel (Australian Kestrel)		
<i>Fulica atra</i>	Eurasian Coot		
<i>Fulmarus glacialisoides</i>	Southern Fulmar		
<i>Glossopsitta concinna</i>	Musk Lorikeet		
<i>Glossopsitta porphyrocephala</i>	Purple-crowned Lorikeet		
<i>Glyciphila melanops</i>	Tawny-crowned Honeyeater		
<i>Grallina cyanoleuca</i>	Magpie-lark		
<i>Himantopus himantopus</i>	Black-winged Stilt		
<i>Hirundapus caudacutus</i>	White-throated Needletail	M	
<i>Hirundo neoxena</i>	Welcome Swallow		
<i>Larus pacificus</i>	Pacific Gull		
<i>Lichenostomus chrysops</i>	Yellow-faced Honeyeater		
<i>Lichenostomus virescens</i>	Singing Honeyeater		
<i>Malacorhynchus membranaceus</i>	Pink-eared Duck		
<i>Malurus cyaneus</i>	Superb Fairy-wren		
<i>Manorina melanocephala</i>	Noisy Miner		
<i>Melithreptus brevirostris</i>	Brown-headed Honeyeater		

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Species	Common Name	Aus status	SA status
<i>Melopsittacus undulatus</i>	Budgerigar		
<i>Microcarbo melanoleucos</i>	Little Pied Cormorant		
<i>Morus serrator</i>	Australasian Gannet		
<i>Neochmia temporalis</i>	Red-browed Finch		
<i>Ninox novaeseelandiae</i>	Southern Boobook		
<i>Nymphicus hollandicus</i>	Cockatiel		
<i>Ocyphaps lophotes</i>	Crested Pigeon		
<i>Pachycephala pectoralis</i>	Golden Whistler		
<i>Pachycephala rufiventris</i>	Rufous Whistler		
<i>Pardalotus striatus</i>	Striated Pardalote		
<i>Pelecanus conspicillatus</i>	Australian Pelican		
<i>Petrochelidon nigricans</i>	Tree Martin		
<i>Petroica boodang</i>	Scarlet Robin		ssp
<i>Phalacrocorax fuscescens</i>	Black-faced Cormorant (Black-faced Shag)		
<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant		
<i>Phalacrocorax varius</i>	Pied Cormorant		
<i>Phaps chalcoptera</i>	Common Bronzewing		
<i>Phaps elegans</i>	Brush Bronzewing		
<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater		
<i>Platalea flavipes</i>	Yellow-billed Spoonbill		
<i>Platalea regia</i>	Royal Spoonbill		
<i>Platycercus elegans</i>	Crimson Rosella		
<i>Platycercus excimius</i>	Eastern Rosella		
<i>Poliiocephalus poliocephalus</i>	Hoary-headed Grebe		
<i>Pomatostomus superciliosus</i>	White-browed Babbler		
<i>Pomatostomus temporalis</i>	Grey-crowned Babbler		ssp
<i>Porzana fluminea</i>	Australian Spotted Crake (Australian Crake)		
<i>Psephotus haematonotus</i>	Red-rumped Parrot		
<i>Rhipidura albiscapa</i>	Grey Fantail		
<i>Rhipidura leucophrys</i>	Willie Wagtail		
<i>Sericornis frontalis</i>	White-browed Scrubwren		
<i>Stipiturus malachurus</i>	Southern Emu-wren	ssp	ssp
<i>Strepera versicolor</i>	Grey Currawong		ssp
<i>Tadorna tadornoides</i>	Australian Shelduck (Mountain Duck)		
<i>Thalasseus bergii</i>	Crested Tern		
<i>Threskiornis molucca</i>	Australian White Ibis (Sacred Ibis)		
<i>Threskiornis spinicollis</i>	Straw-necked Ibis		
<i>Todiramphus sanctus</i>	Sacred Kingfisher		
<i>Tribonyx ventralis</i>	Black-tailed Native-hen		
<i>Trichoglossus haematodus</i>	Rainbow Lorikeet		
<i>Tringa nebularia</i>	Common Greenshank	M	
<i>Tyto javanica</i>	Eastern Barn Owl		
<i>Vanellus miles</i>	Masked Lapwing		
<i>Zosterops lateralis</i>	Silvereye		

CR: Critically endangered, E: Endangered, V: Vulnerable, R: Rare, M: Migratory, ssp: sub-species

Butterflies

Species	Common Name	Status*	Record
<i>Hesperilla donnysa donnysa</i> (pale form <i>flavescens</i>)	Yellowish Sedge-Skipper	E	ex?
<i>Hesperilla cyrboticha cyclospila</i>	Chrysotricha Sedge-skipper or Golden-haired Sedge-skipper	V	ex?
<i>Delias aganippe</i>	Wood White	R	p

SE13 – Kingston SE

Species	Common Name	Status*	Record
<i>Taractrocera papyria papyria</i>	White-banded Grass-dart	R	x
<i>Geitoneura klugii klugii</i>	Common Xenica	C	p
<i>Heteronympha merope merope</i>	Common Brown	C	p
<i>Heteronympha penelope</i>	Shouldered Brown		p
<i>Junonia villida calybe</i>	Meadow argus	Va	p
<i>Lampides boeticus</i>	Long-tailed Pea-blue		p
<i>Nacaduba biocellata biocellata</i>	Two-spotted Line-blue	LC	p
<i>Neolucia agricola agricola</i>	Fringed Heath-blue		p
<i>Ocybadistes walkeri hypochlorus</i>	Southern Grass-dart		p
<i>Ogyris amaryllis meridionalis</i>	Amaryllis Azure		p
<i>Theclinesthes albocincta</i>	Bitter-bush blue	LC	p
<i>Theclinesthes serpentata serpentata</i>	Salt-bush blue		p
<i>Vanessa itea</i>	Australian Admiral	Va	p
<i>Zizina labradus labradus</i>	Common Grass Blue		p

*Vulnerability as per R. Grund, E: Endangered, V: Vulnerable, R: Rare

Va: Vagrant, LC: Locally common, C: Common

x: recorded, p: possibly there, ex?: possibly extinct, as suggested by R. Grund

Mammals

Species	Common Name	Aus status	SA status	Record
<i>Wallabia bicolor</i>	Swamp Wallaby		V	x
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	VU	R	x
<i>Cercartetus concinnus</i>	Western Pygmy-possum			x

E: Endangered, V: Vulnerable, R: Rare

Reptiles

Species	Common Name	Aus status	SA status	Record
<i>Chelonia mydas</i>	Green Turtle	V	V	x
<i>Varanus rosenbergi</i>	Heath Goanna		V	x
<i>Drysdalia coronoides</i>	White-lipped Snake		R	x
<i>Aprasia striolata</i>	Lined Worm-lizard			x
<i>Pseudonaja textilis</i>	Eastern Brown Snake			x
<i>Pygopus lepidopodus</i>	Common Scaly-foot			x
<i>Tiliqua rugosa</i>	Sleepy Lizard			e

E: Endangered, V: Vulnerable, R: Rare

x: recorded, e: expected to be there (M. Hutchinson pers. comm. 2009)

Amphibians

Species	Common Name	Aus status	SA status	Record
<i>Litoria raniformis</i>	Southern Bell Frog	V	V	x
<i>Pseudophryne bibronii</i>	Brown Toadlet		R	x
<i>Crinia signifera</i>	Common Froglet			x
<i>Limnodynastes peronii</i>	Striped Marsh Frog			x
<i>Limnodynastes tasmaniensis</i>	Spotted Marsh Frog			x
<i>Neobatrachus sudelli</i>	Sudell's Frog			x

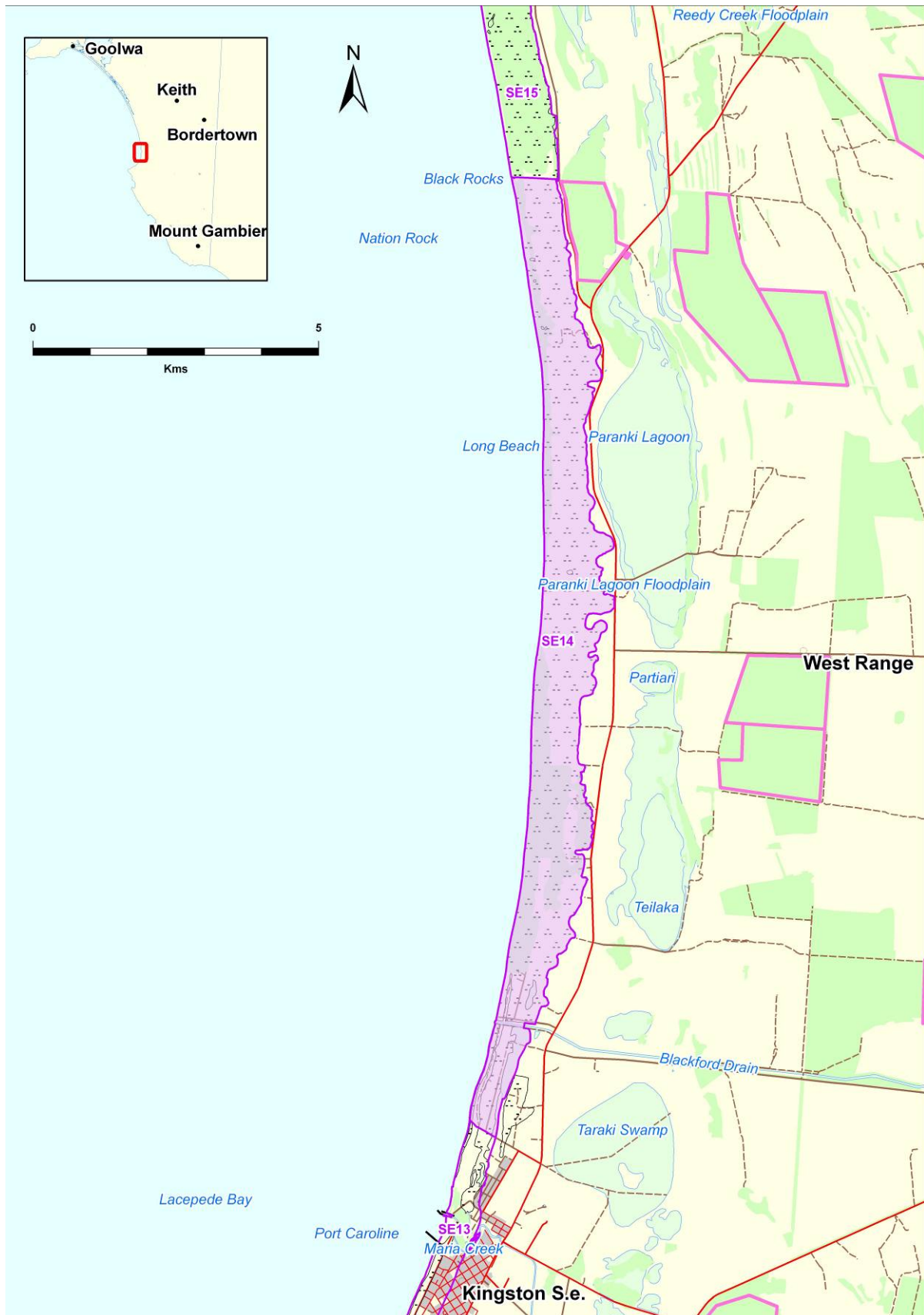
E: Endangered, V: Vulnerable, R: Rare

x: recorded

SE14 – Long Beach

6.3.14 Cell SE14 Long Beach

Area 1,457.8 ha. Length 16.69 km.



SE14 – Long Beach

Landforms

The inland boundary of this cell is set by the mapping of the extent of the Holocene dunes (approximately 1km); extensive dune forms and lakes further inland are Pleistocene features (Sprigg, 1979). The Holocene dunes are stable and low in elevation, adding little relief to the almost featureless coastal plain. In fact 96% of this cell is classified 'coastal dune'. The dunes comprise a relatively large foredune, with a series of very low Holocene ridges immediately inland. Foredunes are stable now and in the past, and few transgressive features are seen. This is a result of low wave energy, that varies from medium to low near the Granites to close to zero at Blackford Drain, that is a result of offshore shoaling on the 'Lacepede Reefs', (Sprigg, 1979) and the generally very shallow offshore gradients. South of Blackford Drain to Port Caroline, the dunes are flat to non-existent. Beaches are composed of mainly fine sands, with low beach face angles. The beach type is classified by Short, as low tide terrace.



Coastal plain at The Granites (northern boundary of Cell SE14). Photograph Coast Protection Board 2008.

Biota

There are 6 flora survey sites, 11 Herbarium record sites, and 11 opportune fauna survey sites. The total area of native vegetation, 368ha, is approximately 25% of the cell. The majority of the cell is cleared primary production land. *Leucopogon parviflorus* shrubland is recorded along the uncleared coastal dune strip with a mix of Spinifex grassland along the foredune. Only 31 bird species, 4 butterflies and one reptile have been recorded in the cell, including the EPBC listed critically endangered Orange-bellied Parrot (*Neophema chrysogaster*). Widespread *Allocasuarina verticillata* coastal woodlands were once present before clearance for farming/ grazing purposes.

Benthic Habitat

Inshore dense to sparse sea grass to 3 to 7km, with calcarenite reef offshore.

Land Use/ Land Ownership

Inner dune ridges are grazed. The majority of land is privately owned, though there are narrow areas of unallotted Crown coastal land. Coastal dune opposite Paranki Lagoon/ Lake Nadzab is

SE14 – Long Beach

held as a miscellaneous Crown lease. No vegetated areas are protected by heritage agreement or park status. Upper South East Marine Park extends the length of the cell.

Values/ Uses (Field visits and local reports)

Much of this area is zoned for grazing; with smaller areas of farming and rural residential land in the south of the cell. Long Beach is used for shore based fishing.

Threats (Field visits and local reports)

ORV tracks are heavy throughout the remnant dunes. Combined with pest plant and animal threats, the remnant coastal shrubland is degraded and almost non-existent in places. Spiny Rush (*Juncus acutus*) is common around the coastal wetlands including Lake Nadzab and the low lying agricultural land and along road reserves. Discharge of nutrient rich and sediment laden waters from Blackford Drain is impacting upon nearshore seagrass meadows.

Opportunities

Encourage landholders to exclude ORVs and grazing from coastal dunes and assist landholders with pest plant and animal control to improve the quality of remnant shrub- and grass-land communities. Possible opportunity for an investigation into the effects of sea-wheat grass on beach morphology and fauna impacts. Dune drift and blowouts in the vegetated dunes north of Blackford Drain could be rehabilitated. Opportunities to redirect flows from Blackford Drain or polish water via wetlands should be explored.

Conservation Analysis (GIS)

The total of conservation mean values, 73.77 is the lowest in the region. The detailed summary map is remarkable in that no part of the cell shows a total higher than medium low, and almost all is low. Habitat for butterflies and for numbers of threatened mammals within the uncleared dunes, and viewscape in the foredune area show high means. However, it is notable that total means for layers relating to threatened plant species, for birds and reptile habitat, as well as Indigenous and European heritage, are extremely low.

Threat Analysis (GIS)

Total for threat summary means is high, 66.09. ORV activity, land ownership, viewscape, land use, vegetation block degradation, numbers of significant weeds (throughout the cell), dune instability (a potential threat through much of the cell), numbers of rabbits are high throughout, are the major contributors to this high total. Dune habitat in the southern half of the cell, noted in the previous paragraph, is threatened by vegetation block isolation, adjacency of the dump, as well as ORV activity. Petroleum extraction licences are current for the area south of Blackford Drain. Existing residential development (and rural residential zoning) poses threats in the south.

Adaptation to Climate Change: Threats for cell SE14

(see also discussion of scenario in Section 4.11)

NOTE: the advice below is indicative of likely change and the direction of change, with implications for ecosystems. Dates, amounts and probabilities cannot be accurately calculated at this time. Thus advice on flood levels, for example, should not be used in engineering or development planning.

SE14 – Long Beach

Climate change element/ scenario	Impacts and implications (for this cell)	Protect and manage habitat threats	Address landscape issues: fire, connectivity, refuges, hydrology
Combined climate changes and sea level rise throughout this cell	This cell presents a complex pattern of habitats sensitive to change.	Create a baseline for shoreline, dune and lake change by establishing a rectified aerial photographic record at an appropriate resolution.	
Sea level rise: 2030 : +c.20cm 2070: +c.80cm.	Increase in storm foredune damage and beach recession beach change may be rapid, because of low storage volumes of sand. Very low to non-existent dune elevations in the south of the cell threaten surge overtopping, and rapid shoreline recession.	Active dune management to avoid escalation of threat. Establish beach profile monitoring as baseline information for coastal change. Review land use planning and development plans to allow for dune retreat. Maintain aerial photographic record to track shoreline changes.	
Storms: <i>Frequency</i> continues to show great variation on a decadal scale. <i>Intensity</i> of large storms increases.	2030: Occasional storm tide flooding above highest known tides. The seasonal wetlands immediately landward of the cell boundary will be subject to storm tide inundation with a slight sea level rise; changing access and groundwater conditions within the cell] 2070: Flooding will affect all swamps and adjacent low lying areas.	Monitor storm tide impacts. Ongoing adaptive management of the sill on the mouth of Blackford Drain.	
	Frequent storm damage to foredunes.	Active management of dune blowouts.	
Warmer average conditions: 2030:+0.3 to.6°C 2070:+1.5 to 2°C	(Impacts uncertain. Existing terrestrial vegetation is found in warmer conditions elsewhere)		Maintain connectivity of vegetation within the region.
Drier average conditions: 2030: -2% to 5% 2070: - 10% to 20%	Native dune vegetation adapts well to drier conditions, but recovers more slowly from fire, disease and storm damage: dune mobilization becomes more likely. Exotic grass species within dunes unlikely to survive drought.	Active weed control within dunes, together with management of blowouts.	Ensure dunes are on the regional fire plan.

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Climate change element/ scenario	Impacts and implications (for this cell)	Protect and manage habitat threats	Address landscape issues: fire, connectivity, refuges, hydrology
'Flashy' run off: Drier creeks, but larger rare floods	Drains and creeks may increase sediment load to coastal swamps, (this depends on land management practices).	Maintain watching brief on sedimentation of swamps.	
Groundwater lowering; saline incursion:	The potential fall in groundwater pressure (and potential storm incursion) a significant threat to vegetation survival in freshwater swamps and in the dunes.	Adaptive management of plant assets.	Monitor salinity of coastal swamps, and vegetation condition in the swamps and dunes.
Nearshore sea changes - temperature; acidity; wave climate: 2030: +0.3°C to + 0.6°C 2070: +1.0°C to + 1.50C	Wave climate changes unlikely.		

Table 6.16. Recommended Actions and Priority for Cell SE14 – Long Beach

Component	Issue	Proposed Action	Priority of Action	Key Players
Dunes	Prevalence of invasive weeds throughout the dunes.	Local action plan for weed control, to improve resilience of the cell to long term threats to dune stability.	Medium (threat)	Land owners, NRM, DENR
	Prevalence of rabbits.	Local action plan for rabbit control, to improve resilience of the cell to long term threats to dune stability.	Medium (threat)	Land owners, NRM, DENR
	ORV activity leading to damage to native vegetation and spreading of weeds between Blackford Drain and the Granites.	Access control, to improve resilience of the cell to long term threats to dune stability.	High (threat)	Land owners, NRM, Council

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Component	Issue	Proposed Action	Priority of Action	Key Players
	Kingston refuse disposal site adjacent to coast.	Relocate away from coast.	Medium (threat)	Council, EPA
Beach and dunes	Degraded state of the dunes and low volumes of sand storage within the beach and dunes threaten rapid recession in response to sea level rise.	Establish beach profile in the northern half of the cell to create a baseline for measurement of change.	Medium (cell)	DENR, CPB
Low lying land behind coastal dunes, and running north to Coorong	Lidar survey suggests possible early incursion of storm tides, due to sea level rise.	Scoping of timelines and implications for possible adaptation of infrastructure.	Medium (hazard)	DPC, DENR, Councils, NRM, DPLG
Whole cell	Cell statistics show poor vegetation block connectivity threatening habitat resilience.	Seek opportunities, (eg through reservation, heritage agreements and assisted landholder action) to improve biodiversity linkages.	Medium (Cons/ threat)	DENR, NRM, Community, landholders
	Lack of biological data.	Conduct flora and fauna surveys to improve knowledge of this cell	Medium (cell)	DENR, NRM, community
	Climate induced changes threaten rapid alteration to beach, dune and swamps. De-stabilisation of dune areas will lead to landform retreat.	Maintain a time series of high resolution rectified aerial photographs to monitor change. Review land use and development plans to allow for dune retreat.	Medium (Cons/ threat)	DENR, NRM, Council, DPLG

BIOTA

Flora

Remnant vegetation area (ha)	368.4 ha, 25.3% of cell area
# flora surveys / records	6 surveys, 11 herbarium record sites
# flora in cell	86
# conservation rated flora in cell	0 recorded
# non-indigenous flora in cell	39 recorded
Significant CDCS floristic community	<i>Leucopogon parviflorus</i> / <i>Olearia axillaris</i> shrubland (>50% of known sites occur along SE coast).
Protected area	No protected areas in the cell

SE14 – Long Beach

Weeds

Species	Common Name	Status	Study rating
<i>Asparagus asparagoides</i> (NC)	Bridal Creeper	WONS, D	9
<i>Lycium ferocissimum</i>	African Boxthorn	D	9
<i>Juncus acutus</i>	Sharp Rush		8
<i>Thinopyrum junceiforme</i>	Sea Wheat-grass		8
<i>Leptospermum laevigatum</i>	Coast Tea-tree		7
<i>Euphorbia paralias</i>	Sea Spurge		4
<i>Limonium</i> sp.	Sea-lavender		4
<i>Senecio elegans</i>	Purple Groundsel		3
<i>Anagallis arvensis</i>	Pimpernel		
<i>Anchusa arvensis</i>	Bugloss		
<i>Arctotheca calendula</i>	Cape Weed		
<i>Avena barbata</i>	Bearded Oat		
<i>Brassica tournefortii</i>	Wild Turnip		
<i>Cakile maritima</i> ssp. <i>maritima</i>	Two-horned Sea Rocket		
<i>Carduus tenuiflorus</i>	Slender Thistle		
<i>Catapodium rigidum</i>	Rigid Fescue		
<i>Cerastium glomeratum</i>	Common Mouse-ear Chickweed		
<i>Dischisma arenarium</i>	Sand Dichisma		
<i>Ehrharta longiflora</i>	Annual Veldt Grass		
<i>Erodium moschatum</i>	Musky Herons-bill		
<i>Galium murale</i>	Small Bedstraw		
<i>Geranium molle</i> var. <i>molle</i>	Soft Geranium		
<i>Hypochaeris glabra</i>	Smooth Cat's Ear		
<i>Isolepis marginata</i>	Little Club-rush		
<i>Lagurus ovatus</i>	Hare's Tail Grass		
<i>Melilotus indicus</i>	King Island Melilot		
<i>Minuartia mediterranea</i>	Slender Sandwort		
<i>Oenothera stricta</i> ssp. <i>stricta</i>	Common Evening Primrose		
<i>Oxalis pes-caprae</i>	Soursob		
<i>Plantago lanceolata</i> var. <i>dubia</i>	Ribwort		
<i>Polypogon maritimus</i>	Coast Beard-grass		
<i>Reichardia tingitana</i>	False Sowthistle		
<i>Rostraria cristata</i>	Annual Cat's-tail		
<i>Sonchus asper</i> ssp.	Rough Sow-thistle		
<i>Sonchus oleraceus</i> (NC)	Common Sow-thistle		
<i>Stellaria media</i>	Chickweed		
<i>Verbascum virgatum</i>	Twiggy Mullein		
<i>Vulpia fasciculata</i>	Sand Fescue		
<i>Vulpia myuros</i> f. <i>myuros</i>	Rat's-tail Fescue		

D: Declared weed, WONS: Weeds of National Significance

Native flora

Species	Common Name	Aus status	SA status
<i>Acacia longifolia</i> ssp. <i>sophorae</i>	Coastal Wattle		
<i>Acaena novae-zelandiae</i>	Biddy-biddy		
<i>Adriana klotzschii</i> (NC)	Coast Bitter-bush		
<i>Allocasuarina verticillata</i>	Drooping Sheoak		
<i>Aphanes australiana</i> (NC)	Australian Piert		
<i>Calandrinia brevipedata</i>	Short-stalked Purslane		
<i>Calandrinia calyptrata</i>	Pink Purslane		

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<i>Species</i>	Common Name	Aus status	SA status
<i>Carpobrotus rossii</i>	Native Pigface		
<i>Carpobrotus rossii</i> (NC)	Native Pigface		
<i>Clematis microphylla</i> var. <i>microphylla</i>	Old Man's Beard		
<i>Crassula closiana</i>	Stalked Crassula		
<i>Crassula decumbens</i> var. <i>decumbens</i>	Spreading Crassula		
<i>Crassula sieberiana</i> ssp. <i>tetramera</i> (NC)	Australian Stonecrop		
<i>Cynoglossum australe</i>	Australian Hound's-tongue		
<i>Dianella brevicaulis</i>	Short-stem Flax-lily		
<i>Dichondra repens</i>	Kidney Weed		
<i>Dodonaea viscosa</i> ssp. <i>spatulata</i>	Sticky Hop-bush		
<i>Epilobium billardierianum</i> ssp. <i>X intermedium</i>	Variable Willow-herb		
<i>Eucalyptus diversifolia</i> ssp. <i>diversifolia</i>	Coastal White Mallee		
<i>Exocarpos syrticola</i>	Coast Cherry		
<i>Ficinia nodosa</i>	Knobby Club-rush		
<i>Geranium potentilloides</i> var. <i>potentilloides</i>	Downy Geranium		
<i>Hydrocotyle laxiflora</i>	Stinking Pennywort		
<i>Lepidosperma gladiatum</i>	Coast Sword-sedge		
<i>Leucophyta brownii</i>	Coast Cushion Bush		
<i>Leucopogon parviflorus</i>	Coast Beard-heath		
<i>Lichen</i> sp.			
<i>Lotus australis</i>	Austral Trefoil		
<i>Moss</i> sp.			
<i>Muehlenbeckia gunnii</i>	Coastal Climbing Lignum		
<i>Olearia axillaris</i>	Coast Daisy-bush		
<i>Parietaria debilis</i>	Smooth-nettle		
<i>Parietaria debilis</i> (NC)	Smooth-nettle		
<i>Pelargonium australe</i>	Austral Stork's-bill		
<i>Pimelea serpyllifolia</i> ssp. <i>serpyllifolia</i>	Thyme Riceflower		
<i>Rhagodia candolleana</i> ssp.	Sea-berry Saltbush		
<i>Rhagodia candolleana</i> ssp. <i>candolleana</i>	Sea-berry Saltbush		
<i>Senecio pinnatifolius</i> (NC)	Variable Groundsel		
<i>Senecio spanomerus</i>			
<i>Solanum laciniatum</i>	Cut-leaf Kangaroo-apple		
<i>Spinifex sericeus</i> (NC)	Rolling Spinifex		
<i>Stackhousia spathulata</i>	Coast Candles		
<i>Suaeda australis</i>	Austral Seablite		
<i>Swainsona lessertiifolia</i>	Coast Swainson-pea		
<i>Tetragonia implexicoma</i>	Bower Spinach		
<i>Threlkeldia diffusa</i>	Coast Bonefruit		

E: Endangered, V: Vulnerable, R: Rare

Fauna

# of fauna in cell	37 recorded – 31 birds, 4 butterflies, 1 mammal, 1 reptile (an additional 22 butterflies and 1 reptile identified by experts as possibly occurring)
# of fauna surveys / records	0 surveys, 11 opportune sites
# of threatened fauna in cell	8 recorded
# of non-indigenous fauna	2 recorded (an additional invertebrate possible)

Non-indigenous fauna

Species	Common Name	Class	Record
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Species	Common Name	Class	Record
<i>Vulpes vulpes</i>	Fox (Red Fox)	Mammalia	x
<i>Pieris rapae rapae</i>	Cabbage White	Invertebrate	p
<i>Carduelis carduelis</i>	European Goldfinch	Aves	x

x: recorded, p: possibly there as suggested by R. Grund

Birds

Species	Common Name	Aus status	SA status
<i>Neophema chrysogaster</i>	Orange-bellied Parrot	CR/M	E
<i>Coturnix ypsilophora</i>	Brown Quail		V
<i>Thinornis rubricollis</i>	Hooded Plover		V
<i>Actitis hypoleucos</i>	Common Sandpiper	M	R
<i>Calidris alba</i>	Sanderling	M	R
<i>Haematopus fuliginosus</i>	Sooty Oystercatcher		R
<i>Haematopus longirostris</i>	Australian Pied Oystercatcher		R
<i>Stagonopleura bella</i>	Beautiful Firetail		R
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill		
<i>Anthus novaeseelandiae</i>	Australasian Pipit (Richard's Pipit)		
<i>Calamanthus fuliginosus</i>	Striated Fieldwren		
<i>Calidris ruficollis</i>	Red-necked Stint	M	
<i>Charadrius bicinctus</i>	Double-banded Plover		
<i>Charadrius ruficapillus</i>	Red-capped Plover (Red-capped Dotterel)		
<i>Charadrius veredus</i>	Oriental Plover	M	
<i>Chroicocephalus novaehollandiae</i>	Silver Gull		
<i>Corvus mellori</i>	Little Raven		
<i>Egretta novaehollandiae</i>	White-faced Heron		
<i>Falco cenchroides</i>	Nankeen Kestrel (Australian Kestrel)		
<i>Hirundo neoxena</i>	Welcome Swallow		
<i>Lichenostomus virescens</i>	Singing Honeyeater		
<i>Malurus cyaneus</i>	Superb Fairy-wren		
<i>Ocyphaps lophotes</i>	Crested Pigeon		
<i>Phalacrocorax fuscescens</i>	Black-faced Cormorant (Black-faced Shag)		
<i>Phalacrocorax varius</i>	Pied Cormorant		
<i>Pluvialis squatarola</i>	Grey Plover	M	
<i>Tadorna tadornoides</i>	Australian Shelduck (Mountain Duck)		
<i>Thalasseus bergii</i>	Crested Tern		
<i>Vanellus miles</i>	Masked Lapwing		
<i>Zosterops lateralis</i>	Silvereye		

CR: Critically endangered, E: Endangered, V: Vulnerable, R: Rare, M: Migratory, ssp: sub-species

Butterflies

Species	Common Name	Status*	Record
<i>Hesperilla donnyisa donnyisa</i> (pale form <i>flavescens</i>)	Yellowish Sedge-Skipper	E	x
<i>Jamenus icilius</i>	Icilius Hairstreak	E in SE	p
<i>Candalides heathi heathi</i>	Rayed Blue	R	p
<i>Erina hyacinthina form josephina</i>	Common Dusky-blue	R	p
<i>Lucia limbaria</i>	Small Copper	R	p
<i>Anisynta cynone cynone</i>	Mottled Grass-skipper	V	p
<i>Hesperilla cyrhoticha cyclopsila</i>	Chrysotricha Sedge-skipper or Golden-haired Sedge-skipper	V	x
<i>Delias aganippe</i>	Wood White	R	p
<i>Erina acasta</i>	Blotched Dusky-blue		p

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Species	Common Name	Status*	Record
<i>Erina hyacinthina form simplex</i>	Western Dusky-blue		p
<i>Geitoneura klugii klugii</i>	Common Xenica	C	p
<i>Hesperilla donnysa delos (incl. form diluta)</i>	Donnysa skipper		x
<i>Heteronympha merope merope</i>	Common Brown	C	p
<i>Heteronympha penelope</i>	Shouldered Brown		p
<i>Junonia villida calybe</i>	Meadow argus	Va	p
<i>Lampides boeticus</i>	Long-tailed Pea-blue		p
<i>Nacuduba biocellata biocellata</i>	Two-spotted Line-blue	LC	p
<i>Neolucia agricola agricola</i>	Fringed Heath-blue		p
<i>Ocybadistes walkeri hypochlorus</i>	Southern Grass-dart		p
<i>Ogyris amaryllis meridionalis</i>	Amaryllis Azure		p
<i>Theclinesthes albocincta</i>	Bitter-bush blue	LC	x
<i>Theclinesthes miskini miskini</i>	Wattle Blue		p
<i>Theclinesthes serpentata serpentata</i>	Salt-bush blue		p
<i>Vanessa itea</i>	Australian Admiral	Va	p
<i>Vanessa kershawi</i>	Australian Painted Lady	Va	p
<i>Zizina labradus labradus</i>	Common Grass Blue		p

*Vulnerability as per R. Grund, E: Endangered, V: Vulnerable, R: Rare

Va: Vagrant, LC: Locally common, C: Common

x: recorded, p: possibly there, as suggested by R. Grund

Mammals

No mammal species recorded

Reptiles

Species	Common Name	Aus status	SA status	Record
<i>Pseudonaja textilis</i>	Eastern Brown Snake			x
<i>Tiliqua rugosa</i>	Sleepy Lizard			e

E: Endangered, V: Vulnerable, R: Rare

x: recorded, e: expected to be there (M. Hutchinson pers. comm. 2009)

Amphibians

No amphibian species recorded

SE15-17 – The Coorong

6.3.15 Cells SE15 – 17 The Coorong

(These three cells have been described together because of their many common features and because their local management is dominated by the Coorong National Park. The composite cell is referred to below as ‘the Coorong’, including all areas within the coastal boundary; the water body is referred to as the ‘Coorong lagoon’). Combined area of 55278.3 ha, length 156.3 km.



Landforms

This 558km² combined cell is a low coastal plain, comprising an approximately 150km long sand barrier known as the Youngusband Peninsula, backed by mudflats and near flat Pleistocene barriers and the long narrow water body of the Coorong lagoon. Short & Hesp (1984) argue for an accumulation of the barrier Holocene sands from 6000 to 10000 BP, followed by foredune erosion and barrier recession. The Holocene sands have accumulated over a Pleistocene barrier calcarenite ‘range’, here a little below current sea level. However the calcarenite barrier varies in elevation, and locally forms part of the contemporary surface of the peninsula. Within this sandy peninsula a freshwater lens, perched over saltwater, supports a varied shrub and grassland; in places this perched water table intersects with the land surface in a ‘freshwater soak’, (Gilbertson & Foale, 1981). The dune barrier varies in width from 3 km near the Murray Mouth to a hundred metres near the Granites; sand volumes are also greatest near the Murray Mouth. The dunes extend over 30.9% of the cell by area, and 27.2% of the dunes are unvegetated.

Currently it is clear that the Holocene dunes are transgressing landward, through storm and other damage leading to blowout formation; in places the transgressive dune front is spilling into the Coorong lagoon. As sand is transported landwards from the foredune, incrementally the beach recedes. Over time, it may be said that this entire sand barrier form is receding landwards; though this process will be complicated by the underlying Pleistocene calcarenite. Between Tea Tree Crossing and 42 Mile Crossing the beach is currently receding at measurable rates: comparison of a time series of aerial photographs suggests this rate may be of the order of 1m./yr (Fotheringham, pers. comm. 9/10¹).; any recession north and south of this part of the Coorong shore appears to be much less.

The cell is entirely fronted by a beach, one of the longest in the state: a curve facing SW x W, micro-tidal (springs range c.1m.) and in a plan form adjusted to the refracted pattern of swell from the Southern Ocean. Short & Hesp, 1984 and Short & Cowell, 2009, have extensively discussed the form and evolution of the beach and dunes and the contemporary processes affecting them. They describe the beach and dune as follows:

“The study area has a high-energy dissipative beach and backing active transgressive dune system, exposed to consistent high-energy southerly swell and seas and accompanying periodic strong southwest winds.”

A relatively steep offshore profile allows the majority of the swell energy of the Southern Ocean to reach the shore as breakers; mean values for the swell are H_{sig} 2.8m with a period of 12.8 seconds. This high energy characteristic is reduced by shoaling on Pleistocene calcarenite barriers in the southern quarter of the composite cell, south of Tea Tree Crossing and here medium wave energy prevails. Although the beaches are composed of fine to fine-medium quartz and shell sands, their prevailing dissipative state maintains generally steep beachface angles, with frequent variation due to cusp formation and cusp migration.

Some 60% of the area of the cell is lagoon or seasonal mudflat, with the remainder being saltmarsh, and low Pleistocene calcarenite materials on the landward edge of the cell. The lagoon occupies a shallow trough between low Pleistocene ‘ranges’. It narrows in the southern half, finally to separate seasonal pools and then absent behind a narrow dune barrier in the extreme south.

The lagoon shore of the Youngusband Peninsula is irregular in form, with tiny beaches, extensive mudflats and dunes spilling into the lagoon; within the lagoon tidal channels and local wavelets shape these into a varied pattern of small bays and forelands. Tidal movement in the lagoon has been much reduced by the decline in the tidal prism following the terminal lakes

¹ Re-survey of the 1890 land division boundaries in the hundred of Duffield in the late 1980s suggested this process had been active over at least this time span. However, comparison of a time series of aerial photographs of 42 Mile Crossing suggests recession is much less north of this point. (File record, Coastal Management, DENR).

SE15-17 – The Coorong

barrier completion in 1940. Freshwater addition to the lagoon is in the south, from the Lower South East Drainage Scheme through Salt Creek and from regional groundwater movement (Tyler et al, 1983, pp 49-60). Both these sources have been much reduced in recent years, with a consequent rise in salinity in the southern lagoon.

Saline mudflats, samphire saltmarsh, and low calcarenite plain comprise the rest of the coastal zone. Salinas flooded by a variety of evaporites are found near the coastal boundary of the southern part of the cell; these are a result of the evaporation of rising groundwaters containing a variety of salts. In these ephemeral lakes calcium and magnesium carbonate are precipitated as unusual fine-grained dolomite crystals. Dunes transgressing the peninsula and spilling into the muds and lakes on the inner side, cause folding in the plastic muds.



Youngusband Peninsula and Coorong lagoon. Photograph Coast Protection Board 2008.

Benthic Habitat

At the southern end this cell shows inshore sand and dense seagrass offshore; further north there is a pattern of sand to c.800m, then reef to seagrass. This pattern continues to Coolatoo Flat (5975 N) where both reef and seagrass are entirely replaced by bare sand. Further north, towards the Murray Mouth, has been mapped as bare sand; however Short and Cowell (2010) report extensive Pleistocene reef offshore, and in the northernmost 40 km of the cell extensive bare mud and calcarenite.

Biota

The area of remnant vegetation is 22,744 ha, about one third of the total area. There are 175 flora survey sites, 39 opportune flora sites, 320 Herbarium record sites, 60 fauna survey sites, and 587 opportune survey sites within this large composite cell.

The Youngusband sand barrier is dominated by tall shrubland, *Leucopogon parviflorus* with *Olearia axillaris*, and areas of grasses, notably *Spinifex sericeus* in the northern part of the barrier. In patches along the peninsula shore of the lagoon supra-tidal sedges and samphire are found; dotted along

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the inner shore are stands of supra-tidal *Melaleuca*. On the calcarenite slopes near the inner edge of the coastal boundary, remnant stands of mallee form *E. diversifolia*, woodland *E. leucoxyton*, and, in the north, tall shrubland *Muehlenbeckia florulenta* remain. *Melaleuca halmaturorum* shrubland and *Sarcocornia spp.* shrubland are common along the inland edges of the Coorong.

306 fauna species have been recorded in the cell including 225 birds, 24 butterflies, 22 mammals, 27 reptiles and 8 amphibians. Listed threatened species include the EPBC listed critically endangered Orange-bellied Parrot (*Neophema chrysogaster*); also the State endangered White-bellied Sea Eagle (*Haliaeetus leucogaster*), Little (*Sternula albifrons*) and Fairy (*Sternula nereis*) Terns and Western Barred Bandicoot (*Perameles bougainville*).

Land Use/ Land Ownership

Approximately 86% of the cell is in the Coorong National Park. Upper South East Marine Park extends 20km north of 42 Mile Crossing to Kingston.

Values/ Uses (Field visits and local reports)

The wilderness character of the Youngusband Peninsula is commented upon by visitors and in written accounts. This intrinsic value should be retained. Aboriginal Heritage values throughout.



Murray Mouth. Photograph Coast Protection Board 2008.

Threats (Field visits and local reports)

Cullen & Bird, 1980, (p.B2) report that dunes have been de-stabilised by 19C grazing and burning, further damaged by rabbits and ORV. "In recent years ORVs have been much used here, and these have further damaged the vegetation and extended the area of bare mobile sand." Buick & Paton, 1989, estimated that 60% of Hooded Plover eggs and chicks were run over by ORVs in the mid to late 1980s.

Altered freshwater river flows to the Coorong from the upstream catchments are a serious threat to the regions ecology. Similarly, land clearance on the landward side of the Coorong poses a

SE15-17 – The Coorong

threat, limiting the extent of native vegetation and increasing the edge effects of invasive plants and pest animals. Weeds present a threat to high value conservation areas in the cell.

Opportunities

Review and update of the Coorong NP Management Plan, 1990.

Review of Coorong and Lakes Alexandrina and Albert Ramsar Management Plan, 2000.

Coorong Habitat Management Plan: Prioritisation of on-ground works in the Coorong RAMSAR region (under development), funded through the Coorong, Lower Lakes and Murray Mouth Program, DENR.

Conservation Analysis (GIS)

This group of cells are rated as high to medium high in values, with totals of conservation means ranked 4th, 6th and 8th within the SE region. For the composite Coorong cell the following conservation layers are relatively high throughout: threatened status of fauna, total number of threatened species, numbers of endemic plant species, species richness, number of threatened bird species, number of bird species, number of threatened reptile species, habitat of the focal species Fairy Tern and Southern Bell Frog, viewscape priority and wetland values. Vegetation patch size and connectivity show medium to high values.

The distributions of the several high scoring variables that contribute significantly to the conservation total are relatively clear: the lakes and mudflats show large numbers of threatened species and great species richness; all areas show large numbers of bird species; south of Chinaman Well Lake mudflats show numbers of threatened reptile species; all vegetation patches show high scores for all metrics; the lakes and mudflats provide habitat for the focal species Southern Bell Frog and the Fairy Tern; endemic plant species are mainly within the tall shrublands of the dunes. Habitat for the nationally critically endangered Orange-bellied Parrot is found along the dune barrier. The state vulnerable Hooded Plover has been recorded along most of the Coorong foreshore and within unvegetated parts of the dunes. The Peninsula and the lagoon perimeter also retain important cultural sites of the Ngarrindjeri people, (see Luebbbers 1980 & 1982).

The detailed summary map shows extensive high to high/ moderate value areas both on the vegetated dunes and mudflats around the Coorong Lagoon, also the remnant blocks on the NE side of the lagoon; only the de-vegetated dunes and the narrow strip of cleared land on the landward side of the Coorong show low or low medium total values.

Carbonate ephemeral lakes have been designated as Significant Geological Features at Pipe Clay Lakes and immediately south; immediately SE of Tea Tree Crossing; near Chinaman Well; and immediately adjacent to 42 mile Crossing. [These evaporite deposits are supplied, at least in part by regional rising groundwaters, (Holmes JW & Waterhouse JD in Tyler et al, 1983)]

Threat Analysis (GIS)

The total for threat means is low: only values for weeds, vegetation block degradation, visual amenity, feral deer (in the south) and rabbits (in the south) stand out. Within the remote and wild areas of the Coorong NP total threats are everywhere low; however, south of the Princess Soak track (park 'Natural' zone) threat totals within the dune are medium and in places medium high.

From the southern end of the Coorong NP, for some 17 km north from the park boundary, invasive weeds occur on the inner dunes; concentrations of invasive weeds increase south of the park boundary to the Granites. Other notable concentrations of weeds occur in the dunes near Nine Mile Point and across the lagoon from this location, on the dunes near Hells Gate, along the seasonal lake edge near Tea Tree Crossing. There are also notable areas of invasive weeds in

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the dunes across from Marks Point, opposite Mosquito Bay near Gnurlung Point, and near Nine Mile Point. The native vegetation block at ‘Potters’ also shows a high weed concentration.

There are notable concentrations of ORV activity, on cleared dunes in the south and on lakeside mudflats in the north of the region; there is seasonal movement of ORVs along the beach south of Princes Soak Track and into the dunes.

Adaptation to Climate Change: Threats for cells SE15-17

(see also discussion of scenario in Section 4.11)

NOTE: the advice below is indicative of likely change and the direction of change, with implications for ecosystems. Dates, amounts and probabilities cannot be accurately calculated at this time. Thus advice on flood levels, for example, should not be used in engineering or development planning.

Climate change element/ scenario	Impacts and implications (for this cell)	Protect and manage habitat threats	Address landscape issues: fire, connectivity, refuges, hydrology
Combined climate changes and sea level rise throughout this cell	This cell presents a complex pattern of habitats sensitive to change.	Create a baseline for shoreline, dune and lake change by establishing a rectified aerial photographic record at an appropriate resolution.	
Sea level rise: ² 2030 : +c.20cm 2070: +c.80cm.	Increase in storm foredune damage and beach recession. Beach change will be affected by the outcrop Pleistocene calcarenite revealed by recession. Increased dune transgression transports increasing volumes of sand across the Youngusband Peninsula towards the lagoon. Changes in mudflat and lagoon conditions resulting from increased tidal and groundwater influences.	Active dune management to avoid escalation of threat. Establish beach profile monitoring as baseline information for coastal change. Maintain aerial photographic record to track shoreline changes along the whole shore (150km). Monitor lagoon water quality.	
Storms:	2030: Occasional storm tide	Monitor storm tide	

² Short & Cowell (2009) employ a range of sea level rise projections, from 0.18m to 1.5m over 100 years, to review erosion of the Coorong shoreline using a Shoreface Translation Model (Cowell et al 2006): they conclude that “Shoreline recession would be driven by the sea level rise together with sand loss to the dunes, the Murray Mouth flood tide delta and periodically to storm demand.”

Year	Probability 99% that erosion will be greater than, m.	Probability 50% that erosion will be greater than, m.	Probability 1% that erosion will be greater than, m.
2030	10	28	41
2050	21	67	106
2109	38	152	265

Even the highest projections here (which assume the Youngusband Peninsula is made entirely of sand) would not see a breaching of the barrier through to the lagoon; however, the model appears limited in its ability to recognise the effect of the offshore bare rock areas in the north of the region.

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Climate change element/ scenario	Impacts and implications (for this cell)	Protect and manage habitat threats	Address landscape issues: fire, connectivity, refuges, hydrology
<p><i>Frequency</i> continues to show great variation on a decadal scale.</p> <p><i>Intensity</i> of large storms increases.</p>	<p>flooding above highest known tides. The lagoon and seasonal wetlands will be subject to storm tide inundation with a slight sea level rise; changing access and groundwater conditions within the cell.</p> <p>2070: Flooding will affect all swamps and adjacent low lying areas. Seasonal wetland areas adjacent to the Southern Lagoon will be flooded by the 2m inundation. Flooding above this level is much more extensive.</p>	<p>impacts n the lagoon fringes. Continue aerial photographic monitoring.</p>	
	<p>Frequent storm damage to foredunes.</p>	<p>Active management of dune blowouts.</p>	
<p>Warmer average conditions: 2030:+0.3 to.6°C 2070:+1.5 to 2°C</p>	<p>(Impacts uncertain. Existing terrestrial vegetation is found in warmer conditions elsewhere)</p>		<p>Maintain connectivity of vegetation within the region.</p>
<p>Drier average conditions: 2030: -2% to 5% 2070: - 10% to 20%</p>	<p>Native dune vegetation adapts well to drier conditions, but recovers more slowly from fire, disease and storm damage: dune mobilization becomes more likely. Exotic grass species within dunes unlikely to survive drought.</p>	<p>Active weed control within dunes, together with management of blowouts.</p>	
<p>‘Flashy’ run off: Drier creeks, but larger rare floods</p>	<p>Drains and creeks may increase sediment load to coastal swamps, (this depends on land management practices).</p>	<p>Maintain watching brief on sedimentation of swamps.</p>	
<p>Groundwater lowering; saline incursion:</p>	<p>The potential fall in groundwater pressure (and potential storm incursion) a significant threat to vegetation survival in freshwater swamps and in the dunes.</p>	<p>Adaptive management of plant assets.</p>	<p>Monitor salinity of coastal swamps, and vegetation condition in the swamps and dunes.</p>
<p>Nearshore sea changes - temperature; acidity; wave climate:</p>	<p>Wave climate changes unlikely.</p>		

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Climate change element/ scenario	Impacts and implications (for this cell)	Protect and manage habitat threats	Address landscape issues: fire, connectivity, refuges, hydrology
2030: +0.3°C to +0.6°C 2070: +1.0°C to +1.50C			

Management Context.

The biggest threats to this group of cells are not part of the GIS analysis, namely reductions in flow of the River Murray, reduction in both surface and groundwater flow from the SE, and climate change. Major management decisions that might affect these threats are made outside the region; thus some management decisions relate to adaptation to changes resulting from decisions made remotely. A major study of the Coorong lagoon, with particular regard to changes in salinity and water circulation and ecosystem models to guide management, has been developed, at the end of a period of lengthy drought (Brookes JD et al. 2009).

The relatively minor management action suggestions which follow from the GIS analysis of this project are generally supportive of the management proposals of the Coorong NP Management Plan of 1990.

Cells SE15, 16 and 17 occur within the Ngarrindjeri and Others Native Title Claim area. The South Australian Government has entered into a Kungun Ngarrindjeri Yunnan (KNY) Agreement 2009 with the Ngarrindjeri Regional Authority (NRA). The KNY Agreement establishes a consultation and negotiation framework to support Ngarrindjeri engagement in all government-led environmental management and planning in the Ngarrindjeri native title claim area. The State and NRA meet regularly to discuss current and proposed management activities and key players are encouraged to contact DENR to find out more information about this forum and to consider creating working partnerships with the Ngarrindjeri community. On ground management activities may also have Aboriginal Heritage implications and key players should ensure they seek advice from the Ngarrindjeri Heritage Committee before actions that cause physical disturbance are undertaken.

Table 6.17 Recommended Actions and Priority for Cells SE15, SE16 and SE17 – the Coorong

Component	Issue	Proposed Action	Priority of Action	Key Players
Whole cell	This cell presents a complex pattern of habitats sensitive to change.	Continue a rectified aerial photographic record at an appropriate resolution, in order to show change from current baseline.	Medium (Cons/ threat)	DENR, NRM
Beach and frontal dunes	Current and projected beach and dune recession threaten the stability of the Younghusband Peninsula.	Monitor changes through continuation of the DENR beach profiling surveys.	Medium (Cons/ threat)	DENR
Beach and	ORV threat to nesting	Maintain seasonal ban.	High	DENR

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Component	Issue	Proposed Action	Priority of Action	Key Players
unvegetated dunes	shorebirds including Hooded Plover. ORVs alter shoreline morphology, compacting beach sand and causing dune erosion.		(Cons/ threat)	
Beach and dunes in NP	Distinct areas of invasive weeds, (see threat layer, 4E). Ongoing weed management and regular monitoring for alert weeds listed in Section 4.9.	Give priority to weed control in separate distinct areas in north of the Youngusband Peninsula. Education campaign to encourage shack owners and landholders adjoining the coast to remove invasive garden plants and replace with suitable non-invasive or indigenous species.	High (Cons/ threat)	DENR, NRM
Beach and dunes in NP natural zone	Spread of invasive weeds in dune areas in the south.	Monitor spread to refine weed control strategy.	Medium (Cons/ threat)	DENR
Dunes, south of NP boundary	Prevalence of invasive weeds.	Local action plan for weed control, to improve resilience of the cell to long term threats to dune stability.	High (threat)	Land owners, NRM
	ORV activity	Access control, to improve resilience of the cell to long term threats to dune stability.	High (threat)	Land owners, NRM
Saline clays on E side of lagoon and ephemeral lakes	Compaction of saline clays by ORVs; damage slow to repair.	Signage and re-direction away from damaged areas.	High (Cons/ threat)	DENR
Aboriginal sites, objects and remains throughout the dunes	Disturbance or removal of bones from burials; loss of middens from direct ORV damage.	Signage at major access points. Consultation to appropriately manage sites in this area.	High (Cons./ threat)	Murrapeena Heritage Association Inc., SE Aboriginal Focus Group, Ngarrindjeri Heritage Committee, NRM, Aboriginal Heritage Branch

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Component	Issue	Proposed Action	Priority of Action	Key Players
				– DPC, Aboriginal Partnership Unit – DENR
Carbonate ephemeral lakes between lagoon and Princes Highway	Geological deposits, declared part of national heritage, severely impacted by ORV.	Signage at major access points; restrict access to designated geological features.	High (Cons/ threat)	DENR
Coorong NP	Existing plan designed in late 1980s	Review plan	Medium (cell)	DENR
Whole of cell	Threat from invasive alert list weeds on the landward side of the Coorong.	Regular monitoring for alert weeds, listed in Section 4.9. Weed strategy development and action on weed removal.	High (Cons/ threat)	DENR, NRM, land owners

BIOTA

Flora

Remnant vegetation area (ha)	SE 15: 15075.7 ha, 45.3% of cell area SE 16: 2171.3 ha, 26.7 % of cell area SE 17: 5496.7 ha, 39.7% of cell area
# flora surveys / records	SE 15: 105 surveys, 197 herbarium record sites. SE 16: 12 surveys, 52 herbarium record sites. SE 17: 58 surveys, 39 opportune sites, 71 herbarium record sites, 16 threatened plant population record sites.
# flora in cell (includes some marine species)	SE 15: 494 SE 16: 210 SE 17: 342
# conservation rated flora in cells	18 recorded in total
# non-indigenous flora in cell	SE 15: 137 recorded SE 16: 64 recorded SE 17: 98 recorded
Significant CDCS floristic community	SE 15: <i>Leucopogon parviflorus</i> / <i>Olearia axillaris</i> shrubland (>50% of known sites occur along SE coast). <i>Olearia axillaris</i> / <i>Leucopogon parviflorus</i> shrubland (>50% of known sites occur along SE coast). SE 16: <i>Olearia axillaris</i> / <i>Leucopogon parviflorus</i> shrubland (>50% of known sites occur along SE coast). SE 17: <i>Olearia axillaris</i> / <i>Leucopogon parviflorus</i> shrubland (>50% of known sites occur along SE coast).
Protected area	Coorong National Park, Salt Lagoon Islands Conservation Park (47301.9ha in total).

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Note: Flora species records for SE cells 15-17 have been collated in the following tables.

Weeds

Species	Common Name	Status	Study rating
<i>Asparagus asparagoides</i> (NC)	Bridal Creeper	WONS, D	9
<i>Polygala myrtifolia</i>	Myrtle-leaf Milkwort		9
<i>Ehrharta villosa</i> var. <i>maxima</i>	Pyp Grass		8
<i>Juncus acutus</i>	Sharp Rush		8
<i>Thinopyrum junceiforme</i>	Sea Wheat-grass		8
<i>Acacia saligna</i>	Golden Wreath Wattle		5
<i>Freesia cultivar</i>	Freesia		5
<i>Euphorbia paralias</i>	Sea Spurge		4
<i>Euphorbia terracina</i>	False Caper	D	4
<i>Limonium companyonis</i>	Sea-lavender		4
<i>Limonium hyblaenum</i>			4
<i>Limonium</i> sp.	Sea-lavender		4
<i>Mesembryanthemum crystallinum</i>	Common Iceplant		3
<i>Pinus halepensis</i>	Aleppo Pine	D	3
<i>Senecio elegans</i>	Purple Groundsel		3
<i>Ammophila arenaria</i>	Marram Grass		2
<i>Aeonium arboreum</i>	Tree Aeonium		
<i>Aira cupaniana</i>	Small Hair-grass		
<i>Allium ampeloprasum</i>	Wild Leek		
<i>Amsinckia lycopsoides</i>	Bugloss Fiddle-neck		
<i>Anagallis arvensis</i>	Pimpernel		
<i>Arctotheca calendula</i>	Cape Weed		
<i>Arenaria leptoclados</i>	Lesser Thyme-leaved Sandwort		
<i>Asparagus officinalis</i>	Asparagus		
<i>Asphodelus fistulosus</i>	Onion Weed		
<i>Aster subulatus</i>	Aster-weed		
<i>Atriplex prostrata</i>	Creeping Saltbush		
<i>Avellinia michelii</i>	Avellinia		
<i>Avena barbata</i>	Bearded Oat		
<i>Avena fatua</i>	Wild Oat		
<i>Avena sativa</i>	Cultivated Oat		
<i>Avena</i> sp.	Oat		
<i>Berula erecta</i>	Water Parsnip		
<i>Blackstonia perfoliata</i>	Yellow-wort		
<i>Brassica tournefortii</i>	Wild Turnip		
<i>Briza minor</i>	Lesser Quaking-grass		
<i>Bromus diandrus</i>	Great Brome		
<i>Bromus hordeaceus</i> ssp. <i>hordeaceus</i>	Soft Brome		
<i>Bromus madritensis</i>	Compact Brome		
<i>Bromus rubens</i>	Red Brome		
<i>Buglossoides arvensis</i>	Sheepweed		
<i>Bupleurum semicompositum</i>	Hare's Ear		
<i>Cakile edentula</i>	American Sea Rocket		
<i>Cakile maritima</i> ssp. <i>maritima</i>	Two-horned Sea Rocket		
<i>Camelina alyssum</i>	Stinking Flaxweed		
<i>Carduus tenuiflorus</i>	Slender Thistle		
<i>Carthamus lanatus</i>	Saffron Thistle		
<i>Catapodium rigidum</i>	Rigid Fescue		
<i>Centaurea calcitrapa</i>	Star Thistle		
<i>Centaurea melitensis</i>	Malta Thistle		

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Species	Common Name	Status	Study rating
<i>Centaureum erythraea</i>	Common Centaury		
<i>Cerastium balearicum</i>	Chickweed		
<i>Cerastium glomeratum</i>	Common Mouse-ear Chickweed		
<i>Cerastium pumilum</i>	Chickweed		
<i>Chenopodium album</i>	Fat Hen		
<i>Chenopodium glaucum</i>	Glaucous Goosefoot		
<i>Chenopodium murale</i>	Nettle-leaf Goosefoot		
<i>Chondrilla juncea</i>	Skeleton Weed		
<i>Cirsium vulgare</i>	Spear Thistle		
<i>Conium maculatum</i>	Hemlock		
<i>Conyza albida</i>	Tall Fleabane		
<i>Conyza bonariensis</i>	Flax-leaf Fleabane		
<i>Cotula coronopifolia</i>	Water Buttons		
<i>Cotyledon orbiculata</i> var. <i>oblonga</i>	Cotyledon		
<i>Cotyledon orbiculata</i> var. <i>orbiculata</i>	Pig's Ear		
<i>Cucumis myriocarpus</i>	Paddy Melon		
<i>Cynara cardunculus</i> ssp. <i>flavescens</i>	Artichoke Thistle		
<i>Cynodon dactylon</i> var. <i>dactylon</i>	Couch		
<i>Cyperus hamulosus</i>	Curry Flat-sedge		
<i>Dactylis glomerata</i>	Cocksfoot		
<i>Dimorphotheca pluvialis</i>	Cape Marigold		
<i>Dittrichia graveolens</i>	Stinkweed		
<i>Echium plantagineum</i>	Salvation Jane		
<i>Ehrharta calycina</i>	Perennial Veldt Grass		
<i>Ehrharta erecta</i>	Panic Veldt Grass		
<i>Ehrharta longiflora</i>	Annual Veldt Grass		
<i>Ehrharta</i> sp.	Veldt Grass		
<i>Erodium cicutarium</i>	Cut-leaf Heron's-bill		
<i>Erophila verna</i> ssp. <i>praecox</i>	Early Whitlow Grass		
<i>Euphorbia pepylus</i>	Petty Spurge		
<i>Ferraria crispa</i> ssp. <i>crispa</i>	Black Flag		
<i>Foeniculum vulgare</i>	Fennel		
<i>Fumaria bastardii</i>	Bastard Fumitory		
<i>Galium aparine</i>	Cleavers		
<i>Galium murale</i>	Small Bedstraw		
<i>Geranium molle</i> var. <i>molle</i>	Soft Geranium		
<i>Gomphocarpus cancellatus</i>	Broad-leaf Cotton-bush		
<i>Heliotropium amplexicaule</i>	Blue Heliotrope		
<i>Heliotropium curassavicum</i>	Smooth Heliotrope		
<i>Helminthotheca echioides</i>	Ox-tongue		
<i>Hirschfeldia incana</i>	Hoary Mustard		
<i>Holcus lanatus</i>	Yorkshire Fog		
<i>Hordeum glaucum</i>	Blue Barley-grass		
<i>Hornungia procumbens</i>	Oval Purse		
<i>Hypochaeris glabra</i>	Smooth Cat's Ear		
<i>Hypochaeris radicata</i>	Rough Cat's Ear		
<i>Hypochaeris</i> sp.	Cat's Ear		
<i>Isolepis marginata</i>	Little Club-rush		
<i>Juncus articulatus</i>	Jointed Rush		
<i>Juncus usitatus</i>	Common Rush		
<i>Lactuca serriola</i> f. <i>serriola</i>	Prickly Lettuce		
<i>Lagurus ovatus</i>	Hare's Tail Grass		
<i>Limonium binervosum</i>	Dwarf Sea-lavender		

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Species	Common Name	Status	Study rating
<i>Lolium loliaceum</i>	Stiff Ryegrass		
<i>Lolium perenne</i>	Perennial Ryegrass		
<i>Lolium rigidum</i>	Wimmera Ryegrass		
<i>Malva assurgentiflora</i>			
<i>Malva dendromorpha</i>	Tree Mallow		
<i>Marrubium vulgare</i>	Horehound		
<i>Medicago lupulina</i>	Black Medic		
<i>Medicago minima</i> var. <i>minima</i>	Little Medic		
<i>Medicago polymorpha</i> var. <i>polymorpha</i>	Burr-medic		
<i>Melilotus indicus</i>	King Island Melilot		
<i>Mentha spicata</i> f. B (B.Copley 1119)	Spearmint		
<i>Minuartia mediterranea</i>	Slender Sandwort		
<i>Nicotiana glauca</i>	Tree Tobacco		
<i>Oenothera stricta</i> ssp. <i>stricta</i>	Common Evening Primrose		
<i>Oxalis pes-caprae</i>	Soursob		
<i>Papaver somniferum</i>	Small-flower Opium Poppy		
<i>Parapholis incurva</i>	Curly Ryegrass		
<i>Parentucellia latifolia</i>	Red Bartsia		
<i>Paspalum vaginatum</i>	Salt-water Couch		
<i>Phalaris aquatica</i>	Phalaris		
<i>Picnomon acarna</i>	Soldier Thistle		
<i>Plantago coronopus</i> ssp.	Bucks-horn Plantain		
<i>Poa annua</i>	Winter Grass		
<i>Poa bulbosa</i>	Bulbous Meadow-grass		
<i>Poa infirma</i>	Winter Grass		
<i>Polycarpon tetraphyllum</i>	Four-leaf Allseed		
<i>Polygogon maritimus</i>	Coast Beard-grass		
<i>Polygogon monspeliensis</i>	Annual Beard-grass		
<i>Puccinellia distans</i>	Reflexed Poa		
<i>Puccinellia fasciculata</i>	Borrer's Saltmarsh-grass		
<i>Reichardia tingitana</i>	False Sowthistle		
<i>Reseda alba</i>	White Mignonette		
<i>Reseda lutea</i>	Cut-leaf Mignonette		
<i>Reseda luteola</i>	Wild Mignonette		
<i>Retama raetam</i>	White Weeping Broom		
<i>Rorippa palustris</i>	Yellow Marsh-cress		
<i>Rostraria cristata</i>	Annual Cat's-tail		
<i>Rostraria pumila</i>	Tiny Bristle-grass		
<i>Rumex crispus</i>	Curled Dock		
<i>Sagina apetala</i>	Annual Pearlwort		
<i>Senecio pterophorus</i>	African Daisy		
<i>Setaria verticillata</i>	Whorled Pigeon-grass		
<i>Sberardia arvensis</i>	Field Madder		
<i>Silene nocturna</i>	Mediterranean Catchfly		
<i>Silene vulgaris</i>	Bladder Campion		
<i>Sisymbrium erysimoides</i>	Smooth Mustard		
<i>Sisymbrium irio</i>	London Mustard		
<i>Solanum linnaeanum</i>	Apple Of Sodom		
<i>Solanum nigrum</i>	Black Nightshade		
<i>Sonchus asper</i> ssp. <i>glaucescens</i>	Rough Sow-thistle		
<i>Sonchus oleraceus</i>	Common Sow-thistle		
<i>Sonchus oleraceus</i> (NC)	Common Sow-thistle		
<i>Spergularia media</i>	Coast Sand-spurrey		

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Species	Common Name	Status	Study rating
<i>Stellaria media</i>	Chickweed		
<i>Stenotaphrum secundatum</i>	Buffalo Grass		
<i>Tamarix ramosissima</i>			
<i>Taraxacum erythrospermum</i>	Red-seed Dandelion		
<i>Taraxacum officinale</i>	Dandelion		
<i>Trifolium campestre</i>	Hop Clover		
<i>Trifolium hirtum</i>	Rose Clover		
<i>Trifolium repens</i>	White Clover		
<i>Trifolium tomentosum</i>	Woolly Clover		
<i>Urospermum picroides</i>	False Hawkbit		
<i>Urtica urens</i>	Small Nettle		
<i>Verbascum virgatum</i>	Twiggy Mullein		
<i>Vicia cracca</i>	Tufted Vetch		
<i>Vulpia ciliata</i>	Fringed Fescue		
<i>Vulpia fasciculata</i>	Sand Fescue		
<i>Vulpia myuros</i> f.	Fescue		
<i>Vulpia myuros</i> f. <i>megalura</i>	Fox-tail Fescue		
<i>Vulpia myuros</i> f. <i>myuros</i>	Rat's-tail Fescue		
<i>Vulpia</i> sp.	Fescue		

D: Declared weed, WONS: Weeds of National Significance

Native flora*

Species	Common Name	Aus status	SA status
<i>Caladenia colorata</i>	Coloured Spider-orchid	EN	E
<i>Caladenia conferta</i>	Coast Spider-orchid	EN	E
<i>Caladenia richardsiorum</i>	Little Dip Spider-orchid	EN	E
<i>Thelymitra epipactoides</i>	Metallic Sun-orchid	EN	E
<i>Thelymitra aristata</i>	Great Sun-orchid		E*
<i>Pomaderris halmaturina</i> ssp. <i>halmaturina</i>	Kangaroo Island Pomaderris	VU	V
<i>Pterostylis arenicola</i>	Sandhill Greenhood	VU	V
<i>Scaevola calendulacea</i>	Dune Fanflower		V
<i>Atriplex australasica</i>			R
<i>Austrostipa echinata</i>	Spiny Spear-grass		R
<i>Correa alba</i> var. <i>pannosa</i>	White Correa		R
<i>Eucalyptus fasciculosa</i>	Pink Gum		R
<i>Eucalyptus leucoxylon</i> ssp. <i>megalocarpa</i>	Large-fruit Blue Gum		R
<i>Haegiela tatei</i>	Small Nut-heads		R
<i>Lachnagrostis robusta</i>	Tall Blown-grass		R
<i>Melaleuca squamea</i>	Swamp Honey-myrtle		R
<i>Olearia pannosa</i> ssp. <i>cardiophylla</i>	Velvet Daisy-bush		R
<i>Pratia concolor</i>	Poison Pratia		R
<i>Acacia cupularis</i>	Cup Wattle		
<i>Acacia cyclops</i>	Western Coastal Wattle		
<i>Acacia farinosa</i>	Mealy Wattle		
<i>Acacia leiophylla</i>	Coast Golden Wattle		
<i>Acacia longifolia</i> ssp. <i>sophorae</i>	Coastal Wattle		
<i>Acacia mearnsii</i>	Black Wattle		
<i>Acacia melanoxylon</i>	Blackwood		
<i>Acacia myrtifolia</i>	Myrtle Wattle		
<i>Acacia oxycedrus</i>	Spike Wattle		
<i>Acacia pycnantha</i>	Golden Wattle		
<i>Acacia spinescens</i>	Spiny Wattle		

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Species	Common Name	Aus status	SA status
<i>Acaena novae-zelandiae</i>	Biddy-biddy		
<i>Acetabularia peniculus</i>			
<i>Acianthus pusillus</i>	Mosquito Orchid		
<i>Acianthus</i> sp.	Mosquito Orchid		
<i>Acrotriche affinis</i>	Ridged Ground-berry		
<i>Acrotriche cordata</i>	Blunt-leaf Ground-berry		
<i>Actites megalocarpa</i>	Coast Sow-thistle		
<i>Adenanthos terminalis</i>	Yellow Gland-flower		
<i>Adriana klotzschii</i> (NC)	Coast Bitter-bush		
<i>Adriana quadripartita</i>	Coast Bitter-bush		
<i>Allocasuarina mackliniana</i> ssp. <i>xerophila</i>	Macklin's Oak-bush		
<i>Allocasuarina muelleriana</i> ssp. <i>muelleriana</i>	Common Oak-bush		
<i>Allocasuarina pusilla</i>	Dwarf Oak-bush		
<i>Allocasuarina verticillata</i>	Drooping Sheoak		
<i>Alyxia buxifolia</i>	Sea Box		
<i>Amyema melaleuca</i>	Tea-tree Mistletoe		
<i>Amyema miraculosa</i> ssp. <i>boormanii</i>	Fleshy Mistletoe		
<i>Angianthus preissianus</i>	Salt Angianthus		
<i>Angianthus tomentosus</i>	Hairy Angianthus		
<i>Apalochlamys spectabilis</i>	Showy Firebush		
<i>Aphanes australiana</i>	Australian Piert		
<i>Aphanes australiana</i> (NC)	Australian Piert		
<i>Apium annuum</i>	Annual Celery		
<i>Apium prostratum</i> var. <i>filiforme</i>	Native Celery		
<i>Apium prostratum</i> var. <i>prostratum</i>	Native Celery		
<i>Apium</i> sp.	Celery		
<i>Apodasmia brownii</i>	Coarse Twine-rush		
<i>Arabidella nasturtium</i>	Yellow Cress		
<i>Argentipallium blandowskianum</i>	Woolly Everlasting		
<i>Argentipallium obtusifolium</i>	Blunt Everlasting		
<i>Arthropodium fimbriatum</i>	Nodding Vanilla-lily		
<i>Astroloma conostephioides</i>	Flame Heath		
<i>Astroloma humifusum</i>	Cranberry Heath		
<i>Atriplex cinerea</i>	Coast Saltbush		
<i>Atriplex paludosa</i> ssp. <i>cordata</i>	Marsh Saltbush		
<i>Atriplex paludosa</i> ssp. <i>paludosa</i>	Marsh Saltbush		
<i>Atriplex semibaccata</i>	Berry Saltbush		
<i>Atriplex stipitata</i>	Bitter Saltbush		
<i>Austrodanthonia caespitosa</i>	Common Wallaby-grass		
<i>Austrodanthonia geniculata</i>	Knead Wallaby-grass		
<i>Austrodanthonia pilosa</i>	Velvet Wallaby-grass		
<i>Austrodanthonia setacea</i>	Small-flower Wallaby-grass		
<i>Austrofestuca littoralis</i>	Coast Fescue		
<i>Austrostipa curticoma</i>	Short-crest Spear-grass		
<i>Austrostipa drummondii</i>	Cottony Spear-grass		
<i>Austrostipa elegantissima</i>	Feather Spear-grass		
<i>Austrostipa exilis</i>	Heath Spear-grass		
<i>Austrostipa flavescens</i>	Coast Spear-grass		
<i>Austrostipa mollis</i>	Soft Spear-grass		
<i>Austrostipa mollis</i> group	Soft Spear-grass		
<i>Austrostipa nitida</i>	Balcarra Spear-grass		
<i>Austrostipa nodosa</i>	Tall Spear-grass		
<i>Austrostipa semibarbata</i>	Fibrous Spear-grass		

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Species	Common Name	Aus status	SA status
<i>Austrostipa</i> sp.	Spear-grass		
<i>Austrostipa stipoides</i>	Coast Spear-grass		
<i>Austrostipa trichophylla</i>			
<i>Banksia marginata</i>	Silver Banksia		
<i>Banksia ornata</i>	Desert Banksia		
<i>Baumea juncea</i>	Bare Twig-rush		
<i>Beyeria lechenaultii</i>	Pale Turpentine Bush		
<i>Billardiera cymosa</i> (NC)	Sweet Apple-berry		
<i>Billardiera cymosa</i> ssp. <i>cymosa</i>	Sweet Apple-berry		
<i>Billardiera sericophora</i>	Silky Apple-berry		
<i>Bolboschoenus caldwellii</i>	Salt Club-rush		
<i>Boraginaceae</i> sp.	Borage Family		
<i>Boronia coerulescens</i> ssp. <i>coerulescens</i>	Blue Boronia		
<i>Boronia filifolia</i>	Slender Boronia		
<i>Brachyscome exilis</i>	Slender Daisy		
<i>Brachyscome lineariloba</i>	Hard-head Daisy		
<i>Brachyscome perpusilla</i>	Tiny Daisy		
<i>Bromus</i> sp.	Brome		
<i>Bursaria spinosa</i> ssp. <i>spinosa</i>	Sweet Bursaria		
<i>Caladenia australis</i>	Southern Spider-orchid		
<i>Caladenia cardiochila</i>	Heart-lip Spider-orchid		
<i>Caladenia carnea</i>	Pink Fingers		
<i>Caladenia fuscata</i>	Dusky Caladenia		
<i>Caladenia latifolia</i>	Pink Caladenia		
<i>Caladenia prolata</i>	Shy Caladenia		
<i>Caladenia tentaculata</i>	King Spider-orchid		
<i>Caladenia verrucosa</i>	Yellow-club Spider-orchid		
<i>Calandrinia brevipedata</i>	Short-stalked Purslane		
<i>Calandrinia calypttrata</i>	Pink Purslane		
<i>Calandrinia eremaea</i>	Dryland Purslane		
<i>Callistemon rugulosus</i>	Scarlet Bottlebrush		
<i>Calystegia sepium</i> ssp. <i>roseata</i>	Large Bindweed		
<i>Calytrix alpestris</i>	Snow Heath-myrtle		
<i>Calytrix tetragona</i>	Common Fringe-myrtle		
<i>Carpobrotus modestus</i>	Inland Pigface		
<i>Carpobrotus modestus</i> / <i>rossii</i>	Native Pigface		
<i>Carpobrotus rossii</i>	Native Pigface		
<i>Carpobrotus rossii</i> (NC)	Native Pigface		
<i>Cassytha glabella</i> f. <i>dispar</i>	Slender Dodder-laurel		
<i>Cassytha melantha</i>	Coarse Dodder-laurel		
<i>Cassytha pubescens</i>	Downy Dodder-laurel		
<i>Centrolepis polygyna</i>	Wiry Centrolepis		
<i>Ceratocoma jacksoniae</i>			
<i>Cheilanthes sieberi</i> ssp. <i>sieberi</i>	Narrow Rock-fern		
<i>Cladonia cervicornis</i> ssp. <i>verticillata</i>			
<i>Cladophora vagabunda</i>			
<i>Clematis microphylla</i> var. <i>microphylla</i>	Old Man's Beard		
<i>Comesperma calymega</i>	Blue-spike Milkwort		
<i>Comesperma volubile</i>	Love Creeper		
<i>Correa reflexa</i> var. <i>reflexa</i> (NC)	Common Correa		
<i>Correa reflexa</i> var. <i>scabridula</i>	Common Correa		
<i>Corybas despectans</i>	Coast Helmet-orchid		
<i>Corybas incurvus</i>	Slaty Helmet-orchid		

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Species	Common Name	Aus status	SA status
<i>Cotula australis</i>	Common Cotula		
<i>Cotula vulgaris</i> var. <i>australasica</i>	Slender Cotula		
<i>Crassula closiana</i>	Stalked Crassula		
<i>Crassula colligata</i> ssp. <i>lamprosperma</i>			
<i>Crassula colorata</i> var.	Dense Crassula		
<i>Crassula colorata</i> var. <i>acuminata</i>	Dense Crassula		
<i>Crassula decumbens</i> var. <i>decumbens</i>	Spreading Crassula		
<i>Crassula helmsii</i>	Swamp Crassula		
<i>Crassula sieberiana</i> ssp. <i>tetramera</i> (NC)	Australian Stonecrop		
<i>Cryptandra tomentosa</i>	Heath Cryptandra		
<i>Cryptandra tomentosa</i> (NC)	Heath Cryptandra		
<i>Cynoglossum australe</i>	Australian Hound's-tongue		
<i>Cyperus gymnocaulos</i>	Spiny Flat-sedge		
<i>Cyperus laevigatus</i>	Bore-drain Sedge		
<i>Cyrtostylis reniformis</i>	Small Gnat-orchid		
<i>Cyrtostylis robusta</i>	Robust Gnat-orchid		
<i>Dampiera rosmarinifolia</i>	Rosemary Dampiera		
<i>Danthonia</i> sp. (NC)	Wallaby-grass		
<i>Darwinia micropetala</i>	Small Darwinia		
<i>Daucus glochidiatus</i>	Native Carrot		
<i>Deyeuxia quadriseta</i>	Reed Bent-grass		
<i>Dianella brevicaulis</i>	Short-stem Flax-lily		
<i>Dianella brevicaulis</i> / <i>revoluta</i> var.	Black-anther Flax-lily		
<i>Dianella revoluta</i> var. <i>revoluta</i>	Black-anther Flax-lily		
<i>Dichelachne crinita</i>	Long-hair Plume-grass		
<i>Dichondra repens</i>	Kidney Weed		
<i>Dillwynia hispidula</i>	Red Parrot-pea		
<i>Disphyma crassifolium</i> ssp. <i>clavellatum</i>	Round-leaf Pigface		
<i>Distichlis distichophylla</i>	Emu-grass		
<i>Diuris pardina</i>	Spotted Donkey-orchid		
<i>Dodonaea viscosa</i> ssp.	Sticky 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>Drosera macrantha</i> ssp. <i>planchonii</i>	Climbing Sundew		
<i>Drosera whittakeri</i> (NC)	Scented Sundew		
<i>Dysphania pumilio</i>	Clammy Goosefoot		
<i>Eleocharis acuta</i>	Common Spike-rush		
<i>Elymus scaber</i> var. <i>scaber</i>	Native Wheat-grass		
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	Ruby Saltbush		
<i>Enteromorpha compressa</i>			
<i>Epacris impressa</i>	Common Heath		
<i>Epilobium billardierianum</i> ssp. <i>billardierianum</i>	Robust Willow-herb		
<i>Epilobium billardierianum</i> ssp. <i>X intermedium</i>	Variable Willow-herb		
<i>Epilobium</i> sp.	Willow-herb		
<i>Eremophila longifolia</i>	Weeping Emubush		
<i>Eucalyptus baxteri</i>	Brown Stringybark		
<i>Eucalyptus diversifolia</i> (NC)	Coastal White Mallee		
<i>Eucalyptus diversifolia</i> ssp. <i>diversifolia</i>	Coastal White Mallee		
<i>Eucalyptus incrassata</i>	Ridge-fruited Mallee		
<i>Eucalyptus leptophylla</i>	Narrow-leaf Red Mallee		
<i>Eucalyptus leucoxylon</i> ssp.	South Australian Blue Gum		
<i>Eucalyptus leucoxylon</i> ssp. <i>leucoxylon</i>	South Australian Blue Gum		
<i>Eucalyptus leucoxylon</i> ssp. <i>stephaniae</i>	Scrubby Blue Gum		

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<i>Eucalyptus obliqua</i>	Messmate Stringybark		
<i>Eucalyptus ovata</i> var. <i>ovata</i>	Swamp Gum		
<i>Eucalyptus rugosa</i>	Coastal White Mallee		
<i>Exocarpos aphyllus</i>	Leafless Cherry		
<i>Exocarpos cupressiformis</i>	Native Cherry		
<i>Exocarpos spartens</i>	Slender Cherry		
<i>Exocarpos syrticola</i>	Coast Cherry		
<i>Ficinia nodosa</i>	Knobby Club-rush		
<i>Frankenia pauciflora</i> var.	Southern Sea-heath		
<i>Frankenia pauciflora</i> var. <i>fruticulosa</i>	Southern Sea-heath		
<i>Frankenia pauciflora</i> var. <i>gunnii</i>	Southern Sea-heath		
<i>Gabnia densa</i>	Limestone Saw-sedge		
<i>Gabnia filum</i>	Thatching Grass		
<i>Galium compactum</i>	Compact Bedstraw		
<i>Galium gaudichaudii</i> ssp. <i>gaudichaudii</i>	Rough Bedstraw		
<i>Geranium potentilloides</i> var. <i>potentilloides</i>	Downy Geranium		
<i>Geranium retrorsum</i>	Grassland Geranium		
<i>Geranium solanderi</i> var. <i>solanderi</i>	Austral Geranium		
<i>Geranium</i> sp.	Geranium		
<i>Glossodia major</i>	Purple Cockatoo		
<i>Gnaphalium indutum</i> ssp. <i>indutum</i>	Tiny Cudweed		
<i>Gompholobium ecostatium</i>	Dwarf Wedge-pea		
<i>Gonocarpus tetragynus</i>	Small-leaf Raspwort		
<i>Goodenia geniculata</i>	Bent Goodenia		
<i>Goodenia varia</i>	Sticky Goodenia		
<i>Goodia medicaginea</i>	Western Golden-tip		
<i>Gracilaria chilensis</i>			
<i>Gramineae</i> sp.	Grass Family		
Green alga			
<i>Grevillea ilicifolia</i> ssp. <i>ilicifolia</i>	Holly-leaf Grevillea		
<i>Gyrostemon australasicus</i>	Buckbush Wheel-fruit		
<i>Hakea mitchellii</i>	Heath Needlebush		
<i>Hakea nodosa</i>	Yellow Hakea		
<i>Hakea rostrata</i>	Beaked Hakea		
<i>Hakea rugosa</i>	Dwarf Hakea		
<i>Hakea vittata</i>	Limestone Needlebush		
<i>Haliptilon roseum</i>			
<i>Halophila australis</i>	Paddle Weed		
<i>Haloragis acutangula</i> f.	Smooth Raspwort		
<i>Haloragis acutangula</i> f. <i>acutangula</i>	Smooth Raspwort		
<i>Haloragis acutangula</i> f. <i>tetraptera</i>	Smooth Raspwort		
<i>Haloragis aspera</i>	Rough Raspwort		
<i>Halosarcia</i> sp. (NC)	Samphire		
<i>Hardenbergia violacea</i>	Native Lilac		
<i>Helichrysum leucopsidium</i>	Satin Everlasting		
<i>Heliotropium europaeum</i>	Common Heliotrope		
<i>Hemichroa pentandra</i>	Trailing Hemichroa		
<i>Hibbertia pallidiflora</i>	Round-leaf Guinea-flower		
<i>Hibbertia sericea</i>	Silky Guinea-flower		
<i>Hibbertia sericea</i> var. <i>scabrifolia</i> (NC)	Rough-leaf Guinea-flower		
<i>Hibbertia sericea</i> var. <i>sericea</i> (NC)	Silky Guinea-flower		
<i>Hibbertia virgata</i>	Twiggy Guinea-flower		
<i>Hydrocotyle callicarpa</i>	Tiny Pennywort		

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Species	Common Name	Aus status	SA status
<i>Hydrocotyle capillaris</i>	Thread Pennywort		
<i>Hydrocotyle hirta</i>	Hairy Pennywort		
<i>Hydrocotyle laxiflora</i>	Stinking Pennywort		
<i>Hydrocotyle medicaginoidea</i>	Medic Pennywort		
<i>Hydrocotyle pterocarpa</i>	Wing Pennywort		
<i>Hydrocotyle</i> sp.	Pennywort		
<i>Hydrocotyle verticillata</i>	Shield Pennywort		
<i>Hymenena curdieana</i>			
<i>Hymenocladia chondricola</i>			
<i>Hypolaena fastigiata</i>	Tassel Rope-rush		
<i>Hypoxis glabella</i> var. <i>glabella</i>	Tiny Star		
<i>Imperata cylindrica</i>	Blady Grass		
<i>Isolepis cernua</i>	Nodding Club-rush		
<i>Isopogon ceratophyllus</i>	Horny Cone-bush		
<i>Juncus bufonius</i>	Toad Rush		
<i>Juncus kraussii</i>	Sea Rush		
<i>Juncus pallidus</i>	Pale Rush		
<i>Kennedia prostrata</i>	Scarlet Runner		
<i>Kunzea pomifera</i>	Muntries		
<i>Lachnagrostis billardierei</i> ssp. <i>billardierei</i>	Coast Blown-grass		
<i>Lachnagrostis filiformis</i>	Common Blown-grass		
<i>Lasiopetalum discolor</i>	Coast Velvet-bush		
<i>Lawrenzia spicata</i>	Salt Lawrenzia		
<i>Lawrenzia squamata</i>	Thorny Lawrenzia		
<i>Lepidobolus drapetocoleus</i>	Scale Shedder		
<i>Lepidosperma carphoides</i>	Black Rapier-sedge		
<i>Lepidosperma concavum</i>	Spreading Sword-sedge		
<i>Lepidosperma congestum</i>			
<i>Lepidosperma gladiatum</i>	Coast Sword-sedge		
<i>Lepidosperma laterale</i> (NC)	Sharp Sword-sedge		
<i>Lepidosperma viscidum</i>	Sticky Sword-sedge		
<i>Lepilaena australis</i>	Austral Water-mat		
<i>Lepilaena cylindrocarpa</i>	Long-fruit Water-mat		
<i>Lepilaena preissii</i>	Slender Water-mat		
<i>Leptoceras menziesii</i>	Hare Orchid		
<i>Leptomeria aphylla</i>	Leafless Currant-bush		
<i>Leptospermum continentale</i>	Prickly Tea-tree		
<i>Leptospermum coriaceum</i>	Dune Tea-tree		
<i>Leptospermum myrsinoides</i>	Heath Tea-tree		
<i>Leucophyta brownii</i>	Coast Cushion Bush		
<i>Leucopogon glacialis</i>	Twisted Beard-heath		
<i>Leucopogon parviflorus</i>	Coast Beard-heath		
<i>Leucopogon woodsii</i>	Nodding Beard-heath		
<i>Lichen</i> sp.			
<i>Limosella australis</i>	Australian Mudwort		
<i>Lobelia anceps</i>	Angled Lobelia		
<i>Lobelia gibbosa</i>	Tall Lobelia		
<i>Logania crassifolia</i>	Coast Logania		
<i>Logania linifolia</i>	Flax-leaf Logania		
<i>Logania ovata</i>	Oval-leaf Logania		
<i>Lomandra effusa</i>	Scented Mat-rush		
<i>Lotus australis</i>	Austral Trefoil		
<i>Lycopus australis</i>	Australian Gipsywort		

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Species	Common Name	Aus status	SA status
<i>Lysiana exocarpi</i> ssp. <i>exocarpi</i>	Harlequin Mistletoe		
<i>Maireana oppositifolia</i>	Salt Bluebush		
<i>Malva preissiana</i>	Australian Hollyhock		
<i>Melaleuca brevifolia</i>	Short-leaf Honey-myrtle		
<i>Melaleuca balmaturorum</i>	Swamp Paper-bark		
<i>Melaleuca lanceolata</i>	Dryland Tea-tree		
<i>Melaleuca lanceolata</i> ssp. <i>lanceolata</i> (NC)	Dryland Tea-tree		
<i>Menkea australis</i>	Fairy Spectacles		
<i>Microbryum starckeanum</i>			
<i>Microseris lanceolata</i>	Yam Daisy		
<i>Microtis arenaria</i>	Notched Onion-orchid		
<i>Microtis parviflora</i>	Slender Onion-orchid		
<i>Millotia muelleri</i>	Common Bow-flower		
<i>Mimulus repens</i>	Creeping Monkey-flower		
<i>Moss</i> sp.			
<i>Muehlenbeckia adpressa</i>	Climbing Lignum		
<i>Muehlenbeckia florulenta</i>	Lignum		
<i>Muehlenbeckia gunnii</i>	Coastal Climbing Lignum		
<i>Mychodea aciculare</i>			
<i>Myoporum insulare</i>	Common Boobialla		
<i>Myosotis australis</i>	Austral Forget-me-not		
<i>Nicotiana maritima</i>	Coast Tobacco		
<i>Nitraria billardierei</i>	Nitre-bush		
<i>Olearia axillaris</i>	Coast Daisy-bush		
<i>Olearia ramulosa</i>	Twiggy Daisy-bush		
<i>Opercularia turpis</i>	Twiggy Stinkweed		
<i>Oxalis perennans</i> (NC)	Native Sorrel		
<i>Ozothamnus turbinatus</i>	Coast Bush-everlasting		
<i>Parietaria cardiostegia</i>	Mallee Smooth-nettle		
<i>Parietaria debilis</i>	Smooth-nettle		
<i>Parietaria debilis</i> (NC)	Smooth-nettle		
<i>Pelargonium australe</i>	Austral Stork's-bill		
<i>Persicaria decipiens</i>	Slender Knotweed		
<i>Persoonia juniperina</i>	Prickly Geebung		
<i>Phragmites australis</i>	Common Reed		
<i>Phyllota pleurandroides</i>	Heathy Phyllota		
<i>Physcia</i> sp.			
<i>Picris angustifolia</i> ssp. <i>angustifolia</i>	Coast Picris		
<i>Picris</i> sp.	Picris		
<i>Pimelea flava</i> ssp. <i>dichotoma</i>	Diosma Riceflower		
<i>Pimelea glauca</i>	Smooth Riceflower		
<i>Pimelea humilis</i>	Low Riceflower		
<i>Pimelea octophylla</i>	Woolly Riceflower		
<i>Pimelea serpyllifolia</i> ssp. <i>serpyllifolia</i>	Thyme Riceflower		
<i>Plantago hispidula</i>	Hairy Plantain		
<i>Plocamium cartilagineum</i>			
<i>Plocamium patagiatum</i>			
<i>Poa crassicaudex</i>	Thick-stem Tussock-grass		
<i>Poa balmaturina</i>	Kangaroo Island Poa		
<i>Poa labillardieri</i> var. <i>labillardieri</i>	Common Tussock-grass		
<i>Poa poiformis</i> var. <i>poiformis</i>	Coast Tussock-grass		
<i>Poa</i> sp.	Meadow-grass/Tussock-grass		
<i>Podotroche angustifolia</i>	Sticky Long-heads		

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Species	Common Name	Aus status	SA status
<i>Pomaderris paniculosa</i> ssp. <i>paniculosa</i>	Mallee Pomaderris		
<i>Pomaderris paniculosa</i> ssp. <i>paralia</i>	Coast Pomaderris		
<i>Pomaderris racemosa</i>	Cluster Pomaderris		
<i>Poranthera microphylla</i>	Small Poranthera		
<i>Poronia erici</i>			
<i>Posidonia angustifolia</i>	Narrow-leaf Tapeweed		
<i>Potamogeton pectinatus</i>	Fennel Pondweed		
<i>Pottia</i> sp.			
<i>Prasophyllum fitzgeraldii</i>	Fitzgerald's Leek-orchid		
<i>Prasophyllum odoratum</i>	Scented Leek-orchid		
<i>Prostanthera behriana</i>	Downy Mintbush		
<i>Pseudognaphalium luteoalbum</i>	Jersey Cudweed		
<i>Pterostylis longifolia</i> (NC)	Tall Greenhood		
<i>Pterostylis nana</i>	Dwarf Greenhood		
<i>Pterostylis prasina</i>			
<i>Pterostylis</i> sp.	Greenhood		
<i>Puccinellia stricta</i> var. <i>stricta</i>	Australian Saltmarsh-grass		
<i>Puccinia elymi</i>			
<i>Puccinia morrisoni</i>			
<i>Pultenaea densifolia</i>	Dense Bush-pea		
<i>Pultenaea penna</i>	Feather Bush-pea		
<i>Pultenaea prostrata</i>	Silky Bush-pea		
<i>Pultenaea tenuifolia</i>	Narrow-leaf Bush-pea		
<i>Ranunculus amphitricibus</i>	Small River Buttercup		
<i>Ranunculus sessiliflorus</i> var. <i>sessiliflorus</i>	Annual Buttercup		
<i>Rhabdonia verticillata</i>			
<i>Rhagodia candolleana</i> ssp.	Sea-berry Saltbush		
<i>Rhagodia candolleana</i> ssp. <i>candolleana</i>	Sea-berry Saltbush		
<i>Rhagodia parabolica</i>	Mealy Saltbush		
<i>Rhizoclonium implexum</i>			
<i>Rhodophyllis multipartita</i>			
<i>Riccia albida</i>			
<i>Rumex brownii</i>	Slender Dock		
<i>Rumex</i> sp.	Dock		
<i>Ruppia maritima</i>	Sea Tassel		
<i>Ruppia megacarpa</i>	Widgeon Grass		
<i>Ruppia polycarpa</i>	Widgeon Grass		
<i>Ruppia tuberosa</i>	Widgeon Grass		
<i>Sagina maritima</i>	Sea Pearlwort		
<i>Salsola tragus</i>	Buckbush		
<i>Samolus repens</i>	Creeping Brookweed		
<i>Sarcocornia blackiana</i>	Thick-head Samphire		
<i>Sarcocornia quinqueflora</i>	Beaded Samphire		
<i>Sarcocornia</i> sp.	Samphire		
<i>Scaevola aemula</i>	Fairy Fanflower		
<i>Scaevola crassifolia</i>	Cushion Fanflower		
<i>Schoenoplectus litoralis</i>	Shore Club-rush		
<i>Schoenoplectus pungens</i>	Spiky Club-rush		
<i>Schoenoplectus validus</i>	River Club-rush		
<i>Schoenus breviculmis</i>	Matted Bog-rush		
<i>Schoenus deformis</i>	Small Bog-rush		
<i>Schoenus nitens</i>	Shiny Bog-rush		
<i>Scirpus</i> sp. (NC)			

SE15-17 – The Coorong

Species	Common Name	Aus status	SA status
<i>Sebaea albidiflora</i>	White Sebaea		
<i>Sebaea ovata</i>	Yellow Sebaea		
<i>Selliera radicans</i>	Shiny Swamp-mat		
<i>Senecio biserratus</i>	Jagged Groundsel		
<i>Senecio cunninghamii</i> var. <i>cunninghamii</i>	Shrubby Groundsel		
<i>Senecio glomeratus</i> ssp. <i>glomeratus</i>	Swamp Groundsel		
<i>Senecio glomeratus</i> ssp. <i>longifructus</i>	Swamp Groundsel		
<i>Senecio glossanthus</i>	Annual Groundsel		
<i>Senecio glossanthus</i> (NC)	Annual Groundsel		
<i>Senecio odoratus</i>	Scented Groundsel		
<i>Senecio odoratus</i> var. <i>odoratus</i> (NC)	Scented Groundsel		
<i>Senecio picridioides</i>	Purple-leaf Groundsel		
<i>Senecio pinnatifolius</i> (NC)	Variable Groundsel		
<i>Senecio pinnatifolius</i> var. <i>pinnatifolius</i>			
<i>Senecio quadridentatus</i>	Cotton Groundsel		
<i>Senecio</i> sp.	Groundsel		
<i>Senecio spanomerus</i>			
<i>Solanum laciniatum</i>	Cut-leaf Kangaroo-apple		
<i>Solanum simile</i>	Kangaroo Apple		
<i>Sonchus hydrophilus</i>	Native Sow-thistle		
<i>Sonchus</i> sp.	Sow-thistle		
<i>Spinifex sericeus</i> (NC)	Rolling Spinifex		
<i>Sporobolus virginicus</i>	Salt Couch		
<i>Spyridia dasyoides</i>			
<i>Spyridium balmaturinum</i> var. <i>balmaturinum</i>	Kangaroo Island Spyridium		
<i>Spyridium subochreatum</i>			
<i>Stackhousia spathulata</i>	Coast Candles		
<i>Stylidium graminifolium</i>	Grass Trigger-plant		
<i>Styphelia excarrhena</i>	Desert Heath		
<i>Suaeda australis</i>	Austral Seablite		
<i>Swainsona lessertii</i> folia	Coast Swainson-pea		
<i>Tecticornia arbuscula</i>	Shrubby Samphire		
<i>Tecticornia halocnemoides</i> ssp. <i>halocnemoides</i>	Grey Samphire		
<i>Tecticornia indica</i> ssp. <i>leiostachya</i>	Brown-head Samphire		
<i>Tecticornia pergranulata</i> ssp.	Black-seed Samphire		
<i>Tecticornia pergranulata</i> ssp. <i>pergranulata</i>	Black-seed Samphire		
<i>Tecticornia syncarpa</i>	Fused Samphire		
<i>Tetragonia implexicoma</i>	Bower Spinach		
<i>Tetragonia capillaris</i>	Hair Sedge		
<i>Tetratebea pilosa</i> ssp. <i>pilosa</i>	Hairy Pink-bells		
<i>Thehymitra azurea</i>	Azure Sun-orchid		
<i>Thehymitra</i> sp.	Sun-orchid		
<i>Thomasia petalocalyx</i>	Paper-flower		
<i>Threlkeldia diffusa</i>	Coast Bonefruit		
<i>Thysanotus patersonii</i>	Twining Fringe-lily		
<i>Triglochin centrocarpum</i> (NC)	Dwarf Arrowgrass		
<i>Triglochin striata</i>	Streaked Arrowgrass		
<i>Typha domingensis</i>	Narrow-leaf Bulrush		
<i>Ulva lactuca</i>			
<i>Ulvaria oxysperma</i>			
<i>Uromyces limonii</i>			
<i>Uromyces scaevolae</i>			
<i>Urtica incisa</i>	Scrub Nettle		

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Species	Common Name	Aus status	SA status
<i>Veronica hillebrandii</i>	Rigid Speedwell		
<i>Vittadinia australasica</i> var. <i>australasica</i>	Sticky New Holland Daisy		
<i>Wahlenbergia communis</i>	Tufted Bluebell		
<i>Wahlenbergia</i> sp.	Native Bluebell		
<i>Weissia brachycarpa</i>			
<i>Weissia controversa</i>			
<i>Wilsonia backhousei</i>	Narrow-leaf Wilsonia		
<i>Wilsonia humilis</i>	Silky Wilsonia		
<i>Wittrockiella salina</i>			
<i>Wurmbea dioica</i> ssp. <i>dioica</i>	Early Nancy		
<i>Wurmbea dioica</i> ssp. <i>dioica</i> (NC)	Early Nancy		
<i>Wurmbea dioica</i> ssp. <i>dioica</i> (NC)	Early Star-lily		
<i>Xanthorrhoea caespitosa</i>	Sand-heath Yacca		
<i>Xanthosia leiophylla</i>	Cut-leaf Xanthosia		
<i>Zygophyllum apiculatum</i>	Pointed Twinleaf		
<i>Zygophyllum billardierei</i>	Coast Twinleaf		
<i>Zygophyllum billardierei</i> (NC)	Coast Twinleaf		

E: Endangered, V: Vulnerable, R: Rare, E*: application of the status requires qualification

*note: includes some marine species

Fauna

# of fauna in cell	SE15: 270 recorded – 208 birds, 8 butterflies, 22 mammals, 24 reptiles, 8 amphibians. (an additional 14 butterflies and 1 reptile identified by experts as possibly occurring) SE16: 157 recorded – 139 birds, 1 butterfly, 8 mammals, 5 reptiles, 4 amphibians. (an additional 18 butterflies, 2 mammals and 3 reptiles identified by experts as possibly occurring) SE17: 216 recorded – 177 birds, 1 butterfly, 14 mammals, 19 reptiles, 5 amphibians.
# of fauna surveys / records	SE15: 26 surveys, 325 opportune sites, 1 reserve database record SE16: 5 surveys, 72 opportune sites SE17: 29 surveys, 190 opportune sites
# of threatened fauna in cells	SE15: 53 recorded SE16: 38 recorded SE17: 44 recorded
# of non-indigenous fauna	SE15: 16 recorded (an additional 2 invertebrates possible) SE16: 10 recorded (an additional 2 invertebrates and 1 mammal possible) SE17: 13 recorded

Note: Fauna species records for SE cells 15-17 have been collated in the following tables.

Non-indigenous fauna

Species	Common Name	Class	Record
<i>Alauda arvensis</i>	Eurasian Skylark	Aves	x
<i>Carduelis carduelis</i>	European Goldfinch	Aves	x
<i>Chloris chloris</i>	Common Greenfinch (European Greenfinch)	Aves	x
<i>Columba livia</i>	Rock Dove (Feral Pigeon)	Aves	x
<i>Passer domesticus</i>	House Sparrow	Aves	x
<i>Streptopelia chinensis</i>	Spotted Dove (Spotted turtle-dove)	Aves	x
<i>Sturnus vulgaris</i>	Common Starling	Aves	x

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Species	Common Name	Class	Record
<i>Turdus merula</i>	Common Blackbird	Aves	x
<i>Pieris rapae rapae</i>	Cabbage White	Invertebrate	p
<i>Danaus plexippus plexippus</i>	Wanderer, Monarch	Invertebrate	p
<i>Cervus elaphus</i>	Red Deer	Mammalia	x
<i>Dama dama</i>	Fallow Deer	Mammalia	x
<i>Felis catus</i>	Cat (Feral Cat)	Mammalia	x
<i>Lepus capensis</i>	Brown Hare (European Hare)	Mammalia	x
<i>Mus musculus</i>	House Mouse	Mammalia	x
<i>Oryctolagus cuniculus</i>	Rabbit (European Rabbit)	Mammalia	x
<i>Rattus rattus</i>	Black Rat (Ship Rat, Roof Rat)	Mammalia	x
<i>Vulpes vulpes</i>	Fox (Red Fox)	Mammalia	x

x: recorded, p: possibly there as suggested by R. Grund

Birds

Species	Common Name	Aus status	SA status
<i>Neophema chrysogaster</i>	Orange-bellied Parrot	CR/M	E
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	M	E
<i>Sternula albifrons</i>	Little Tern		E
<i>Sternula nereis</i>	Fairy Tern		E
<i>Botaurus poiciloptilus</i>	Australasian Bittern		V
<i>Calyptorhynchus funereus</i>	Yellow-tailed Black-Cockatoo		V
<i>Cladorhynchus leucocephalus</i>	Banded Stilt		V
<i>Coturnix ypsilophora</i>	Brown Quail		V
<i>Leipoa ocellata</i>	Malleefowl	VU	V
<i>Lewinia pectoralis</i>	Lewin's Rail		V
<i>Neophema chrysostoma</i>	Blue-winged Parrot		V
<i>Numenius madagascariensis</i>	Eastern Curlew	M	V
<i>Petroica phoenicea</i>	Flame Robin		V
<i>Stictonetta naevosa</i>	Freckled Duck		V
<i>Thinornis rubricollis</i>	Hooded Plover		V
<i>Actitis hypoleucos</i>	Common Sandpiper	M	R
<i>Anas rhynchotis</i>	Australasian Shoveler		R
<i>Anhinga novaehollandiae</i>	Australasian Darter		R
<i>Ardea ibis</i>	Cattle Egret		R
<i>Ardea intermedia</i>	Intermediate Egret		R
<i>Arenaria interpres</i>	Ruddy Turnstone	M	R
<i>Biziura lobata</i>	Musk Duck		R
<i>Calidris alba</i>	Sanderling	M	R
<i>Calidris melanotos</i>	Pectoral Sandpiper	M	R
<i>Calidris tenuirostris</i>	Great Knot	M	R
<i>Cereopsis novaehollandiae</i>	Cape Barren Goose		R
<i>Charadrius mongolus</i>	Lesser Sand Plover (Mongolian Plover)	M	R
<i>Egretta garzetta</i>	Little Egret		R
<i>Falco peregrinus</i>	Peregrine Falcon		R
<i>Gallinago hardwickii</i>	Latham's Snipe (Japanese Snipe)	M	R
<i>Haematopus fuliginosus</i>	Sooty Oystercatcher		R
<i>Haematopus longirostris</i>	Australian Pied Oystercatcher		R
<i>Hylacola cauta</i>	Shy Heathwren (Shy Hylacola)		R
<i>Larus dominicanus</i>	Kelp Gull		R
<i>Limosa lapponica</i>	Bar-tailed Godwit	M	R
<i>Limosa limosa</i>	Black-tailed Godwit	M	R
<i>Myiagra inquieta</i>	Restless Flycatcher		R

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Species	Common Name	Aus status	SA status
<i>Neophema elegans</i>	Elegant Parrot		R
<i>Numenius phaeopus</i>	Whimbrel	M	R
<i>Oxyura australis</i>	Blue-billed Duck		R
<i>Philomachus pugnax</i>	Ruff	M	R
<i>Plegadis falcinellus</i>	Glossy Ibis	M	R
<i>Pluvialis fulva</i>	Pacific Golden Plover	M	R
<i>Podiceps cristatus</i>	Great Crested Grebe		R
<i>Porzana tabuensis</i>	Spotless Crake		R
<i>Stagonopleura bella</i>	Beautiful Firetail		R
<i>Sterna hirundo</i>	Common Tern	M	R
<i>Tringa brevipes</i>	Grey-tailed Tattler	M	R
<i>Xenus cinereus</i>	Terek Sandpiper	M	R
<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater		
<i>Acanthiza apicalis</i>	Inland Thornbill		
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill		
<i>Acanthiza iredalei</i>	Slender-billed Thornbill	ssp	ssp
<i>Acanthiza lineata</i>	Striated Thornbill		
<i>Acanthiza nana</i>	Yellow Thornbill		
<i>Acanthiza pusilla</i>	Brown Thornbill		
<i>Acanthiza reguloides</i>	Buff-rumped Thornbill		
<i>Acanthorhynchus tenuirostris</i>	Eastern Spinebill		
<i>Accipiter cirrocephalus</i>	Collared Sparrowhawk		
<i>Acrocephalus australis</i>	Australian Reed Warbler (Clamorous Reed-Warbler)		
<i>Aegotheles cristatus</i>	Australian Owlet-nightjar		
<i>Anas castanea</i>	Chestnut Teal		
<i>Anas gracilis</i>	Grey Teal		
<i>Anas superciliosa</i>	Pacific Black Duck		
<i>Anthochaera carunculata</i>	Red Wattlebird		
<i>Anthochaera chrysoptera</i>	Little Wattlebird		
<i>Anthus novaeseelandiae</i>	Australasian Pipit (Richard's Pipit)		
<i>Apus pacificus</i>	Fork-tailed Swift		
<i>Aquila audax</i>	Wedge-tailed Eagle		
<i>Ardea alba</i>	Great Egret		
<i>Ardea modesta</i>	Eastern Great Egret		
<i>Ardea pacifica</i>	White-necked Heron (Pacific Heron)		
<i>Ardenna tenuirostris</i>	Short-tailed Shearwater (Mutton Bird)		
<i>Artamus cyanopterus</i>	Dusky Woodswallow		
<i>Artamus personatus</i>	Masked Woodswallow		
<i>Artamus superciliosus</i>	White-browed Woodswallow		
<i>Aythya australis</i>	Hardhead (White-eyed Duck)		
<i>Barnardius zonarius</i>	Australian Ringneck (Ring-necked Parrot)		
<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo		
<i>Cacomantis pallidus</i>	Pallid Cuckoo		
<i>Calamanthus fuliginosus</i>	Striated Fieldwren		
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	M	
<i>Calidris canutus</i>	Red Knot	M	
<i>Calidris ferruginea</i>	Curlew Sandpiper	M	
<i>Calidris minuta</i>	Little Stint	M	
<i>Calidris ruficollis</i>	Red-necked Stint	M	
<i>Chalcites basalis</i>	Horsfield's Bronze-cuckoo		
<i>Chalcites lucidus</i>	Shining Bronze-Cuckoo		
<i>Charadrius bicinctus</i>	Double-banded Plover		
<i>Charadrius ruficapillus</i>	Red-capped Plover (Red-capped Dotterel)		

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Species	Common Name	Aus status	SA status
<i>Charadrius veredus</i>	Oriental Plover	M	
<i>Chenonetta jubata</i>	Australian Wood Duck (Maned Duck)		
<i>Cheramoeca leucosterna</i>	White-backed Swallow		
<i>Chlidonias hybrida</i>	Whiskered Tern	M	
<i>Chlidonias leucopterus</i>	White-winged Black Tern	M	
<i>Chroicocephalus novaehollandiae</i>	Silver Gull		
<i>Chrysococcyx osculans</i>	Black-eared Cuckoo		
<i>Cincloramphus cruralis</i>	Brown Songlark		
<i>Cincloramphus mathewsi</i>	Rufous Songlark		
<i>Circus approximans</i>	Swamp Harrier (Marsh Harrier)		
<i>Circus assimilis</i>	Spotted Harrier		
<i>Cisticola exilis</i>	Golden-headed Cisticola		
<i>Colluricincla harmonica</i>	Grey Shrike-thrush		
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike		
<i>Corvus coronoides</i>	Australian Raven		
<i>Corvus mellori</i>	Little Raven		
<i>Coturnix pectoralis</i>	Stubble Quail		
<i>Cracticus tibicen</i>	Australian Magpie		
<i>Cracticus torquatus</i>	Grey Butcherbird		
<i>Cygnus atratus</i>	Black Swan		
<i>Daphoenositta chrysoptera</i>	Varied Sittella		
<i>Dasyornis broadbenti</i>	Rufous Bristlebird		ssp
<i>Dicaeum hirundinaceum</i>	Mistletoebird		
<i>Dromaius novaehollandiae</i>	Emu		
<i>Drymodes brunneopygia</i>	Southern Scrub-robin		
<i>Egretta novaehollandiae</i>	White-faced Heron		
<i>Elanus axillaris</i>	Black-shouldered Kite		
<i>Elseyornis melanops</i>	Black-fronted Dotterel (Black-fronted Plover)		
<i>Eolophus roseicapillus</i>	Galah		
<i>Eopsaltria australis</i>	Eastern Yellow Robin		
<i>Epthianura albifrons</i>	White-fronted Chat		
<i>Erythrogonys cinctus</i>	Red-kneed Dotterel		
<i>Endiptyula minor</i>	Little Penguin (Fairy Penguin)		
<i>Falco berigora</i>	Brown Falcon		
<i>Falco cenchroides</i>	Nankeen Kestrel (Australian Kestrel)		
<i>Falco longipennis</i>	Australian Hobby		
<i>Fulica atra</i>	Eurasian Coot		
<i>Fulmarus glacialis</i>	Southern Fulmar		
<i>Gallinula tenebrosa</i>	Dusky Moorhen		
<i>Gallirallus philippensis</i>	Buff-banded Rail		
<i>Gelochelidon nilotica</i>	Gull-billed Tern		
<i>Geopelia striata</i>	Peaceful Dove		
<i>Glossopsitta concinna</i>	Musk Lorikeet		
<i>Glossopsitta porphyrocephala</i>	Purple-crowned Lorikeet		
<i>Glyciphila melanops</i>	Tawny-crowned Honeyeater		
<i>Grallina cyanoleuca</i>	Magpie-lark		
<i>Haliastur sphenurus</i>	Whistling Kite		
<i>Hieraaetus morphnoides</i>	Little Eagle		
<i>Himantopus himantopus</i>	Black-winged Stilt		
<i>Hirundo neoxena</i>	Welcome Swallow		
<i>Hydroprogne caspia</i>	Caspian Tern		
<i>Lalage sueurii</i>	White-winged Triller		
<i>Larus pacificus</i>	Pacific Gull		

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Species	Common Name	Aus status	SA status
<i>Lichenostomus chrysops</i>	Yellow-faced Honeyeater		
<i>Lichenostomus cratitius</i>	Purple-gaped Honeyeater		ssp
<i>Lichenostomus leucotis</i>	White-eared Honeyeater		
<i>Lichenostomus ornatus</i>	Yellow-plumed Honeyeater		
<i>Lichenostomus penicillatus</i>	White-plumed Honeyeater		
<i>Lichenostomus virescens</i>	Singing Honeyeater		
<i>Limicola falcinellus</i>	Broad-billed Sandpiper	M	
<i>Malacorhynchus membranaceus</i>	Pink-eared Duck		
<i>Malurus cyaneus</i>	Superb Fairy-wren		
<i>Malurus lamberti</i>	Variiegated Fairy-wren		
<i>Manorina melanocephala</i>	Noisy Miner		
<i>Megalurus gramineus</i>	Little Grassbird		
<i>Melithreptus brevirostris</i>	Brown-headed Honeyeater		
<i>Melopsittacus undulatus</i>	Budgerigar		
<i>Microcarbo melanoleucos</i>	Little Pied Cormorant		
<i>Microeca fascinans</i>	Jacky Winter		ssp
<i>Morus serrator</i>	Australasian Gannet		
<i>Neochmia temporalis</i>	Red-browed Finch		
<i>Ninox novaeseelandiae</i>	Southern Boobook		
<i>Northiella haematogaster</i>	Blue Bonnet		ssp
<i>Numenius minutus</i>	Little Curlew	M	
<i>Nymphicus hollandicus</i>	Cockatiel		
<i>Ocyphaps lophotes</i>	Crested Pigeon		
<i>Onychoprion fuscata</i>	Sooty Tern		
<i>Pachycephala pectoralis</i>	Golden Whistler		
<i>Pachycephala rufiventris</i>	Rufous Whistler		
<i>Pardalotus punctatus</i>	Spotted Pardalote		
<i>Pardalotus striatus</i>	Striated Pardalote		
<i>Pelecanus conspicillatus</i>	Australian Pelican		
<i>Petrochelidon ariel</i>	Fairy Martin		
<i>Petrochelidon nigricans</i>	Tree Martin		
<i>Petroica boodang</i>	Scarlet Robin		ssp
<i>Phalacrocorax carbo</i>	Great Cormorant		
<i>Phalacrocorax fuscescens</i>	Black-faced Cormorant (Black-faced Shag)		
<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant		
<i>Phalacrocorax varius</i>	Pied Cormorant		
<i>Phalaropus fulicarius</i>	Grey Phalarope		
<i>Phalaropus lobatus</i>	Red-necked Phalarope	M	
<i>Phaps chalcoptera</i>	Common Bronzewing		
<i>Phaps elegans</i>	Brush Bronzewing		
<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater		
<i>Platalea flavipes</i>	Yellow-billed Spoonbill		
<i>Platalea regia</i>	Royal Spoonbill		
<i>Platycercus elegans</i>	Crimson Rosella		
<i>Platycercus eximius</i>	Eastern Rosella		
<i>Pluvialis squatarola</i>	Grey Plover	M	
<i>Podargus strigoides</i>	Tawny Frogmouth		
<i>Poliiocephalus poliocephalus</i>	Hoary-headed Grebe		
<i>Pomatostomus superciliosus</i>	White-browed Babbler		
<i>Pomatostomus temporalis</i>	Grey-crowned Babbler		ssp
<i>Porphyrio porphyrio</i>	Purple Swamphen (Purple Moorhen)		
<i>Porzana fluminea</i>	Australian Spotted Crake (Australian Crake)		
<i>Psephotus haematonotus</i>	Red-rumped Parrot		

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Species	Common Name	Aus status	SA status
<i>Pulvialis dominica</i>	Lesser Golder Plover	M	
<i>Recurvirostra novaehollandiae</i>	Red-necked Avocet		
<i>Rhipidura albiscapa</i>	Grey Fantail		
<i>Rhipidura leucophrys</i>	Willie Wagtail		
<i>Sericornis frontalis</i>	White-browed Scrubwren		
<i>Smicrornis brevirostris</i>	Weebill		
<i>Stipiturus malachurus</i>	Southern Emu-wren	ssp	ssp
<i>Stipiturus malachurus malachurus</i>	Southern Emu-wren		
<i>Strepera versicolor</i>	Grey Currawong		ssp
<i>Tachybaptus novaehollandiae</i>	Australasian Grebe (Little Grebe)		
<i>Tadorna tadornoides</i>	Australian Shelduck (Mountain Duck)		
<i>Thalasseus bergii</i>	Crested Tern		
<i>Threskiornis molucca</i>	Australian White Ibis (Sacred Ibis)		
<i>Threskiornis spinicollis</i>	Straw-necked Ibis		
<i>Tribonyx ventralis</i>	Black-tailed Native-hen		
<i>Trichoglossus haematodus</i>	Rainbow Lorikeet		
<i>Tringa nebularia</i>	Common Greenshank	M	
<i>Tringa stagnatilis</i>	Marsh Sandpiper	M	
<i>Vanellus miles</i>	Masked Lapwing		
<i>Vanellus tricolor</i>	Banded Lapwing		
<i>Zosterops lateralis</i>	Silvereye		

CR: Critically endangered, E: Endangered, V: Vulnerable, R: Rare, M: Migratory, ssp: sub-species

Butterflies

Species	Common Name	Status*	Record
<i>Hesperilla donnysa donnysa (pale form flavescens)</i>	Yellowish Sedge-Skipper	E	x
<i>Ogyris olane</i>	Olane Azure	E in SE	x
<i>Hesperilla cyrhoticha cyclospila</i>	Chrysotricha Sedge-skipper or Golden-haired Sedge-skipper	V	x
<i>Lucia limbaria</i>	Small Copper	R	p
<i>Danaus chrysippus petilia</i>	Lesser Wanderer	Va	p
<i>Erina acasta</i>	Blotched Dusky-blue		x
<i>Erina hyacinthina form simplex</i>	Western Dusky-blue		x
<i>Geitoneura klugii klugii</i>	Common Xenica	C	p
<i>Hesperilla donnysa delos (incl. form diluta)</i>	Donnysa skipper		x
<i>Heteronympha merope merope</i>	Common Brown	C	p
<i>Heteronympha penelope</i>	Shouldered Brown		p
<i>Junonia villida cabybe</i>	Meadow argus	Va	p
<i>Lampides boeticus</i>	Long-tailed Pea-blue		p
<i>Nacuduba biocellata biocellata</i>	Two-spotted Line-blue	LC	p
<i>Neolucia agricola agricola</i>	Fringed Heath-blue		p
<i>Ocybadistes walkeri hypochlorus</i>	Southern Grass-dart		p
<i>Ogyris amaryllis meridionalis</i>	Amaryllis Azure		x
<i>Theclimnesthes albocincta</i>	Bitter-bush blue	LC	x
<i>Theclimnesthes serpentata serpentata</i>	Salt-bush blue		p
<i>Vanessa itea</i>	Australian Admiral	Va	p
<i>Vanessa kershawi</i>	Australian Painted Lady	Va	p
<i>Zizina labradus labradus</i>	Common Grass Blue		p

Vulnerability as per R. Grund, E: Endangered, V: Vulnerable, R: Rare

Va: Vagrant, LC: Locally common, C: Common

x: recorded, p: possibly there, as suggested by R. Grund

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Mammals

Species	Common Name	Aus status	SA status	Record
<i>Perameles bougainville</i>	Western Barred Bandicoot		E	x
<i>Macropus rufogriseus</i>	Red-necked Wallaby		R	x
<i>Rattus lutreolus</i>	Swamp Rat		R	x
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat		R	x
<i>Vombatus ursinus</i>	Common Wombat		R	x
<i>Cercartetus concinnus</i>	Western Pygmy-possum			x
<i>Cercartetus lepidus</i>	Little Pygmy-possum			x
<i>Chalinolobus gouldii</i>	Gould's Wattled Bat			x
<i>Hydromys chrysogaster</i>	Water-rat			x
<i>Macropus fuliginosus</i>	Western Grey Kangaroo			x
<i>Nyctophilus geoffroyi</i>	Lesser Long-eared Bat			x
<i>Pseudomys apodemoides</i>	Silky Mouse			x
<i>Tachyglossus aculeatus</i>	Short-beaked Echidna			x
<i>Vespadelus regulus</i>	Southern Forest Bat			x

E: Endangered, V: Vulnerable, R: Rare

Reptiles

Species	Common Name	Aus status	SA status	Record
<i>Varanus rosenbergi</i>	Heath Goanna		V	x
<i>Echiopsis curta</i>	Bardick		R	x
<i>Aprasia striolata</i>	Lined Worm-lizard			x
<i>Bassiana duperryi</i>	Eastern Three-lined Skink			x
<i>Chelodina longicollis</i>	Common Long-necked Tortoise			x
<i>Christinus marmoratus</i>	Marbled Gecko			x
<i>Ctenophorus pictus</i>	Painted Dragon			x
<i>Ctenotus orientalis</i>	Spotted Ctenotus			x
<i>Ctenotus robustus</i>	Eastern Striped Skink			x
<i>Diplodactylus vittatus complex (NC)</i>	Stone Geckos			x
<i>Emydura macquarii</i>	Short-necked Turtle (Murray Turtle)			x
<i>Hemiergis peronii</i>	Four-toed Earless Skink			x
<i>Lampropholis delicata</i>	Delicate Skink			x
<i>Lerista bougainvillii</i>	Bougainville's Skink			x
<i>Lerista dorsalis</i>	Southern Four-toed Slider			x
<i>Liopholis multiscutata</i>	Bull Skink			x
<i>Menetia greyii</i>	Dwarf Skink			x
<i>Morethia adelaidensis</i>	Adelaide Snake-eye			x
<i>Morethia obscura</i>	Mallee Snake-eye			x
<i>Nephrurus milii</i>	Barking Gecko			x
<i>Notechis scutatus</i>	Eastern Tiger Snake	ssp		x
<i>Pogona barbata</i>	Eastern Bearded Dragon			x
<i>Pogona vitticeps</i>	Central Bearded Dragon			x
<i>Pseudemoia entrecasteauxii</i>	Southern Grass Skink			x
<i>Pseudonaja textilis</i>	Eastern Brown Snake			x
<i>Tiliqua rugosa</i>	Sleepy Lizard			x
<i>Tiliqua scincoides</i>	Eastern Bluetongue			x

E: Endangered, V: Vulnerable, R: Rare

x: recorded

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Amphibians

Species	Common Name	Aus status	SA status	Record
<i>Litoria raniformis</i>	Southern Bell Frog	V	V	x
<i>Pseudophryne semimarmorata</i>	Marbled Toadlet		V	x
<i>Pseudophryne bibronii</i>	Brown Toadlet		R	x
<i>Crinia signifera</i>	Common Froglet			x
<i>Limnodynastes dumerilii</i>	Banjo Frog			x
<i>Limnodynastes tasmaniensis</i>	Spotted Marsh Frog			x
<i>Litoria ewingii</i>	Brown Tree Frog			x
<i>Neobatrachus pictus</i>	Burrowing Frog			x

E: Endangered, V: Vulnerable, R: Rare

x: recorded