

Southern Fleurieu Coastal Action Plan

Surfers Beach, Middleton

(Tokuremoar to Ratalang)

Cell F5

Overview

Cell boundaries include a variety of land uses, from high density urban dwellings, and farmland used for grazing, to high value conservation areas supporting a range of conservation-rated fauna and flora species. Coastal dune reserves and the beach to the low water mark provide valuable habitat for beach nesting birds and foraging shorebirds.

Multiple weed species present in dunes and clifftop areas, many from garden escape species, including significantly large stands of *Gazania spp.* Stormwater management (including periodic inundation of low-lying areas) and increasing pressure from urban infill are key threats to this cell.



Cell detail

This cell extends from the western boundary of Tokuremoar Reserve (Newell Ave) approximately 2.5km to Chapman Road, Middleton. This cell is in Alexandrina Council local government area.

Tenure, Land Use and Values

Residential land occupies approximately half of this cell. A small area of grazing land exists behind housing at the eastern end of the cell adjacent to a Council coastal reserve (Newell Ave Reserve). Narrow council managed coastal reserve is valuable buffer against coastal erosion in front of houses and includes multiple carparks to support regular visitation by tourist for recreational activities including walking, surfing, fishing, dog walking, whale watching (from clifftops) surf school businesses and SLSC carnivals. Since 2012, the waters surrounding this cell are within the boundaries of the Encounter Marine Park.

Two Crown land parcels within this cell (as well as Tokuremoar Reserve (see F4) and adjoining private lands) are proclaimed as Significant Environment Benefit (SEB) Areas (Ref 2012_3009) that have protection under the *Native Vegetation Act 1991*.

Native title has been determined for Ngarrindjeri people over land and sea Country within this cell under the *Native Title Act 1993 (Cth)*.

The beach is an important habitat and recreational fishing area for Western Australian Salmon (*Arripis truttaceus*), Mullet (*Argyrosomus japonicus*), Yelloweye mullet (*Aldrichetta forsteri*), and Goolwa Cockle/ Pipi (*Plebidonax deltoides*) (Bryars 2013).

The Goolwa Coastcare Group have undertaken works across this and neighbouring cells for more than 18 years, making a substantial contribution to the conservation and protection of areas through valuable on-ground bushcare, revegetation and community awareness activities. Friends of the Hooded Plover Fleurieu Peninsula (supported by BirdLife Australia) and Team Oystercatcher volunteers (SA Shorebird Foundation) monitor and raise awareness of beach nesting and shorebird species within the cell.

Landforms

“This entire beach is composed of fine sand and exposed to waves averaging over 2m. These break across a 500m wide double bar surf zone, characterized by numerous spilling breakers and substantial wave set-up and set-down at the shoreline and, during lower wave conditions, widely spaced rips.” (Short, 2001, p.98). 200m dune barrier in east of cell, grading to a 10m aeolianite bluff. Further west a discontinuous low foredune at base of low (<10m high) aeolianite bluff; aeolianite coastal plain.



*Surfers high energy beach, dunes, low aeolianite cliffs, suburban coastal sprawl, wetlands and grazing land.
(Coast Protection Board, March 2024)*

First Nations cultural heritage and connection to land and sea Country

This cell holds high cultural value and significance for the Ramindjeri people of the Ngarrindjeri Nation. It forms part of their Dreaming stories and contains numerous stories, places, and artefacts of cultural importance. Ramindjeri cultural heritage is present throughout the entire cell, everywhere you tread. The Ramindjeri lived, hunted, played, swam, and danced here. Those working within and restoring these areas may encounter artefacts or evidence of cultural significance to the Ramindjeri people and the broader Ngarrindjeri Nation. These areas must be known, recognised, respected, and protected.

Creeks, wetlands, estuaries, dunes, cliff lines, islands and coastal areas are important gathering places that support a variety of habitats and food sources essential for sustaining and protecting Nga:tji. Nga:tji are the personal totems of the Ngarrindjeri people. They embody deep cultural values, symbolising kinship, spiritual protection, and an embedded responsibility to care for the land, waters, and ecosystems they inhabit.

Landscape features and culturally significant sites within this cell include the wetlands that support a stand of Swamp Paper-bark (*Melaleuca halmaturorum*) trees. A number of important sites, camping grounds, midden sites, stone tools and artefacts are located throughout the sandhills. A Clan trade path from the wetlands heading northeast also existed within this cell, illustrating the long-standing relationships between neighbouring clan groups and the exchange of locally sourced materials such as stone tools, food, and other cultural items.

This cell is also a particularly important site in the Ngurunderi Creation and Dreaming story, which tells of the Ngarrindjeri people's creation of the land and waters, including the River Murray and its mouth, Kandukang (west) and Tapalwora (east). This ancestral narrative extends westward along the southern coast of the Fleurieu Peninsula, encompassing the rugged shoreline, estuaries, and coastal landscapes all the way to Cape Jervis (Parrewar-angk). These areas hold deep cultural and spiritual significance for the Ramindjeri people, with Dreaming tracks, songlines, and important sites embedded throughout the region.

The coastline with its cliffs, beaches, and native vegetation reflects Ngurunderi's journey as he shaped the land, rested at key locations, and followed the tracks of his wives. Cape Jervis (Parrewar-angk) marks an important point in this story, serving as both a physical and spiritual place in the landscape. It connects the mainland to Kangaroo Island (Ngurungai), continuing the cultural narrative of creation, movement, and connection to Country.

Within this cell, the Dreaming story tells how Ngurunderi created the wetland, he left Kutiangk (Goolwa), finding tracks from his wives within the dunes and followed them to Ratalang (near Port Elliot).

Please respect that cultural concepts and content included in this plan are the Aboriginal Cultural and Intellectual property (ACIP) of the Ramindjeri people of the Ngarrindjeri Nation (provided by Cedric Varcoe, Ramindjeri Cultural Leader living on Country) (cells 1-20). They may not be used or adapted by any other parties without consent.

Terrestrial biodiversity

Whole Cell

Low coastal heath on narrow clifftops and coastal dunes occupying the narrow linear strip of land above the high-water mark contains pockets of remnant and larger revegetated areas. Many areas have a variety of weed species, particularly garden escapes including succulents and *Gazania spp.* The northern side of the cell on the eastern end supports remnant areas of coastal Swamp Paper-bark (*Melaleuca halmaturorum*) woodland, coastal saltmarsh, samphire lagoon and grasslands. Neighbouring private properties support species of conservation significance despite a history of grazing.

Newell Avenue Reserve is a significant Alexandrina Council reserve containing excellent biodiverse remnant vegetation. It includes an area of samphire lagoon that fills with seasonal rains and provides habitat for a diverse range of waterbirds. There are a number of uncommon, rare and vulnerable native plant species found in Newell Avenue Reserve (Simon and Bain 2015). The land parcel to the west of Newell Ave Reserve (private property) contains regionally significant coast heathland/grassland species Coastal Heath +/- Mat-rush (*Lomandra spp.*) grassland and Blady Grass (*Imperata cylindrica*) grassland), with many species of high conservation significance.



Coastal Heath +/- Mat-rush (Lomandra spp.) grassland on private property west of Newell Ave reserve is of very high conservation value to this cell (B Simon)

There is a management plan for Newell Ave Reserve, with an accompanying species list of the planting program, related to DIT funding for Significant Environmental Benefit (SEB) offset (DPTI 2007), under the *Native Vegetation Act SA (1991)*.



*Newell Ave Reserve samphire lagoon that supports a variety of habitats including Swamp Paperbark (*Melaleuca halmaturorum*) and that fills with seasonal rains (B Simon)*

Newell Ave Reserve land parcels support high conservation species of waterbirds, significant butterfly habitat, and native fauna, including Western Grey Kangaroos (*Macropus fuliginosus*), Short-beaked Echidna (*Tachyglossus aculeatus*), Common Brushtail Possum (*Trichosurus vulpecula*), Common Ringtail Possum (*Pseudocheirus peregrinus*) and Native Swamp Rat (*Rattus lutreolus*), and various reptile species (Simon and Bain 2015).

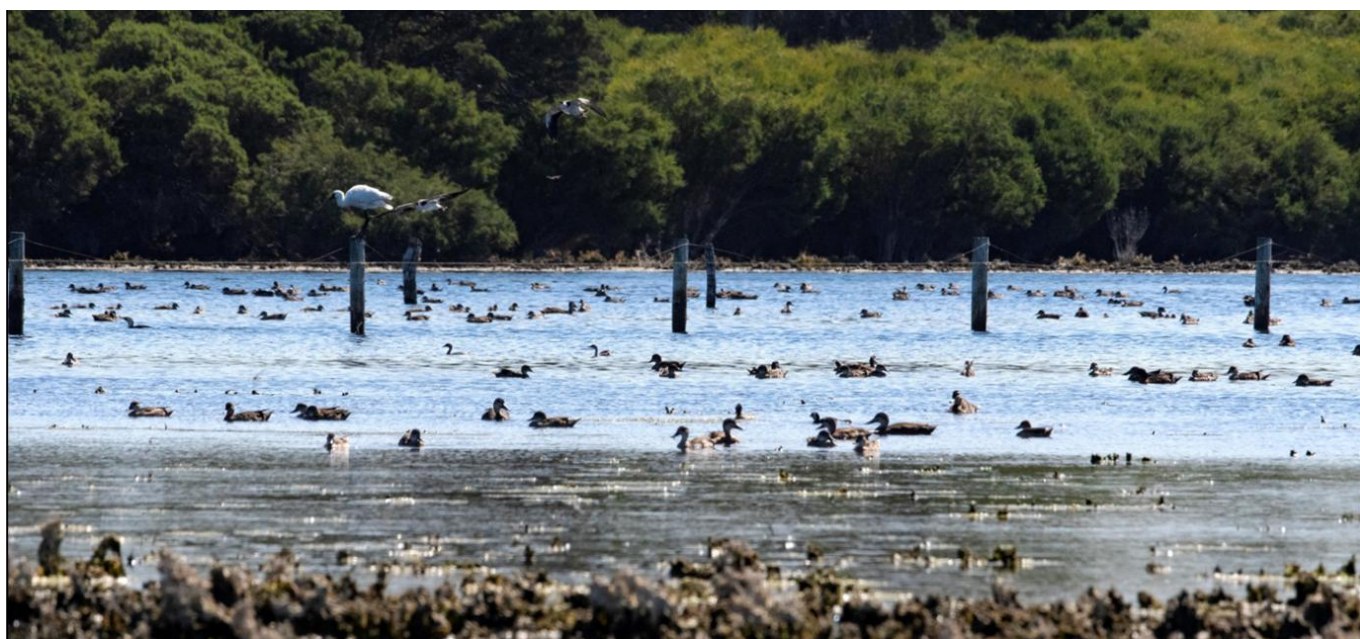
In addition to established beach breeding territories of the nationally vulnerable Hooded Plover (*Thinornis cucullatus cucullatus*), suitable foraging habitats exist for Pied (*Haematopus longirostris*) and Sooty Oystercatchers (*Haematopus fuliginosus fuliginosus*); both species with conservation rating of rare in SA, which use the beach as an important foraging site for Goolwa Cockles/Pipis and other marine invertebrates (beach worms). Red-capped Plovers (*Charadrius ruficapillus*) that are semi-colonial nesters are also recorded in this cell. Seagrass wrack (also known as Beach cast wrack) found regularly on these 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 (*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 or the Encounter Bay area.



Red-capped Plovers have been recorded foraging and resting on Middleton Beach (M Stokes)

Local dune systems provide refuge and likely valued habitat for a range of seabird species, including the White-bellied Sea-Eagle (*Haliaeetus leucogaster*), Eastern Osprey (*Pandion haliaetus cristatus*), Little Black Cormorant (*Phalacrocorax sulcirostris*), Black-faced Cormorant (*Phalacrocorax fuscescens*), Pacific Gull (*Larus pacificus georgii*), Silver Gull (*Chroicocephalus novaehollandiae*) and Kelp Gull (*Larus dominicanus*). Irregular sightings of a range of pelagic birds are also reported in this cell, including albatrosses, petrels, shearwaters and gannets.

Over 90 native bird species have been recorded in Tokuremoar and Newell Ave Reserve through numerous surveys since 2012, with several having conservation significance, including records of Elegant Parrot (*Neophema elegans*). The highest number and diversity of species were recorded when the area has been in flood and included a wide range of wetland bird species (Simon and Bain 2015).



Newell Ave Reserve can hold water for extended periods and provides a highly valuable refuge for multiple bird species (J Gitsham)

Several butterfly species have been recorded in this cell, including species of conservation value including Mottled Grass Skipper (*Anisynta cynone cynone*), Common Xenica (*Geitoneura klugii*), Chequered Copper (*Lucia limbaria*) and multiple common species that are observed across the Fleurieu Peninsula (Stolarski 2024). Mottled Grass Skipper (*Anisynta cynone cynone*) is very localised and restricted to coastal areas where its larval food plants, Poaceae (Grasses), both native and introduced, are present. *A. cynone cynone* has a patchy distribution, occurring at; Hindmarsh Island, Sir Richard Peninsula, Goolwa foreshore, Surfers to Goolwa Dunes, Port Elliot, Victor Harbor including Granite Island, and Newland Head CP (Stolarski 2024).

The Chequered Copper (*Lucia limbaria*) butterfly is very localised, rarely observed and present in coastal areas where its larval food plant, Native Sorrel (*Oxalis perennans*), is present. Populations fluctuate in densities in response to the availability of fresh *O. perennans* leaf growth favoured by larvae. The butterfly also uses Yellow Wood-sorrel (*Oxalis corniculata* ssp. *corniculata*), an introduced weed species commonly found in suburban gardens. The species has a symbiotic relationship with Black Tyrant Ants (*Iridomyrmex rufoniger*). Chequered Copper (*Lucia limbaria*) distribution along the southern Fleurieu Peninsula is known from three sites; Carrickalinga North, Waitpinga Creek and Middleton areas, both in sub-coastal sites (Stolarski 2024).



Chequered Copper butterfly (Lucia limbaria) (M Endacott)

Several of the species recorded in the Newell Ave Reserve area form a vegetation association that may be considered as part of the Beaded Samphire (*Salicornia quinqueflora* ssp. *quinqueflora*) Low Shrublands, which may be part of the Nationally Vulnerable community *Subtropical and temperate coastal saltmarsh*, as listed in the *Environmental Protection and Biodiversity and Conservation (EPBC) Act 1999*. The EPBC ecological community is the assemblage of plants, animals and micro-organisms associated with saltmarsh in coastal regions of sub-tropical and temperate Australia (DCCEEW 2013). To be considered for listing, this community needs to under regular or intermittent tidal influence, including rarely inundated supratidal areas, intermittently opened or closed lagoons, or groundwater tidal influences. The tidal connection includes areas that are inundated by astronomical tides and also by weather assisted tides (i.e. storm surges). The plant assemblage comprises salt-tolerant herbs, succulent shrubs or grasses, and there may be large areas of bare sediment.

No recognised estuaries occur in this cell.

Vegetation Communities

Newell Ave Reserve

Coastal Shrublands & Tall Shrublands

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*)

There are remnant areas of limestone outcrop, with Very Low Shrubland of Cup Wattle (*Acacia cupularis*) +/- Thyme Riceflower (*Pimelea serpyllifolia* ssp. *serpyllifolia*) +/- Short-stem Flax-lily (*Dianella brevicaulis*) +/- Knobby Club-rush (*Ficinia nodosa*).

Coastal Swamp Paper-bark (*Melaleuca halmaturorum*) Low Open Forests & Tall Shrublands of Saline Swamps

Swamp Paper-bark (*Melaleuca halmaturorum*) low closed forest over Sea Rush (*Juncus kraussii*) +/- Austral Seablite (*Suaeda australis*) tall sedges over Beaded Samphire (*Salicornia quinqueflora* ssp. *quinqueflora*) +/- Creeping Brookweed (*Samolus repens*) +/- Southern Sea-heath (*Frankenia pauciflora* var. *gunnii*)

Coastal reserve dunes

Coastal Shrublands & Tall Shrublands

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*)

Nearshore Habitats

This cell forms part of the Encounter Marine Park. The marine areas of cell F5 are within a Habitat Protection Zone (HPZ-7) and make up part of the nursery grounds for the endangered Southern Right Whale and is part of the designated *Encounter Bay Whale Nursery Protection Area* from the Murray Mouth to The Bluff, Victor Harbor.

Bryars (2013) describes this cell as composed entirely of bare sand (including Surfers Beach) (Figure 5.1). No seagrass or reef areas have been mapped for this cell. The inshore bare sand is characterised by a high energy beach system with 500m wide dissipative surf zone and fine sand (Short 2001).

The cell is regionally significant due to the beach (soft bottom/ bare sand) habitat (Bryars 2013).



Western Shovelnose Rays (Aptychotrema vincentiana) are a regularly encountered benthic species, typically occupying shallow sandy and mixed-substrate habitats. They are easily recognised by their elongated, shovel-shaped snout and patterned dorsal surface, and they often lie partially buried in the sediment while foraging for small invertebrates and fishes. (A Burnell)

Haig et al. (2006) undertook video surveys and made limited specimen collections from grab samples in the region. Bryars (2003) listed ten fish and three macroinvertebrate fisheries taxa for the surf beach habitat between Middleton Beach and Goolwa Beach. However, no habitat condition or systematic biological surveys appear to have been undertaken on the habitat within this cell.



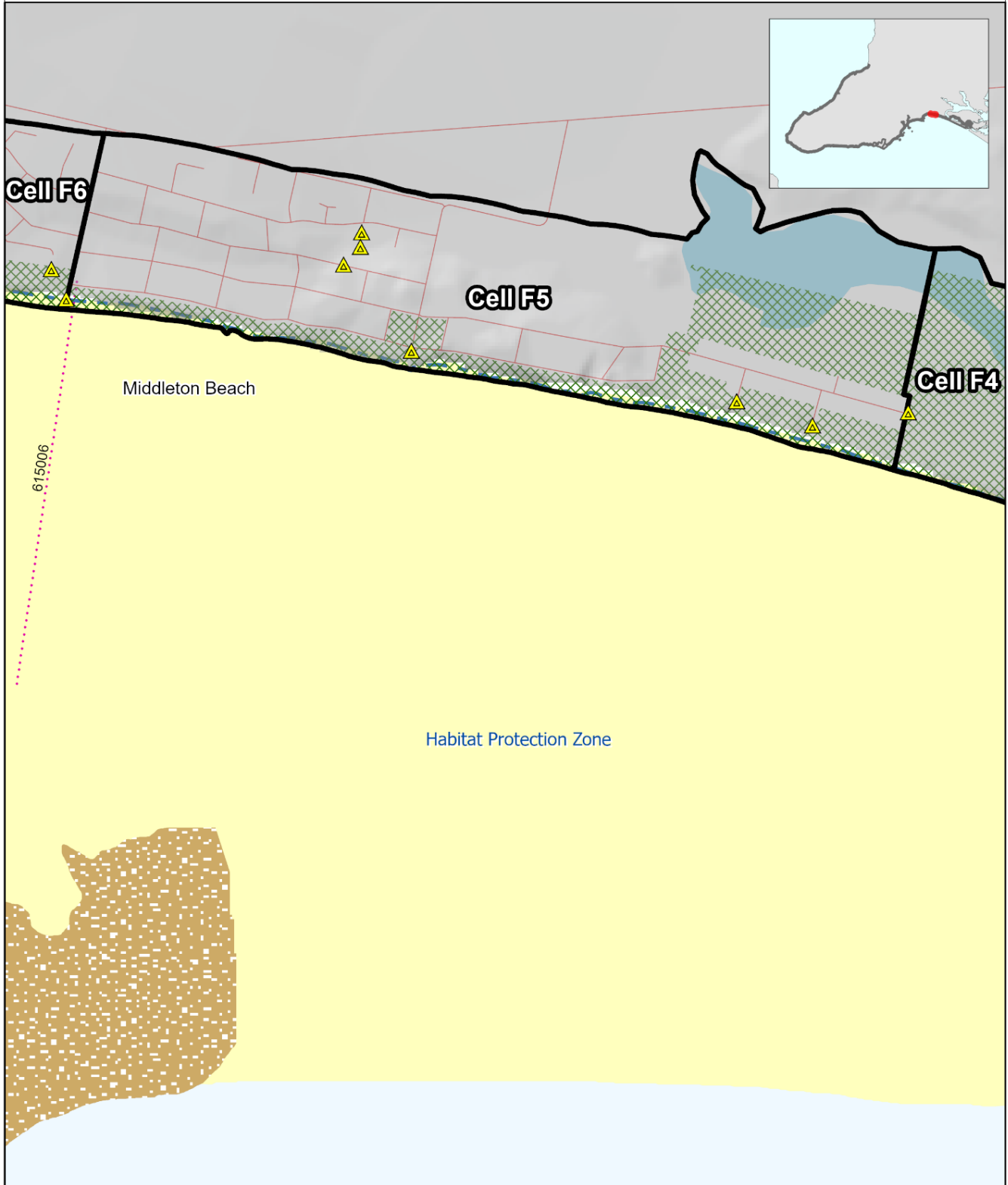
The Common Sand Crab (Ovalipes australiensis) is widespread along the Fleurieu Peninsula, including the Middleton coastline, where it inhabits surf-exposed sandy beaches. It is a fast-burrowing, highly mobile species that forages actively in the swash zone and plays an important role as both predator and prey within local nearshore ecosystems. (A Burnell)

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 beach and seabed level, 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. A beach profile 615006 established in 1977 has been monitored at Chapman Road (to the far west of the cell) to monitor beach-dune dynamics over time.

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.

The Coast Protection Board in partnership with Alexandrina Council and the South Care Dune Group, installed a beach pole community monitoring site at profile 615006 in 2002, where the dune group undertook additional measurements up until 2022 to capture additional information to provide more detailed records of how beach levels respond to seasonal changes and storm events and development along the coast to compliment the CPB beach profile annual monitoring program.

Nearshore Habitats: Cell F5



Low Profile Reef - Patchy	Wetland	N 0 500 1,000 Metres
Unconsolidated Bare Substrate	Beach Profile Monitoring	
Unmapped	Stormwater Discharge	Produced by Landscapes Hills and Fleurieu Date Date Saved: 27/11/2025 11:05 PM Projection GDA 2020 South Australia
Coastal Reserves / NPWS Parks	Watercourse	LANDSCAPE SOUTH AUSTRALIA HILLS AND FLEURIEU Government of South Australia
Coastal Conservation Cell	Roads	
Marine Park Zones		<small>© Crown in right of the State of South Australia, Hills and Fleurieu Landscape Board. The HFLB does not guarantee that this map is error free. Use of the map is at the user's sole risk and the information contained on the map may be subject to change without notice.</small>

Figure 5.1. Nearshore habitats of Cell F5

Threats

Whole cell

Increased visitation and permanent population growth exacerbate pressure upon natural environments (e.g. increased formal and informal access, dogs on beaches, drone use, cockle harvesting, trampling from whale watching, Surf Life Saving events with vehicles on beach, litter etc.). Informal foot traffic significantly impacts cultural and environmental values. Local residences have created formal and informal access paths to the beach, dissecting the dunes, exacerbating weed spread, dune instability and erosion.

Significant funding and resourcing for restoration on-ground works in this cell has been led by from Second Nature Conservancy (formerly GWLAP) for nearly 20 years, with several funded programs occurring on the site including an SEB (Significant Environmental Benefit) project. Support and resources have also been invested by Goolwa Coastcare Group, Alexandrina Council and Landscapes Boards towards revegetation, weed control, access restriction on this site to protect the high conservation values, manage threats, reduce erosion and enhance biodiversity. It is important that weed control efforts are maintained, and new incursions are monitored and controlled, including along the Encounter Bikeway path.

The Goolwa Dunes and Tokuremoar Reserve Environmental Action Plan includes weed mapping, directing control efforts for high priority weeds. Conservation analysis for this cell is remarkable, considering its location and the threats imposed by rapidly rising population in adjacent areas (Caton et al 2007). This is made up of high scores for the proportion of exotic species and distribution of rated weeds.

Moderate threats include development zoning, dune instability, cliff instability, land ownership, land use and viewscape values. 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.

The following declared or red alert weeds were found in this cell; Gazania (*Gazania linearis*), Coastal Wattle (*Acacia cyclops*), African Boxthorn (*Lycium ferocissimum*), Coast Tea-tree (*Gaudium laevigatum*), Golden Wreath Wattle (*Acacia saligna*), Sea Spurge (*Euphorbia paralias*), False Caper (*Euphorbia terracina*), Soursob (*Oxalis pes-caprae*), White Arctotis (*Arctotis stoechadifolia*), Hottentot Fig (*Carpobrotus edulis*), New Zealand Mirror-bush (*Coprosma repens*), Century Plant (*Agave americana*), Coastal Galenia (*Aizoon pubescens*), Broad-leaf Aloe (*Aloe maculata*), Marram Grass (*Ammophila arenaria*), Cape Weed (*Arctotheca calendula*), Trailing African Daisy (*Dimorphotheca fruticosa*), Cape Marigold (*Dimorphotheca pluvialis*), Rodondo Creeper (*Drosanthemum candens*), Sea-lavender (*Limonium companyonis*), Tree Mallow (*Malva arborea*), Common Iceplant (*Mesembryanthemum crystallinum*), Cape Ivy (*Senecio angulatus*), Buffalo Grass (*Stenotaphrum secundatum*), Sea Wheat-grass (*Thinopyrum junceiforme*).



White Arctotis (Arctotis stoechadifolia) spreads rapidly through dunes either through seed, fragments or deliberate plantings (B Simon)

Garden encroachments and deliberate planting of invasive garden plants are occurring by local residents. Garden escapes, such as Gazania and Coastal Tea-tree, from local residences threaten coastal biodiversity by degrading condition and habitat values. A concerted effort from multiple organisations and land manager has occurred in high conservation area at Tokuremoar Reserve however persistent threats remain in this cell. Ongoing monitoring, control and community education is required. Additional high priority weeds for control in this cell include Western Coastal Wattle and African Boxthorn.



Gazanias (Gazania spp.) dominate the dunes in sections of this cell. Targeted removal and restoration of these dunes will take a concerted effort across land managers and community (C Jackson)



BEFORE: Middleton dunes prior to targeted Gazania (Gazania linearis) control with limited revegetation (Sept 2016) (C Jackson)



AFTER: Multiple years of targeted weed control and revegetation with local coastal native species has significantly improved species diversity and habitat while reducing weed threat (May 2024) (C Jackson)

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. Urbanisation of coastal areas reduces the efficiency of species movements that could otherwise occur. Several species are now restricted to pockets of isolated habitats, resulting in some being vulnerable to population collapse (Stolarski 2024).

Off-leash dogs are permitted at times on this beach, which may deter Hooded Plover and other beach nesting birds (including Red-capped Plovers and Oystercatchers) through frequent use and disturbance. Foxes, sea level rise, storm surge, dogs off-leash, Pyp (*Ehrharta villosa*) and Sea Wheat-grasses (*Thinopyrum junceiforme*) are impacting beach nesting birds in this cell.



Conservation detection dog and handler searching for fox dens in the dunes and bottom of the cliff line in this cell. Dens are marked by GPS location and later fumigated and collapsed (C Taylor)

Sea Wheat-grass is well established in the Middleton to Goolwa and peninsula foredunes and has altered dune geomorphology, creating a wall of taller dunes that impacts beach nesting birds and potential Hooded Plover habitat. 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 from predators, such as silver gulls, ravens, foxes and other species.

Potential pest animal threats to coastal fauna and flora from rabbits (*Oryctolagus cuniculus*), foxes (*Vulpes vulpes*), and cats (*Felis catus*). Coordinated collaboration between landowners and managers is required to manage pest animals (refer to Regional Pest Management Strategies).



Rabbits (Oryctolagus cuniculus) are a challenging feral animal species across coastal areas, creating burrows within dunes or harbouring under vegetation in local resident houses and gardens

A sighting of the declared pest Common Myna (*Acridotheres tristis*) in Encounter Bay (on the coastal slopes adjacent to cell F12) was reported in 2024, and this is the only known location of the bird in South Australia. This aggressive invasive species, also known as the Indian Myna, is established throughout eastern Australia and poses a threat by evicting native birds from their nests, destroying eggs, and killing chicks. They also damage crops and orchards and are a nuisance for residents. A pest alert remains in place for any sightings to be reported via MynaScan to aid eradication efforts.

Diseases, such as Avian cholera, are a threat to waterbirds in the cell (sea bird, shorebirds, waterfowl, penguins). Zoonotic threats to marine wildlife from humans (and vice versa). Refer to national wildlife health and biosecurity plans (Wildlife Health Australia 2018 and 2022).

Recreational cockle harvesting can impact feeding and habitats through reduced food sources for beach nesting birds and migratory shore birds. Commercial and recreational cockle harvesting for human consumption has increased since the 1990's (Durante 2022) and could impact feeding and habitats through reduced food sources for beach nesting birds and migratory shore birds. Maintain and improve recreational fishing and beach access information for the general public and targeted community groups.

The bulk of this cell is outside the Conservation Zone of the Planning and Design Code in rural land. most of the coastal land, however, does fall within the coastal areas overlay, and hence is still subject to the coastal zone provisions or the protections given swamp and sand dune areas in many other coastal areas. Revision of the Conservation zone to include the entire cell should be undertaken to resolve the disparity of conservation vs rural zone.

Tokuremoar, and the adjacent high biodiversity site at Newell Ave Reserve, are subject to land based flooding. However, flooding regimes are dependent on land and water management within the catchment, which is based on agricultural needs and wetland management. Locally, there is potential for groundwater contamination from the adjacent dump, now waste transfer station (WTS), which is immediately upslope on a pervious limestone slope (Caton et al 2007). The WTS also remains a fire hazard to Tokuremoar Reserve. There is currently no monitoring of flooding, groundwater levels and groundwater quality, although the values of this rare area depend upon its hydrology. Bryars (2013) notes following heavy rains in the winter of 2012 the Tokuremoar Reserve flooded and, in

an attempt to prevent damage to nearby houses (within this cell), the water was pumped over the dunes onto the beach. This action caused localised sand scour and erosion on the beach, such activities should be discouraged, and appropriate stormwater management planning undertaken.

Changes to the hydrology of this area which support regionally rare vegetation communities and fauna by increased stormwater (quality and quantity) will directly impact these species (Caton et al 2007).

Most of the beach in this cell is fringed by coastal dunes, apart from a section of cliff around 6m high between Boettcher Road and Miami Boulevard. The aeolianite cliffs along this section have been eroding and collapsing in recent years and it is estimated that the clifftop in this area has moved about 15m landwards since 1949. The long stretch of beach in the cell is very exposed to coastal erosion, particularly around stormwater outlets. Exposure to flooding is low for the entire Middleton coast, apart from a small section to the east of Miami Boulevard, where further research is required (Western et al 2019).



Aeolianite cliffs between Boettcher Road and Miami Boulevard (Coast Protection Board, March 2024)

Stormwater is discharged through multiple outlets directly onto the beach in this cell, having a measurable impact on the beach and adjacent subtidal soft bottom sand habitat. The modelling by Western et al (2019) demonstrates that stormwater lowers the level of the beach. With increasing sea levels, the outlet will come under increased attack.

Outflow from the River Murray during flood events is significant, with associated turbid waters extending westward from the Murray Mouth across Encounter Bay to The Bluff and possibly further. The impacts of these episodic flows on nearshore habitats are unknown.

No measurable threats to habitats were identified by Bryars (2013) to the nearshore habitats.

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 improved infrastructure and fencing to ensure environmentally sensitive path formalisation and low-impact walking trails, and further opportunities to reduce impacts on the coastal environment. Education, restrictions and compliance regarding off-leash dogs. Work with First Nation communities, tourism operators and agencies to support visitor education about coastal ecological and cultural values and appropriate behaviors.

Community education opportunities regarding:

- Migratory and residential shorebirds and sea birds (dogs on leads, nesting sites, citizen science projects, managing visitor disturbance) and interpretive signage at high use areas.
- Fragile nature of coastal areas that are sensitive to foot traffic, soil compaction and erosion.
- Education and targeted communications regarding marine parks and nearshore habitats.
- Increased cultural awareness training and knowledge of culturally appropriate processes to respect known cultural heritage sites for land managers and coastal community groups
- Citizen science monitoring to contribute to intertidal reef monitoring, Seagrass restoration, dolphin watch, beach pole monitoring, Fleurieu seabird monitoring program and beach nesting birds.
- Coastal gardens and resident/business owner education
- Value of place and coastal values, responsible beach use and reducing human impact on dunes.
- There is opportunity for signage renewal across coastal areas to educate the community about coastal conservation, cultural significance and appropriate behaviours.

Review and close unauthorised access paths from local residences and car parks. Rehabilitate and conserve areas affected by informal foot traffic, for example through fencing, revegetation with local native species, in conjunction with First Nations, community education, monitoring and compliance.

Support implementation of the Goolwa dunes and Tokuremoar Environmental Action Plan, in collaboration with local community and land managers. Opportunity to review the Goolwa dunes & Tokuremoar Reserve Environmental Action Plan (Simon and Bain 2015) including a detailed fauna survey and undertake on-going habitat condition monitoring to support implementation of the plan. On-going control and investment are critical to addressing high priority weeds and maintaining conservation values for the cell. Coordination with coastal community groups and land managers is required to leverage further investment.

There is an opportunity for coastal dunes in this cell to act as a “buffer” for the adjacent high value Tokuremoar dunes through weed control and habitat connectivity. In addition, there are opportunities to continue buffering and connectivity through restoration of Council reserves in the eastern part of this cell.

Biodiversity connectivity opportunities exist with multiple land owners, including private property adjoining Heritage Agreement areas. There may be an opportunity for developing Memoranda of Understanding between land owners for conservation management, or progressing a formal conservation status for high value coastal habitat in this cell.



Blady Grass (Imperata cylindrica) grassland on an umande road reserve near Boettcher Road is of local conservation significance (B Simon)

On-going collaborative management of private Heritage Agreements and public land areas has been occurring between the private owners of this land, land managers (including Council, Second Nature Conservancy, Landscapes Boards etc) and Goolwa Coastcare Group for many years. Continued funding support, especially to continue to resource and matching funding/in-kind arrangement in place involving the landowner and bushcare contractor are needed to support this partnership approach.

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

Increase suitable habitat for coastal butterfly populations through planting of host plants (including *Oxalis perennans* and *Poa spp.*) to increase habitat suitability for local introductions.

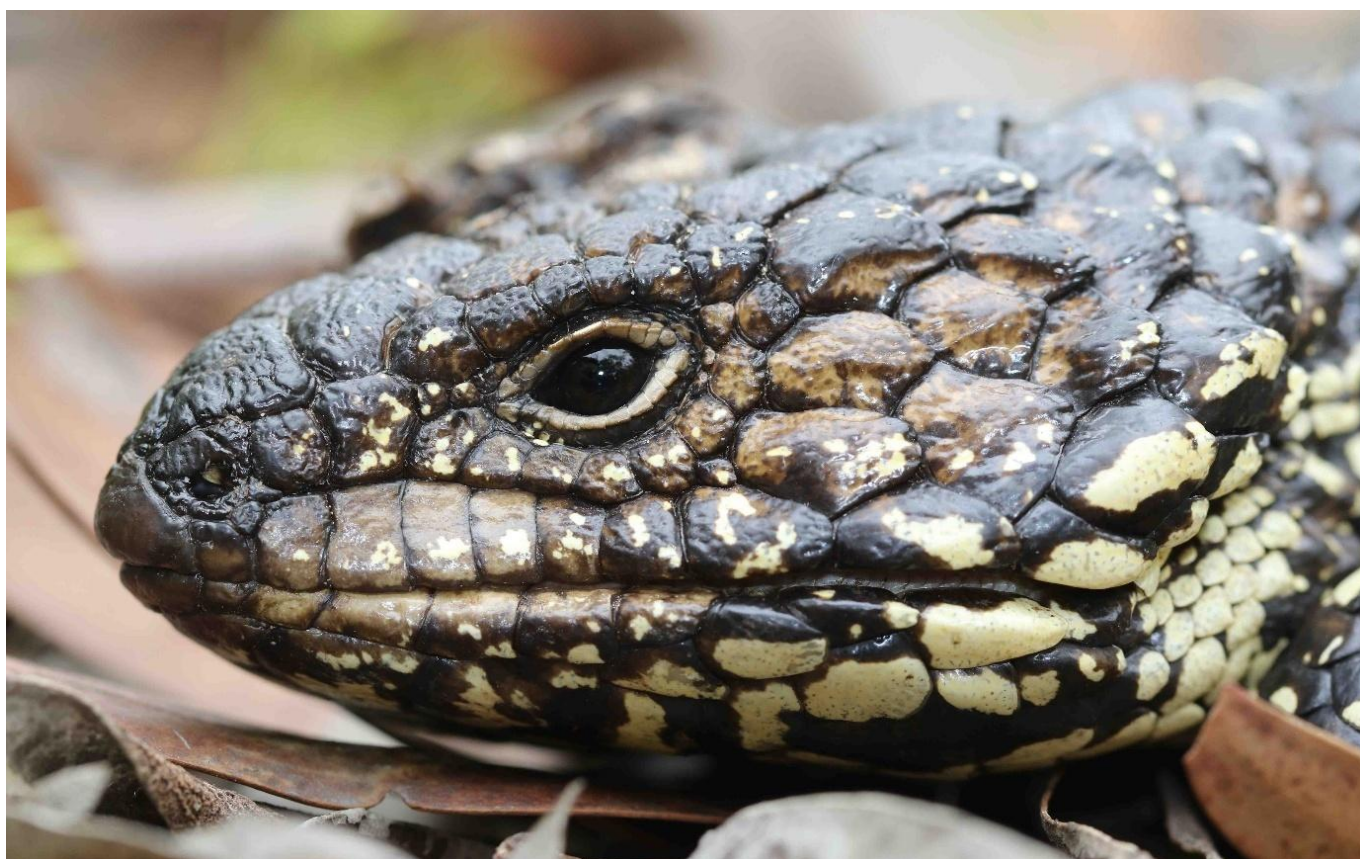
Off-leash dog areas coincide with Hooded Plover nesting areas and there is a critical need to increase beach user awareness regarding off-leash dogs and beach nesting and shore birds. Community education and compliance strategies require implementation. There is also opportunity to educate the local community and beach users on the importance of protecting the breeding sites, including that locations of breeding sites can change within and between a nesting season.

Determine the Pipi wildcatch requirement for shorebirds and continue monitoring of commercial and recreational fishing areas to ensure bag limits maintain adequate food supplies for wild populations.

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-bellied Sea-Eagles (2022). Monitor, maintain and improve the quality of vegetation for the provision of wildlife habitat for priority species.

As part of the *Coastal Dune and Cliff-top 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 cliff-top 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.



Shingleback (Tiliqua rugosa) are often seen in coastal environments but seldom recorded in databases (M Stokes)

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

Supporting community volunteer, First Nations and private landowner efforts to undertake priority restoration and conservation work in this cell. Strengthening partnerships with adjoining landowners, volunteer organisations, researchers, and the wider community to foster collaboration and long-term management benefits for biodiversity protection and restoration.

Opportunity to work with nature-based tourism operators to strengthen education and stewardship of local coastal environments and their associated plant and animal communities. Continue to include information on Hooded Plover management in permitting for major community events.

There is opportunity for forward planning with stormwater management and infrastructure to allow for environmental flows and vegetation connectivity while supporting flood protection. Investigate improved stormwater and flood mitigation strategies while maintaining integrity of the dune system (WSUD). Support initiatives to collect and reuse stormwater (e.g. Alexandrina Council's Stormwater Detention and Retention Standards). Undertake development of Southern Fleurieu Coastal Action Plan 2026

stormwater management plan for Middleton and surrounding coastal areas to manage potential eutrophication and sediment impacts entering watercourses and the marine environment. Consider a wetland system at the rear of the dunes (cell F3), providing connectivity with areas east of Beach Road (natural flows).

Western et al (2019) recommended that the stormwater at Chapman Road end of cell be detained or retained within the existing swale (council reserve between housing and rear of dune). A wetland could be created (retained), or a detention system where water is detained within the swale and then let out to the shore at a slower rate to minimise eutrophication and sediment impacts entering watercourses and the marine environment.

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.

Nearshore Habitats

Biological surveys of the soft bottom/ bare sand habitat are required to better understand habitat values and compile meaningful species lists for the cell. For example, Rowling et al. (2010) documented 21 epifauna species from a series of benthic beam trawls on soft bottom/ sandy habitat offshore from the surf beach adjacent to the south lagoon of The Coorong.

Climate change threats on coastal biodiversity (see BMT 2025)

Potential Climate Change Threats

Cell F5 includes cliffs, beach and dunes. The dunes support native vegetation of importance for flora and fauna, the beach is an important nesting area for birds and the intertidal areas support infauna on which birds feed.

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

- Coastal dunes and vegetation
- Intertidal ecosystems
- Native vegetation
- Nesting area for birds
- Coastal cliffs

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

Over time, increasing aridity will slow natural recovery from damage to dune vegetation. Rising sea levels will see increased storm damage to foredunes; Bruun Rule calculations of beach recession could be compromised by active littoral drift values here. However, recession of the order 10 – 20 m over 50 years could be likely, given current IPCC forecasts. Changes in wave climate which increase the long period swell component would increase the likelihood of foredune damage. Where dunes are eroded in front of aeolianite cliffs, these will be undermined at varied rates, depending on their local composition (Caton et al 2007).

The 1-in-100 ARI storm event would significantly impact the beach and dune, especially in the southern areas. High tides 1m greater than today would also routinely impact the dunes and the areas behind the dunes. Routine tidal action 1m higher than present will cause the dune escarpment to recede. The extent of the recession is unknown, but modelling in other areas indicates that the esplanade road would come under impact within the years 2050–2100 (Western et al., 2019).

In the context of a high energy sand dominated beach, it is unlikely that protecting the base of the cliffs will be viable in the second half of this century. Therefore, a managed retreat strategy should be employed. This does not mean 'surrender' but rather monitor and adapt to the recession when it begins to occur. While a cliff collapse is unlikely, if the dunes eroded away in a storm event, and this was followed by another storm event, direct impact could occur to the base of the cliffs. Over the longer term, it is also expected that routine action will impact the base of the cliffs (Western et al., 2019).

Erosion modelling suggests that in the second half of this century these sand dunes may have eroded away, and erosion will be impacting urban settlement in this region. Note: The area behind the dunes is not flooded by sea water in this scenario. However, if the dune system broke down in SF4, then flooding is possible (Western et al., 2019).

Cell Action Table

Component	Issue	Proposed Action	Priority	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)	NAC, Council, LHF, Coastal Community groups, Aboriginal Affairs and Reconciliation - Department of Premier and Cabinet
	Coordinated active management required of reserve with high conservation and Aboriginal heritage value, which is facing increased population pressure from adjacent areas.	Review by DEW Land Administration Branch, Coast Protection and NPWS, in light of conservation values and increasing threats..	High (Cons / threat)	Council, DEW-NPWS, NAC, Aboriginal Affairs and Reconciliation - Department of Premier and Cabinet.
	Increased visitation and recreational pressure on dunes and viewing points due to increased local population and tourist promotion (particularly whale watching).	Assess increased visitation capacity at known sites, repair or upgrade fencing to restrict unauthorised access and review car parking capacity. Manage visitor impacts within sustainable limits in ecologically and culturally sensitive and significant areas - consult with First Nations groups.	High (cons/ threat)	Council, NAC, Second Nature Conservancy, land managers
		Investigate opportunities for community education and engagement regarding unique and valuable coastal landscape and fragile nature of coastal areas. Dedicated cultural education and training for land managers, agency staff and land stewards	High (Cons/ Soc)	DEW, NPWSSA, Council, LHF, NAC, Second Nature Conservancy, 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. Increased awareness of local coastal values and responsible beach use. Co-design signage with First Nations/ knowledge holders.	Medium (Soc/ Cons)	Council, NPWSSA, NAC, LHF, Second Nature Conservancy, coastal community groups
		Monitor, educate, and advocate to ensure that recreational activities (e.g., boating, paddleboarding, jet-skiing) do not increase interactions with marine wildlife or place additional pressure on coastal species and habitats.	High (threat)	DIT, DEW, land managers, NPWSSA, Coastal Community groups
		Opportunity to work with nature-based tourism operators to enhance education and stewardship of local coastal environments, including opportunities to partner with First Nations groups who hold cultural obligations and authority to Sea Country	Medium (Cons)	Tourism operators, land managers, NAC, NPWSSA, coastal community groups
		Collaborate and manage access with beach-based users and businesses (e.g. SLSC, Surfing SA, surf/paddle boarders, swim/surf schools), to ensure protection of coastal areas and groups do not impact conservation and cultural value areas and species.	Medium (threat)	Council, DEW, land managers, NAC, coastal community groups, beach users and businesses
		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
		Planning and Design Code zoning does not fully recognise conservation zone and protection of coastal habitats.	Review of local zoning in P&D code	Medium (threat)
	Revision of the Conservation zone to include the entire cell to resolve the disparity of conservation vs rural zone.		Medium (threat)	CPB, Plan SA, Council, Department for Housing and Urban Development (DHUD)

Component	Issue	Proposed Action	Priority	Key Players
Whole cell	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.	High (threat)	Councils, Second Nature Conservancy, NAC business/contractors/rangers land owners, LHF
		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, Second Nature Conservancy, coastal community groups
	Coastal reserve and surrounding land parcels are of conservation and buffering value to Tokuremoar reserve but are under growing population and weed pressure.	Implementation of Goolwa Dunes and Tokuremoar Environmental Action Plan through targeted control of weed species.	High (Cons / threat)	Council, LHF, NAC business/contractors/rangers, land managers, Second Nature Conservancy, coastal community groups
		Review and updating of the Goolwa Dunes & Tokuremoar Reserve Environmental Action Plan to continue support of cultural heritage values and extensive weed control implementation and restoration activities.	High (Cons / threat)	DEW, LHF, NAC, Second Nature Conservancy, Council, coastal community groups
		Ongoing control and investment in weed control (particularly WONS and Red Alert Species) to protect and maintain high conservation areas including in difficult to access areas.	High (threat)	NPWSSA, land managers, NAC business/contractors/rangers, Council, coastal community groups, LHF, Second Nature Conservancy.
		Leverage funding opportunities based on previous investment and in-kind contributions from coastal community groups.	Medium (cons)	Second Nature Conservancy, LHF, coastal community groups and Council
		Determine opportunities to collaborate with private land managers with similar vegetation associations and heritage agreements to increase connectivity across local landscape.	High (cons)	Council, NPWSSA, land managers, NAC, Second Nature Conservancy, LHF, coastal community groups
		Monitor changes to dunes through BushRAT or similar monitoring to measure condition assessment and change.	High (threat/ cons)	Second Nature Conservancy, Council, LHF, Community Groups.
		Ongoing weed incursions and weed control.	Target residences with educational materials, with regard to weeds.	High (Soc / Econ)
	Weed control and monitoring of garden escape weeds from local residences to public lands and intentional plantings within the dunes.		High (threat)	Council, land owners, coastal community groups, LHF
	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, NPWSSA, land managers, NAC business/contractors/rangers, LHF, coastal community groups,
		Propagate local plants for reintroduction to other sites to maintain genetic diversity and increase source populations.	High (cons)	Council, NPWSSA, land managers, LHF, NAC business/contractors/rangers, coastal community groups, Local coastal plant nurseries, Second Nature Conservancy
		Targeted interventions for threatened/ rare plant species and communities.	High (cons)	DEW, NPWSSA, LHF, Council, coastal community groups
		Explore opportunities for greater local awareness of conservation value of area.	Medium (cons)	Council, NPWSSA, LHF, coastal community groups
	Limited protection and awareness of EPBC listed Threatened ecological community – Subtropical and temperate Coastal saltmarsh.	Increased protection from weed incursion, development and disturbance through site restoration and increased community awareness.	High (cons)	Council, coastal Community groups, LHF
		Formal assessment of vegetation communities to determine listing on the national register of protected sites.	High (cons)	Council, LHF, DEW, coastal community groups

Component	Issue	Proposed Action	Priority	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, Second Nature Conservancy, DEW, LHF, coastal community groups
		Extension of existing habitats and reintroduction of locally extinct butterfly species.	Medium (cons)	Council, Second Nature Conservancy, NAC business/contractors/rangers, DEW, LHF, coastal community groups
		Monitor for Chequered Copper (<i>Lucia limbaria</i>) & common species and protect existing populations including host plant.	Medium (cons)	Council, Second Nature Conservancy, DEW, LHF, coastal community groups
	Valuable habitat for coastal raptors (White-bellied Sea-eagle and Eastern Osprey).	Ongoing monitoring and management of high values nesting and foraging areas.	High (cons)	NPWSSA, DEW, LHF, Council, NAC business/contractors/rangers
		Implement the recovery plan for Eastern Osprey and White-bellied Sea Eagles (2022).	High (cons)	DEW, NPWSSA, LHF
	Stormwater impacts from inland development are likely to impact marine intertidal habitats and may accelerate seabed deepening and coastal erosion. Turbidity and nutrients are a significant threat to reef and seagrass habitats (neighbouring cells).	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
		Seasonal pooling of water behind dunes prevented from natural flow from this cell to River Murray due to Beach Road. Undertake development of stormwater management plan for Middleton to Goolwa including coastal areas.	High (threat)	Council, LHF, Stormwater Management Authority
		Support initiatives to collect and reuse stormwater (e.g. Alexandrina Council's Stormwater Detention and Retention Standards)	High (cons)	Council
		Monitor and manage stormwater to minimise suspended sediment and nutrients impacts in the coast and marine environment. Improvements in the stormwater system to reduce gross pollutants and erosive impact of stormwater discharge into the dunes. Implement Water Sensitive Urban Design (WSUD).	High (Threat)	DEW, EPA, LHF, 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, CPB, DEW, Stormwater Management Authority
		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).	Implementation of the Coastal Adaptation Plan, including key locations, recommendations and priorities for funding.	High (Cons. Threat)
	Support partnerships for ongoing investigation and monitoring in the coastal zone, working with the CPB to identify adaptation options for the future.			
	Coordinated approach to monitoring of coastal wildlife.	Collaboration between land manager and stakeholders to support research and citizen science of beach-nesting birds, seabird, coastal raptors, marine mammals and other wildlife.	Medium (cons)	DEW, NPWSSA, NAC business/contractors/rangers, BirdLife Aust, LHF, Council, SA Whale Centre, Encounter Whales, ecotourism operators
	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.

Component	Issue	Proposed Action	Priority	Key Players
Whole cell	Multiple community groups and volunteers across coastal areas	Acknowledge significant value, contribution and knowledge of coastal community groups. 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.	High (cons)	Council, land managers, LHF, NAC, coastal community groups
Cliff top Reserves	Weed infestation including multiple garden escape species	Weed control and revegetation program.	High (threat)	Council, NAC business/contractors/rangers, coastal community groups
Dunes	Impacts on cultural and environmental values through creation of formal and informal access paths to beach.	Assessment of access paths including weed spread and erosion issues and closure, monitoring and rehabilitation of unnecessary paths.	Medium (threat)	Council, NAC business/contractors/rangers
		Signage and access control of foot traffic on dunes.	Medium (threat)	Council and community partnership
Coastal wetlands and <i>Melaleuca halmaturorum</i> woodland	Pressures on groundwater and flooding regime.	Review opportunities to establish a monitoring regime of flooding regime, groundwater levels and groundwater quality.	Medium (threat)	DEW, EPA, LHF, community volunteers.
	Stormwater management issues and flood mitigation.	Consider development of Stormwater Management Plan for Middleton to Goolwa and surrounding coastal areas.	High (threat)	Council, LHF, Stormwater Management Authority
	Environmental flows and inundation periods for health of wetland system.	Investigate opportunities for infrastructure and WSUD to allow for longer periods of inundation while supporting flood protection.	High (cons)	Council, NPWSSA, LHF
Intertidal and supratidal saltmarsh communities	These tide dependent habitats are threatened by climate change induced accelerated sea level rise. Some of the saltmarsh communities are rare in South Australia.	Advocate and review of buffer zone provisions to allow for species migration within the Planning, Development and Infrastructure Act 2016. Also review of flood hazard issues for shacks and low lying properties.	High (Cons / Threat)	PlanSA, DEW, CPB, Council.
	Need for data updates to map the change in extent and habitat type of coastal saltmarsh and mangrove ecosystems in SA including coastal acid sulfate soil classification	Update DEW Coastal Saltmarsh/Mangrove Habitat spatial mapping to capture changes in the extent and different habitat types of saltmarsh ecosystems in South Australia since the original mapping was undertaken over 20 years ago. Data layer to be made publicly available on NatureMaps	High (Cons/threat)	DEW, CPB
Beach and dune	Seasonal visitor impacts on dunes.	Development of educational materials for seasonal visitors / holiday homes to reduce impact on dune and beach.	Medium (threat)	Council and community partnership
	Increased recreational cockle harvesting can impact shorebirds and beach nesting birds.	Increase community awareness of impacts to beach- nesting and shorebirds through recreational fishing.	Medium (cons)	PIRSA, DEW, NPWSSA, BirdLife Australia
		Determine wildcatch requirements of pipi's for dependent wildlife populations.	High (cons)	PIRSA, DEW, NAC business/contractors/rangers
		Monitoring of pipi population in recreational and commercial areas to ensure adequate supply for wildcatch dependent populations.	High (cons)	PIRSA, DEW, NAC business/contractors/rangers
Beach-nesting birds	Hooded Plover and Red-capped 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 and horse riders.	High (Cons / threat)	Council, BirdLife Australia, LHF, NAC business/contractors/rangers, Friends of the Hooded Plover, Fleurieu Peninsula volunteers, coastal community groups, Oystercatcher monitoring volunteers
	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 and Sooty Oystercatchers (dogs on leads, nesting sites, citizen science projects, managing visitor and vehicle patrol disturbance).	High (cons)	Council, BirdLife Australia, LHF, NAC business/contractors/rangers, Friends of the Hooded Plover, Fleurieu Peninsula volunteers, coastal community groups, Oystercatcher monitoring volunteers

Component	Issue	Proposed Action	Priority	Key Players
Beach-nesting birds	Protection of natural assets of high conservation values.	Support the introduction and implementation of Council by-laws related to dogs on lead on beaches and high value areas.	High (threat)	Council, land owners, community, BirdLife Australia, 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, NAC 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 (soft bottom/bare sand habitats)	Limited understanding of nearshore habitats and species assemblages.	Biological surveys of the soft bottom/ bare sand habitat.	High (cons)	DEW, NPWSSA, LHF
Climate (Cliffs and rocky headlands)	More intense rainfall events likely to increase soil erosion.	Restoration of native plant species to assist soil stabilisation.	High (Cons/threat)	Council, NAC business/ contractors/rangers, coastal community groups, LHF
	Increased aridity likely to make growing conditions less suitable to native vegetation fragments.	Restoration of native plant species to assist soil stabilisation.	High (Cons/threat)	Council, coastal community groups, LHF
	Increased sea levels contribute to more frequent and intense wave action, which accelerates cliff erosion.	Restoration of native plant species to assist soil stabilisation.	Medium (threat)	Council, NAC business/ contractors/rangers, coastal community groups, LHF
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.	Restrict public access to fragile dunes and implement restoration of native plant species.	Medium (threat)	Council, coastal community groups, LHF
		Implement restoration of native plant species.	Medium (threat)	Council, NAC business/ contractors/rangers, coastal community groups, LHF
	Predicted increases in aridity can lead to reduced vegetation cover and increased dune drift and dune mobility.	Monitor recession rate of beaches and sand dunes.	Medium (threat)	Council, coastal community groups, CPB, LHF
		Monitoring of cross-shore dune, beach and nearshore sand level profiles.	Low (Hazard) Medium (cons/threat)	DEW CPB, Research Institutions, Universities.
		Support cultural monitoring and communications to protect significant known heritage sites	High (threat)	NAC, First nations business/ contractors/ rangers, Council, DEW, LHF, coastal community groups
	Physical changes on the coast and natural assets from long term adjustment to climate change induced conditions including Sea Level Rise	Continuation of monitoring of cross-shore cliff, dune, beach and nearshore sand level profiles.	Medium (threat)	DEW, CPB, Coastal Community groups, Research Institutions, Universities.
		Topographic and photogrammetry drone surveys to provide detailed 2D and 3D digital surface models to monitor changes to the coastal landforms over time in response to climate change including more frequent and intense storm surge events and changes in wave climate and sea level rise. Encourage community to reestablish monitoring of existing Beach pole located on the CPB profile line for more frequent data on how the beach and dunes responds to seasonal changes and storm events.		
Likely beach and dune recession consequent on coastal and riverine flooding and climate change effects.	Use advances in technology (e.g. LiDAR and improved imagery capture), and more recently available information to 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, Cons/threat)	DEW, CPB, Research Institutes, Universities	

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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 10km² 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	Newell Avenue Reserve (Council)			
Terrestrial Habitat Description/s	See Terrestrial biodiversity vegetation communities in cell description.			
# Flora in cell	87			
# Native Flora in cell	43			
# Introduced Flora in cell	44			
# Conservation Rated Flora in cell	1 (0 national, 1 state)			
# Threatened Ecological Communities (EPBC Act)	1 (Subtropical and Temperate Saltmarsh)			
Conservation Rated Flora	Species	Common Name	EPBC Act Status	NPW Status
	<i>Correa alba var. pannosa</i>	White Correa		R

All Native Flora in cell

Species	Common Name	EPBC Status	NPW Act Status	Subregional Status*
<i>Acacia cupularis</i>	Cup Wattle			LC
<i>Acacia ligulata</i>	Umbrella Bush			LC
<i>Acacia longifolia ssp. sophorae</i>	Coastal Wattle			LC
<i>Actites megalocarpus</i>	Coast Sow-thistle			NT
<i>Atriplex cinerea</i>	Coast Saltbush			LC
<i>Atriplex nummularia ssp. nummularia</i>	Old-man Saltbush			
<i>Atriplex paludosa ssp. cordata</i>	Marsh Saltbush			LC
<i>Austrostipa flavescens</i>	Coast Spear-grass			LC
<i>Carpobrotus rossii</i>	Native Pigface			LC
<i>Correa alba var. pannosa</i>	White Correa		R	VU
<i>Dianella brevicaulis</i>	Short-stem Flax-lily			LC
<i>Disphyma crassifolium ssp. clavellatum</i>	Round-leaf Pigface			LC
<i>Einadia nutans ssp. nutans</i>	Climbing Saltbush			LC
<i>Enchylaena tomentosa var. tomentosa</i>	Ruby Saltbush			LC
<i>Exocarpos syrticola</i>	Coast Cherry			LC
<i>Ficinia nodosa</i>	Knobby Club-rush			LC
<i>Frankenia pauciflora var. gunnii</i> [^]	Southern Sea-heath			LC
<i>Geranium potentilloides var. potentilloides</i>	Downy Geranium			LC
<i>Imperata cylindrica</i> [^]	Blady Grass			
<i>Juncus kraussii</i> [^]	Sea Rush			LC
<i>Kunzea pomifera</i>	Muntries			LC
<i>Lepidosperma gladiatum</i>	Coast Sword-sedge			LC
<i>Leucophyta brownii</i>	Coast Cushion Bush			LC

Species	Common Name	EPBC Status	NPW Act Status	Subregional Status*
<i>Leucopogon parviflorus</i> [^]	Coast Beard-heath			LC
<i>Melaleuca decussata</i>	Totem-poles			RA
<i>Melaleuca halmaturorum</i>	Swamp Paper-bark			LC
<i>Muehlenbeckia adpressa</i>	Climbing Lignum			LC
<i>Muehlenbeckia gunnii</i>	Coastal Climbing Lignum			LC
<i>Myoporum insulare</i>	Common Boobialla			LC
<i>Olearia axillaris</i>	Coast Daisy-bush			LC
<i>Osteocarpum acropterum</i> var.	Bonefruit			
<i>Pelargonium australe</i>	Austral Stork's-bill			LC
<i>Pimelea serpyllifolia</i> ssp. <i>serpyllifolia</i>	Thyme Riceflower			LC
<i>Rhagodia candolleana</i> ssp.	Sea-berry Saltbush			
<i>Rhagodia candolleana</i> ssp. <i>candolleana</i>	Sea-berry Saltbush			LC
<i>Salicornia quinqueflora</i> ssp. <i>quinqueflora</i> [^]	Beaded Samphire			LC
<i>Samolus repens</i> [^]	Creeping Brookweed			LC
<i>Senecio pinnatifolius</i> group	Variable Groundsel			
<i>Spergularia marina</i>	Salt Sand-spurrey			NT
<i>Spinifex hirsutus</i>	Rolling Spinifex			LC
<i>Suaeda australis</i> [^]	Austral Seablite			LC
<i>Tetragonia implexicoma</i>	Bower Spinach			LC
<i>Threlkeldia diffusa</i>	Coast Bonefruit			LC

[^] 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
<i>Acacia cyclops</i>	Western Coastal Wattle	IC		
<i>Acacia saligna</i>	Golden Wreath Wattle	HP		
<i>Aeonium arboreum</i>	Tree Aeonium			
<i>Agave americana</i>	Century Plant	HP		
<i>Aizoon pubescens</i>	Coastal Galenia	IC		
<i>Aloe arborescens</i>	Tree Aloe			
<i>Aloe maculata</i>	Broad-leaf Aloe	HP		
<i>Ammophila arenaria</i>	Marram Grass	HP		
<i>Arctotheca calendula</i>	Cape Weed	HP		
<i>Arctotis stoechadifolia</i>	White Arctotis	IC		
<i>Artemisia arborescens</i>	Silver Wormwood			
<i>Cakile maritima</i> ssp. <i>maritima</i>	Two-horned Sea Rocket			
<i>Carpobrotus edulis</i> ssp. <i>edulis</i>	Hottentot Fig	HP		

Species	Common Name	Red Alert Weeds	Declared Weeds	WONS
<i>Coprosma repens</i>	New Zealand Mirror-bush	IC	Yes	
<i>Cotyledon orbiculata</i> var.	Cotyledon			
<i>Cynodon dactylon</i> var. <i>dactylon</i>	Couch			
<i>Dimorphotheca fruticosa</i>	Trailing African Daisy	HP		
<i>Dimorphotheca pluvialis</i>	Cape Marigold	HP		
<i>Drosanthemum candens</i>	Rodondo Creeper	IC		
<i>Ehrharta villosa</i> *	Pyp Grass	IC		
<i>Euphorbia paralias</i>	Sea Spurge	HP		
<i>Euphorbia terracina</i>	False Caper	HP	Yes	
<i>Gaudium laevigatum</i>	Coast Tea-tree		Yes	
<i>Gazania linearis</i>	Gazania	IC	Yes	
<i>Gazania</i> spp.*	Gazania		Yes	
<i>Lagurus ovatus</i>	Hare's Tail Grass			
<i>Limonium companyonis</i>	Sea-lavender	IC		
<i>Lycium ferocissimum</i>	African Boxthorn	IC	Yes	Yes
<i>Malva arborea</i>	Tree Mallow	HP		
<i>Medicago polymorpha</i>	Burr-medic			
<i>Mesembryanthemum crystallinum</i>	Common Iceplant	HP		
<i>Oxalis pes-caprae</i>	Soursob			
<i>Paspalum vaginatum</i>	Salt-water Couch			
<i>Phyla canescens</i>	Lippia			
<i>Plantago coronopus</i> ssp. <i>coronopus</i>	Bucks-horn Plantain			
<i>Plantago lanceolata</i> var.	Ribwort			
<i>Reichardia tingitana</i>	False Sowthistle			
<i>Rosmarinus officinalis</i>	Rosemary			
<i>Senecio angulatus</i>	Cape Ivy	IC		
<i>Sonchus asper</i>	Rough Sow-thistle			
<i>Sonchus oleraceus</i>	Common Sow-thistle			
<i>Stenotaphrum secundatum</i>	Buffalo Grass	HP		
<i>Thinopyrum junceiforme</i>	Sea Wheat-grass	IC		
<i>Vulpia fasciculata</i>	Sand Fescue			

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	108
# Native Fauna in cell	97
# Introduced Fauna in cell	11
# Conservation Rated Fauna in cell	17* (4 national, 16 state)

Conservation Rated Fauna				
Species Name	Common Name	Class	EPBC Act Status	NPW Act Status
<i>Anthochaera chrysoptera</i>	Little Wattlebird	AVES	ssp	
<i>Cladorhynchus leucocephalus</i>	Banded Stilt	AVES		V
<i>Coturnix ypsilophora australis</i>	Brown Quail	AVES		V
<i>Falco peregrinus macropus</i>	Peregrine Falcon	AVES		R
<i>Haematopus fuliginosus fuliginosus</i>	Sooty Oystercatcher	AVES		R
<i>Haematopus longirostris</i> [^]	Pied Oystercatcher	AVES		R
<i>Haliaeetus leucogaster</i> [^]	White-bellied Sea Eagle	AVES		E
<i>Larus dominicanus dominicanus</i> [^]	Kelp Gull	AVES		R
<i>Neophema elegans elegans</i> [^]	Elegant Parrot	AVES		R
<i>Pandion haliaetus cristatus</i> [^]	Eastern Osprey	AVES		E
<i>Spatula rhynchotis</i>	Australasian Shoveler	AVES		R
<i>Thinornis cucullatus cucullatus</i>	Hooded Plover	AVES	VU	V
<i>Zanda funerea whiteae</i> [^]	Yellow-tailed Black Cockatoo	AVES		V
<i>Pteropus poliocephalus</i> [^]	Grey-headed Flying-fox	MAM	VU	R
<i>Rattus lutreolus</i> [^]	Swamp Rat	MAM		R
<i>Tachyglossus aculeatus</i> [^]	Short-beaked Echidna	MAM	ssp	ssp
<i>Trichosurus vulpecula</i> [^]	Common Brushtail Possum	MAM		R

All Native Fauna in cell

Species Name	Common Name	Class	EPBC Act Status	NPW Act Status	Subregional Status
<i>Aldrichetta forsteri</i> [^]	Yelloweye Mullet	ACT			
<i>Argyrosomus japonicus</i> [^]	Mulloway	ACT			
<i>Crinia signifera</i>	Common Froglet	AMP			NT
<i>Limnodynastes tasmaniensis</i>	Spotted Marsh Frog	AMP			NT
<i>Rawlinsonia calliscelis</i>	South Australian Tree Frog (MLR MN)	AMP			NT
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill	AVES			LC
<i>Acanthiza pusilla samueli</i>	Brown Thornbill (MLR)	AVES			
<i>Anas castanea</i>	Chestnut Teal	AVES			LC
<i>Anas gracilis gracilis</i>	Grey Teal	AVES			
<i>Anas superciliosa</i>	Pacific Black Duck	AVES			LC
<i>Anthochaera carunculata</i>	Red Wattlebird	AVES			LC
<i>Anthochaera chrysoptera</i>	Little Wattlebird	AVES	ssp		LC
<i>Aythya australis</i>	Hardhead	AVES			LC
<i>Cacomantis flabelliformis flabelliformis</i>	Fan-tailed Cuckoo	AVES			LC
<i>Cacomantis pallidus</i>	Pallid Cuckoo	AVES			NT
<i>Calidris ruficollis</i>	Red-necked Stint	AVES			NT
<i>Chalcites basalix</i>	Horsfield's Bronze Cuckoo	AVES			NT
<i>Charadrius ruficapillus</i>	Red-capped Plover	AVES			RA
<i>Chroicocephalus novaehollandiae novaehollandiae</i>	Silver Gull	AVES			LC

Species Name	Common Name	Class	EPBC Act Status	NPW Act Status	Subregional Status
<i>Circus approximans</i>	Swamp Harrier	AVES			RA
<i>Cisticola exilis exilis</i>	Golden-headed Cisticola	AVES			VU
<i>Cladorhynchus leucocephalus</i>	Banded Stilt	AVES		V	VU
<i>Colluricincla harmonica</i>	Grey Shrikethrush	AVES			LC
<i>Corvus mellori</i>	Little Raven	AVES			LC
<i>Coturnix ypsilophora australis</i>	Brown Quail	AVES		V	
<i>Cygnus atratus</i>	Black Swan	AVES			LC
<i>Dicaeum hirundinaceum hirundinaceum</i>	Mistletoebird	AVES			NT
<i>Egretta novaehollandiae</i>	White-faced Heron	AVES			LC
<i>Elanus axillaris</i>	Black-shouldered Kite	AVES			LC
<i>Elseyornis melanops</i>	Black-fronted Dotterel	AVES			RA
<i>Eolophus roseicapilla</i>	Galah	AVES			LC
<i>Erythrogonyx cinctus</i>	Red-kneed Dotterel	AVES			RA
<i>Falco cenchroides cenchroides</i>	Nankeen Kestrel	AVES			LC
<i>Falco peregrinus macropus</i>	Peregrine Falcon	AVES		R	RA
<i>Fulica atra australis</i>	Eurasian Coot	AVES			NT
<i>Gallinula tenebrosa tenebrosa</i>	Dusky Moorhen	AVES			RA
<i>Gavicalis virescens</i>	Singing Honeyeater	AVES			LC
<i>Geopelia placida placida</i>	Peaceful Dove	AVES			LC
<i>Grallina cyanoleuca cyanoleuca</i>	Magpielark	AVES			LC
<i>Gymnorhina tibicen</i>	Australian Magpie	AVES			LC
<i>Haematopus fuliginosus fuliginosus</i>	Sooty Oystercatcher	AVES		R	VU
<i>Haematopus longirostris</i> [^]	Pied Oystercatcher	AVES		R	VU
<i>Haliaeetus leucogaster</i> [^]	White-bellied Sea Eagle	AVES		E	EN
<i>Himantopus leucocephalus</i>	Pied Stilt	AVES			NT
<i>Hirundo neoxena neoxena</i>	Welcome Swallow	AVES			LC
<i>Larus dominicanus dominicanus</i> [^]	Kelp Gull	AVES		R	RA
<i>Larus pacificus georgii</i>	Pacific Gull	AVES			LC
<i>Malurus cyaneus</i>	Superb Fairywren	AVES			LC
<i>Neophema elegans elegans</i> [^]	Elegant Parrot	AVES		R	RA
<i>Ocyphaps lophotes lophotes</i>	Crested Pigeon	AVES			LC
<i>Pachyptila belcheri</i>	Slender-billed Prion	AVES			RA
<i>Pandion haliaetus cristatus</i> [^]	Eastern Osprey	AVES		E	
<i>Pardalotus striatus striatus</i>	Striated Pardalote	AVES			NT
<i>Phalacrocorax carbo</i>	Great Cormorant	AVES			LC
<i>Phalacrocorax fuscescens</i> [^]	Black-faced Cormorant	AVES			NT
<i>Phalacrocorax sulcirostris</i> [^]	Little Black Cormorant	AVES			LC
<i>Phaps chalcoptera</i>	Common Bronzewing	AVES			LC
<i>Phaps elegans elegans</i>	Brush Bronzewing	AVES			LC
<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater	AVES			LC
<i>Pomatostomus superciliosus</i>	White-browed Babbler	AVES			NT
<i>Poodytes gramineus goulburni</i>	Little Grassbird	AVES			LC
<i>Psephotus haematonotus</i>	Red-rumped Parrot	AVES			LC
<i>Recurvirostra novaehollandiae</i>	Red-necked Avocet	AVES			NT
<i>Rhipidura albiscapa</i>	Grey Fantail	AVES			LC
<i>Rhipidura leucophrys leucophrys</i>	Willie Wagtail	AVES			LC
<i>Sericornis frontalis rosinae</i>	White-browed Scrubwren (MLR)	AVES			
<i>Spatula rhynchotis</i>	Australasian Shoveler	AVES		R	NT
<i>Tachybaptus novaehollandiae novaehollandiae</i>	Australasian Grebe	AVES			RA
<i>Thinornis cucullatus cucullatus</i>	Hooded Plover	AVES	VU	V	EN
<i>Tribonyx ventralis</i>	Black-tailed Nativehen	AVES			LC
<i>Trichoglossus moluccanus moluccanus</i>	Rainbow Lorikeet	AVES			LC
<i>Vanellus miles</i>	Masked Lapwing	AVES			LC
<i>Zanda funerea whiteae</i> [^]	Yellow-tailed Black Cockatoo	AVES		V	RA
<i>Zosterops lateralis</i>	Silvereye	AVES			LC

Species Name	Common Name	Class	EPBC Act Status	NPW Act Status	Subregional Status
<i>Anisynta cynone cynone</i> ^	Mottled Grass Skipper	INV			
<i>Danaus petilia</i> ^	Lesser Wanderer	INV			
<i>Danaus plexippus plexippus</i> ^	Monarch	INV			
<i>Geitoneura klugii</i> ^	Common Xenica	INV			
<i>Junonia villida calybe</i> ^	Meadow Argus	INV			
<i>Lampides boeticus</i> ^	Long-tailed Pea-blue	INV			
<i>Lucia limbaria</i> ^	Chequered Copper	INV			
<i>Nacaduba biocellata biocellata</i> ^	Two-spotted Line-blue	INV			
<i>Ocybadistes walkeri hypochlora</i> ^	Southern Grass-dart	INV			
<i>Pieris rapae rapae</i> ^	Cabbage White	INV			
<i>Taractrocera papyria papyria</i> ^	White-banded Grass-dart	INV			
<i>Theclinesstes miskini miskini</i> ^	Wattle Blue	INV			
<i>Theclinesstes serpentatus serpentatus</i> ^	Salt-bush Blue	INV			
<i>Vanessa itea</i> ^	Australian Admiral	INV			
<i>Vanessa kershawi</i> ^	Australian Painted Lady	INV			
<i>Zizina otis labradus</i> ^	Common Grass-blue	INV			
<i>Macropus fuliginosus</i> ^	Western Grey Kangaroo	MAM			LC
<i>Pseudocheirus peregrinus</i> ^	Common Ringtail Possum	MAM			
<i>Pteropus poliocephalus</i> ^	Grey-headed Flying-fox	MAM	VU	R	
<i>Rattus lutreolus</i> ^	Swamp Rat	MAM		R	RA
<i>Tachyglossus aculeatus</i> ^	Short-beaked Echidna	MAM	ssp	ssp	
<i>Trichosurus vulpecula</i> ^	Common Brushtail Possum	MAM		R	
<i>Aprasia striolata</i>	Lined Worm-lizard	REP			LC

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

All Introduced Fauna in cell

Species	Common Name
<i>Carduelis carduelis britannica</i>	European Goldfinch
<i>Columba livia</i>	Feral Pigeon
<i>Passer domesticus domesticus</i>	House Sparrow
<i>Spilopelia chinensis</i>	Spotted Dove
<i>Sturnus vulgaris vulgaris</i>	Common Starling
<i>Turdus merula merula</i>	Common Blackbird
<i>Felis catus</i> ^	Domestic Cat (Feral Cat)
<i>Mus musculus</i> ^	House Mouse
<i>Oryctolagus cuniculus</i> ^	Rabbit (European Rabbit)
<i>Vulpes vulpes</i> ^	Fox (Red Fox)
<i>Acridotheres tristis</i> ^	Common Myna



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Published by the Hills and Fleurieu Landscape Board
2026 | FIS 1107263