Southern Fleurieu Coastal Action Plan

Bungala River (Pangkarla)[1] to SW bank of Carrickalinga Creek (Karrapootungga)

Cell F24

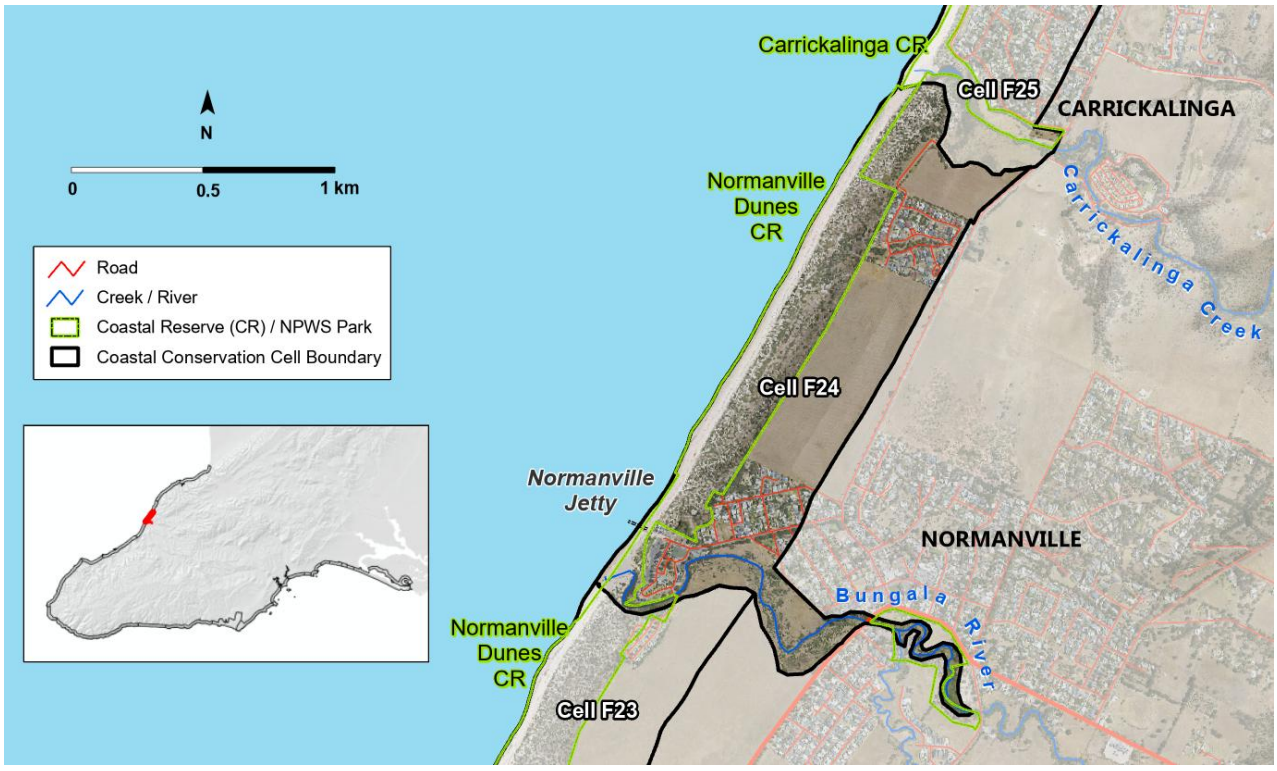
Overview

This cell encompasses high biodiversity areas across the Normanville dunes, extending through this cell and F23, and the Bungala River estuary. These dunes are the last major remnants of once-extensive systems along the eastern Gulf St Vincent and form the largest, most intact coastal dune system on the western Fleurieu Peninsula.

The Bungala River estuary connects the land and marine environments and supports a diversity of vegetation associations and habitats for flora and fauna species. Areas of saltmarsh in the lower estuary potentially support the Environment Protection and Biodiversity Conservation (EPBC) Act 1999 (EPBC Act) threatened ecological community of *Beaded Glasswort* (*Salicornia quinqueflora* ssp. *quinqueflora).*

The cell experiences increasing population and development pressures that threaten the high conservation values of the cell. Weed threat, grazing pressures, water quality and flow regimes also place added threats to this cell.

Nearshore marine habitats support high diversity marine flora and fauna species and buffer the shoreline from coastal erosion.



[1] "Pangkarla was the earliest recorded traditional language word (Kaurna Meyunna), recorded in 1939. It means two lagoons.". Karrapootungga River, to the north of Pangkarla, was recorded in 1840 and good water could be found there 10 months of the year" (Karl Winda Telfer, personal communications, December 2025).

Traditional Owner and First Nations cultural heritage and connection to land and sea Country

This cell is of high cultural value and significance to the Kaurna Patpangga Meyunna people. The Country is part of several Dreaming stories, including Tjilbruke/Tjirbuki, which is a coast and sea songline story. The area features places, artefacts, plants and animals of high cultural and human value, including caves, fish traps and fishing grounds, seasonal campgrounds, sleeping places, and places of creation story and spiritual practices. This cell includes registered and un-registered Aboriginal heritage sites; more broadly, all the lands and waters are of importance to the Kaurna Patpa and Mullawirra Meyunna.

Please respect that cultural concepts and content included in this plan are the Aboriginal Cultural and Intellectual property (ACIP) of Karl Winda Telfer of the Mullawirra Meyunna (Kaurna Meyunna) (cells 20-27). They may not be used or adapted by any other parties without consent.

Cell detail

This cell extends from the Bungala River estuary (including upper reaches where seawater incursion occurs during tidal inflows) approximately 2km to the south side of Carrickalinga Creek. The cell is in the District Council of Yankalilla local government area.

Tenure, Land Use and Values

The Crown lands reserve (Normanville Dunes Coastal Reserve) is under the care and control of the council dedicated for Conservation purposes, while most of the land behind the coastal dunes within the cell is privately owned. The upper reaches of the Bungala estuary are located within the Bungala Park Reserve (upstream of Willis Drive), which is managed by council the District Council of Yankalilla. Much of the mid to lower estuary is privately owned and grazing property. A council-managed Normanville Jetty Caravan Park, recreational reserve, public boat ramp, substantial carpark and the Normanville Surf Life Saving Club occupy either side of the Bungala River estuary mouth. Since 2012, the waters surrounding this cell are within the boundaries of the Encounter Marine Park.

Native title has not been established for this cell. The Federal Court did not determine native title for Kaurna Yerta Aboriginal Corporation over the lands south of Myponga to the edge of the Ngarrindjeri determination (3.5km northeast of Cape Jervis). Kaurna Patpangga Meyunna maintain cultural and historical connections to this region, the formal determination was limited to areas from Lower Light in the north to Myponga in the south.

The presence of a functional beach – dune system is valuable to this settlement and regularly visited by tourist population. The foreshore and reserves support a number of activities, including swimming, snorkelling, diving, boating, fishing, kayaking, walking, camping, caravanning, large community events and group activities on the beach. Facilities include the surf lifesaving club, café, car parking, caravan park, beach-based boat ramp, jetty.

Carrickalinga Reef is a recognised recreational diving site (Bryars 2013).

Local volunteer groups, such as Friends of Bungala River, volunteers from the Fleurieu Environment Centre and the Fleurieu Coast Community Nursery have helped to conserve and revegetate the cell and will continue to play a supporting role in conservation and public awareness. There is not a dedicated volunteer group that works across the Normanville Dunes, despite the high conservation value and species diversity. Friends of the Hooded Plover Fleurieu Peninsula (supported by BirdLife Australia) monitor and raise awareness of beach-nesting and shorebird species within the cell.

Landforms

Fine to medium, pure quartz, Holocene sand beach and dune. Intermediate wave energy, low tide terrace beach: relatively steep beach face to flat bar at low tide, then a steep drop. Waves generally below 1m, but larger waves can generate dangerous minirips on bar. Dune barrier (c.50 – 200m wide, and up to 16 m. high) (Caton et al 2007).

Estuarine section of the Bungala River traverses the coastal plain to seasonally barred entrance. The coastal plain landward of the dunes is relatively flat, and the floodplain of the Bungala River is incised into the coastal plain.

Nearly the whole length of the cell occupies the Normanville Sand Dunes geological monument (1109), displaying undifferentiated Holocene aeolian sediments, which are the last major relics of similar coastal dunes that once existed along the east coast of Gulf St Vincent. The dunes provide information on the processes of shoreline development during the Holocene (5,000 years), forming a double crested system, with younger foredunes to

seaward and older dunes inland. (Geological Society of Australia 2002). These dunes are also an important source for the replenishment of beach sand and protective feature of the inland areas that are very low-lying.

Several sand dune blowout areas are known to have occurred in these dunes from the 1940s, resulting in large areas of bare sand, potential through vegetation loss due to grazing.

The Normanville dunes are recognised for their geological and biodiversity values and listed under the Australian Heritage Commission, the South Australian Heritage Register (reference 175586, 14041, 17035), and have been accepted as a Geological Monument (no 1109) by the Geological Monuments Sub-committee of the South Australian Division of the Geological Society of Australia Limited.

Normanville: The Bungala River Estuary, Normanville Dune, boat ramp, caravan park and carpark (Coast Protection Board, March 2024)

Terrestrial biodiversity

Whole cell

This cell is dominated by two key biodiversity assets, in the Heritage listed Normanville Dunes Coastal Reserve, and the Bungala River estuary.

The Normanville dunes north of the Bungala River to the northern end of this cell at Carrickalinga Creek (and extending south to the Yankalilla River in Cell F23) are the largest and most intact dune system on the western Fleurieu, stretching approximately 4.5 km, and are 200 to 250 m in width. These dunes are widely recognised as one of few examples of preserved natural dunes (Telfer and Milne 2016, Caton et al 2007, Geological Society of Australia 2002) and constitute the highest conservation value coastal dune systems within this plan.

The dunes support multiple flora species of conservation significance, and form habitat for reptiles and birds of state or regional conservation significance (Telfer and Milne 2016). This high level of listings reflects the value of these dunes and the scarcity of intact coastal dunes and, in particular, coastal woodland habitats within the region.

Flora species of conservation significance include Sticky Daisy-bush (*Olearia passerinoides ssp. glutescens*), Coast Silver Wattle (*Acacia uncifolia)*, Sieber's Crassula (*Crassula sieberiana*), Lignum (*Duma florulenta*), Thatching Grass (*Gahnia filum*), Cushion Fanflower (*Scaevola crassifolia*), Torpedo Arrowgrass (*Triglochin trichophora*), Cup Wattle

(*Acacia cupularis*), Coast Bitter-bush (*Adriana quadripartita*), Sea Box (*Alyxia buxifolia*), Short-stalked Purslane (*Calandrinia brevipedata*), Strap Purslane (*Calandrinia corrigioloides*), Notched Sedge (*Carex bichenoviana*), Muntries (*Kunzea pomifera)*, Dryland Tea-tree (*Melaleuca lanceolata*), Nitre-bush (*Nitraria billardierei*), Mallee Smooth-nettle (*Parietaria cardiostegia*), Austral Stork's-bill (*Pelargonium australe*), Quandong (*Santalum acuminatum)*, and Variable Groundsel (*Senecio pinnatifolius var. maritimus)* (Telfer and Milne 2016).

The foredune seaward face vegetation is dominated by wind and salt tolerant species such as Rolling Spinifex (*Spinifex hirsutus),* Coastal Wattle (*Acacia longifolia spp. sophorae),* Coast Daisy-bush *(Olearia axillaris),* and introduced Sea Wheat-grass (*Thinopyrum junceiforme)* (which is particularly prevalent on the incipient dune). Behind this is a shrubland community on the dune and swale, and seaward side of the secondary dune, which is generally dominated by the shrub species Coast Beard-heath *(Leucopogon parviflorus),* Coast Daisy-bush *(Olearia axillaris),* Coastal Wattle (*Acacia longifolia spp. sophorae),* with patches of Dryland Tea-tree *(Melaleuca lanceolata)* and Sea Box (*Alyxia buxifolia).* At the rear of the secondary dune, the vegetation tends to a woodland community type, with small areas of Drooping Sheoak *(Allocasuarina verticillata)* and Coast Silver Wattle (*Acacia uncifolia*) Low woodlands. These species, along with the introduced Bracelet Honey-myrtle (*Melaleuca armillaris ssp. armillaris),* are also dominant where revegetation has been undertaken following sand mining, which has removed the secondary dune in the mid northern section of the Dunes (Telfer and Milne 2016).

Normanville dunes and coastal shrubland with Bungala River estuary breaking through to the beach. Lady bay settlement can be seen in the background (C Taylor)

Limited information exists about the fauna species that are present across the Normanville dunes, with only a handful of records from mammals, bat and reptile records. Telfer and Milne (2016) list fauna species that are likely to be supported by habitats within the dune areas as Water-rat (*Hydromys chrysogaster*), Western Grey Kangaroo (*Macropus fuliginosus*), Common Ringtail Possum (*Pseudocheirus peregrinus*), Bush Rat (*Rattus fuscipes*), Common Brushtail Possum (*Trichosurus vulpecula*) and Short-beaked Echidna (*Tachyglossus aculeatus*).

Reptile and amphibian species considered to be possibly, or likely to be present based on a consideration of past disturbance, isolation and the remnant habitats present include Marbled Gecko (*Christinus marmoratus*), Three-toed Earless Skink (*Hemiergis decresiensis*), Four-toed Earless Skink (*Hemiergis peronii*), Bougainville's Skink *Lerista bougainvillii*), Four-toed Slider (*Lerista dorsalis)*, Dwarf Skink (*Menetia greyii*), Mallee Snake-eye *(Morethia obscura*),

Eastern Bearded Dragon (*Pogona barbata*), Red-bellied Black Snake (*Pseudechis porphyriacus*), Eastern Brown Snake (*Pseudonaja textilis*), Sleepy Lizard (*Tiliqua rugosa)* and Eastern Bluetongue (*Tiliqua scincoides*), Common Froglet (*Crinia signifera*), Banjo Frog (*Limnodynastes dumerilii*), Spotted Marsh Frog (*Limnodynastes tasmaniensis*), Southern Brown Tree Frog (*Litoria ewingii*) and Burrowing Frog (*Neobatrachus pictus*) (Telfer and Milne 2016, Caton et al 2007).

Eastern Bearded Dragon (Pogona barbata) are one of several reptiles found within the Normanville Dunes (M Stokes)

The bird species recorded through surveys in this cell, have a diverse range of requirements for food, shelter and nesting. The regionally uncommon woodland habitat in the coastal reserves provides an abundance of lateral branches for perching and dense shrubs for shelter. Telfer and Milne (2016) describe the dead trees as providing perching habitat for numerous birds, including Lauging Kookaburra (*Dacelo novaeguineae novaeguineae*), Crested Pigeon (*Ocyphaps lophotes*), Australian Magpie (*Gymnorhina tibicen*) and Nankeen Kestrel (*Falco cenchroides cenchroides*). As there are limited-to-no tree hollows present in the reserve, most of the resident birds did not rely on hollows for nesting. Those birds requiring hollows for nesting, likely nest elsewhere and frequent the reserve for feeding (Telfer and Milne 2016).

Bird species with conservation ratings recorded in the cell include Yellow-tailed Black Cockatoo (*Zanda funerea whiteae*), Great Egret (Ardea alba modesta), Elegant Parrot *(Neophema elegans),* Silvereye (*Zosterops lateralis),* Greater Crested Tern (*Thalasseus bergii cristatus*), and Hooded Plover (*Thinornis cucullatus cucullatus*).

Silvereye (Zosterops lateralis) (M Endacott)

The coastal dunes and remnant vegetation patches provide substantial butterfly habitats and species-specific host plants. Butterflies that have the required host plants within this cell include Icilius Hairstreak (*Jalmenus icilius*), Rayed Blue (*Candalides heathi heathi*), Blotched Dusky-blue (*Erina Acasta*), Bitter-bush Blue (*Theclinesthes albocinctus*), as well as locally uncommon Wood White (*Delias aganippe*), Common Brown (*Heteronympha merope merope),* and multiple common butterfly species that are observed across the Fleurieu Peninsula (Stolarski 2024, Telfer and Milne 2016, Caton et al 2007).

Many of the species listed above including Icilius Hairstreak (*Jalmenus icilius*), Rayed Blue (*Candalides heathi heathi*), and Blotched Dusky-blue (*Erina acasta*) occur only in this cell, or in neighbouring cells throughout the plan area and, therefore, are of significant regional conservation value.

Icilius Hairstreak (*Jalmenus icilius*) butterflies are considered rare in the region and are only found in Normanville Dunes (F23 and F24) within the Plan area. This species requires a range of host plants, including Golden Wattle (*Acacia pycnantha)*, Wirilda *(A. retinodes),* and Coast Silver Wattle (*A. uncifolia),* with larvae attended by small black ants (Stolarski 2024).

Icilius Hairstreak (Jalmenus icilius) butterflies are only found within the Normanville dunes within the plan's region (M Endacott)

Rayed Blue (*Candalides heathi heathi*), which has been recorded in land adjoining cell F24, is also included based on the species larval host presence within the cell boundary, and its ability for extensive dispersion and colonisation in favourable years (Stolarski 2024). This species has only been recorded in this cell throughout the plan area.

Bitter-bush Blue *(Theclinesthes albocinctus)*, whilst locally common at times, is subject to restricted population sites supporting Coast Bitter-bush (*Adriana quadripartita),* its only larval host plant, without which it would not be able to exist. The butterfly is restricted to cells F4, F15, F19, F23 & F24 (Storlaski 2024).

The coastal dunes provide refuge and valued habitat for a range of seabird species, including the White--bellied Sea Eagle (*Haliaeetus leucogaster)*, Eastern Osprey (*Pandion haliaetus cristatus),* Little Pied Cormorant (*Microcarbo melanoleucos melanoleucos*), and Australian Pied Cormorant (*Phalacrocorax varius hypoleucos).*

The Hooded Plover (*Thinornis cucullatus cucullatus)*, vulnerable in South Australia, successfully nests and forages across Normanville beach (including the estuary) to Carrickalinga Creek. Red-capped Plovers *(Charadrius ruficapillus)* that are semi-colonial nesters are also recorded in this cell. The beaches in this cell provide foraging habitats for shorebirds, including Sooty Oystercatchers (*Haematopus fuliginosus fuliginosus)*, Caspian *(Hydroprogne caspia)* and Greater Crested Terns (*Thalasseus bergii cristatus),* Silver Gulls (*Chroicocephalus novaehollandiae novaehollandiae*) and Pacific Gulls (*Larus pacificus georgii*).

Seagrass wrack (also known as Beach cast wrack) found regularly on beaches has an important ecological function recycling nutrients back to coastal waters as well as protection and stabilisation of the shoreline and coastal dunes by acting as a trap that binds drifting sands and reduces sand erosion during winter (PIRSA 2014). Beach wrack also provides an important role as habitat and shelter for Hooded Plovers (*Thinornis cucullatus cucullatus*) and Pied Oystercatcher *(Haematopus longirostris)* and Sooty Oystercatchers *(Haematopus fuliginosus fuliginosus)* as well as other shorebirds and juvenile fish. Beach cast wrack collection within Encounter Marine Park is prohibited in all zones except general managed use zones. Therefore, no removal of beach wrack is permitted in this cell.

Estuary (Bungala River)

Bungala River is a recognised estuary (DEH 2007).

The Bungala Estuary is an intermittent estuary, where the mouth is seasonally barred with sediment, losing connection with the marine environment. A diverse range of both marine and brackish, subtidal, intertidal and supratidal estuarine habitats are supported by the estuary. The Bungala Estuary is 0.66km long, 10–30m wide and has a deep narrow channel (AECOM 2010). Within the estuary boundary habitats include beach, channel, coastal dune, floodplain, intertidal flat, bare marine intertidal sandflat, riparian, supratidal/estuarine flat and supratidal samphire (see figure 24.1)

The coastal dunes and shrubland at the estuary surround either side of river mouth, extending along the beach with Rolling Spinifex (*Spinifex hirsutus),* Coastal Wattle (*Acacia longifolia spp. sophorae),* Coast Daisy-bush *(Olearia axillaris),* Coast Beard-heath *(Leucopogon parviflorus),* and introduced Sea Wheat-grass (*Thinopyrum junceiforme)* vegetation associations, as described above. Upstream from the mouth, the dominant association is a mix of riparian species, with a dominant canopy of River Red Gum (*Eucalyptus camaldulensis spp. camaldulensis*) and South Australian Blue Gum (*Eucalyptus leucoxylon sp.*), with isolated individuals of Dryland Tea-tree (*Melaleuca lanceolata*). Coastal species occur throughout the Bungala Estuary, with the river providing a corridor for the movement of seed by birds (AECOM 2010).

The dominant in-stream vegetation comprises various sedges (*Cyperus*, *Juncus* and *Machaerina* spp.) and reeds (*Typha* and *Phragmites* spp.), changing their relative dominance as estuary conditions vary (AECOM 2010, Baron 2024). Small areas of supratidal samphire also exist within the estuary (see figure 24.1).

The estuary supports vegetation associations aligned as being areas of the Nationally Critically Endangered ecological community *swamps* of the Fleurieu Peninsula, as listed in the *Environment Protection and Biodiversity Conservation* (EPBC) Act 1999 and have been identified as part of the Fleurieu Peninsula Wetlands Inventory (Harding 2005).

Equally of note in the Bungala River estuary, vegetation communities (Beaded Glasswort- *Salicornia quinqueflora* ssp. *quinqueflora* saltmarsh) exist that satisfy criteria to be considered part of the nationally Vulnerable subtropical and *temperate coastal saltmarsh* threatened ecological community, as listed in the EPBC Act 1999. These habitats or ecological communities represent the assemblage of plants, animals and micro-organisms associated with saltmarsh in coastal regions of sub-tropical and temperate Australia (DCCEEW 2013).

Beaded glasswort (Salicornia quinquefolia ssp. quinqueflora) on banks of Bungala River near estuary mouth (C Jackson)

Fish biodiversity and water quality monitoring surveys have been undertaken at the lower reaches of the Bungala River. These surveys indicate it supports a range of fish species, including Common Galaxias (*Galaxias maculatus*), Climbing G*alaxias* (*Galaxias brevipinnis*), Congolli ((*Pseudaphritis urvillii*), Big-headed Gudgeon (*Philypnodon grandiceps*) and Dwarf Flathead Gudgeon (*Philypnodon macrostomus),* Western Bluespot Gudgeon Goby (*Pseudogobius olorum)*; Black Bream (*Acanthopagrus butcheri*), Bridled Goby (*Arenigobius bifrenatus*), Yelloweye Mullet (*Aldrichetta forsteri*) Australian Salmon (*Arripis trutta)* and the introduced Gambusia (*Gambusia holbrooki)* (Schmarr et al. 2022).

Fig 24.1 Bungala River estuarine habitats

Vegetation Communities (Telfer and Milne 2016)

Coastal watercourses and slopes

River Red Gum (*Eucalyptus camaldulensis spp. camaldulensis)* mid woodland

- River Red Gum (*Eucalyptus camaldulensis spp. camaldulensis)* mid woodland over Golden Wattle (*Acacia pycnantha) + Acacia sp. +* River Bottlebrush (*Callistemon sieberi)* over *Large Quaking-grass (*Briza maxima) +* Stiff Flat-sedge (*Cyperus vaginatus) +* Kangaroo Grass (*Themeda triandra) +* *African Daisy (*Senecio pterophorus)* mid tussock grasses

Drooping Sheoak (*Allocasuarina verticillata)* Low Woodland

- Drooping Sheoak (*Allocasuarina verticillata)* Low Woodland over an open grassy and herbaceous understorey Hard Mat-rush (*Lomandra multiflora ssp. dura) +* Scented Mat-rush (*Lomandra effusa) +* Wallaby Grass (*Rytidosperma spp.) +* Spear Grass *(Austrostipa spp.*)

Coastal dunes and shrublands

*Sea Spurge (*Euphorbia paralias) +* *Sea Wheat-grass (*Thinopyrum junceiforme) grassland*

- * Sea Spurge (*Euphorbia paralias) +* *Sea Wheat-grass (*Thinopyrum junceiforme)* grassland with emergent Coast Daisy-bush (*Olearia axillaris) +* Coastal Wattle (*Acacia longifolia ssp. sophorae) ±* Coast Cushion Bush (*Leucophyta brownii)*

Coast Daisy-bush (*Olearia axillaris) +* Coast Beard-heath (*Leucopogon parviflorus) +* Coastal Wattle (*Acacia longifolia ssp. sophorae) +/-* Common Boobialla (*Myoporum insulare)* mid open shrubland

- Coast Daisy-bush (*Olearia axillaris) +* Coast Beard-heath (*Leucopogon parviflorus) +* Coastal Wattle (*Acacia longifolia ssp. sophorae) +/-* Common Boobialla (*Myoporum insulare)* mid open shrubland over Sea-berry Saltbush (*Rhagodia candolleana ssp. candolleana)* low shrubs over Thyme Riceflower (*Pimelea serpyllifolia ssp. serpyllifolia) +* Bower Spinach (*Tetragonia implexicoma) +/-* Coastal Climbing Lignum (*Muehlenbeckia gunnii) +/-* Short-stem Flax-lily (*Dianella brevicaulis)*

Drooping Sheoak (*Allocasuarina verticillata) low woodland*

- Drooping Sheoak (*Allocasuarina verticillata) low woodland over* Coast Daisy-bush (*Olearia axillaris) +/-* Coast Wallowa (*Acacia nematophylla) +/-* Umbrella Bush (*Acacia ligulata) +/-* Sea Box (*Alyxia buxifolia) +/-* Coast Beard-heath (*Leucopogon parviflorus) +/-* Cup Wattle (*Acacia cupularis)* mid shrubs over Sea-berry Saltbush (*Rhagodia candolleana ssp. candolleana)* low shrubs over *Hare's Tail Grass (*Lagurus ovatus) +* Pimpernel (*Lysimachia arvensis) +/-* Coast Bitter-bush (*Adriana quadripartita) +/-* Coast Sword-sedge (*Lepidosperma gladiatum)*

Estuary (Bungala)

- Common Reed (*Phragmites australis*) +/- Bulrush spp. (*Typha* spp.) Grassland
- Beaded Samphire (*Salicornia quinqueflora ssp. quinqueflora)* Supratidal samphire

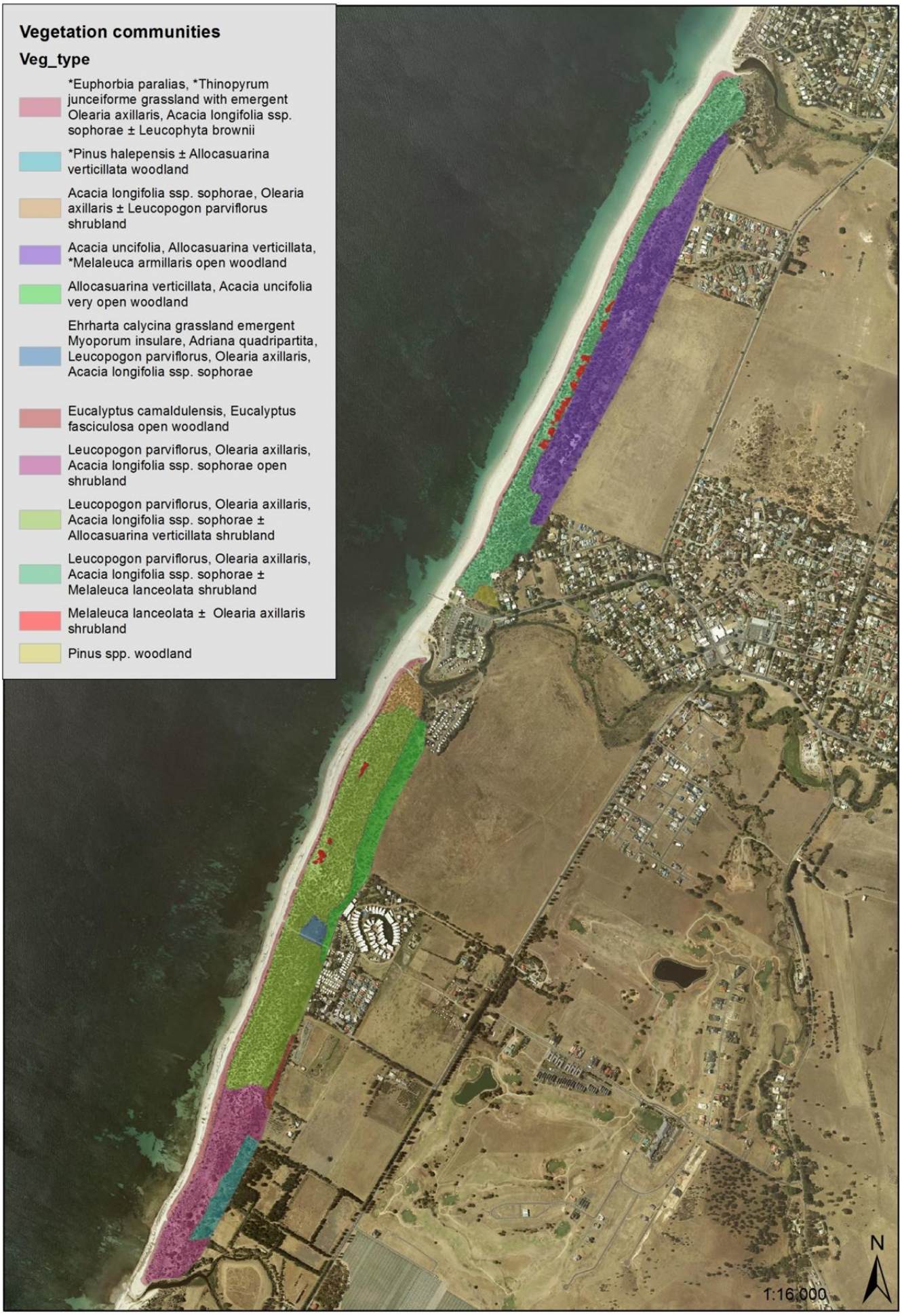


Fig 24.2 Vegetation communities in Normanville Dunes (F23 and F24) (Telfer and Milne 2016)

Nearshore habitats

This cell forms part of the Encounter Marine Park. The marine areas of cell F24 are within a Habitat Protection Zone (HPZ-5).

Bryars (2013) describes this cell as dominated by continuous seagrass meadows (Figure 24.3). There are also significant areas of continuous low-profile reef inshore, and bare sand further offshore beyond the depth limit of seagrass growth. Smaller amounts of other habitats (viz. patchy seagrass) are also scattered throughout the cell.

Subtidal reefs in the area are composed of limestone or metamorphic rock with a cover of macroalgae and sessile invertebrates (Turner et al. 2007, DEH 2008, Baker et al. 2009, Brook and Bryars 2014, Brook et al. 2020, Brock et al. 2023). Artificial reef occurs within the cell in the form of a jetty at Normanville. The inshore bare sand is characterised by a low-energy, low tide terrace beach system (Short 2001).

The cell is regionally significant due to its substantial coverage of seagrass, inshore reef systems, and existence of the Bungala River estuary (Bryars 2013).

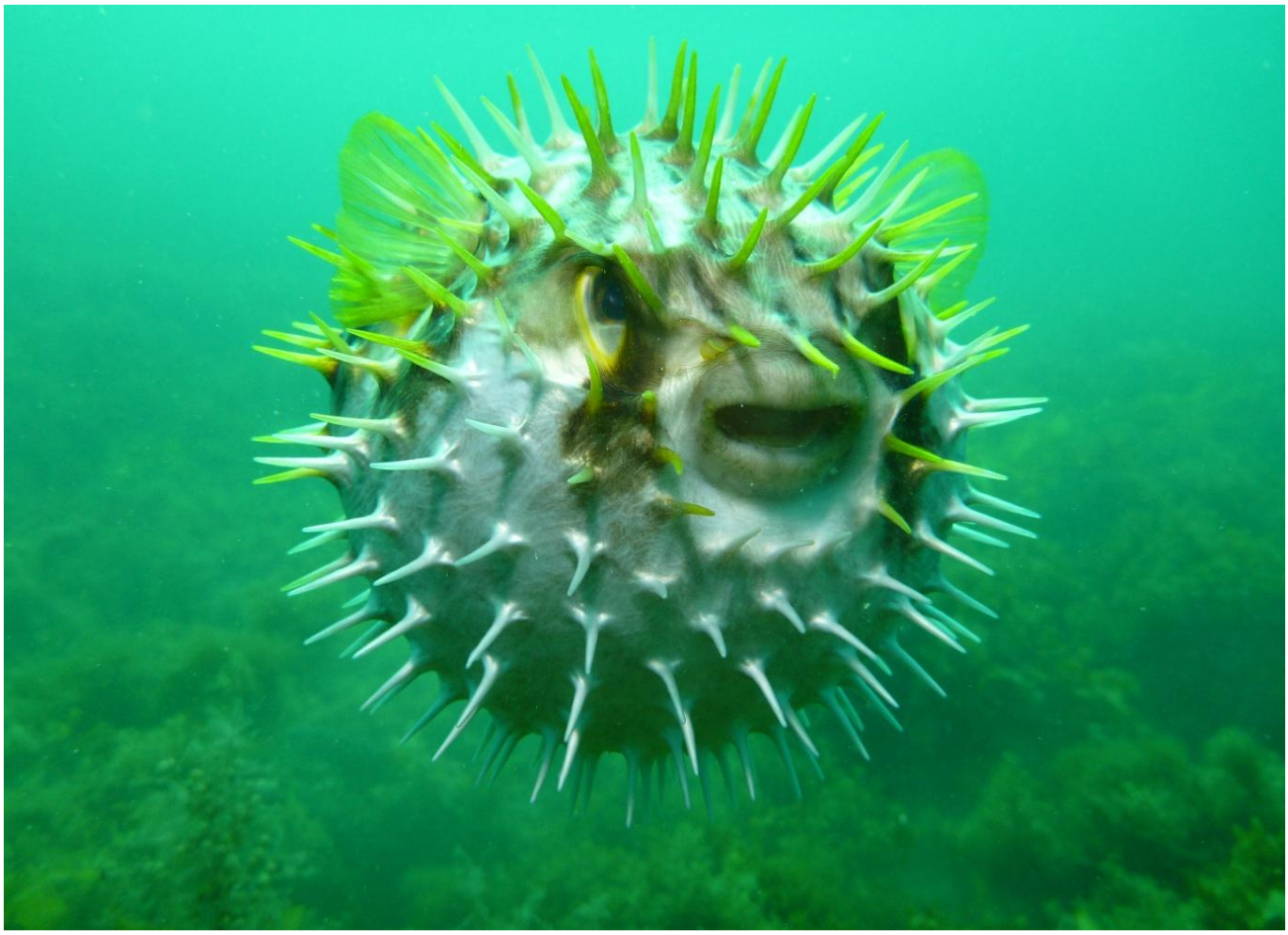
Subtidal reefs

Surveys of subtidal reef at Normanville and in nearby cells have found a high diversity of fishes, invertebrates and macroalgae (Edgar et al. 2006, Turner et al. 2007, DEH 2008, Baker et al. 2009, Brook and Bryars 2014, Brook et al. 2020, Brock et al. 2023). The cell lies within a region of low macroalgal species diversity. However, this is probably partly due to a low level of collection effort (see Baker and Gurgel 2010). The inshore habitats of Yankalilla Bay appear to be a hotspot for pipefishes and seahorses (David Muirhead, pers. comm. in Bryars 2013, Baker et al 2009).

Spotted Pipefish (Stigmatopora argus) uses camouflage to amongst Narrow-leaf Tapeweed (Posidonia sinuosa) (A Burnell)

The reef ecosystem baseline study (Brook et al. 2020) and current study by Brock *et al.* (2023) assessing the trends in the condition of rocky reef ecosystems of the greater Adelaide and Fleurieu Peninsula region, found that the

overall status of rocky reefs was stable or improving, based on several key indicators of condition (e.g. fish and macroinvertebrate species richness, community structure, large fish biomass, macroalgae percentage cover, and reef thermal index). The Central Fleurieu subregion comprises 24 long term monitoring survey reef sites, with two sites found within the cell. These sites include South Shores and Normanville Beach. Combined reef surveys in this subregion indicate that macroinvertebrate and fish species richness, large fish biomass, and the percentage cover of canopy-forming algae has remained stable or is increasing (Brock *et al.* 2023). Marine species in the Central Fleurieu subregion include 143 bony fish, 12 sharks and rays, 104 species of marine invertebrate, and 20 species of crustacean (Brock et al. 2023, Edgar and Barrett (2012), Edgar and Stuart-Smith (2014), Edgar et al. (2020)).



Porcupine Fish (Dicotylichthys punctulatus) (S Bryars)

Seagrass

The inshore seagrasses in this part of Yankalilla Bay are dominated by *Amphibolis antarctica*, with some *Posidonia* spp. and *A. griffithii* (Murray-Jones et al. 2009). For the inshore waters (<500m offshore) of Yankalilla Bay between Lady Bay and Carrickalinga, Bryars (2014) documented a mixture of *Amphibolis antarctica, A. griffithii*, *Posidonia sinuosa. P. angustifolia* and mixed *Amphibolis/Posidonia* seagrass meadows, patches of macroalgal reef, and scattered sand holes amongst the seagrass and reef.

Species diversity

Bryars (2003) listed 10 fish and two macroinvertebrate species for the sheltered beach habitat between Carrickalinga Head and Lady Bay, 12 fish and four macroinvertebrate species for the seagrass habitat between Sellicks Beach and Rapid Head, 14 fish and six macroinvertebrate species for the unvegetated soft bottom habitat between Sellicks Beach and Rapid Head, 14 fish and six macroinvertebrate species for the reef habitat between Sellicks Beach and Rapid Head.

Surveys for uncommon and cryptic reef fishes have been conducted in the cell (see Baker et al. 2008, 2009).

Western Talma (Chelmonops curiosus) (M Stokes)

While the seagrass and bare sand habitats are likely to support a range of species (e.g. see Bryars 2003), apart from mapping studies that have characterised the seafloor (Shepherd and Sprigg 1976, Tanner 2002, DEH 2008, Tanner et al. 2012), only citizen science community surveys (Brook, 2007) appear to have been undertaken on the seagrass and sand habitats within Cell F24.

The SA Coast Protection Board's Beach Profile Survey Program initiative, undertaken by Coast Unit, DEW, was first established in 1977 along the Fleurieu Peninsula to monitor and evaluate changes in dune, beach and nearshore seabed levels, with a network of over 600 profiles maintained across the state. Profiles are usually established perpendicular to the shoreline and may extend 1 to 10 km offshore. Erosion hotspots are monitored annually to identify risks to natural assets and infrastructure. Profiles are also used to monitor a range of coastal ecosystems and landforms including saltmarsh and mangroves, seagrass, sand dunes and cliff profiles and provide a rare, long-term dataset which informs evidence-based decision making and coastal adaptation planning.

The program utilises a range of terrestrial and hydrographic survey techniques involving high precision GPS equipment and at some locations, topographic and photogrammetry drone survey is undertaken, which uses overlapping photos to create 2D and 3D digital surface model to map detailed changes to the coastal landforms over time.

There is one historical cross-shore beach profile monitoring site within this cell (profile 625002) established in 1977, approximately 100 m to the north of the SLSC and extending to 1 km offshore, which monitors trends in beach-dune and nearshore dynamics over time. The profile features periodic erosion in response to storm events and subsequent accretion during calm wave conditions. The foredune crest shows variability in dune level over time, with the front of the dune crest accreting over time and the rear of the crest showing a deflation area where the dune has decreased in height of up to 4 m. Following several significant nor westerly storm events over the 2025 winter, the beach level at the base of the foredune is the lowest on record over all the years of survey where surface level is 1.6 m lower than 2024 levels.

In addition, five seagrass profiles within this cell (625011 and 625010 and 625009 and 625008, 625007) established by Coast DEW as part of a study (Murray-Jones et al 2009) in partnership with the South Australian Research and Development Institute (SARDI) Aquatic Sciences and the AMLR NRM Board (now Green Adelaide) to monitor seagrass condition where baseline bathymetric data was collected in 2009. This is an important baseline data set from which to monitor future condition of seagrass conditions as well as changes in seabed bathymetry in response to changes in seagrass cover with historical links between seagrass loss and seabed erosion and deepening off other urban populations (Tanner et al, 2012 and 2019). This survey was undertaken on the basis that Yankalilla Bay is home to extensive areas of seagrass in the region with the potential to be impacted by settlements with growing urban populations.

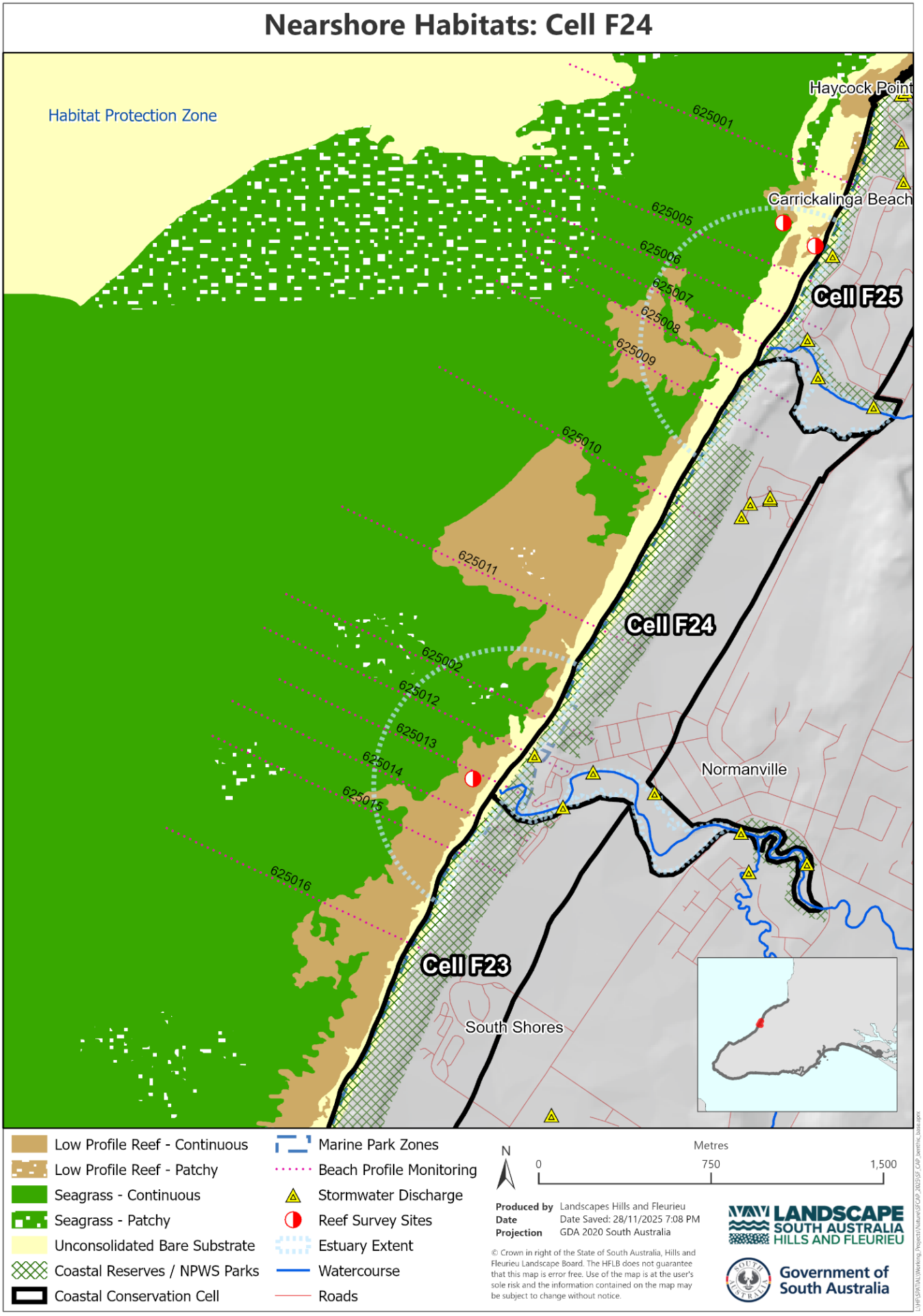


Figure 24.3 Nearshore habitats of Cell F24.

Threats

Whole cell

There are a diversity of threats across the length of the cell, including land ownership, land use, development zoning, vegetation block shape, isolation, and degradation, distribution of significant weeds, and viewscape values (Caton et al 2007).

The threat of land ownership and land use identifies some land parcels as potential threats to coastal areas due to factors like proximity to the coast or vulnerability to hazards. This highlights land parcels for potential intervention, such as zoning changes, restrictions or land purchase, to mitigate risks like erosion, inundation (storm surges, or sea-level rise), or the potential impact of current or future land use on coastal ecosystems, such as development or agriculture.

Dune face scarping (steep faces) and erosion along the length of the dune system after storm surge and high tides at Normanville (June 2025) (M Sierp)

The region is one of the strongest areas for growth in South Australia. In the summer holiday season, the local population doubles in size, putting additional pressure on infrastructure, services and the environment (AECOM 2010, AWE 2020). Usage of coastal environments via visitor/tourism pressures, walkers, camp groups, and major events, have the potential to increase weed incursions, damage vegetation, introduce litter, and disturb native fauna. Despite relatively defined paths that are heavily utilised, unintended foot traffic wanders off tracks, which results in creation of unauthorised access tracks within and across the dunes, and subsequent damage to native vegetation.

The diversity and structure of the native vegetation communities in the Normanville Dunes and coastal habitats in this cell are threatened by a range of introduced weed species (Telfer and Milne 2016). A seed bank of African Boxthorn (*Lycium ferocissimum*), Olives (*Olea europaea ssp. europaea*) and Blowfly Bush (*Rhamnus alaternus*) remains in the dunes following years of targeted weed control. A substantial population of Olives remains at Bungala Estuary, which presents a fire hazard for the township and an ongoing source of weed spread to the Heritage Listed Normanville dunes. Black Flag (*Ferraria crispa ssp. crispa*) is a threat in the dunes, while Caltrop (*Tribulus terrestris*) is located in the paddocks behind the dunes and may be a seed source for future incursions.

Encroachments into the dunes from garden weed escapes, dumping of garden waste and intentional planting of non-local plants are a threat (Telfer and Milne 2016, Caton et al 2007, AECOM 2010), spreading from local residences and the Caravan Parks, including New Zealand Mirror-bush (*Coprosma repens*), assorted succulents (Tree Aloe (*Aloe arborescens), Century Plant (Agave americana), Cotyledon (Cotyledon orbiculata var.), Aeonium spp.*), Teneriffe Daisy (*Argyranthemum frutescens ssp. foeniculaceum*), Geranium (*Geranium sp.),* Cape Marguerite (*Dimorphotheca ecklonis)* and Gazania (*Gazania linearis*).

The following declared and red alert weeds were found within this cell: Bridal Creeper (*Asparagus asparagoides),* Gazania *(Gazania linearis),* African Boxthorn *(Lycium ferocissimum),* Western Coastal Wattle *(Acacia Cyclops),* Gorse *(Ulex europaeus),* Soursob *(Oxalis pes-caprae),* Sallow Wattle *(Acacia longifolia ssp. longifolia),* Golden Wreath Wattle *(Acacia saligna),* Sea Spurge *(Euphorbia paralias),* False Caper *(Euphorbia terracina),* Tufted Honey-flower *(Melianthus comosus),* Olive *(Olea europaea ssp. europaea),* Giant Reed (*Arundo donax),* Salvation Jane (*Echium*

plantagineum), One-leaf Cape Tulip (*Moraea flaccida),* Blowfly Bush (*Rhamnus alaternus),* Dog Rose (*Rosa canina),* Gorse (*Ulex europaeus),* White Arum Lily (*Zantedeschia aethiopica),* Marram Grass (*Ammophila arenaria),* Cape Weed (*Arctotheca calendula),* White Arctotis (*Arctotis stoechadifolia),* Teneriffe Daisy (*Argyranthemum frutescens ssp. foeniculaceum),* Kikuyu (*Cenchrus clandestinus),* Feather-top (*Cenchrus longisetus),* Evening-flower Gladiolus (*Gladiolus tristis),* Broad-leaf Cotton-bush (*Gomphocarpus cancellatus),* Tree Mallow (*Malva arborea),* Bracelet Honey-myrtle (*Melaleuca armillaris ssp. armillaris),* Cape Honey-flower (*Melianthus major),* Common Iceplant (*Mesembryanthemum crystallinum),* Castor Oil Plant (*Ricinus communis),* Pincushion (*Sixalix atropurpurea),* Aster-weed (*Symphyotrichum subulatum),* Sea Wheat-grass (*Thinopyrum junceiforme),* Perennial Veldt Grass *(Ehrharta calycina),* White Arctotis *(Arctotis stoechadifolia),* Black Flag *(Ferraria crispa ssp. crispa), and* Apple of Sodom *(Solanum linnaeanum).*

Dieback of the woodland overstorey species (*Acacia unicifolia*, *Allocasuarina verticillata*) has been recorded in recent years, with plants clearly dying at a faster rate than they are regenerating. A loss of this open overstorey layer would reduce the available habitats for woodland birds and greatly change the nature of the dunes (Telfer and Milne 2016). Possible causes include old age, extended periods of low rainfall, competition with introduced species, and replenishment of young trees limited by grazing pressure.

Pest animal threats to coastal fauna and flora from rabbits (*Oryctolagus cuniculus*), foxes (*Vulpes vulpes),* and cats (*Felis catus*). There is a need to monitor and control Fallow Deer (*Cervus dama*) incursions. Coordinated collaboration between landowners and managers is required to manage pest animals (refer to regional pest management strategies). Total grazing pressure within the cell, particularly the dunes, exists through introduced and native species, as well as stock from adjacent land, impacting on vegetation through limiting regeneration and revegetation activities. Telfer and Milne (2016) note Western Grey Kangaroo (*Macropus fuliginosus*) frequent the open grazing areas adjacent to the dunes and emerge from sheltered areas of remnant vegetation at dusk to graze in the open but then retreat to these remnants at other times.

Rabbit (Oryctolagus cuniculus) or Fox (Vulpes vulpes) den at rear of Normanville Dunes (Telfer and Milne 2016)

Past mining of quartz sands in the rear of the dunes has detrimentally affected the vegetation and the dune structure (AECOM 2010, Geological Society of Australia 2002). Areas of dune blowout have occurred at multiple locations, likely to have occurred from the mid-1940s due to ongoing grazing pressure (Telfer and Milne 2016). Previous damage from sandboarding in blowouts and on the foredune are still evident.

Urbanisation in the lower catchment and extensive land clearance for agriculture in the upper catchment has led to a heavily modified riverine, riparian and estuarine environment (AECOM 2010). Currently, there is no buffer zone around existing developments (urban and agricultural) to protect the estuarine and riparian zones of the Bungala River (AECOM 2010, AWE 2020). Areas next to Bungala River and behind the dunes are identified in the District Council of Yankalilla's District 30-year plan as being future residential development and community open space (currently zoned Recreation and Tourism Development under the Planning and Design Code). Pressure exists to infill areas behind the dunes, as demand for housing is experienced locally. Pockets of undeveloped land are rare within coastal areas and offer opportunity for coastal retreat of dune systems and important habitats that are under increasing pressures and impending climate change impacts.

The Normanville Dunes are on example of nature-based solution for coastal hazard adaptation, where these dunes, stabilised by native vegetation, act as a buffer by absorbing wave energy, trapping large amounts of sediments and protecting lower lying inland areas from storm surge and coastal flooding hazard. This is owed largely to the large proportion of inland areas on the boundary of the dunes that are currently undeveloped.

Hesp, et al 2025, highlights that beaches and foredunes can respond to sea level rise by translating upwards and landwards as sea level rises (Ollerhead et al., 2013; Van Ijzendoorn et al., 2021; Davidson-Arnott et al., 2024) but this can only occur if some sediment is returned to the beach following erosion events, and where there is space for the beach and dunes to do so. If infrastructure is emplaced on or near a foredune then it is unlikely translation would be allowed to take place unless we are willing to retreat (which seldom occurs).

In addition, in order for the Normanville Sand Dunes to be able to persist in the long term, a buffer to development on the land ward boundary will be require to allow for these dunes to translocate inland with sea level rise and to provide a buffer to protect future development from sand dune hazard risk and maintain a dune barrier to protect lower lying inland areas from coastal inundation. The landward dune extent currently sits on the boundary between Crown land and private land currently zoned for Tourism Development.

It is recommended that study be undertaken by a suitably qualified geomorphologist to determine an appropriate buffer to development to 2100 for a 1 metre SLR scenario to allow for these dunes to translocate inland as well as providing a buffer to coastal sand dune drift hazard risk.

As the dunes are arguable critical going forward as a key element of Yankalilla Bay’s coastal hazard adaptation strategy, opportunities exist for these investigations to be incorporated as part of an overall Coastal Hazard Adaptation Plan for the area and Council area as a whole, to respond to risks posed by coastal hazards and to plan for the protection of natural assets as well as council and private assets into the future.

Most of the stormwater drainage outlets in Normanville discharge directly into the Bungala River before flows reach the estuary. However, at some locations stormwater flows are directly into Yankalilla Bay (AWE 2020). While some of the stormwater at Carrickalinga is directed via the underground stormwater network, formal/informal roadside swales to a detention basin, run-off is primarily being discharged directly into the marine environment, with only a couple of outfalls draining into the Carrickalinga Creek (AWE 2020).

There is evidence of freshwater soaks to the rear of some sections of the Normanville sand dunes ie presence of a Red Gum (*Eucalyptus camaldulensis)* habitat and presence of other freshwater sedge species. There is also freshwater pooling of these lower lying areas following high rainfall events and ongoing issues with managing stormwater from incremental land divisions. With more intense rainfall events, the combined interaction of seasonal flooding and interactions with rising saline ground water from sea level rise is increasingly uncertain.

Several butterfly and skipper species that have localised populations are limited in capacity for dispersal and/or colonisation of new sites. The lack of suitable habitats, weed invasion, and interconnectivity between habitats prohibits movements and, therefore, creates localised isolation of populations. Several species are now restricted to pockets of isolated habitats, resulting in some being vulnerable to population collapse (Stolarski 2024).

On the beach and dunes, Sea Wheat-grass (*Thinopyrum junceiforme)* and *Euphorbia* spp (*Euphorbia paralias* and *E. terracina*) are limiting Hooded Plover habitat and require management. Dunes with introduced grasses develop steeper and higher dune heights than those dominated with local native spinifex plants, due to their growth habits. Hooded plovers need a relatively open beach/foredune area to be able to breed, roost and feed. Dunes with high and densely planted areas are not favourable to Hooded Plovers and put them at greater risk to predators such as silver gulls, ravens, foxes and other species. Foxes are an issue at beaches within this cell and have impacted nesting, chick survival and fledging success.

Coastal raptors are recorded to utilise habitats within the cell, including Wedge-tailed Eagles (*Aquila audax audax*) that have established foraging and breeding territories locally. Current and potential future threats include disturbance, recreational and industrial use of drones, windfarms and spread of urban development (Rowe et al 2018).

Undefined boat launching occurs on the at the Normanville estuary, vehicles are often left in the beach instead of being returned to the carpark. Access to the beach for vehicles often overlaps with Hooded Plover breeding territories at the estuary mouth. Vehicles on beach impacts occur, with unauthorised off-road vehicle access and beach driving between the two boat ramps at Lady Bay and Normanville.

Unauthorised group activities on beaches impacting coastal environments and beach-nesting birds (for example, outdoor education service providers and school groups).

Estuary (Bungala River)

Pressures of local population increases (in peak times that doubles in size) places additional pressure on infrastructure, services and the environment, along with past urban and agricultural development, which have led to a decline in the ecological character of the Bungala Estuary over time (AECOM 2010).

There are extensive areas of weeds within the estuary that have been actively managed on public land over the last decade by Coastal community group efforts and through engaging contractors. High priority species include several Weeds of National Significance (WONS), declared and red alert species including Bridal Creeper (*Asparagus asparagoides)*, Gorse (*Ulex europaeus),* Western Coastal Wattle *(Acacia cyclops),* African Boxthorn *(Lycium ferocissimum),* Apple of Sodom *(Solanum linnaeanum)* and Blowfly Bush *(Rhamnus alaternus).*

The private land upstream of the caravan park to Willis Drive has extensive areas of weeds, particularly large stands of Olives (*Olea europaea ssp. europaea*). Left untreated, these areas provide sources for seed to be spread to other areas of conservation value and reduce capacity for restoration. The large stands of olives are also a fire risk to the township, as the species is highly flammable.

Heavy aquatic reed growth can be associated with estuarine disturbance, such as altered water regimes, sedimentation, and increased nutrients (AECOM 2010). Heavy reed monocultures can also impact upon estuary integrity by blocking flows and further increasing sedimentation. Isolated patches of heavy reed monoculture exist in the Bungala Estuary. Several sedge species and floodplain communities exist in good condition, and at the western end of the survey area. There are a number of remnant River Red Gums (E*ucalyptus camaldulensis spp. camaldulensis*) in Bungala Park upstream of Willis Drive.

The loss of riparian vegetation, predominately through grazing pressures, has decreased bank stability, increased erosion, reduced the amount and quality of fish habitat, and reduced the buffering capacity of the riparian zone (AECOM 2010).

Lower Bungala River estuary following months of drought over summer 2024/25. Note dieback of many mid storey wattle (Acacia longifolia ssp. sophorae) shrubs within the dunes (C Jackson)

Water extraction upstream has reduced environmental flows, which has led to the estuary mouth remaining closed for extended periods. Altered mouth opening and closing regimes (including the artificial opening and closing of the estuary) can have dramatic effects on the estuary, as well as the adjacent reef and seagrass environs (AECOM 2010). The Bungala Estuary historically exhibited an intermittent mouth opening regime. However, reduced environmental flows and connectivity from agricultural developments have significantly reduced environmental flows (Bryars 2003).

There are currently four stormwater outfalls within the estuary boundary for this plan. These drains release untreated stormwater into the estuary (AECOM 2010). Changes to water flows, including increased stormwater flows, can cause scouring and undercutting of estuary banks, taking sediments further downstream.

Normanville wastewater treatment plant (WWTP) is located adjacent to Salt Creek (a tributary of the Bungala River), which currently services the townships of Normanville and Yankalilla. Following treatment, wastewater his held in holding basins and is reused by the golf course at Links Lady Bay.

Sea level rise will increase the level of sea water flowing up the Bungala and Carrickalinga River estuaries leading to increased inundation of estuary floodplains over time between the estuary mouth and Main South Road.

Artificial opening by mechanical opening of the estuary can be undertaken by the Council (associated with an EPA permit) to manage river build-up. There are upstream implications and complexities associated with opening and closure of estuaries, particularly related to permanent water bodies. The opening of the estuary mouth can dramatically affect the functioning of organisms within the estuary and near shore. Changes to mouth opening will impact water quality and fish within the estuary, and the movements of fish between the estuary and the coastal environment (AECOM Australia Pty Ltd 2010).

Nearshore Habitats

The coastline has significant coastal settlements at Normanville and Carrickalinga and has significant intermittent freshwater inputs via the Bungala River and Carrickalinga Creek. The Bungala River and Carrickalinga Creek are directly connected to the sea only during the wetter months from about April to October (Bryars 2013). It is unknown if groundwater exchange occurs between the estuary waters and the adjacent seawater during times when the river mouths are closed. Farm dam construction in small coastal catchments has reduced environmental flows in creeks (Caton et al 2007).

The Bungala River collects rural catchment water and stormwater from both Yankalilla and Normanville. Carrickalinga Creek collects rural catchment water and stormwater from the Carrickalinga settlement. Stormwater in general is a recognised issue within the Yankalilla area, and a stormwater management plan (which addresses both urban and rural sources) has been developed that encompasses the Yankalilla River, Bungala River and Carrickalinga Creek catchments (AWE and SARDI 2012). Local reports of turbid plumes of discharge water from the Bungala River and Carrickalinga Creek that spread along the inshore waters of Yankalilla Bay are common. Stormwater management is also an issue for existing developments behind the foreshore dunes and is seen as a potential problem with any future developments in the area. It is unknown if stormwater entering the aquifer behind the foreshore dunes could make its way into the marine environment.

Caton et al. (2007) identified that poor water quality from the Bungala River estuary had potential to be impacting seagrass beds. Inshore reef adjacent the Bungala River and Carrickalinga Creek has sediment, mussels, and turfing macroalgae (Bryars 2013), which could be indicative of nutrient and sediment impacts. AECOM Australia Pty Ltd (2010) identified a number of issues for the Bungala River estuary, including elevated sediment and nutrient inputs, reduced environmental flows and connectivity with the marine environment. Currently there are issues with polluted stormwater entering the Bungala River following heavy rains. AECOM Australia Pty Ltd (2010) also identified that nutrient and sediment outflows from the estuary during times when it is open pose a threat to adjacent seagrass and reef habitats.

Despite the apparent threats, two separate studies concluded that seagrasses within the cell appeared in general to be in good condition, with no indication that the Bungala River or Carrickalinga Creek were impacting on nearshore seagrasses (Murray-Jones et al. 2009, Tanner et al. 2012). Epiphyte cover on seagrasses was not increased around the Bungala River mouth or Carrickalinga Creek mouth (Tanner et al. 2012). It is possible that even with increased nutrient inputs to the inshore waters of Yankalilla Bay, wave energy in the area has a cleaning effect on seagrass epiphytes (cf. Bryars 2009). Outflow from the Bungala River did not appear to be affecting the reproduction, recruitment or growth of the seagrass, *Amphibolis antarctica*, during 2009 (Irving 2009), although the river was apparently not flowing at the time of the study (AECOM Australia Pty Ltd, 2010).

In contrast to earlier seagrass studies, Bryars (2014) documented unhealthy *Amphibolis* seagrass, high epiphyte loads in some areas, widespread erosion scarps and blowouts, and presented evidence for historical inshore seagrass loss in Yankalilla Bay, particularly adjacent to the Bungala River. Bryars (2014) suggested that seagrass loss might be linked to freshwater inputs from the Yankalilla River, Bungala River and Carrickalinga Creek, but also noted that groundwater freshwater upwellings were occurring in parts of Yankalilla Bay.

Sea Nymph (Amphibolis antartica) seagrass in the nearshore habitats at Normanville (M Sierp)

Surveys using video transects were conducted by Murray-Jones et al 2009 and Tanner et al (2012) and (2019) across Yankalilla Bay, encompassing south of Bungala River to North of Carrickalinga Creek, to determine the health of seagrass community data using the same methods and data established in 2009. It indicated a seagrass decline from south to north. The study noted epiphyte loads greater in northern seagrass compared to the south, possibly indicating greater nutrient and stress loads. Nutrients were suspected to be a localised cause of seagrass epiphyte loads documented south of Bungala River.

Sierp (2025) conducted an assessment of benthic habitat conditions near the Carrickalinga Creek and Bungala Creek estuaries in Yankalilla Bay, focusing on the potential for seagrass rehabilitation. This work built on earlier surveys, particularly Bryars (2014), which documented significant erosion and declining seagrass health in the area. The investigation aimed to evaluate changes in ecosystem condition and inform future restoration strategies, recognizing both the ecological value of seagrass meadows and the increasing feasibility of restoration in Gulf St Vincent.

The Sierp (2025) survey found seagrass meadows to be in generally good condition, with patchy but dense canopy cover and low to very low epiphyte loads, lower than those reported by Bryars (2014). However, high turbidity during the survey, possibly linked to the 2025 algal bloom, limited visibility and prevented diving assessments. Despite these challenges, video and sonar data were sufficient for species comparison with the 2014 baseline. Seagrass communities near the Bungala estuary showed more signs of degradation than those at Carrickalinga, including unhealthy *Amphibolis* and reduced recruitment, potentially influenced by local riverine inputs. Evidence of erosion scarps and blowouts persisted, particularly near Normanville, indicating ongoing stress in nearshore habitats. A newly observed blackening of *Posidonia* leaves may signal environmental stress, though its cause remains unclear. Overall, the findings suggest a decline in seagrass health at Bungala since 2014.

Whilst a lack of freshwater flows and reduced connectivity with the sea are issues for the Bungala River estuary itself, it must be recognised that due to the polluted nature of the estuary (elevated nutrients/sediments and other pollutants), any management action aimed at increasing outflows from the estuary has the potential to negatively impact on the adjacent marine environment (see AECOM Australia Pty Ltd 2010).

Bryars (2013) considered the risk ratings for identified catchment and stormwater threats to seagrass and reef ranged from low to high, while no measurable threats to sand were identified.

Bryars (2013) describes the two major sources of catchment water and stormwater discharging to the coast. Because all of the relatively small total area of reef lies inshore, where contact with these flows is most likely, it was considered that a severe consequence for reef may occasionally occur, hence the risk rating was high. In contrast for seagrass, Bryars (2013) notes the relative area of seagrass is much greater than reef, and most of it occurs further offshore. Therefore, it was considered possible that there would be a minor consequence for seagrass and the risk rating was low.

It is worth noting that the risk ratings made by Bryars (2013) were made prior to the studies in 2014 (Bryars) and 2019 (Tanner et al 2019), and these ratings may need to be reviewed, considering the impacts (epiphyte loads in some areas, widespread erosion scarps and blowouts) documented on inshore seagrass.

Opportunities

Whole cell

Manage visitor numbers and impacts to ensure coastal areas can support growing demand, while maintaining and improving the quality of experiences without diminishing the values of the cell. Investigate informal camping issues, low-impact walking trails, and further opportunities to reduce impacts on the coastal environment. Education, restrictions and compliance regarding off-road vehicle and informal camping. Opportunity to work with nature-based tourism (commercial and recreational) operators, agencies and community volunteers to increase visitor education and stewardship of local coastal values, environments, protection of species and appropriate behaviors.

Community education opportunities regarding:

- Unique and valuable coastal landscape (for example, wildflowers, birds, and mammals)
- Fragile nature of coastal areas that are sensitive to foot traffic, soil compaction and erosion.
- Coastal gardens and resident/business owner education
- Community education and targeted communications regarding Marine Parks, nearshore habitats and estuary values.
- Beach-nesting birds, such as Hooded Plovers (dogs on leash, nesting sites, citizen science projects, managing visitor disturbance)

- Citizen science monitoring to contribute to intertidal reef monitoring, seagrass restoration, dolphin watch, beach pole monitoring, Fleurieu seabird monitoring program and beach-nesting birds.
- Consistency of signage regarding coastal values and for compliance purposes, including possibility for consistency of signage around conservation areas (public managed lands, coastal reserves) across the Fleurieu Peninsula coast.

This cell (and F23) is highlighted as one of three areas (along with Newland Head to the Bluff (F13 - F15) and the beaches and lower slopes of Fishery Beach, Lands End, Cape Jervis and Morgans Beach (F19 - F20) within this plan to have high conservation and high threat values. As a result, the priority of actions (conservation and threat) for these areas have been rated higher than in other cells and warrant prioritised effort and investment.

Review strategic planning to enable targeted actions and the opportunity to guide and prioritise management effort that enhance coastal resilience and environmental protection. These include reviewing and restricting development in high-risk zones, acquiring vulnerable or ecologically valuable land to conserve sensitive coastal environments and managing private land use to safeguard coastal habitats and support long-term ecological health. Consider opportunities and the best mechanisms for greater long-term conservation status and protection of this area (conservation outcomes and ongoing ability to access current funding and resources) and connectivity with cells F23-F25.

The transient population at Normanville puts substantial pressure on the Bungala River estuary. With the sudden doubling of the population in summer, comes increased visitation, litter, trampling and wastewater treatment requirements, as well as pressure to construct more holiday accommodation. Future development in the region, particularly in close proximity to the Bungala Estuary, needs to incorporate the principles of ecologically sustainable development and water sensitive urban design (WSUD) (AECOM 2010, AWE 2020). Opportunities for increased wastewater treatment output volumes with increasing population, should consider that environmental flows would increase flows within the lower catchment, and potentially increase connectivity with marine environments.

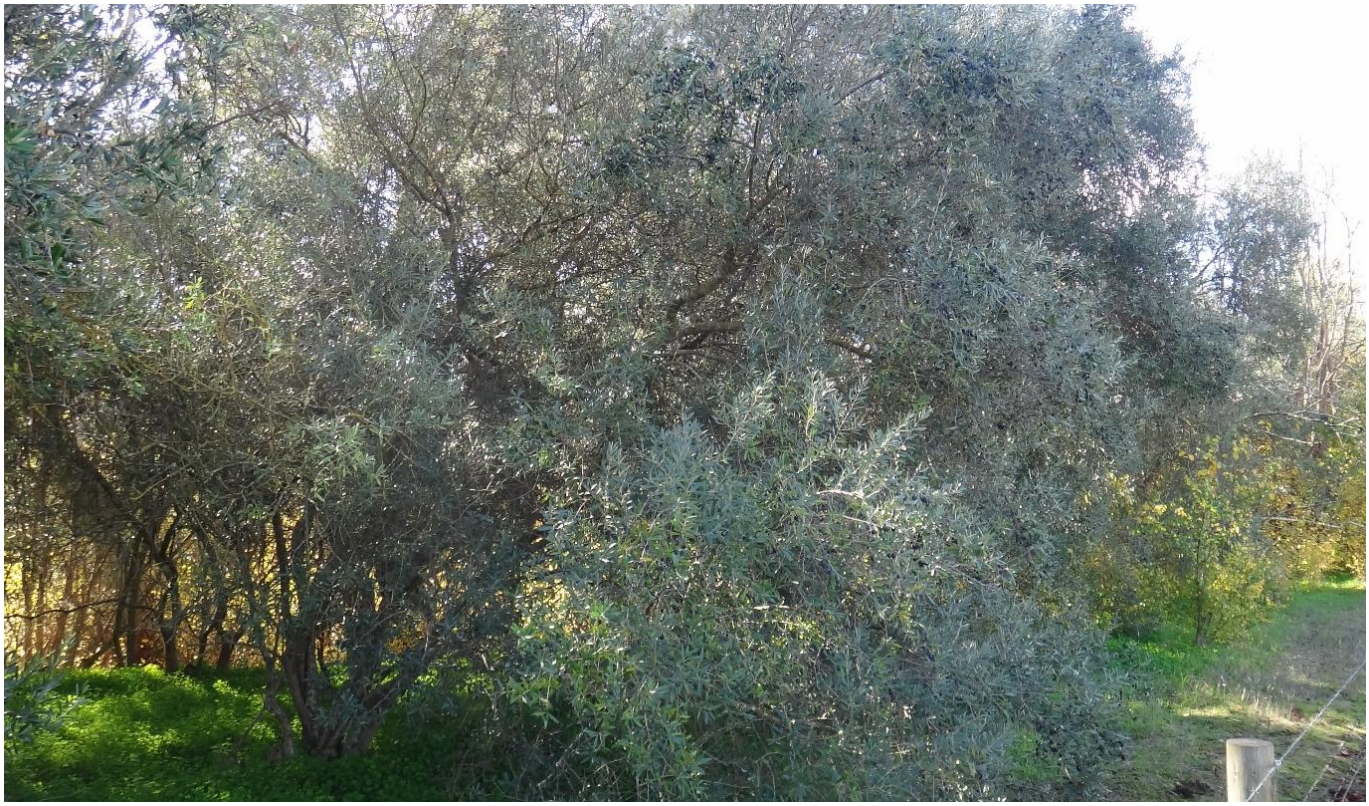
Yankalilla Bay is one of the few urban areas on the Southern Fleurieu that still contains extensive undeveloped coastal dunes, including land adjoining estuaries. This makes it one of the last viable locations where long-term adaptation through development avoidance remains feasible. To support this, further investigation is needed to prioritise opportunities for coastal dune retreat under future climate scenarios. Where development proceeds, appropriate buffer zones for riparian, dune, and estuarine habitats should be defined to enable rehabilitation and staged habitat retreat. Planning processes should enforce increased protection and minimum setbacks for these areas.

Implement WSUD features to treat stormwater run-off to improve stormwater quality and biodiversity in the area and actively manage future stormwater impacts on the coast and marine environment (AWE 2020).

Normanville dunes between Carrickalinga Sands and Carrickalinga Creek estuary with buffer areas to allow for dune retreat under future climate change scenarios (Coast Protection Board, March 2024)

Continue implementation of the Normanville Dunes Biodiversity Action Plan and the Bungala Estuary Action Plan as a high priority, to protect and enhance the biodiversity and conservation values of this cell, while also addressing the multiple threatening processes. Review of these documents is likely to be needed throughout the life of this plan, to review actions and update priorities as needed. Resourcing for BushRAT or condition assessment should be supported to monitor impacts of action and detect change in condition.

Several existing council plans (DCY 2019, AWE 2020) call for the development of a linear park and trail between the townships of Yankalilla, Normanville and the coast, to buffer development growth areas and improve water quality of the Bungala River. Development of trail networks should ensure existing areas are improved for biodiversity and conservation outcomes, limit disturbance to fauna, and increase community awareness of environmental values.



Large stands of wild Olives (Olea europaea ssp. europaea) exist within the Bungala estuary and require control as a declared weed (D Miles)

Weed management is a key priority to help retain the high biodiversity values within the cell across the parcels of Council and Crown lands. Targeted control of declared and red alert weeds, including Olive (*Olea europaea ssp. europaea*), African Boxthorn (*Lycium ferocissimum*), Coast Tea-tree (*Gaudium laevigatum*), Golden Wreath Wattle (*Acacia saligna*) and Western Coastal Wattle (*Acacia cyclops*) are a high priority, as they are actively invading intact native vegetation and displace or choke out native plant species. Ongoing monitoring for, and mapping of, new weed infestations should also be undertaken as part of an ongoing weed control program, which is critical to addressing high priority weeds and maintaining conservation values for the cell (Baron 2024). Garden escape weeds require ongoing monitoring, control, and education for local residents on the impact of coastal garden weeds that spread to coastal reserves.

Monitor the impacts and effects of total grazing pressure that are causing impacts on native vegetation and revegetation programs and reducing plant diversity and habitat quality for other important and conservation rated species. Implement measures to reduce grazing pressure and erosion on creek lines, estuaries and high conservation value pockets of remnant vegetation. Replace, repair and maintain existing fencing with private land to restrict stock access to the dunes and areas of conservation values.

Restoration and revegetation efforts at Normanville Dunes should focus upon supplementing existing habitat, using appropriate species for the vegetation community and planting at appropriate (natural) densities. Telfer and Milne (2016) identified that the vegetation already present in the foredune and dune shrubland areas provides a good benchmark for the appropriate target structure and floristic composition. The hind-dune woodland areas have been modified in the past and efforts should aim to recreate a woodland structure that may represent the type and diversity of species that was once present in the area. Revegetation of key woodland species (Sheoak, Coast Silver Wattle) is needed to retain important woodland habitat.

Targeted interventions for threatened/rare plant species and communities, including weed control and reintroductions and translocations of rare plants and orchids. Engagement and collaboration with private landowners of high value remnant vegetation communities and opportunities for increased protection from stock, weed incursion and potential future development.

Pest animal threats to coastal fauna and flora from rabbits, foxes, and cats. There is a need to monitor deer incursions and kangaroo numbers, and control through coordinated collaboration between landowners and managers to manage pest animals (refer to regional pest management strategies).

Western Grey Kangaroo (Macropus fuliginosus) frequent the open grazing areas adjacent to the dunes (M Stokes)

Assessment and rehabilitation of access tracks and dune blowouts (and previous sand mining sites) are needed, while addressing continuing access control issues, with visitor pressure on tracks through dunes. From a conservation and biodiversity perspective, it is desirable that no further beach access points are created in the Normanville Dunes (Telfer and Milne 2016, Caton et al 2007). Continue to manage the large blowout areas, following substantial efforts within the dune near the South Shores development (F23), where management intervention (fencing and revegetation) has been very successful in helping to stabilise this area.

Maintain and expand coastal restoration actions, including revegetation with local native plants and priority weed control particularly for butterfly populations, including Bitter-bush Blue (*Theclinesthes albocinctus)* and common species. Increase suitable habitat for coastal butterfly populations, including planting of host plants in coastal areas to increase habitat suitability for local introductions.

Icilius Hairstreak (*Jalmenus icilius*) butterflies are considered rare in the region and are only found within the Plan area in Normanville Dunes (F23 and F24). This species requires a range of host plants, including Golden Wattle (*Acacia pycnantha)*, Wirilda *(A. retinodes),* and Coast Silver Wattle (*A. uncifolia),* which should be increased within the dunes of this and neighbouring cells, to increase potential habitats (Stolarski 2024).

Golden-haired Sedge-skipper (*Hesperilla chrysotricha cyclospila*), with its current Fleurieu Peninsula extant of four known population sites (Stipiturus CP, Myponga River Gorge private property (PP), and Deep Creek PP), is considered as locally vulnerable. Opportunities have been identified in cells F15, F21, F22, F23 and F24 for the restoration of the species habitats with Saw-sedge (*Gahnia* ssp. including Curled Saw-sedge (*Gahnia ancistrophylla),* Limestone Saw-sedge (*Gahnia deusta),* Thatching Grass (*Gahnia filum),* Red-fruit Saw-sedge (*Gahnia sieberiana);* Cutting Grass *(Gahnia trifida))*, in view of introduction into sites.

Bitter-bush Blue butterfly (*Theclinesthes albocinctus)*, whilst locally common at times, is subject to restricted population sites supporting Coast bitter-bush (*Adriana quadripartita)*, but requires additional habitat enhancement through plantings of *Adriana* in suitable soils in cells F23 & F24. The facilitation of host plant propagations and habitat creation supports extensive habitat and site interconnectivity across many cells for securing this species into the future.

Bitter-bush Blue (Theclinesthes albocinctus) on larval host plant Coast Bitter-bush (Adriana quadripartita) (M Endacott)

This cell is important for coastal raptors and ongoing monitoring and management is critical to minimise visitor disturbance and to support habitat condition for raptor populations. Investigate opportunities to support and implement the recovery plan for Eastern Osprey and White-bellied Sea Eagles (2022). Monitor, maintain and improve the quality of vegetation for the provision of wildlife habitat for priority species.

Continue to support collaborative efforts to protect and conserve Hooded Plover breeding habitats within this cell. Implement actions to support Hooded Plover conservation including signage for dogs on leash on beach, opportunities for collaboration to manage foxes and increase suitable habitat by replacing introduced Sea Wheat-grass with native Spinifex vegetation associations to support Hooded Plover populations. Maintain Council beach controls to support Hooded Plover protection efforts.

Define boat launch access areas (Lady Bay and Bungala), community education and compliance to reduce damage to reef and beach environments, including beach-nesting bird locations.

Opportunity for coordinated and permitted beach activities, including awareness for outdoor activity service providers and groups using the beaches.

Implement actions to support Hooded Plover conservation including signage for dogs on leash on beach, opportunities for collaboration to manage foxes, and increase suitable habitat by replacing introduced Sea Wheat Grass with native Spinifex vegetation associations to support Hooded Plover populations. Maintain council beach controls to support Hooded Plover protection efforts.

As part of the *Coastal Dune and Clifftop Vegetation Surveys* (1995–1997) (Opperman 1999), long-term monitoring sites were established across South Australia and the Southern Fleurieu region to assess the structure and composition of coastal dune and clifftop plant communities, and their relationships to regional and environmental factors. Given that nearly 30 years have passed since these surveys were undertaken, there is strong potential for shifts in geographical range and changes in species composition due to the long-term impacts of climate change. The *Survey of Remnant Vegetation of the Southern Fleurieu Peninsula* involved biological surveys conducted between 1987 and 1991 to establish baseline data on remnant vegetation and swamps in the region south of Adelaide, South Australia.

During the development of this plan, and through the assessment of flora and fauna (both native and introduced) species lists available via the Biological Database of South Australia (BDBSA), significant gaps were identified between recorded species and known species distributions within cells. To address these data deficiencies and improve the accuracy of long-term ecological records, both above foundational vegetation survey projects should be repeated and incorporated into an ongoing monitoring program. Fauna assessments across cells to establish population baselines, update existing records and species distribution, particularly of underrepresented groups (reptiles and invertebrates) should be undertaken.

There is opportunity for collaboration between partners, such as National Parks, Marine Parks, Traditional Owners, First Nations, landscape boards, volunteer groups, community and nature-based tourism operators for monitoring of seabirds, coastal raptors, marine mammals and other wildlife.

Support community volunteer and private landowner efforts to undertake priority restoration and conservation work in this cell. Strengthen partnerships with Traditional Owners, First Nations, lessees, adjoining landowners, volunteer organisations, researchers, and the wider community to foster collaboration and long-term management benefits for biodiversity protection and restoration. Continue to develop and maintain good relationships with privately owned land neighbours.

Collaborate with the SA Climate Ready Coasts program to enhance, resource, and implement coastal management initiatives and accelerate coastal hazard adaptation planning across South Australia. This program supports the development and delivery of Coastal Hazard Adaptation Plans (CHAPs), led by the Local Government Association (LGA) of South Australia in partnership with the SA Coast Protection Board, the Department for Environment and Water, the Adelaide Coastal Councils Network, and the SA Coastal Councils Alliance.

Estuary (Bungala River)

Stock exclusion (and fence repair), weed control of priority species and revegetation with appropriate local coastal/riparian species along the Bungala River estuary are crucial to the ecological integrity of the area (AECOM 2010).

Protection from weed incursion, development, disturbance, increased restoration and community awareness of local value of vegetation communities related to the EPBC Act Threatened ecological communities – subtropical and temperate coastal saltmarsh and *swamps of the Fleurieu Peninsula* – at Bungala River estuary. Further assessment of these areas through formal classification and listing on the national register of Matters of National Environmental Significance (MNES) needs to be undertaken.

Create an estuary buffer between Normanville Jetty Caravan Park and dunes through planting of native vegetation to reduce unauthorised access to the dunes and impact of wildlife.

Erosion and undercutting of banks from increased water movement should be addressed with assessment of feasibility of instream structures to slow the flow (AWE 2020). Increased sedimentation and build-up of undesirable reed growth in estuary should be monitored and removed as required (with appropriate approvals), to prevent flow restrictions.

Untreated stormwater that enters the waterway impacts water quality within the estuary. Opportunities exist to construct wetland (biofiltration) systems in naturally low-lying areas and redirect stormwater outfalls to these locations (AECOM 2010, AWE 2020, Baron 2024).

AWE (2020) recommends the development of a watercourse rehabilitation plan linked to linear park developments (e.g. including emergent and submerged aquatic vegetation), from at least Hay Flat Rd to the estuary. The aim is to reduce impacts of adverse water quality run-off on downstream users (priority rehabilitation site), promote aquatic biota recruitment and distribution, and increase amenity value of the park. Key strategies include:

- In-stream treatment systems, with potential for the existing water lagoon along Willis Drive to be deepened and widened to create a large treatment area for nutrient uptake, whilst improving habitat opportunities.
- Rehabilitation of the permanent waterhole at the southern end of Norman Ave (within Bungala Park), to improve in-stream values and address the significant pollution problems via urban run-off.
- Implement best management practice principles at Caravan Park to ensure water quality discharges into the Estuary meet water quality objectives listed in SMP.

Improvement to the estuarine flora and fauna habitats and connectivity with marine environments can be achieved through the development and employment of an Estuary Entrance Management Support System (EEMSS). This would include a framework for decision makers, considering both the ecological and infrastructure/amenity concerns. Improved management of estuaries within the region (and across the state) is required for a more strategic planning and management approach to deliver positive and coordinated outcomes for estuary habitats. Improved monitoring of ecological communities, connectivity with marine systems and water quality conditions within the estuary will allow more effective adaptive management; being aware of conditions and responding as required.

A hydrological study of the Bungala catchment, including groundwater inputs, should be undertaken to:

- Determine the degree of groundwater versus stream water entering the estuary, particularly during different seasons.

- Determine the effects of local groundwater extraction (e.g. commercial recreational users) on estuarine flows and salinity.
- Determining whether groundwater inputs into the estuary would allow for better management of surface and groundwater, and a better understanding of how dependent the estuaries are on groundwater as a base source of water.

Flow restoration recommendations to restore and enhance watershed flows and, therefore, increase estuarine flushing include:

- Consider estuarine environmental flows in the Water Allocation Plan (WAP).
- Determine the proportion of dams in the upper catchment that should have low flow bypasses by 2029.
- Investigate surface water extractions throughout the catchment, including for agriculture and recreation.

Maintenance of natural conditions in creeks and estuaries depends on integrated catchment management. Land use that minimises the negative impacts to the stream, including limited water extraction, the reestablishment of native vegetation following priority weed control, and exclusion of stock from creek lines, should be encouraged within the cell and throughout the catchment.

Nearshore Habitats

Bryars (2013) recommends that biological surveys of seagrass and sand habitats are required to better understand habitat values and compile meaningful species lists for the cell.

A follow up survey to that of Bryars (2014) would be useful to determine if the erosion scarp adjacent to the Bungala River has continued to migrate offshore, with subsequent loss of seagrass meadows.

Climate change threats to coastal biodiversity (see BMT 2025)

Potential climate change threats to coastal biodiversity

Cell F24 includes an estuarine ecosystem of the Bungala River, beach and dunes. The dunes support native vegetation, including coastal shrubland and grasses There is an inshore limestone reef, with intertidal and reef ecosystems supporting a number of flora and fauna species, as well as extensive dense seagrass offshore.

Biodiversity Assets potentially vulnerable to climate change in this cell include:

- Native dune vegetation
- Creek and estuary ecosystems
- Intertidal and reef ecosystems
- Beach nesting birds

These ecosystems may be particularly vulnerable to the direct impacts of climate change, particularly sea level rise, coastal erosion, increased drought, higher temperatures and more intense storms.

Rising sea levels will see increased storm damage to foredunes; Bruun Rule calculations of beach change suggest a recession of the order 5–30m over 50 years could be likely, given current IPCC sea level forecasts. Both beach and dune recede under this process and, over time, consideration will have to be given to dune recession. CSIRO forecasts suggest fewer storms, but a small increase in storm magnitude, increasing the level of unpredictability of seasonal beach change. Rising sea levels threaten tidal inundation of small areas of low-lying land adjacent to Bungala Creek, and ground water intrusion risk between Bungala River and Carrickalinga Creek (Caton et al 2007).

All climate models project drier conditions for southern South Australia, together with increased evapotranspiration. It is clear that in some years soil field capacity may not be reached in winter and seasonal run-off in the Bungala River may be greatly reduced. However, fast run-off from intense storms in summer may give irregular flows. Over time, increasing aridity will slow natural recovery from damage to dune vegetation (Caton et al 2007).

Marine heatwaves place further stress temperate reefs and seagrasses, reducing biodiversity. Higher atmospheric temperatures will lead to increased marine heatwaves, loss of species in the intertidal with longer than experience to grow back due to increased stressors, e.g. loss of sediment. Higher sea surface temperatures increase the potential for algal blooms.

Changes in ocean temperatures, salinity, and acidity (from increased CO_2 levels) can directly affect the health of temperate reefs. Warmer waters and increased acidification may hinder the growth of calcareous organisms, such as marine molluscs and phytoplankton.

Cell Action Table

Component	Issue	Proposed Action	Priority of Action	Key Players
Whole cell	Threats and opportunities to improve protection of cultural heritage within cell.	Cultural consultation and collaboration to appropriately manage cultural heritage within this area. Prevent damage, disturbance, or interference to cultural heritage by adhering to the Aboriginal Heritage Act 1988.	High (cons/ threat)	Traditional Owners, First Nations, Council, LHF, Coastal Community groups, Aboriginal Affairs and Reconciliation - Department of Premier and Cabinet
	Need to raise awareness of natural and heritage values of Normanville Dunes and the coastal region.	Development of a strategy to involve and raise capacity within the community to conserve natural coastal values and heritage. Structured cultural education and training for land managers, agency staff and land stewards. Support Traditional Owner aspirations to care for Country and provide cultural education for these dunes.	Medium (cons)	Traditional Owners, First Nations, Council, LHF, CPB community groups.
	Increased visitation and recreational pressure on dunes and viewing points due to increased local population and tourist promotion.	Assess increased visitation capacity at known sites, ensure infrastructure is sufficient to meet the demands of increasing visitor numbers. Manage visitor numbers within sustainable limits in ecologically and culturally sensitive and significant areas - consult with Traditional Owners.	High (cons/ threat)	Council, DEW, land managers, Traditional Owners, First Nations
		Investigate opportunities for community education and engagement regarding unique and valuable coastal landscape and fragile nature of coastal areas. Structured cultural education and training for land managers, agency staff and land stewards.	High (Cons/ Soc)	Council, LHF, DEW, NPWSSA, Traditional Owners, First Nations, coastal community groups, Community groups
		Opportunity to work with nature-based tourism operators to increase education and stewardship of local coastal environments. Support opportunities for Traditional Owner-led tourism and cultural education.	Medium (Cons)	Council, land managers, Traditional Owners, First Nations, NPWSSA, coastal community groups
		Development of consistent signage and messaging for coastal values and compliance for conservation areas (public managed lands, coastal reserves) across the Fleurieu Peninsula coast. Co-design with Traditional Owner knowledge holders through collaborative process.	Medium (Soc/ Cons)	Council, land managers, Traditional Owners, First Nations, NPWSSA, coastal community groups
		Collaborate and manage access with event managers to ensure protection of coastal areas and groups do not impact high conservation value areas, or cultural heritage in consultation with Traditional Owners.	High (threat)	Council, Traditional Owners, First Nations, coastal community groups
		Monitor aquatic activities (boating, paddleboard and jet skis) for increased pressures on local coastal habitats and fauna species interactions.	High (threat)	Council, NPWSSA, DEW and land managers
		Events on beaches and coastal habitats must not impact on natural values, especially listed threatened species and communities, in the area or vicinity of events. Event organisers should be informed, where appropriate via permits, on their obligations to not inflict environmental harm and to undertake actions in accordance with relevant legislation and by-laws.	Medium (threat)	Council, DEW, NPWSSA, BirdLife Australia, event managers
	Increase in informal camping.	Monitor Crown and Council reserves and undertake compliance where required. Seek resourcing to support implementation.	High (threat)	Council, tourism body
		Increase public awareness of legal camping areas and responsible use. Support areas set aside for free camping and correct information. Seek resourcing and build partnerships to support implementation.	Medium (threat)	Council, tourism bodies, Crown Lands, DEW

Component	Issue	Proposed Action	Priority of Action	Key Players
Whole cell	New weed incursions in reserves adjacent to residential areas.	Monitor for new weed incursions, record incursions via public database (e.g. BDBSA) and control new incursions as a priority.	High (threat)	Council, land managers, coastal community groups
	Weed species threat to significant flora and fauna habitats.	Ongoing control and investment in weed control (particularly WONS and Red Alert Species) to protect and maintain high conservation areas including is difficult to access areas.	High (threat)	Council, land managers, coastal community group, LHF, Traditional Owners, First Nations business/ contractors/ rangers
		Monitor new and existing incursions of African Boxthorn, Olives, Italian Buckthorn, Black Flag and Caltrop.	High (threat)	Council, LHF, Traditional Owners, First Nations business/ contractors/ rangers, coastal community groups
		Targeted interventions for threatened/rare plant species and communities.	High (cons)	DEW, NPWSSA, LHF, Traditional Owners, First Nations business/ contractors/ rangers, coastal community groups
		Monitor changes to dunes through BushRAT or similar monitoring to measure condition assessment and change.	High (cons/ threat)	Council, DEW, LHF, Community Groups.
	Ongoing weed incursions and weed control.	Leverage funding opportunities based on previous investment and in-kind contributions from coastal community groups.	High (Cons)	Council, LHF, coastal community groups
	Residential encroachment to coastal reserve.	Assessment of boundaries, education and compliance.	High (Threat/ Soc)	Council
		Control and monitoring of garden escape weeds from local residences and caravan parks. Target residences with educational materials, with regard to weeds.	High (Soc / Econ)	Council, coastal community groups
		Removal of introduced non-local species and restoration of pathways and erosion with local native coastal species.	High (threat)	Council, LHF, coastal community groups
	Protection of significant flora and fauna.	Protect existing populations through targeted weed control and restoration of habitats with local coastal species.	High (Cons/ threat)	Council, land managers, LHF, Traditional Owners, First Nations business/ contractors/ rangers, coastal community groups
		Revegetation programs to improve the conservation prospects of threatened species.	High (cons)	DEW, land managers, LHF, Traditional Owners, First Nations business/ contractors/ rangers, coastal community groups
		Propagate local plants for reintroduction to other sites to maintain genetic diversity and increase source populations.	High (cons)	Council, land managers, LHF, coastal community groups, Traditional Owners, First Nations business/ contractors/ rangers, local coastal plant nurseries
		Improve knowledge of fauna and flora through increased monitoring, mapping and reporting to better inform conservation management.	High (cons)	DEW, land managers, LHF, Traditional Owners, First Nations business/ contractors/ rangers, coastal community groups
	Improve connectivity, strategic planning and protection of large, high value remnant vegetation blocks.	Investigate opportunities for formal conservation agreement/protection of high biodiversity conservation areas within cell and connectivity of the Normanville Dunes from Yankalilla River to Carrickalinga Creek.	Medium (cons)	CPB, DEW, NPWSSA, LHF, NAC business/ contractors/rangers, Council

Component	Issue	Proposed Action	Priority of Action	Key Players
Whole cell	Butterfly habitats and host plant protection.	Identify locations of potential butterfly habitats and host plants with the cell.	High (cons)	Council, DEW, NPWSSA, LHF, Traditional Owners, First Nations business/ contractors/ rangers, coastal community groups
		Extension of existing habitats and reintroduction of locally extinct butterfly species.	Medium (cons)	Council, DEW, NPWSSA, LHF, Traditional Owners, First Nations business/ contractors/ rangers, coastal community groups
		Undertake weed management around existing populations and enhance habitat through additional plantings for Bitter-bush Blue (*Theclinesthes albocinctus) with Adriana quadripartita,* Icilius Hairstreak *(Jalmenus icilius) with Acacia pycnantha, A. retinodes, and A. uncifolia & common species.*	Medium (cons)	Council, LHF, Traditional Owners, First Nations business/ contractors/ rangers, coastal community groups
		Restore wetland and riparian areas, through priority weed control and reestablish habitats for Golden-haired Sedge-skipper (*Hesperilla chrysotricha cyclospila)* through plantings of *Gahnia spp* (*Gahnia deusta; G. filum; G. sieberiana; G. trifida).*	Medium (cons)	Council, LHF, Traditional Owners, First Nations business/ contractors/ rangers, landowners, coastal community groups
	Valuable habitat for coastal raptors (White-bellied Sea Eagle, Wedge-tailed Eagle and Eastern Osprey).	Ongoing monitoring and management of high values nesting and foraging areas. Partner with Traditional Owners to understand cultural value and obligations associated with local raptors.	High (cons)	NPWSSA, DEW, Traditional Owners, First Nations, LHF
		Implement the recovery plan for Eastern Osprey and White-bellied Sea Eagles (2022).	High (cons)	DEW, NPWSSA, LHF
		Investigate opportunities for establishment of nesting towers for additional habitat.	Medium (cons)	DEW, LHF, land owners
	Coordinated approach to monitoring of coastal wildlife.	Collaboration between land manager and stakeholders to support research and citizen science of beach-nesting birds, seabirds, coastal raptors, marine mammals and other wildlife.	Medium (cons)	DEW, NPWSSA, BirdLife Australia, LHF, Council, SA Whale Centre, Encounter Whales, ecotourism operators, coastal community groups, Traditional Owners, First Nations business/ contractors/ rangers.
	Aged baseline data and significant gaps in recorded flora and fauna species across the Southern Fleurieu region.	Repeat and integrate historical vegetation surveys into a long-term monitoring program to update records and address data deficiencies.	Medium (cons/ threat)	DEW, LHF, councils, coastal community groups
		Undertake fauna assessments across cells to establish baselines, update records and species distribution, particularly of underrepresented groups (reptiles and invertebrates).	Medium (cons/ threat)	DEW, LHF, councils, coastal community groups
		Identify potential funding sources to repeat these long-term flora monitoring sites and fauna assessments.	High (cons/ threat)	DEW, LHF, councils.
	Threat to coastal fauna and flora from pest animals (rabbits, foxes and cats).	Coordinated collaboration between landowners and managers is required to manage pest animals. Ensure control methods refer to cultural heritage protocols.	High (threat)	Councils, landowners, LHF, Traditional Owners, First Nations business/ contractors/ rangers,
		Report sightings of feral animals (deer, fox, rabbit, cat and declared species) through the feral scan pest animal recording and management tool.	High (threat)	Land managers, community, coastal community groups

Component	Issue	Proposed Action	Priority of Action	Key Players
Whole cell	Increasing grazing pressure from native and introduced species	Coordinate with regional grazing pressure programs (kangaroos, deer and goats) to monitor populations and control as required to protect remnant vegetation and revegetation efforts.	High (threat)	NPWSSA, DEW, PIRSA, LHF, Traditional Owners, First Nations business/ contractors/ rangers.
		Fencing of remnant and high value vegetation communities on private and Crown land.	High (Cons / Threat)	DEW, LHF, land owners
	Multiple community groups and volunteers across coastal areas.	Facilitate opportunities for increased coordination and sharing of skills and information between community groups and volunteers to support landscape scale approach to coastal conservation and management. Implement program of structured cultural education and training for land managers, agency staff and land stewards.	High (cons)	Council, land managers, LHF, Traditional Owners, First Nations business/ contractors/ rangers, coastal community groups, FLEC
		Continue to support community and private land owner efforts to undertake priority restoration and conservation work in this cell.	High (cons)	Council, LHF, DEW, FLEC
	Development pressures to infill areas behind the dunes for housing.	Investigate opportunities to protect areas of undeveloped land behind the dunes from increasing development pressure and climate change impacts.	High (threat)	Council, CPB
		Investigate opportunities for coastal dune retreat under future climate change scenarios. Ensure appropriate natural buffers between dune environments and future development.	High (threat/ Cons/ Hazard/ Soc/Econ)	Council, CPB, DEW, LHF
		Review current development zoning of Normanville to Carrickalinga for greater levels of protection.	Medium (threat/ Soc)	Council, CPB, Planning SA, Department for Housing and Urban Development (DHUD)
	Development of a linear park and trail between the townships of Yankalilla, Normanville and the coast to buffer development growth areas and improve water quality of the Bungala River.	Ensure trail networks areas are improved for biodiversity and conservation outcomes, limit disturbance to fauna and increase community awareness of environmental values.	High (Cons/ Threat/ Soc/Econ)	Council, coastal community groups, LHF, Traditional Owners, First Nations business/ contractors/ rangers, land owners
	Resilience to climate change effects across landscape.	Strengthen connectivity between coastal ecosystems and nature corridors (Bungala River and Carrickalinga creek).	Medium (Cons)	Council, land managers, DEW, LHF, coastal community groups
	Stormwater impacts from inland development are likely to impact marine intertidal habitats and may accelerate seabed deepening and coastal erosion. Turbidity from suspended sediments and nutrients are a significant threat to reef and seagrass habitats.	Implementation of the Yankalilla, Normanville and Carrickalinga Stormwater Management Plan (2022). Consider locations within existing open space to install/retrofit sedimentation or detention areas increasing water quality and improve biodiversity values.	High (Cons/ threat)	Council, LHF
		Investigate opportunities for reusing water from the Normanville Wastewater Treatment Plant, allowing for sufficient environmental flows for estuary health and management.	Medium (cons)	Council, SA Water, LHF, EPA
		Monitor and manage stormwater to minimise impacts in the coast and marine environment. Implement Water Sensitive Urban Design (WSUD).	High (Threat)	Council, LHF, CPB, Water Sensitive SA
		Develop guidelines for projects within Council areas to support improved stormwater management and reduce land-based impacts on coastal and nearshore marine environments.	Medium (cons/ threat)	Council, LHF, DEW, Stormwater Management Authority

Component	Issue	Proposed Action	Priority of Action	Key Players
Whole cell	Physical changes on the coast and natural assets from sea level rise (such as coastal squeeze on tidal habitats, erosion, vegetation loss, marine turbidity and light reduction).	Development of a council wide Coastal Hazard Adaptation Plan, including key locations, recommendations and priorities for funding. Support partnerships for ongoing investigation and monitoring in the coastal zone, working with the Coast Protection Board to identify adaptation options for the future.	High (Cons. Threat)	CPB, Council, community, university and research agencies, Climate Ready Coast Program
Tjilbruke / Tjirbruki Dreaming story sites within cell	Significant cultural story locations within cell and opportunities to increase community cultural education through reconciliation.	Support existing Traditional Owner cultural walks and communications to build broader community education.	High (cons/ threat)	Traditional Owners, First Nations, Council, LHF, coastal community groups, community
		Support Traditional Owner aspirations to care for Country and provide cultural education for these dunes.	High (cons/ threat)	Traditional Owners, First Nations, Council, LHF, coastal community groups, community
		Support Traditional Owner cultural monitoring and communications to protect significant known heritage sites.	High (cons/ threat)	Traditional Owners, First Nations, Council, LHF, coastal community groups, community
Normanville Dunes	The dunes include significant habitats, cultural sites and a variety of threats.	Implement Biodiversity Action Plan for the Normanville Dunes. Continued effort in dune revegetation.	High (Cons / threat)	LHF, Council, Traditional Owners, First Nations business/ contractors/ rangers, community groups.
		Monitor changes to dunes through BushRAT or similar monitoring to measure condition assessment and change.	High (cons)	Council, LHF, Council, Traditional Owners, First Nations business/ contractors/ rangers, community groups.
		Revegetation of key woodland species (Sheoak, Coast Silver Wattle) is needed to retain important woodland habitat.	High (cons)	Council, LHF, Traditional Owners, First Nations business/ contractors/ rangers, Council, community groups.
	Conservation analysis confirms the high value of the dune within the region. In spite of its reserve status, there have been incursions of various kinds into the dunes.	Resist further development incursions into dunes. Retain all existing allotments with State Heritage listing including parcels within and adjoining the Normanville Caravan Park which have been under threat from recent development pressure. Boundary re alignment to absorb historical individual allotments to be incorporated into the one allotment to avoid ongoing future development pressure due to legacy of small allotments that are part of an historical land division within Heritage Dunes that is now null and void.	High (Cons / threat)	Council , landholders, Community DEW (Crown land Branch and Coast).
		Review of capacity and management of stormwater from coastal development behind dune system.	High (threat)	Council, LHF, CPB
	Damage to foredunes by sandboarding.	Maintain Council effort to inform public of the damage and impact of sandboarding on dunes.	Medium (threat)	Council.
	Access control issues with multiple pathways throughout dunes impacting geomorphology and stability.	Assessment of access points and pathways to beach throughout dunes.	Medium (threat)	Council, CPB, DEW
		Erosion control works and revegetation of closed pathways.	Medium (threat)	Council, coastal community groups
	Dune blowouts increasing erosion and instability of habitats	Continue works to restore and rehabilitate due blowouts, cultural sites and historical mining sites.	Medium (cons/threat)	Council, CPB, LHF, Traditional Owners, First Nations business/ contractors/ rangers, coastal community groups

Component	Issue	Proposed Action	Priority of Action	Key Players
Normanville Dunes	Lack of buffer West of dunes to support long term future of Normanville Dunes landform with sea level rise and to provide protection to future development from coastal dune hazard risk.	Continue to influence appropriate setbacks for future development of land directly abutting the Normanville Sand Dunes to allow for buffer for potential dune translocation and to protect future development from coastal sand dune drift hazard risk.	High (cons/ threat)	CPB, DEW, Consultant, Research institutions
	Coastal dune study to determine potential dune translocation potential with sea level rise predications	Continue to influence appropriate setbacks for future development of land directly abutting the Normanville Sand Dunes to allow for buffer for potential dune translocation and to protect future development from coastal sand dune drift hazard risk.	High (cons/ threat)	CPB, DEW, Consultant, Research institutions
Beach	Unpermitted beach activities impacting coastal environments and fauna.	Review of permit requirements for group or events on beaches to reduce impact on coastal habitats and fauna (particularly beach-nesting birds).	High (threat)	Council, DEW LHF, BirdLife Australia
		Increase awareness of group and event beach users of impacts on coastal habitats.	Medium (cons)	Council
Boat ramps (Lady Bay and Bungala)	Undefined boat launching areas causing impact to beach habitats.	Review boat launching areas at Bungala estuary which impacts beach and seagrass condition over wider area.	High (threat)	Council, CPB, DEW
		Undefined boat launch areas contribute to unauthorised ORV access and use of beach between Lady Bay and Normanville.	High (threat)	Council
		Increase compliance of boat ramp use and impacts on surround beach habitats.	High (threat/ cons)	Council
Bungala River estuary	Coordinated approach to estuary management across multiple land owner and managers.	Continue to implement the Bungala River Estuary Action Plan (AECOM Australia Pty Ltd (2010) and review as required throughout the life of this plan.	High (Cons/ threat)	Council, land owners, LHF, Traditional Owners, First Nations business/ contractors/ rangers, coastal community groups
		Support Traditional Owner aspirations to care for Country and provide cultural education for the Bungala River estuary. Support cultural monitoring and communications to protect significant known heritage sites Traditional Owner-led cultural mapping to document cultural values of the river estuary and surrounds.	High (Cons/ threat)	Traditional Owners, First Nations, Council, LHF, coastal community groups, community
	Improve strategic planning and management approach to deliver positive and coordinated outcomes for estuary habitats.	Development of Bungala River Estuary strategic management plan across agencies and land mangers addressing the need for improved monitoring of ecological communities, connectivity with marine systems and water quality conditions within the Estuary.	High (Cons/ threat)	Council, DEW, EPA, SA Water, LHF, Traditional Owners, First Nations business/ contractors/ rangers, coastal community groups
		Opportunities exist to construct wetland (biofiltration) systems in naturally low lying areas and redirect stormwater outfalls to these locations.	Medium (cons/ threat)	Council, CPB, Traditional Owners, First Nations business/ contractors/ rangers, LHF
		In stream treatment systems with potential for the existing water lagoon and permanent waterholes.	Medium (cons)	Council, CPB, Traditional Owners, First Nations business/ contractors/ rangers, LHF
		Implement best management practice principles at Caravan Park to ensure water quality discharges into the Estuary to meet water quality objectives listed in SMP.	High (threat)	Council
		Undertake hydrological study of the Bungala catchment to determine surface and ground water inputs.	Medium (cons)	DEW, LHF, Council

Component	Issue	Proposed Action	Priority of Action	Key Players
Bungala River estuary	Limited protection and awareness of EPBC listed Threatened ecological community – subtropical and temperate coastal saltmarsh and *swamps of the Fleurieu Peninsula* at Bungala River estuary.	Increased protection from weed incursion, development and disturbance through site restoration and increased community awareness.	High (threat/ cons)	Council, coastal community group, Traditional Owners, First Nations business/ contractors/ rangers, LHF
		Formal assessment of vegetation communities to be listed on the national register of protected sites.	High (cons)	Council, LHF, DEW, coastal community group,
	Estuary entrance currently opened / closed by Council largely for recreational/amenity reasons.	Develop an Estuary Entrance Management Support System (EEMSS)). (1), including a framework for decision makers considering both the ecological and infrastructure/amenity concerns. Include impacts to beach-nesting birds during breeding season and disturbance.	High (Cons / Soc / Econ)	Council. DEW, CPB, LHF, Traditional Owners, First Nations business/ contractors/ rangers, EPA
	Limited monitoring data of estuary flow and opening and closing durations exist for these estuaries.	Consider monitoring of estuaries to determine the connectivity and functionality with marine ecosystems.	High (cons/ threat)	CPB, LHF, DEW
	Concern over fall in river flow, and reduced seasonal connection to the Gulf.	Review opportunities to increase environmental flow through Water Allocation Planning (WAP), WWTP, low flow bypass on farm dams and other local opportunities to improve connectivity with marine environments.	High (cons/ threat)	Council. DEW, LHF
	Poor water quality within estuary, with potential effects on nearshore habitats including seagrass beds.	Catchment management to reduce sediment and nutrient load to Bungala estuary.	High (cons/ threat)	Land owners, Council, LHF, DEW, SA Water, EPA, community, Marine Parks.
		Investigation, with a view to use of gross pollutant traps to reduce impact on lower river habitats.	Medium (threat)	Council.
	Weed incursion within estuary reducing biodiversity values.	Active control of weed populations within estuary areas.	High (cons/ threat)	Landowners, managers DEW, LHF,
	Significant stand of Olives in middle reaches of estuary poses significant fire risk to township and continued weed reinfestation of dunes.	Continue discussions and encouragement of land owner to remove all declared weeds as a matter of priority. Failure to comply will require compliance action.	High (threat)	LHF, Council, coastal community groups
	Bank instability and multiple areas of erosion evident within estuary.	Undertake restoration activities to improve bank stabilization and revegetation to reduce further erosion and weed cover.	High (cons/ threat)	Landowners, Council, LHF, Traditional Owners, First Nations business/ contractors/ rangers, coastal community groups
	Stock grazing leading to erosion, bank instability and reduced water quality.	Maintain and improve fencing of estuaries and riparian land against stock.	High (Threat)	Landowners, DEW, LHF
	Lack of connectivity for community access along Bungala River.	Investigate the development of a linear open space corridor along the Bungala River.	Medium (Cons/ Soc)	Council, FLEC, coastal community groups
	Impact of caravan park users on local wildlife.	Create a buffer between caravan park and coastal habitats through planting of local native coastal species.	Medium (cons/ threat)	Council, Traditional Owners, First Nations business/ contractors/ rangers, coastal community groups
		Increase awareness and education of caravan park guest to prevent disturbance and impacts to beach-nesting birds.	Medium (cons)	Council, LHF, BirdLife Australia, Friends of Hooded Plover Volunteers
	Population of native Swamp Rat *(Rattus lutreolus*) at Estuary of Bungala River and associated dunes regularly sighted by community and confused with introduced rat species, with unwarranted calls for removal.	Increased community awareness of local native swamp rat population and benefits for local environments.	Medium (Cons/ Soc)	Council, Traditional Owners, First Nations business/ contractors/ rangers, coastal community groups

Component	Issue	Proposed Action	Priority of Action	Key Players
Beach-nesting birds	Hooded Plover nests and breeding areas threatened by disturbance by walkers and dogs.	Community monitoring, fences to mark nests. Signage and awareness raising activities to alert dog walkers.	High (Cons / threat)	Council, BirdLife Australia, LHF, Friends of the Hooded Plover, Fleurieu Peninsula volunteers. coastal community groups, Oystercatcher monitoring volunteers, Traditional Owners, First Nations business/ contractors/ rangers,
	Limited community knowledge of local conservation values and threats.	Provide education opportunities to raise awareness and protection of beach-nesting birds, such as Hooded Plovers, Red-capped Plovers and Sooty Oystercatchers (dogs on leads, nesting sites, citizen science projects, managing visitor disturbance).	High (cons)	Council, BirdLife Australia, LHF, Friends of the Hooded Plover, Fleurieu Peninsula volunteers coastal community groups, Oystercatcher monitoring volunteers
	Protection of natural assets of high conservation values.	Support the introduction and implementation of Council by-laws related to dogs on lead in estuaries and high value areas.	High (threat)	Council, land owners, community, coastal community groups
	Incursion of multiple dune grass weed species is limiting suitable habitat for beach-nesting birds.	Support the staged removal of introduced weedy grasses and restoration of spinifex dunes.	High (threat)	Council, land managers, LHF, Traditional Owners, First Nations business/ contractors/ rangers, coastal community groups, Friends of the Hooded Plover, Fleurieu Peninsula volunteers
		Increase community awareness of habitat needs for beach-nesting bird species.	High (threat/ cons)	Council, land managers, LHF, coastal community groups, Friends of the Hooded Plover, Fleurieu Peninsula volunteers
Nearshore Habitats (Reef, Seagrass)	Sediments and nutrients from the Bungala River and Carrickalinga Creek.	Support the implementation of the stormwater management plan for Yankalilla Bay (AWE and SARDI 2012 and 2020) and the Bungala River Estuary Action Plan (AECOM 2010).	High (threat)	District Council of Yankalilla / LHF
		Minimise the impact development has on flooding and water quality within catchments and receiving environments.	High (threat)	Council, land managers, LHF
		Manage the catchment to meet agreed environmental values and objectives for marine, estuarine and freshwater receiving environments.	High (threat)	Council, land managers, LHF
		Monitor catchment and stormwater impact on nearshore habitats and reefs across the cell.	High (Threat)	Council, DEW, EPA, SA Water, Landscape Boards
	Lack of knowledge of seagrass condition and species diversity in cell.	Collaboration between government agencies, researchers, and community to monitor seagrass cover, species diversity, condition and inform active management.	Medium (Cons/ threat)	DEW, SARDI, EPA, SA Water, LHF, NPWSSA, universities, Council, community
		Investigate opportunities to support reduction of land-based impacts to avoid further loss, promote natural recovery of seagrasses and investigate potential for assisted restoration of seagrass habitats with community	High (cons/threat)	DEW, LHF, SARDI, NPWSSA, Council
Caring for Sea Country	Culturally significant Sea Country, including fish traps and marine life, are neglected and require Traditional Owner access and self determination to care for Country.	Support Traditional Owner mapping of southern Sea Country. Support establishment of Traditional Owner-led caring for Sea Country program. Traditional Owner led restoration of Sea Country and known significant places.	High (cons/threat)	Traditional Owners, First Nations, NPWSSA, DEW, Council, LHF, coastal community groups

Component	Issue	Proposed Action	Priority of Action	Key Players
Climate (Creek/ Estuary)	More intense rainfall events likely to lead to increased pollutants, nutrients and sediments washed into the estuary especially during first flush from the landward end.	Monitor stormwater quality and estuary/creek condition.	Medium (threat)	Council, DEW, LHF, land owners, EPA
	Higher temperatures likely to lead to increased algal blooms with impacts on estuarine fauna.	Monitor stormwater quality and estuary/creek condition.	Medium (threat)	Council, DEW, LHF, Landowners, EPA
Climate (Seasonal freshwater soaks to rear of dunes)	There is evidence of freshwater soaks to the rear of some sections of the sand dunes ie presence of other freshwater sedge species. There is also freshwater pooling of these lower lying areas following high rainfall events and ongoing issues with managing stormwater from incremental land divisions. With more intense rainfall events, the combined interaction of seasonal flooding and interactions with rising saline ground water from sea level rise is increasingly uncertain.	Prior to any major land division of the lower lying lands /seasonal floodplains behind the dunes, (particularly between the Carrickalinga and Bungala Estuaries), a study, including piezometer testing to ascertain combine risk from rising saline ground water due to sea level rise and seasonal and high rainfall events. This research should be part of stormwater management planning for infill development in these lower lying areas.	Medium (threat)	Developers, Council, CPB
Climate (Beach and dunes)	Increased sea levels and more intense storms and higher winds can contribute to more frequent and intense wave action, which accelerates beach and dune erosion. Predicted increases in aridity can lead to reduced vegetation cover and increased dune drift and dune mobility.	Restrict public access to fragile dunes.	Medium (threat)	Council, coastal community groups, LHF
		Implement restoration of native plant species.	Medium (threat)	Council, Traditional Owners, First Nations business/ contractors/ rangers, coastal community groups, LHF
		Investigate and implement monitoring plan for planned dune retreat.	High (threat/ Cons/ Hazard/ Soc/Econ)	Council, coastal community groups, LHF
		Monitoring of cross-shore dune, beach and nearshore sand level profiles.	Low (Hazard) Medium (cons/threat)	DEW CPB, Research Institutions, Universities.
		Update DEW Coastal Hazard Mapping spatial layer identifying the change in extent and stability of coastal dunes across South Australia since the previous hazard mapping was undertaken approximately 20 years ago.	Medium (hazard) Medium (cons/ threat)	DEW, CPB, Research Institutes, Universities
		Beach and dune topographic and photogrammetry drone surveys to provide detailed 2D and 3D digital surface models for monitoring changes to the coastal landforms over time in response to climate change.	Medium (Hazard) Medium (cons/threat)	DEW CPB, Research Institutions, Universities.
		Support cultural monitoring and communications to protect significant known heritage sites	High (threat)	Council, coastal community groups, LHF, Traditional Owners, First Nations business/ contractors/ rangers.
Climate (Macroalgal reefs and seagrasses)	More intense rainfall events likely to lead to increased pollutants, nutrients and suspended sediments washed into coastal waters especially during first flush.	Monitor stormwater quality and creek condition.	Medium (threat)	Council, DEW, LHF, land owners
	Increased storm surge can cause dislodgment of algae and seagrasses.	Monitor stormwater quality and creek condition.	Medium (threat)	Council, DEW, LHF, land owners
	Higher temperatures can lead to increased incidence and persistence of marine heatwaves and increased stress on temperate reefs and seagrasses, reducing biodiversity.	Monitor stormwater quality and creek condition.	Medium (threat)	Council, DEW, LHF, land owners

Component	Issue	Proposed Action	Priority of Action	Key Players
Climate (Macroalgal reefs and seagrasses)	Ocean acidification can impact the life history of marine species.	Monitor stormwater quality and creek condition.	Medium (threat)	Council, DEW, LHF, land owners
		Undertake benthic flora mapping to determine areas or opportunities for restoration.	Medium (threat)	DEW, council, LHF, land owners
Climate (whole cell)	Coastal Hazard Adaptation Planning	Investigate future funding opportunities to undertake coastal adaptation plan for DC Yankalilla to improve understanding of coastal risk, to inform coastal hazard adaptation planning and for evidence-based decisions and investments in the coast.	Medium (threat)	Council, CPB, Climate Ready Coasts Program, LGA, SACCA, DEW, consultancies, research institutions

(1) An Estuary Entrance Management Support System (EEMSS) has been developed by Deakin University and a number of Victorian Catchment Boards. This system takes into account a number of uses (including recreation use), conservation and hydrological factors in assisting with the decision to open or close an entrance (Arundel (2006) also refer to Appendix 15 in Caton et al 2007).

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Cell Biota (Flora and Fauna)

Lists provided are specific to this cell from Biological Database of South Australia (BDBSA), technical updates, review of publications and local input. Conservation ratings (National, State and Sub regional) are included for flora and fauna.

Note: Restricted species as per Department for Environment and Water (DEW) specifications have been omitted from the tables due to the size of cells and requirement for 10km^2 buffering of data. However, records are included in the total species numbers per cell. Please contact DEW directly for restricted data requests.

FLORA Summary

Vegetation Block Metrics	Normanville Dunes Coastal Reserve (Council) Coastal Reserves (Minister Environment and Conservation and Council) Bungala Park Reserve (Council)
Terrestrial Habitat Description/s	See Terrestrial biodiversity vegetation communities in cell description.
# Flora in cell	282
# Native Flora in cell	138
# Introduced Flora in cell	144
# Conservation Rated Flora in cell	3 (0 national, 3 state)
# Threatened Ecological Communities (EPBC Act)	2 (Vegetation associations aligned with Nationally Critically Endangered ecological community “Swamps of the Fleurieu Peninsula” and Beaded Glasswort- *Salicornia quinqueflora* saltmarsh nationally Vulnerable “Subtropical and Temperate Coastal Saltmarsh Threatened Ecological Community” (pending assessment)

Conservation Rated Flora

Species	Common Name	EPBC Act Status	NPW Status
*Crassula sieberiana^*	Sieber's Crassula		E
*Eucalyptus fasciculosa^*	Pink Gum		R
Olearia passerinoides ssp. glutescens	Sticky Daisy-bush		R

All Native Flora in cell

Species	Common Name	EPBC Status	NPW Act Status	Subregional Status*
Acacia cupularis	Cup Wattle			RA
Acacia ligulata	Umbrella Bush			RA
Acacia longifolia ssp. sophorae	Coastal Wattle			LC
*Acacia nematophylla^*	Coast Wallowa			
Acacia pycnantha	Golden Wattle			LC
Acacia retinodes	Wirilda			
*Acacia sp.^*				
*Acacia uncifolia^*	Coast Silver Wattle			
*Adriana quadripartita^*	Coast Bitter-bush			
Allocasuarina verticillata	Drooping Sheoak			LC
Alyxia buxifolia	Sea Box			RA
Amphibolis antarctica	Sea Nymph			
Arthropodium strictum	Common Vanilla-lily			LC
Asperococcus bullosus				
Atriplex cinerea	Coast Saltbush			LC

Species	Common Name	EPBC Status	NPW Act Status	Subregional Status*
Atriplex suberecta	Lagoon Saltbush			NT
Austrostipa curticoma	Short-crest Spear-grass			LC
Austrostipa flavescens	Coast Spear-grass			LC
Austrostipa mollis	Soft Spear-grass			LC
*Austrostipa scabra ssp. falcata^*	Slender Spear-grass			
*Austrostipa spp.^*	Spear Grass			
Banksia marginata	Silver Banksia			LC
*Boerhavia dominii^*	Tar-vine			
Burchardia umbellata	Milkmaids			LC
Bursaria spinosa ssp. spinosa	Sweet Bursaria			LC
Caladenia latifolia	Pink Caladenia			NT
Calandrinia brevipedata	Short-stalked Purslane			RA
Calandrinia calyptrata	Pink Purslane			NT
Calandrinia corrigioloides	Strap Purslane			RA
*Calandrinia eremaea^*	Dryland Purslane			
Calandrinia granulifera	Pigmy Purslane			NT
*Callistemon sieberi^*	River Bottlebrush			
Callitris gracilis	Southern Cypress Pine			LC
Carex bichenoviana	Notched Sedge			RA
Carpobrotus rossii	Native Pigface			
Cassytha pubescens	Downy Dodder-laurel			LC
Centrolepis aristata	Pointed Centrolepis			LC
Centrolepis strigosa ssp. strigosa	Hairy Centrolepis			LC
*Chloris truncata^*	Windmill Grass			
Clematis microphylla	Old Man's Beard			
Codium mamillosum				
Crassula colligata ssp. lamprosperma				LC
Crassula decumbens var. decumbens	Spreading Crassula			LC
*Crassula sieberiana^*	Sieber's Crassula		E	
*Crassula sp.^*				
Cyperus gymnocaulos	Spiny Flat-sedge			LC
*Cyperus spp.^*				
Cyperus vaginatus	Stiff Flat-sedge			LC
Daucus glochidiatus	Native Carrot			LC
Dianella brevicaulis	Short-stem Flax-lily			LC
Dianella revoluta var.				
Dichelachne crinita	Long-hair Plume-grass			LC
Distichlis distichophylla	Emu-grass			LC
Dodonaea viscosa ssp. spatulata	Sticky Hop-bush			LC
Duma florulenta	Lignum			VU
Dysphania pumilio	Small Crumbweed			LC
*Einadia nutans ssp. nutans^*	Climbing Saltbush			
*Enchylaena tomentosa var. tomentosa^*	Ruby Saltbush			
Eucalyptus camaldulensis ssp. camaldulensis	River Red Gum			
*Eucalyptus fasciculosa^*	Pink Gum		R	
*Eucalyptus leucoxylon ssp.^*	South Australian Blue Gum			
*Eucalyptus leucoxylon ssp. leucoxylon^*	South Australian Blue Gum			
Euchiton sphaericus	Annual Cudweed			LC
*Euphorbia drummondii^*	Caustic Weed			

Species	Common Name	EPBC Status	NPW Act Status	Subregional Status*
Feldmannia irregularis				
Ficinia nodosa	Knobby Club-rush			LC
Flabellonema codii				
Gahnia filum	Thatching Grass			VU
Giraudia robusta				
Helichrysum leucopsideum	Satin Everlasting			LC
Juncus kraussii	Sea Rush			LC
*Juncus pallidus^*	Pale Rush			
*Juncus spp.^*				
Juncus subsecundus	Finger Rush			LC
*Kennedia prostrata^*	Scarlet Runner			
Kunzea pomifera	Muntries			RA
Lepidosperma gladiatum	Coast Sword-sedge			NT
Leptospermum lanigerum	Silky Tea-tree			RA
Leucophyta brownii	Coast Cushion Bush			LC
Leucopogon parviflorus	Coast Beard-heath			LC
*Lomandra effusa^*	Scented Mat-rush			
*Lomandra multiflora ssp. dura^*	Hard Mat-rush			
Lomandra sororia	Sword Mat-rush			NT
Lotus australis	Austral Trefoil			NT
*Lythrum hyssopifolia^*	Lesser Loosestrife			
Machaerina juncea	Bare Twig-rush			LC
*Machaerina spp.^*				
Melaleuca lanceolata	Dryland Tea-tree			NT
Millotia myosotidifolia	Broad-leaf Millotia			NT
Muehlenbeckia gunnii	Coastal Climbing Lignum			LC
Myoporum insulare	Common Boobialla			LC
Nitraria billardierei	Nitre-bush			RA
Olearia axillaris	Coast Daisy-bush			LC
Olearia passerinoides ssp. glutescens	Sticky Daisy-bush		R	RA
Oxalis perennans	Native Sorrel			LC
Parietaria australis	Smooth-nettle			
Parietaria cardiostegia	Mallee Smooth-nettle			RA
Parietaria debilis	Smooth-nettle			LC
Pelargonium australe	Austral Stork's-bill			NT
Phragmites australis	Common Reed			LC
*Phragmites spp.^*				
Pimelea serpyllifolia ssp. serpyllifolia	Thyme Riceflower			LC
Platylobium obtusangulum	Holly Flat-pea			LC
Poa poiformis var. poiformis	Coast Tussock-grass			LC
Podotheca angustifolia	Sticky Long-heads			NT
Portulaca oleracea	Common Purslane			LC
Posidonia angustifolia	Narrow-leaf Tapeweed			
Posidonia sinuosa	Narrow-leaf Tapeweed			
Rhagodia candolleana ssp.	Sea-berry Saltbush			
Rhagodia candolleana ssp. candolleana	Sea-berry Saltbush			LC
Rinzia orientalis	Desert Heath-myrtle			RA
*Rytidosperma caespitosum^*	Common Wallaby-grass			
*Rytidosperma spp.^*	Wallaby Grass			

Species	Common Name	EPBC Status	NPW Act Status	Subregional Status*
Salicornia quinqueflora ssp. quinqueflora	Beaded Samphire			NT
Samolus repens	Creeping Brookweed			NT
Santalum acuminatum	Quandong			RA
Sargassum heteromorphum				
Scaevola crassifolia	Cushion Fanflower			RA
Schoenoplectus pungens	Spiky Club-rush			RA
Schoenus apogon	Common Bog-rush			LC
Senecio picridioides	Purple-leaf Groundsel			LC
*Senecio pinnatifolius var. maritimus^*	Coast Groundsel			
Senecio spanomerus	Native Groundsel			NT
*Setaria constricta^*	Knotty-butt Paspalidium			
Spergularia tasmanica	Coast Sand-spurrey			
Spinifex hirsutus	Rolling Spinifex			
Sporobolus virginicus	Salt Couch			LC
Stuartina muelleri	Spoon Cudweed			LC
Suaeda australis	Austral Seablite			NT
Tetragonia implexicoma	Bower Spinach			LC
Thelymitra pauciflora	Slender Sun-orchid			LC
*Themeda triandra^*	Kangaroo Grass			
Threlkeldia diffusa	Coast Bonefruit			NT
Thysanotus patersonii	Twining Fringe-lily			LC
Triglochin striata	Streaked Arrowgrass			LC
*Triglochin trichophora^*	Torpedo Arrowgrass			
Typha domingensis	Narrow-leaf Bulrush			LC
*Typha spp.^*				

^ denotes records from technical updates, review of publications and local input
*See Appendices for subregional map

Regional Conservation status, Mount Lofty Ranges IBRA (Interim Biogeographical Regionalisation for Australia) subregion (Gillam & Urban (2014). Regional Species Conservation Assessment Project, Phase 1 Report - Regional Species Status Assessments, Adelaide and Mount Lofty Ranges NRM Region. DEWNR: SA)

RE = Regionally Extinct	CR = Critically Endangered	EN = Endangered
VU = Vulnerable	RA = Rare	NT = Near Threatened
LC = Least Concern	DD = Data Deficient	NE = Not Evaluated

All Introduced Flora in cell

Species	Common Name	Red Alert Weeds	Declared Weeds	WONS
Acacia cyclops	Western Coastal Wattle	IC		
Acacia longifolia ssp. longifolia	Sallow Wattle	IC		
Acacia saligna	Golden Wreath Wattle	HP		
*Acetosella vulgaris**	Sheep Sorrel			
*Aeonium spp.**	Tree Houseleek			
*Agave americana**	Century Plant	HP		
*Aira cupaniana**	Small Hair-grass			
Aira elegantissima	Delicate Hair-grass			
*Aizoon pubescens**	Coastal Galenia	IC		
*Alcea rosea**	Hollyhock			
*Aloe arborescens**	Tree Aloe			
Amaranthus muricatus	Rough-fruit Amaranth			
Ammophila arenaria	Marram Grass	HP		
Arctotheca calendula	Cape Weed	HP		
Arctotis stoechadifolia	White Arctotis	IC		
Argyranthemum frutescens ssp. foeniculaceum	Teneriffe Daisy	HP		
*Artemisia arborescens**	Silver Wormwood			
Arundo donax	Giant Reed	HP	Yes	
*Asparagus asparagoides**	Bridal creeper		Yes	Yes
Asparagus asparagoides f. asparagoides	Bridal Creeper (form)	IC	Yes	Yes
*Asparagus officinalis**	Asparagus			
Atriplex prostrata	Creeping Saltbush			
Avena barbata	Bearded Oat			
Avena fatua	Wild Oat			
Brassica tournefortii	Wild Turnip			
Briza maxima	Large Quaking-grass			
Bromus catharticus	Prairie Grass			
Bromus diandrus	Great Brome			
Bromus madritensis	Compact Brome			
*Bromus rubens**	Red Brome			
Cakile maritima ssp. maritima	Two-horned Sea Rocket			
*Carpobrotus edulis ssp. edulis**	Hottentot Fig	HP		
*Casuarina glauca**	Grey Buloak	IC	Yes	
Cenchrus clandestinus	Kikuyu	HP		
Cenchrus longisetus	Feather-top	HP		
Cerastium glomeratum	Common Mouse-ear Chickweed			
Cerastium pumilum	Chickweed			
Chenopodium album	Fat Hen			
Cirsium vulgare	Spear Thistle			
Citrullus amarus	Bitter Melon			
*Citrullus lanatus**	Camel Melon			
*Coprosma repens**	New Zealand Mirror-bush	IC	Yes	
*Cotula coronopifolia**	Water Buttons			
*Cotyledon orbiculata var.**	Cotyledon			
*Cynodon dactylon var. dactylon**	Couch			
Digitaria sanguinalis	Crab Grass			
*Dimorphotheca ecklonis**	Cape Marguerite			
Dittrichia graveolens	Stinkweed			
Echium plantagineum	Salvation Jane		Yes	
Ehrharta calycina	Perennial Veldt Grass	HP		
Ehrharta longiflora	Annual Veldt Grass			
Eragrostis cilianensis	Stink Grass			

Species	Common Name	Red Alert Weeds	Declared Weeds	WONS
Erodium botrys	Long Heron's-bill			
*Erodium cicutarium**	Cut-leaf Heron's-bill			
Erodium moschatum	Musky Herons-bill			
*Eucalyptus conferruminata**	Bald Island Marlock			
Eucalyptus gomphocephala	Tuart			
Eucalyptus platypus ssp. platypus	Round-leaved Moort			
Euphorbia paralias	Sea Spurge	HP		
Euphorbia segetalis	Short-stem Carnation Weed			
Euphorbia terracina	False Caper	HP	Yes	
Ferraria crispa ssp. crispa	Black Flag	IC		
Ficus carica	Edible Fig			
Foeniculum vulgare	Fennel			
Fumaria muralis ssp. muralis	Wall Fumitory			
Galium murale	Small Bedstraw			
*Gaudium laevigatum**	Coast Tea-tree		Yes	
Gazania linearis	Gazania	IC	Yes	
Geranium molle	Soft Geranium			
Geranium purpureum	Little-robin			
*Geranium sp.**	Geranium			
Gladiolus tristis	Evening-flower Gladiolus	HP		
Gomphocarpus cancellatus	Broad-leaf Cotton-bush	HP		
Helminthotheca echioides	Ox-tongue			
Hypochaeris glabra	Smooth Cat's Ear			
Hypochaeris radicata	Rough Cat's Ear			
Isolepis marginata	Little Club-rush			
Lactuca serriola f.	Prickly Lettuce			
*Lactuca serriola spp.**	Prickly Lettuce			
Lagurus ovatus	Hare's Tail Grass			
Lepidium africanum	Common Peppercress			
Lycium ferocissimum	African Boxthorn	IC	Yes	Yes
Lysimachia arvensis	Pimpernel			
Malva arborea	Tree Mallow	HP		
Malva parviflora	Small-flower Marshmallow			
*Marrubium vulgare**	Horehound	IC	Yes	
Medicago polymorpha	Burr-medic			
*Medicago sativa**	Lucerne			
Melaleuca armillaris ssp. armillaris	Bracelet Honey-myrtle	HP		
Melianthus comosus	Tufted Honey-flower	IC		
Melianthus major	Cape Honey-flower	IC		
*Mesembryanthemum cordifolium**	Heart-leaf Iceplant	HP		
Mesembryanthemum crystallinum	Common Iceplant	HP		
*Monoculus monstrosus**	Tripteris			
Moraea flaccida	One-leaf Cape Tulip	IC	Yes	
Nicotiana glauca	Tree Tobacco			
Oenothera stricta ssp. stricta	Common Evening Primrose			
Olea europaea ssp. europaea	Olive	IC		
*Opuntia spp.**			Yes	Yes
Oxalis pes-caprae	Soursob			
Phalaris aquatica	Phalaris			
Physalis peruviana	Cape Gooseberry			
*Pinus halepensis**	Aleppo Pine	IC	Yes	
*Pinus radiata**	Radiata Pine	IC		
Piptatherum miliaceum	Rice Millet			
Plantago coronopus ssp. coronopus	Bucks-horn Plantain			
Plantago lanceolata var.	Ribwort			

Species	Common Name	Red Alert Weeds	Declared Weeds	WONS
Polygonum aviculare	Wireweed			
*Reichardia tingitana**	False Sowthistle			
Rhamnus alaternus	Blowfly Bush	IC	Yes	
Ricinus communis	Castor Oil Plant	HP		
Rorippa nasturtium-aquaticum	Watercress			
Rosa canina	Dog Rose	HP	Yes	
Rumex acetosella	Sorrel			
*Rumex crispus**	Curled Dock			
*Rumex hypogaeus**	Three-corner Jack	HP	Yes	
*Rumex pulcher ssp.**	Fiddle Dock			
*Ruschia tumidula**	Pigface	HP		
*Sagina apetala**	Annual Pearlwort			
*Salvia verbenaca var.**	Wild Sage			
*Senecio pterophorus**	African Daisy			
Sixalix atropurpurea	Pincushion	IC		
Solanum linnaeanum	Apple Of Sodom	HP	Yes	
Solanum nigrum	Black Nightshade			
Sonchus oleraceus	Common Sow-thistle			
Stellaria media	Chickweed			
Symphyotrichum subulatum	Aster-weed	HP		
*Tamarix sp.**				
*Tetragonia decumbens**	Sea Spinach			
Thinopyrum junceiforme	Sea Wheat-grass	IC		
*Tragopogon porrifolius**	Salsify			
Tribulus terrestris	Caltrop		Yes	
Trifolium arvense var. arvense	Hare's-foot Clover			
*Trifolium campestre**	Hop Clover			
*Trifolium scabrum**	Rough Clover			
Ulex europaeus	Gorse	IC	Yes	Yes
*Verbascum virgatum**	Twiggy Mullein	HP		
Vicia sativa ssp. sativa	Common Vetch			
Vulpia fasciculata	Sand Fescue			
Vulpia muralis	Wall Fescue			
Vulpia myuros f. megalura	Fox-tail Fescue			
Vulpia myuros f. myuros	Rat's-tail Fescue			
*Watsonia meriana var. bulbillifera**	Bulbil Watsonia	IC		
Zantedeschia aethiopica	White Arum Lily	IC	Yes	

WONS = Weeds of National Significance.

Declared = Declared under the Landscape South Australia Act 2019. Pest plants that are a significant threat to agriculture, the natural environment and public health and safety are called declared plants. Land owners have a legal responsibility to manage these plants.

Red Alert = Weed Threat Level of four or greater out of nine. Plants in this categorised are either designated as requiring immediate control (IC – 6-9) or as a high priority for control (HP – 4-5). See Department for Environment and Water (2024)

Reference – Department for Environment and Water (2024). Threatening Processes - Environmental and Priority Weed Species. Southern Fleurieu Coastal Action Plan Review 2024. Prepared by SA Herbarium

FAUNA Summary

# Fauna in cell	103
# Native Fauna in cell	90
# Introduced Fauna in cell	13
# Conservation Rated Fauna in cell	9 (4 national, 8 state)

Conservation Rated Fauna				
Species	**Common Name**	**Class**	**EPBC Act Status**	**NPW Act Status**
*Haematopus fuliginosus fuliginosus^*	Sooty Oystercatcher	AVES		R
*Haematopus longirostris^*	Pied Oystercatcher	AVES		R
*Haliaeetus leucogaster^*	White-bellied Sea Eagle	AVES		E
*Pandion haliaetus cristatus^*	Eastern Osprey	AVES		E
Platycercus elegans	Crimson Rosella	AVES	ssp	
Thinornis cucullatus cucullatus	Hooded Plover	AVES	VU	V
Zanda funerea whiteae	Yellow-tailed Black Cockatoo	AVES		V
*Pteropus poliocephalus^*	Grey-headed Flying-fox	MAM	VU	R
*Tachyglossus aculeatus^*	Short-beaked Echidna	MAM	ssp	ssp

All Native Fauna in cell

Species Name	**Common Name**	**Class**	**EPBC Act Status**	**NPW Act Status**	**Subregional Status**
Acanthopagrus butcheri	Black Bream	ACT			
Afurcagobius tamarensis	Tamar River Goby	ACT			
Aldrichetta forsteri	Yelloweye Mullet	ACT			
Arenigobius bifrenatus	Bridled Goby	ACT			
*Arripis trutta^*	Eastern Australian Salmon	ACT			
Atherinosoma microstoma	Smallmouth Hardyhead	ACT			LC
*Galaxias brevipinnis^*	Climbing Galaxias	ACT			
Galaxias maculatus	Common Galaxias	ACT			VU
Gracilimugil argentea	Goldspot Mullet	ACT			
Percalates colonorum	Estuary Perch	ACT			
*Philypnodon grandiceps^*	Big-headed Gudgeon	ACT			LC
*Philypnodon macrostomus^*	Dwarf Flathead Gudgeon	ACT			LC
Pseudaphritis urvillii	Congolli	ACT			EN
Pseudogobius olorum	Swan River Goby	ACT			LC
Crinia signifera	Common Froglet	AMP			NT
Limnodynastes tasmaniensis	Spotted Marsh Frog	AMP			NT
Anas superciliosa	Pacific Black Duck	AVES			LC
Anthochaera carunculata	Red Wattlebird	AVES			LC
Anthochaera chrysoptera chrysoptera	Little Wattlebird (mainland SA)	AVES			
*Aquila audax audax^*	Wedge-tailed Eagle	AVES			RA
Ardea alba modesta	Great Egret	AVES			RA
Cacatua galerita	Sulphur-crested Cockatoo	AVES			
Cacatua sanguinea gymnopis	Little Corella	AVES			LC
Charadrius ruficapillus	Red-capped Plover	AVES			RA
Chroicocephalus novaehollandiae novaehollandiae	Silver Gull	AVES			LC
Colluricincla harmonica	Grey Shrikethrush	AVES			LC
Coracina novaehollandiae	Black-faced Cuckooshrike	AVES			LC
Corvus coronoides	Australian Raven	AVES			
Corvus mellori	Little Raven	AVES			LC

Species Name	Common Name	Class	EPBC Act Status	NPW Act Status	Subregional Status
Coturnix pectoralis	Stubble Quail	AVES			LC
*Dacelo novaeguineae novaeguineae^*	Laughing Kookaburra	AVES			
Egretta novaehollandiae	White-faced Heron	AVES			LC
Elanus axillaris	Black-shouldered Kite	AVES			LC
Eolophus roseicapilla	Galah	AVES			LC
Falco cenchroides cenchroides	Nankeen Kestrel	AVES			LC
Gavicalis virescens	Singing Honeyeater	AVES			LC
Grallina cyanoleuca cyanoleuca	Magpielark	AVES			LC
Gymnorhina tibicen	Australian Magpie	AVES			LC
*Haematopus fuliginosus fuliginosus^*	Sooty Oystercatcher	AVES		R	VU
*Haematopus longirostris^*	Pied Oystercatcher	AVES		R	VU
*Haliaeetus leucogaster^*	White-bellied Sea Eagle	AVES		E	EN
Hirundo neoxena neoxena	Welcome Swallow	AVES			LC
*Hydroprogne caspia^*	Caspian Tern	AVES			LC
*Larus pacificus georgii^*	Pacific Gull	AVES			LC
Microcarbo melanoleucos melanoleucos	Little Pied Cormorant	AVES			LC
Morus serrator	Australasian Gannet	AVES			NT
Ocyphaps lophotes lophotes	Crested Pigeon	AVES			LC
*Pandion haliaetus cristatus^*	Eastern Osprey	AVES		E	
Phalacrocorax sulcirostris	Little Black Cormorant	AVES			LC
Phalacrocorax varius hypoleucos	Australian Pied Cormorant	AVES			LC
Phaps chalcoptera	Common Bronzewing	AVES			LC
Phylidonyris novaehollandiae	New Holland Honeyeater	AVES			LC
Platycercus elegans	Crimson Rosella	AVES	ssp		LC
Poliocephalus poliocephalus	Hoary-headed Grebe	AVES			RA
Ptilotula penicillata	White-plumed Honeyeater	AVES			LC
Rhipidura albiscapa	Grey Fantail	AVES			LC
Rhipidura leucophrys leucophrys	Willie Wagtail	AVES			LC
Thalasseus bergii cristatus	Greater Crested Tern	AVES			LC
Thinornis cucullatus cucullatus	Hooded Plover	AVES	VU	V	EN
Tribonyx ventralis	Black-tailed Nativehen	AVES			LC
Trichoglossus moluccanus moluccanus	Rainbow Lorikeet	AVES			LC
Vanellus miles	Masked Lapwing	AVES			LC
Zanda funerea whiteae	Yellow-tailed Black Cockatoo	AVES		V	RA
Zosterops lateralis	Silvereye	AVES			LC
*Candalides heathi heathi^*	Rayed Blue	INV			
*Danaus petilia^*	Lesser Wanderer	INV			
*Danaus plexippus plexippus^*	Monarch	INV			
*Delias aganippe^*	Wood White	INV			
*Erina Acasta^*	Blotched Dusky-blue	INV			
*Heteronympha merope merope^*	Common Brown	INV			
*Jalmenus icilius^*	Icilius Hairstreak	INV			
*Junonia villida calybe^*	Meadow Argus	INV			
*Lampides boeticus^*	Long-tailed Pea-blue	INV			
*Nacaduba biocellata biocellata^*	Two-spotted Line-blue	INV			
*Ocybadistes walkeri hypochlora^*	Southern Grass-dart	INV			
*Pieris rapae rapae^*	Cabbage White	INV			
*Taractrocera papyria papyria^*	White-banded Grass-dart	INV			
*Theclinesthes albocinctus^*	Bitter-bush Blue	INV			
*Theclinesthes miskini miskini^*	Wattle Blue	INV			
*Theclinesthes serpentatus serpentatus^*	Salt-bush Blue	INV			
*Vanessa itea^*	Australian Admiral	INV			
*Vanessa kershawi^*	Australian Painted Lady	INV			
*Zizina otis labradus^*	Common Grass-blue	INV			

Species Name	Common Name	Class	EPBC Act Status	NPW Act Status	Subregional Status
*Macropus fuliginosus^*	Western Grey Kangaroo	MAM			LC
*Phascolarctos cinereus^*	Koala	MAM			
*Pteropus poliocephalus^*	Grey-headed Flying-fox	MAM	VU	R	
*Tachyglossus aculeatus^*	Short-beaked Echidna	MAM	ssp	ssp	
*Hemiergis peronii^*	Four-toed Earless Skink	REP			
*Pogona barbata^*	Eastern Bearded Dragon	REP			
*Tiliqua rugosa^*	Sleepy Lizard	REP			

Class: ACT = Actinopteri, **AMP** = Amphibia, **AVES** = Aves, **INV** = Invertebrates, **MAM** = Mammalia, **REP**= Reptilia

All Introduced Fauna in cell

Species	Common Name
Carduelis carduelis britannica	European Goldfinch
*Cervus dama^*	Fallow Deer
Columba livia	Feral Pigeon
*Felis catus^*	Domestic Cat (Feral Cat)
*Gambusia holbrooki^*	Eastern Gambusia
Mugilogobius stigmaticus	Blackspot Mangrovegoby
*Mus musculus^*	House Mouse
*Oryctolagus cuniculus^*	Rabbit (European Rabbit)
Passer domesticus domesticus	House Sparrow
Spilopelia chinensis	Spotted Dove
Sturnus vulgaris vulgaris	Common Starling
Turdus merula merula	Common Blackbird
Vulpes vulpes	Fox (Red Fox)

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