Torrens Island
Biodiversity Action Plan

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T&M Ecologists Pty Ltd
8 Strathalbyn Road
Aldgate, South Australia 5154
Telephone: (08) 8185 3225
Tim.milne@tmecologists.com.au

1. INTRODUCTION

The purpose of this Biodiversity Action Plan (BAP) is to assist managers in their efforts to protect and conserve the coastal, estuarine and marine ecological values of Torrens Island. The Plan, which is an update of the original 2013 Plan, aims to document the key biodiversity values and threats on Torrens Island and to prioritise management of the threats for effective biodiversity conservation. It is designed to complement and reinforce activities that have been conducted on Torrens Island to date, including weed control, introduced animal control and revegetation. On-ground managers on Torrens Island include Green Adelaide and the South Aaustralian Department of Environment &Water (DEW).

The BAP is intended as a guide for management over the next 5 years with actions prioritised to ensure that time, effort and funding is spent appropriately to maximise conservation effort. It is intended to align with, and contribute to, the objectives of the Metropolitan Adelaide and Northern Coastal Action Plan (MANCAP)[1]. The goal of MANCAP is to understand and facilitate the conservation, protection and maintenance of the region's natural coastal resources and to establish conservation priorities for places and areas within the region.

2. STUDY AREA

Torrens Island is located in the Port River, approximately 15km north-west of Adelaide. It does not sit within a Council area, although it is within 1km of the City of Port Adelaide Enfield boundary. Torrens Island Conservation Park is approximately 609 hectares in area and covers approximately three quarters of the island. Other land uses on the island include the historic Torrens Island Quarantine Station (now a state heritage listed site[2]) and two power stations - Torrens Island Power Station, operated by AGL, and the Quarantine Power Station operated by Origin Energy.

Torrens Island is bounded by the Port River to the west, the Barker Inlet to the south and east and the Section Bank mudflats to the north (see Figure 1). These areas largely support tide dominated estuaries, with low tide saline mudflats, mangroves and salt-marshes comprising a significant part of the area.

This Biodiversity Action Plan covers the majority of land on Torrens Island and includes:

- Torrens Island Conservation Park;
- the historic Quarantine Station (not currently part of the Conservation Park but under the care and control of DEW);
- a parcel of land owned by AGL Energy (Allotment 303 D55734), to the north of the power station (approximately 62.5 hectares); and
- the strip of land on the eastern side of the road adjacent to the AGL block.

See Figure 1 for locations.

[1] Caton B., Fotheringham D., Krahnert E., Pearson J., Royal M. and Sandercock R., 2009. *Metropolitan Adelaide and Northern Coastal Action Plan*. Prepared for the Adelaide and Mount Lofty Ranges NRM Board and Department for Environment and Heritage.

[2] South Australian Heritage Register.

Figure 1: Torrens Island Biodiversity Action Plan - study area

2.1 Current land management

The entirety of land on Torrens Island is currently owned and/or managed by a number of State agencies, non-government organisations and power companies, including:

- Green Adelaide
- Department of Environment & Water (NPWS & Heritage)
- Friends of Torrens Island
- TruEnergy
- AGL
- Origin Energy

2.2 Surrounding and historical land use

Pre-European settlement

The Kaurna people are the traditional custodians of the Adelaide Plains. In 2018, Kaurna Miyurna, through Kaurna Yerta Aboriginal Corporation (KYAC), were awarded native title Consent to Determination which gave them specific rights under the *Native Title Act, 1993*. These rights include the right to enter into Indigenous Land Use Agreements (ILUA) and the ability to enter Co-Management of Parks negotiations with the Department for Environment and Water (DEW), including over the coastal lands from south of the Lower Light River through to Myponga. The Kaurna traditional lands however extend north to Crystal Brook and the Clare Valley and south to Cape Jervis on the Fleurieu Peninsula.

For Kaurna the coastal region was a prime traditional camping area, rich in coastal resources and one of the summer camping grounds along the coast of Wongga Yerlo Western Sea (Gulf St Vincent)[3]. They were a very populous society, with more than twenty clans living in tracts of home country that stretched from the foothills of the Mount Lofty Ranges and across the plains to the coastal beaches, estuaries and wetlands. The coastal streams provided watered access routes across these lands.

Post-European settlement

The historic Torrens Island Quarantine Station is situated on the north-western side of the island on land which is currently owned by DEW but outside the boundary of the conservation park. It was established by the South Australian government in 1879 to stop passengers from bringing diseases such as smallpox into the State. It was used in more recent times (until the 1980's) as an animal quarantine facility. Several historic buildings, a jetty and a cemetery remain on the site, some of which are heritage listed[4].

The Quarantine Power Station (Origin Energy), built in 2002 and expanded in 2009, is directly to the south of the historic precinct and an avian quarantine facility is located in the eastern portion of this area. The Torrens Island Power Station (AGL Energy) is located on the south-western end of the island.

[3] Telfer, K.W. and Malone, G. (2017). *Tulukudangga Spring, Kingston Park and the Tjirbruki Munaintya Cultural Mapping*. Report prepared for the City of Holdfast Bay Council.
[4] SA Heritage Places Register.

Sand mining to replenish beaches further south along the Adelaide coastline (i.e. Glenelg, Brighton, etc) occurred on southern Torrens Island in the late 1980's[5].

On 28 November 1963, land in Section 467 in the Hundred of Port Adelaide was proclaimed as a 'wild-life reserve" under the *National Park and Wild Life Reserves Act 1891*. In November 1967 this Section was proclaimed as the Torrens Island National Park Reserve under the *National Parks Act 1966*. In April 1972, it was proclaimed as Torrens Island Conservation Park under the *National Parks and Wildlife Act 1972*. In January 2014, Allotments 300 and 304 in Deposited Plan 90964, and Section 464 in the Hundred of Port Adelaide were added to the conservation park.

2.3 Regional biodiversity significance

Torrens Island is within an important natural area that extends from Light River to the Port River Estuary. This area has been identified as meeting prime International Union for the Conservation of Nature Conservation Values for biodiversity, education, social values, rare and endangered species/ habitats and meets IUCN Category II criteria "National Park – Protected Area", managed mainly for ecosystem protection and tourism.

The island is part of an 822 hectare ecosystem-unit which includes the Adelaide Dolphin Sanctuary and the Barker Inlet/St Kilda Aquatic Reserve (listed as a wetland of National Importance[6]). It supports a number of vegetation communities, most notably mangroves, samphire and coastal dunes, which provide important habitat for a range of native fauna species, including numerous bird species of conservation significance.

Torrens Island provides one of the very few areas of undeveloped coastline in the Port River estuary, and its dense fringe of mangroves, comprising approximately 50% of the island, are very important as they assist movement of fish at high tide, provide shelter and nesting sites for birds, provide a major role in the balance between erosion and deposition of sediments along the coast and help to create clearer water. This environment in turn supports the growing Indo-Pacific Bottlenose Dolphin population, which also uses this area for habitat[7].

3. AIM AND OBJECTIVES OF THE PLAN

The aim of the Biodiversity Action Plan for Torrens Island is primarily to address the following local management issues and actions identified in the 2009 Metropolitan Adelaide and Northern Coastal Action Plan (MANCAP):

- Torrens Island Conservation Park includes areas of high conservation priority within the region; and
- Undertake management plan process and action to protect high priority areas.

Note that a biodiversity action plan was developed in 2013 and this current plan is an update of that original plan. The objectives of this updated Biodiversity Action Plan for Torrens Island are to:

- Provide the information needed to address the local management action/s identified in the MANCAP;

[5] http://www.nationaltrust.org.au/Assets/6483/1/TorrensIslandSummary-2011-11-02.pdf
[6] Australian Nature Conservation Agency 1996
[7] http://www.nationaltrust.org.au/Assets/6483/1/TorrensIslandSummary-2011-11-02.pdf

- Clearly identify priority issues relating to the management of remnant vegetation and landforms within the study area;
- Identify priority issues relating to public usage and any actions that are recommended to ensure that human activity is managed in a sustainable manner; and
- Identify and address other relevant natural resource management matters identified within the study area during the course of the project.

The Plan is intended as a guide for specific and prioritised "on-ground" works over the next 5 years with the aim being to improve the conservation and biodiversity values of Torrens Island Conservation Park and surrounding areas.

The Plan specifically deals with threats to biodiversity within the target area of the island (Figure 1), however linkages and integration with other land uses and influencing processes on other parts of the island are also addressed. The Plan also considers the strong community interest in Torrens Island and supports the partnered work that DEW and Greening Adelaide undertake with the relevant stakeholders.

The preparation of this Biodiversity Action Plan has involved:

- review of the 2013 Biodiversity Action plan, previous biodiversity surveys and related studies;
- field survey to map and record vegetation associations, plants of conservation significance, weeds and other management issues in the additional parcel of land to the north of the AGL power station;
- stakeholder consultation;
- re-doing of previously established photopoints;
- re-assessment of the biodiversity assets;
- prioritisation of biodiversity threats; and
- actions required to alleviate threats.

4. ENVIRONMENTAL ASSETS

4.1 Landform and soils

Torrens Island is part of a low-lying coastal complex of tidal flats, dunes, swamps and sandy beaches, backed by a gently sloping plain. Soils are described as grey non-cracking plastic clays, grey duplex soils, whitish sands, grey calcareous loams and greyish calcareous sands[8].

4.2 Native vegetation communities

The vegetation of Torrens Island can be broadly categorised into coastal dune, samphire and mangrove communities. The vegetation communities supported by these land systems are described below and delineated in Figure 2. This mapping is based on field assessment as part of this survey, as well as on information supplied by RMP Environmental Pty Ltd[9] who developed a

[8] NatureMaps, Dept Environment Water & Natural Resources.
[9] RMP Environmental Pty Ltd, EcoProTem, 2013. Torrens Island Vegetation Management Plan, prepared for Dept for Planniong, Transport and Infrastructure, March 2013.

Vegetation Management Plan for more northern areas of Torrens Island in 2013 (see full report in Appendix 1).

Plant lists for each community are included in Appendix 2 and are based upon several field visits undertaken in 2013 as part of the development of the initial BAP. Additional plant species noted as part of Bushland Assessments undertaken in 2017[10] or in 2021 as part of the update of the BAP are also recorded. Also included are records from the Biological Database of South Australia (BDBSA)[11] for Torrens Island.

4.2.1 Coastal Dunes

There are several vegetation associations found in the coastal dunes on Torrens Island. These are described below.

Callitris gracilis, Acacia pycnantha +/- Allocasuarina verticillata **Low open woodland** over *Rhagodia candolleana* ssp. *candolleana*. This community occurs on the north-western coast of Torrens Island, directly to the north of the old Quarantine Station and covers an area of approximately 6.7 hectares. This community type was once widespread on the adjacent LeFevre Peninsula, however clearance for residential development and associated infrastructure has meant that few remnants remain and species such as the Southern Cypress-pine (*Callitris gracilis)* is now considered to be 'Near Threatened' in the Adelaide region.

Atriplex paludosa ssp. cordata +/- A. cinerea +/- Nitraria billardierei **Shrubland with emergent** ***Myoporum insulare*** **and** ***Dodonaea visocosa ssp. spatulata***. This community covers approximately 5 hectares at the northern end of Torrens Island on very low sandy dune areas which are surrounded by lower-lying samphire areas and. Due to limited access, the absence of rabbits and a concerted effort to remove weeds, this community is relatively intact and species such as the regionally Endangered Trailing Hemichroa (*Hemichroa pentrandra*), Rare Australian Pelargonium (*Pelargonium australe*) and the Near Threatened Austral Trefoil (*Lotus australis*) are thriving and regenerating in this area.

Acacia pycnantha +/- Callitris gracilis **Low open woodland** occurs across areas of the land parcel owned by AGL Energy as well as on rises on the eastern side of the road (opposite AGL land). The majority of these areas have been revegetated, however the understorey is highly disturbed with heavy infestations of Perennial Veldt Grass (**Ehrharta calycina*) and other grassy and herbaceous weed species. Of particular note is the presence of Coast Bitter-bush (*Adriana quadripartita*) in this community - the host plant for the rare Bitterbush Blue Butterfly (*Theclinesthes albocincta).* Past revegetation also included Running Postman (Kennedia prostrata) which is still surviving and naturally regenerating.

This area also supports a patch of ***Olearia axillaris*** **Shrubland** with emergent *Acacia pycnantha* on a low sandy rise towards thes outhern edge of the AGL land.

4.2.2 Samphire shrublands

Samphire communities cover approximately 228 hectares of Torrens Island. Weed invasion in these areas is minimal as the substrate is very saline and alkaline, making it unsuitable for their

[10] T&M Ecologists, 2017. *Condition change assessment and report for Buckland Park, Torrens Island, Normanville Dunes*, prepared for Adelaide & Mount Lofty Ranges Natural Resources Management Board, May 2017.

[11] Search undertaken in May 2021.

establishment[12]. Sea Lavender (*_Limonium comopanyonis_) is prevalent on the fringes of samphire patches and is out competing, creating edge effects which could have long term impacts on the health of these communities. Weeds such as Soursob (*_Oxalis pes-caprae_) and Coastal Galenia (*_Aizoon pubescens_) also tend to be confined to the built up edges, embankments and roadsides.

There are several vegetation associations found in the samphire areas on Torrens Island. These are described below, and mapped on Figure 2.

Salicornia blackiana, S. quinqueflora, Tecticornia arbuscula* Low shrubland +/- *T. halocnemoides* +/- *T. indica* ssp. +/- *T. pergranulata. This salt marsh community occurs in the intertidal zone and is subject to tidal inundation of varying frequency as well as winter flooding from rainfall. In areas of slightly higher ground *Atriplex paludosa ssp.* and *Suaeda australis* become more prominent.

***Tecticornia flabelliformis, T. halocnemoides, T. pergranulata, Salicornia* sp**. **Low shrubland** occurs on clay pans where there is wet saline clay above hardened layers of highly saline soil impregnated with gypsum. This community is of particular importance because Fan Samphire (*Tecticornia flabelliformis)* is listed as Nationally Vulnerable due to its very restricted range and specific soil requirements (see Section 4.3).

***Lawrencia squamata, Maireana oppositifolia +/- Atriplex paludosa* Low shrubland** over *Disphyma crassifolium, Carpobrotus rossii, Tecticornia arbuscula, Saliocornia quinqueflora*. This community, at the northern end of Torrens Island, appears to be an 'ecotone' or transition zone between the dune areas and samphire areas. It occurs largely on sand and comprises both samphire and coastal dune species, including *Nitraria billardieri*, *Isolepis nodosa, Senecio pinnatifolius, Frankenia pauciflora* and *Distichlis distichophylla*. Weeds are sparse and include Sea-lavender (*_Limonium companyonis_) and Salt Sand-spurrey (*_Spergularia marina)_.

A patch of ***Wilsonia humilis, Maireana oppositifolia, Tecticornia* spp. Low shrubland** occurs east of the roadside and no weed species were recorded. *Wilsonia humilis* is listed as Vulnerable in the Adelaide region.

4.2.3 Mangroves

***Avicennia marina* ssp. *marina* Low open forest over +/-*Tecticornia* sp., +/-*Salicornia quinqueflora* shrubs**. This community occurs on intertidal mudflats of tidal estuaries and muddy seashores and extends inland along the tidal channels merging into the samphire shrublands at the landward limit of the intertidal zone[13]. These areas typically have very low plant diversity with *Avicennia marina* commonly the only vascular plant species present[14] . Approximately 374 hectares of Torrens Island is occupied by mangroves.

4.2.4 Revegetation

Small patches of mature revegetation occur on the AGL Energy land. These comprise *Eucalyptus* spp. Woodland over a reasonably intact chenopod shrubland and *Melaleuca halmaturorum*, *_Casuarina glauca_* Low woodland over an understorey of chenopod shrubs.

[12] *Vegetation Survey Torrens Island Quarantine Station and surrounds*. Dept Planning, Transport & Infrastructure 2012/109.
[13] Croft, SJ, Pedler, JA & TI Milne, 2006. *Bushland Condition Monitoring Manual. Coastal Vegetation Communities of the Southern Mt Lofty Ranges*, Nature Conservation Society of South Australia.
[14] Croft, SJ, Pedler, JA & TI Milne, 2006. *Bushland Condition Monitoring Manual. Coastal Vegetation Communities of the Southern Mt Lofty Ranges*, Nature Conservation Society of South Australia.

Mature non-indigenous plantings also occur around the Quarantine Station, including *Eucalyptus leucoxylon, E. camaldulensis, *Eucalyptus* spp., **Casuarina glauca, *Pinus halepensis, *Tamarix aphylla.* The understorey is dominated by a range of grassy and herbaceous weeds, most notably Perennial Veldt Grass (**Ehrharta calycina*), Coastal Galenia (**Aizoon pubescens*) and Soursob (**Oxalis pes-caprae*).

A 'grove' of dense Swamp Oak (*Casuarina glauca*) is present to the east of the Quarantine Station.

4.2.5 Exotic Grassland/Herbland

These are areas which have been significantly altered and they generally comprise non-native species with a few scattered indigenous species persisting, such as *Rhagodia candolleana, Dianella brevicaulis* and *Acacia pycnantha*.

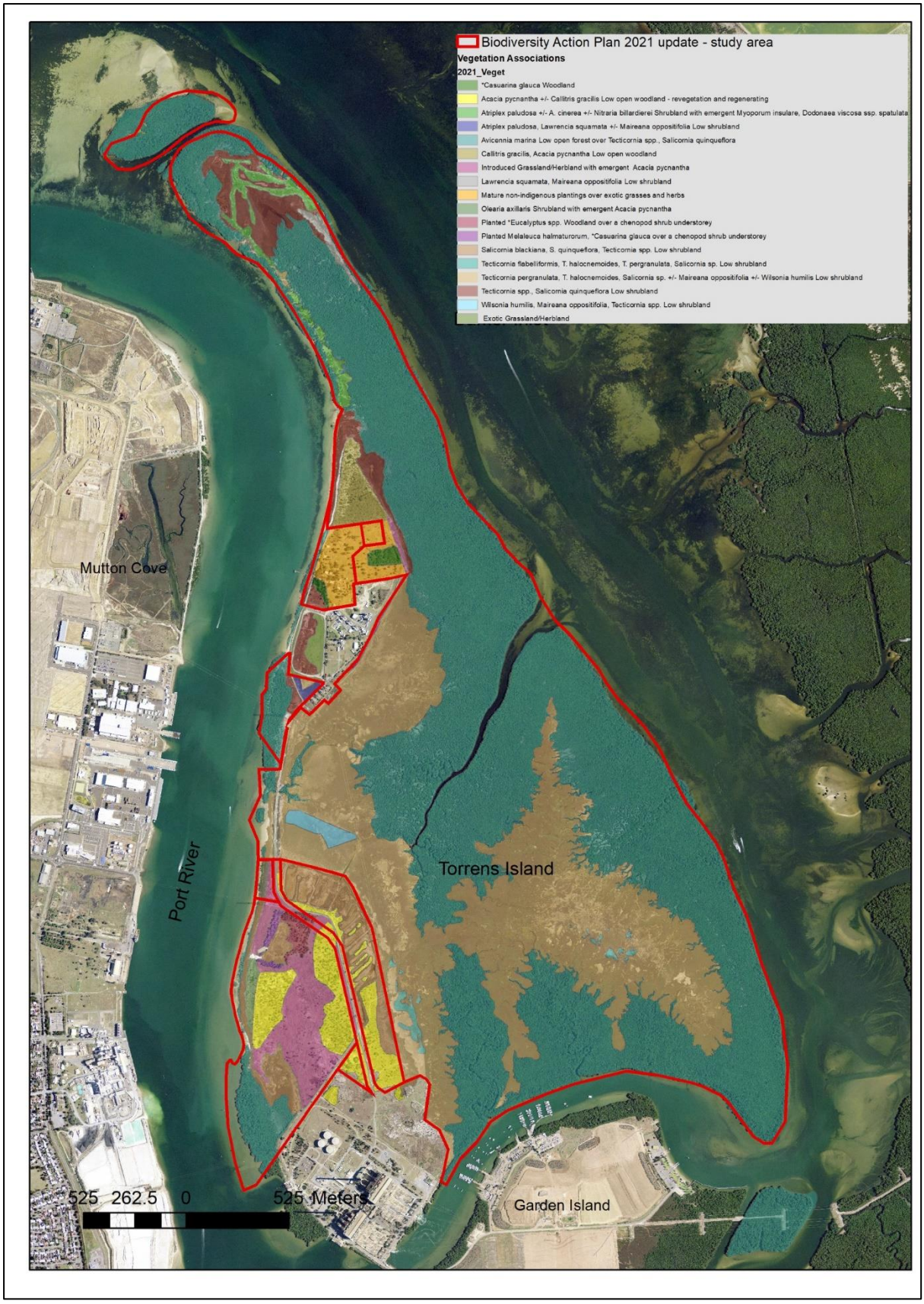

Figure 2: Torrens Island vegetation communities

4.3 Significant Flora Species

The following table lists plant species of conservation significance which have been recorded on Torrens Island in the past and/or as part of this study (Appendix 2 includes a full list of flora species).

Table 1: List of native plant species of conservation significance – Torrens Island Conservation Park

Species	Common Name	Conservation Status*			Comments
		AUS	SA	AD	
Adriana quadriipitarta	Coast Bitter-bush			RA	See Figure 3 for 2020 mapped locations.
Angianthus preissianus	Salt Angianthus			VU	Recorded for Torrens Island in the 2009 MANCAP and as part of previous 2013 BAP field assessment.
Apium annuum	Annual Celery			RA	Recorded for Torrens Island in the 2009 MANCAP and as part of previous 2013 BAP field assessment.
Calandrinia eremaea	Dryland Purslane			NT	Recorded for Torrens Island in the 2009 MANCAP and as part of previous 2013 BAP field assessment.
Callitris gracilis	Southern Cypress Pine			NT	Occurs in dune areas and regeneration was noted in dunes north of the Quarantine Station in June 2021.
Centrolepis cephalorormis ssp. cephaloformis	Cushion Centrolepis		R	VU	Previously recorded on TI by Kraehenbuehl[15] in moist sandy slopes adjacent to *Atriplex paludosa*.
Crassula exserta	Large-fruit Crassula		R	RA	Recorded for Torrens Island in the 2009 MANCAP.
Crassula sieberiana	Sieber's Crassula		E	VU	Recorded for Torrens Island in the 2009 MANCAP.
Gahnia filum	Thatching Grass			RA	Recorded for Torrens Island in the 2009 MANCAP.
Hemichroa pentandra	Trailing Hemichroa			RA	Recorded for Torrens Island in the 2009 MANCAP and as part of previous 2013 BAP field assessment. BDBSA records are from 1990.
Lawrencia squamata	Thorny Lawrencia			VU	Scattered at more northern end of Torrens Island.
Lomandra juncea	Desert Mat-rush			RE	Recorded for Torrens Island in the 2009 MANCAP.
Lomandra leucocephala ssp. robusta	Woolly Mat-rush			VU	Recorded for Torrens Island in the 2009 MANCAP.
Lotus australis	Austral Trefoil			RA	Noted in northern dune areas in June 2021.
Pelargonium australe	Australian Pelargonium			RA	Noted throughout dune areas in 2021.
Rytidosperma laeve	Smooth Wallaby-grass		R	RA	Recorded for Torrens Island in the 2009 MANCAP.
Samolus repens	Creeping Bindweed			NT	Recorded for Torrens Island in the 2009 MANCAP and as part of previous 2013 BAP field assessment. Last BDBSA record is from 2011.

[15] Kraehenbuehl, DN, 1996. *Pre-European Vegetation of Adelaide: A survey from the Gawler River to Hallett Cove*, Nature Conservation Society of South Australia Inc.

Species	Common Name	Conservation Status*			Comments
		AUS	SA	AD	
Sclerolaena muricata var. villosa	Five-spine Bindyi		R	RA	Recorded for Torrens Island in the 2009 MANCAP.
Tecticornia flabelliformis	Bead Glasswort	VU	V	VU	Patches occur in south-western area of the Park.
Wahlenbergia littoricola	Coast Bluebell			NE	Recorded for Torrens Island as part of previous 2013 BAP field assessment.
Wilsonia humilis var. humilis	Silky Wilsonia			VU	Good patches were noted in June 2021 – see Figure 2 for location.
Wilsonia rotundifolia	Round-leaf Wilsonia			VU	Recorded for Torrens Island in the 2009 MANCAP and as part of previous 2013 BAP field assessment.
AUS = Australia *EPBC Act 1999*:** CR = Critically Endangered, EN = Endangered, VU = Vulnerable **SA = South Australia *NPW Act 1972: E = Endangered, V = Vulnerable, R = Rare **AD = Adelaide Region[16] EN=Endangered, VU=Vulnerable, RA=Rare, NT = Near Threatened, LC = Least Concern, NE = Not Evaluated**					

Samphire communities

Of note is the presence within the samphire community of *Tecticornia flabelliformis* (listed as Vulnerable Nationally and at a State level). This species generally occurs on periodically (but not regularly) inundated depressions in saline areas. The Fan Samphire is a small deciduous forb up to twenty centimetres high that is generally found growing in monospecific patches on clay pans or sabkhas directly behind coastal barrier dunes or on salt lakes further inland. The habitat requirements that control the distribution of fan samphires are poorly understood[17]. On Torrens Island it has been recorded in association with *Tecticornia halocnemoides* in the south-western area of the Park.

Also present within the samphire communities are good patches of Silky Wilsonia (*Wilsonia humilis*) and scattered Round-leaf Wilsonia (*Wilsonia rotundifolia*), both listed as Vulnerable in the Southern Lofty region. The State Endangered *Crassula sieberiana* and State Rare *Rytidosperma laeve, Centrolepis cephaloformis ssp. cephaloformis, Crassula exserta* and *Sclerolaena muricata var. villosa* have been recorded within MANCAP's Cell MA16 – Torrens Island, but these species were not recorded as part of this survey.

Coast Bitter-bush (Adriana quadripitarta)

As previously stated, the regionally Rare Coast Bitter-bush occurs on AGL land (see Figure 3 for locations mapped in December 2020[18]). This erect, open shrub provides critical habitat for the Bitterbush Blue Butterfly (*Theclinesthes albocincta*) and is therefore a focal species for conservation in the Green Adelaide region (see Section 4.4.4 for more details).

[16] Gillam, S. and Urban, R., 2014. *Regional Species Conservation Assessment Project, Phase 1 Report: Regional Species Status Assessments*, Adelaide and Mount Lofty Ranges NRM Region. Department of Environment, Water and Natural Resources, South Australia.
[17] Coleman, P and Cook, F, 2009. *Habitat Preference of the Australian Endangered Samphire Tecticornia Flabelliformis.* Transactions of the Royal Society of South Australia (2009), 133(2): 300–306.
[18] Darren Kennedy, Coastal Conservation Officer, Green Adelaide.

Figure 3: Location of *Adriana quadripitarta* on Torrens Island (AGL land) – December 2020.

Sandhill Greenhood (Pterosylis arenicola)

In 2019 a population of the Nationally Vulnerable Sandhill Greenhood (*Pterostylis arenicola*) was translocated in the sand dunes to the north of the Quarantine Station on Torrens Island, using seed from the last known patch of individuals of this species in the Adelaide and Mount Lofty Ranges (AMLR), which occurs at Grange Golf Course. This translocation was about risk mitigation and trying to establish at least one further population of this orchid in an area that is enough distance from Grange Golf Course to ensure that no events, such as fire, inadvertent damage by clearance, trampling, etc. would impact this species in the AMLR. A secondary aim is to see if the new population can be self-maintaining, be naturally pollinated and set seed, with an increase in numbers of plants.

The following information has been provided by Jerry Smith, Threatened Flora Ecologist, Landscapes South Australia[19]:

"The Sandhill Greenhood grows exclusively in areas that contain Native Pine (*Callitris gracilis*) Woodland with occasional Drooping Sheoak (*Allocasuarina verticllata*) and Golden Wattle (*Acacia pycnantha*). Native grasses are virtually absent from the area, with the understorey consisting primarily of Seaberry Saltbush (*Rhagodia candolleana*), Ruby Saltbush (*Enchylaena tomentosa*), the climber *Muehlenbeckia gunnii* and the groundcover Pigface (*Carpobrotus rossii*). The ground has a heavy covering of Native Pine needles and the presence of a mossy crust. This mossy crust is presumed to assist with weed suppression and also the retention of moisture in the soil."

[19] Translocation report for the Sandhill Greenhood (*Pterostylis arenicola*) in the Adelaide and Mount Lofty Ranges 2019.

A total of thirty six (36) young orchids were planted in the Torrens Island dunes in 2019 and the Threatened Flora Ecologist and Friends of Torrens Island have undertaken post planting monitoring and FOTI have also assisted with grassy and herbaceous weed control and watering.

It is envisaged that further translocations of this orchid will occur over the next 2-3 years.

4.4 Native Fauna

4.4.1 Birds

Torrens Island provides a safe haven for numerous local and migratory bird species. It is also a refuge for many local and sea bird species because of the restricted public access to the Island. Birds, including Banded Stilts, Australian White Ducks, Sooty Oyster Catchers, Pelicans, Terns, Egrets, Herons and Sandpipers rely on this habitat for foraging and breeding.

Historically, the tidal mudflats on and around Torrens Island provide significant habitat for wading birds covered under the 'Japan-Australia Migratory Bird Agreement' (JAMBA) and 'China Australia Migratory Bird Agreement' (CAMBA). Anecdotal observations indicate that mudflats previously used by shorebirds have now become mangrove forest/woodland and their value for migratory shorebirds has possibly decreased. Annual seasonal Gulf St Vincent counts for Torrens Island show small numbers of Masked Lapwing, Pied Stilt, Sooty and Pied Oyster Catcher and occasional records of Red-necked Avocet and Red-necked Stint. However, the nearby Section Bank and Bird Island would appear to have provided some additional value over the last decade[20].

White-bellied Sea Eagles are thought to breed on the northern shores of Torrens Island and are regularly observed roosting on the channel marker to the island's south[21].

Appendix 3 provides a full list of bird species which have been recorded within a 5km radius of Torrens Island (Biological Database of SA and Birdlife SA searches, May 2021), which also includes a description of the habitat of those species of conservation significance and/or the likelihood that these species utilise Torrens Island for habitat.

4.4.2 Reptiles and Amphibians

Twenty one (21) reptile species have been recorded within a 5km radius of Torrens Island area. These are listed in Appendix 3 which also includes notes on their ecology and/or the likelihood that these species may be present on the island.

Reptile species which have been recorded on Torrens Island include the Four-toed Earless Skink (*Hemiergis peronii*), Bougainville's Skink (*Lerista bougainvillii*), Four-toed Slider (*Lerista dorsalis*), Dwarf Skink (*Menetia greyii*), Sleepy Lizard (*Tiliqua rugosa*), Eastern Bluetongue (*Tiliqua scincoides*) and the Eastern Brown Snake (*Pseudonaja textilis*).

Many of these species require structure for shelter at the ground level, for example fallen timber, leaf litter, open shrub, grass and groundcover understorey. Management actions need to ensure that these microhabitats are retained or improved wherever possible.

[20] Pers. comm. Tony Flaherty, DEW.

[21] Purnell, C., 2018. *Shorebird Population Monitoring within Gulf St Vincent: July 2016 to June 2017 Annual Report*. BirdLife Australia report for the Adelaide and Mount Lofty Ranges Natural Resources Management Board.

Five (5) frog species have been recorded within a 5km radius of Torrens Island (Appendix 3). Given the close proximity of the sea to the site, and the lack of freshwater pooling to allow eggs and tadpoles to mature, it is considered unlikely that any frogs are present on Torrens Island. The two species that might possibly be present are the burrowing species *Neobatrachus pictus* and *Limnodynastes pictus*.

4.4.3 Mammals

A total of 20 mammal species have been recorded within a 5km radius of Torrens Island, including 4 bat species (see Appendix 3). Bats may possibly be present on Torrens Island, using niches in trees for shelter. Other mammals of note include Indo-Pacific Bottle-nose Dolphins and the waters around Torrens Island, which is part of the protected Adelaide Dolphin Sanctuary, provide significant habitat for this species.

Introduced terrestrial mammal species of concern on Torrens Island include the fox, cat, rat and mouse – note that there are currently no signs of rabbits on the island.

4.4.4 Insects

The Bitter-bush Blue Butterfly (*Theclinesthes albocincta*) is found along Adelaide's coastline and is now considered to be very rare. The caterpillars rely upon the Coast Bitter-bush (*Adriana quadripartita*), a plant that grows in the sub-coastal zone, especially in intact dune systems[22]. The Action Plan for the Bitterbush Blue Butterfly - Northern Adelaide[23] notes that there are two small Bitterbush Blue Butterfly populations on the Le Fevre Peninsula which may indicate connection with the nearby population at Torrens Island (these are the only Adelaide metropolitan populations known to remain). Management of the Torrens Island site is required to reduce risk from fire and stimulate regeneration of *Adriana quadripitarta*. Heavy grass infestation prevents natural recruitment of new Adriana and increases the risk of fire.

The Bitterbush Blue Butterfly Action Plan also states that the Torrens Island site would require ongoing weed management to improve the long-term viability of the *Adriana* population and would be a potential site to test management options such as burning or disturbing soil around existing individuals. *Adriana* individuals on Torrens Island are on industrial land (AGL) and therefore any management would require negotiation with the owners and an ongoing arrangement would be required to facilitate management and reduce the risk of any investment. The disadvantages of this site make it a lower priority for short-term conservation funding compared to activities on the Le Fevre Peninsula, however, the fact it will only have minor impact from predicted sea-rise means it may be worth protecting this site over the long-term. (Note that the The Bitterbush Blue Butterfly study was undertaken as part of the Samphire Coast Icon Project, supported by the Adelaide and Mount Lofty Ranges Natural Resources Management Board through funding from the Australian Government.)

Another species of note which has been recorded on Torrens Island is the Mottle Grass-skipper (*Anisynta cynone*). Alex Stolarski of EntoSearch states that this butterfly is localised and restricted to coastal areas where its larval food plants grow in open grassland habitat and on Torrens Island it is

[22]http://www.butterflygardening.net.au/PDFs/factsheets/BitterbushBlue.pdf

[23] Glatz, R.V., Young, D.A., Marsh, J. & Swarbrick, A. (2017). *Action Plan for the Bitterbush blue butterfly (Theclinesthes albocincta): Northern Adelaide Plains – Kangaroo Island.* Final Report to Adelaide and Mount Lofty Ranges Natural Resources Management. D'Estrees Entomology and Science Services, Kangaroo Island, Australia: 71 pp.

only found on veldt grass. Historically it most likely occurred throughout all of the coastal areas where native grasses such as *Poa poiformis* var. *poiformis*, (Coastal Tussock Grass), *Austrostipa* spp. (Spear Grasses) and other native grasses once occurred.

EntoSearch also note that the Mottle Grass-skipper's habitat is now highly degraded and fragmented along the Adelaide coastline and consequently it appears that some populations have declined or collapsed. Coastal grassy habitats are continually being encroached by exotic grasses and weeds outcompeting native vegetation. However, it appears that this butterfly has been able to survive by being adapted to feed on exotic grass species such as *Cynodon dactylon* (Couch grass) and *Cenchrus clandestinus*, (Kikuyu grass).

A full list of butterfly species recorded on Torrens Island in 2021 by the EntoSearch (Entomology Services and Invertebrate Environmental Consultancy) is included in Appendix 4.

As an intertidal waterway, the area also supports insect life forms that rely on sand marsh and saltbush colonies, including a myriad of microorganisms and macroinvertebrates.

4.4.5 Fish

Torrens Island is part of a larger ecosystem unit which includes the Port River, Barker Inlet and Sand Bank estuary, Mutton Cove to the west on the LeFevre Peninsula and the St Kilda Mangroves to the north. The estuary contains the largest area of mangrove forest, shallow seagrasses and mudflats in Gulf St Vincent. Sheltered conditions and good light penetration create very high levels of plant and animal production making these prime contributors to the ecology of the gulf and major nursery habitats for juvenile species of commercial fish and crustaceans, particularly juvenile Western King Prawns and King George Whiting[24].

4.5 Aboriginal Heritage

Marine and estuarine areas of Torrens Island and surrounds were used extensively by the local Kaurna people, prior to European settlement.

Prior to sand mining on the western side of Torrens Island in 1989, a stone hand axe and an Aboriginal midden were discovered, immediately to the west of the area which was eventually mined. The midden, which is outside of the Conservation Park, contained artefacts shaped from glass and broken clay tobacco pipes, indicating that occupation of the site continued after European colonisation. After the discovery of the midden, a thorough survey of the island was undertaken, but no other artefacts or middens were found elsewhere[25].

The remains of almost 70 Kaurna people from the Port Adelaide area have been reburied on Torrens Island. The remains, previously held by the SA Museum in a warehouse at Netley, were transferred in December 2010, to a site within the conservation park to the north of the quarantine station.

As part of the 2013 Torrens Island Biodiversity Action Plan, a search of Aboriginal Affairs and Reconciliation Division, Department of the Premier and Cabinet (AARD) sites was undertaken. There are eight recorded archaeological sites on Torrens Island – one is within the Conservation Park, whilst the other seven are on land owned by AGL on the south-western side of the Island.

[24] Adelaide and Mount Lofty Ranges Natural Resources Management Board, 2008.
[25] http://www.nationaltrust.org.au/Assets/6483/1/TorrensIslandSummary-2011-11-02.pdf

A full heritage assessment of Torrens Island is planned in the near future, in conjunction with Kaurna in order to supplement and add to existing information.

5. Threats (management issues)

Mangroves and salt marsh ecosystems are generally vulnerable to a number of threats including tidal restrictions, coastal acid sulphate soils, sea level rise, nitrification, increased sedimentation, off-road vehicle use, grazing, weed invasion, urban sprawl, land reclamation and freshwater flooding.

At Torrens Island Conservation Park and environs the management issues of particular concern in terms of biodiversity conservation include:

- weed invasion;
- grazing and predation by pest animals (foxes, cats, rabbits, hares, rats, mice);
- marine debris/rubbish dumping;
- recreation activities such as fishing and kayaking; and
- climate change

5.1 Invasive weeds

The diversity and structure of the native vegetation communities on Torrens Island, most notably the fragile dune communities, is threatened by introduced weedy species and the following table lists the weeds of concern in Torrens Island Conservation Park and surrounds. A full list of weeds recorded is included in Appendix 2.

Table 2: List of priority weeds for control – Torrens Island Conservation Park and environs

Species	Common Name	[26]Declared	[27]WONS	[28]MANCAP	[29]Red Alert	Comments
* *Aizoon pubescens*	Coastal Galenia			2	-	Control has occurred in dune communities at northern end of TI, however further control is required.
**Ammophila arenaria*	Marram Grass			3	3	Cover much reduced in dune area (north of the Quarantine Station) in recent years.
**Asparagus asparagoides*	Bridal Creeper	Y	Y	1	5	Previously widespread – concerted control efforts have significantly reduced covers in dune area (north of the Quarantine Station).
**Carpobrotus edulis ssp. edulis*	Hotentot Fig			3	2	Widespread and interspersed with the native *Carpobrotus rossii*.
**Chondrilla juncea*	Skeleton Weed	Y		2	2	Scattered throughout dune communities.
**Cortaderia selloana*	Pampass Grass	Y		-	-	Scattered individuals on AGL parcel.
**Ehrharta calycina*	Perrennial Veldt Grass			1	3	Widespread and dense in some areas – needs a staged approach to control.
**Ehrharta villosa var. maxima*	Pyp Grass			1	8	Concerted control efforts have virtually eliminated this species in dune area (north of the Quarantine Station).
**Euphorbia terracina*	False Caper	Y		2	3	Previously controlled in dunes north of Quarantine Station.
**Leptospermum laevigatum*	Coastal Tea-tree			2	3	Not recorded in 2021 – eradicated.
**Limonium companyonis*	Sea-lavender			3	2	Appears to be increasing on edges of samphire, however control is problematic.
**Lycium ferocissium*	African Boxthorn	Y	Y	2	3	Effectively controlled north of the Quarantine Station, however it is still a problem on AGL land.
**Mesembryanthemum crystallinum*	Common Iceplant			2	-	Notably present on AGL land.

[26]Biosecurity SA Weeds and Pest Animals. Declared plants in South Australia, October 2012. http://www.pir.sa.gov.au/biosecuritysa/nrm_biosecurity/weeds/declared_plants_in_south_australia,_october_2012

[27] Australian Weeds Committee (2012), Weeds of National Significance 2012. Department of Agriculture, Fisheries and Forestry, Canberra, ACT http://www.weeds.org.au/WoNS/

[28] Weed Threat Levels as per the Metropolitan and Northern Coastal Action Plan, AMLR Natural Resources Management Board

[29] Weed ratings as per Croft, S.J., J.A. Pedler & T.I. Milne (2005 – 2008) *Bushland Condition Monitoring Manual*. Nature Conservation Society of SA Inc.

Species	Common Name	[26]Declared	[27]WONS	[28]MANCAP	[29]Red Alert	Comments
Opuntia stricta	Prickly Pear	Y	Y			Five individuals have been recorded on Torrens Island of this aggressive and highly invasive species.
**Schinus molle*	Pepper Tree	Y		-	-	A grove occurs in *Acacia pycnantha* Low open woodland on AGL parcel and was noted to be regenerating.

5.2 Pest animals

Foxes and cats

Foxes are present on Torrens Island and evidence (footprints and scats) was noted during the field survey as part of this plan update (June 2021). Unwanted domestic cats are regularly dumped on Torrens Island and are a problem around the Quarantine Station and the Torrens Island Power Station.

Feral cats represent the greatest threat to many Australian wildlife species. They have been implicated in at least 27 mammal extinctions across Australia and currently threaten more than 100 native species, including mammals, lizards and ground nesting birds. They not only prey on endangered wildlife but transmit diseases to pet cats, wildlife and humans.

On Torrens Island native fauna, and nesting birds in particular, are at risk of predation by both cats and foxes. Foxes also spread weeds amongst native vegetation, increasing the risk of introducing weeds not currently present on Torrens Island.

Rabbits and hares

Rabbits and hares have exerted a significant grazing pressure on the natural regeneration of plants on Torrens Island in the past, however they do not appear to be a problem on the island at the present time and no evidence of rabbits was recorded during field survey undertaken as part of this BAP update. It is not known whether hares are active on the Island at this time, however vigilance is required to ensure that they do not establish in large numbers.

Introduced rodents (rats and/or mice)

There is evidence (i.e. diggings) that rodents are currently in high numbers on Torrens Island. Rats and/or mice can have a negative impact on revegetation and/or regeneration. Rats can also predate on the eggs of ground-nesting or roosting birds. Rodent numbers should be monitored on an ongoing basis and a baiting program undertaken as deemed necessary.

5.3 Rubbish dumping/marine debris

Much rubbish/debris is either washed up or dumped on Torrens Island. This includes items such as fishing line, rope, plastic drink containers, plastic bags, micro-plastics, old shoes, timber and other 'flotsam and jetsam'. The build-up of rubbish poses a real threat to the biodiversity assets of the area by inhibiting the growth of native flora species and endangering native fauna species, in particular nesting birds. The rubbish which has been historically dumped directly to the east of the old Quarantine Station has also reduced the biodiversity value of this area.

Systematic marine debris removal programs have previously been undertaken on Torrens Island by the Australian Marine Wildlife Research & Rescue Organisation (AMWRRO). In 2018 several clean ups were carried out on the western side of the Island by Conservation Volunteers Australia and AGL. A total of 3,807kg of marine debris was removed at this time (with 141,642 items sorted). The most common item collected was plastic. Unfortunately this program was not continued (as initially planned) and rubbish has again built up to concerning levels.

Also of concern are the piles of scrap metal which occur towards the northern end of Torrens Island, within the Conservation Park. These areas, which are shown in Figure 4, should be cleaned up as a matter of priority.

Figure 4: Location of scrap metal areas which need to be removed, Northern end of Torrens Island Conservation Park.

5.4 Recreation activities

Due to limited access to Torrens Island, recreational activities are minimal and are restricted largely to fishing, boating and kayaking with some people occasionally venturing into the dune and samphire vegetation. Human activities which may have an impact on biodiversity include:

- trampling or crushing vegetation when walking through dune areas;
- compaction of soil which limits natural regeneration;
- disturbance of soil and erosion which encourages weed spread;
- disturbing normal animal behaviour and breeding success, such as dogs chasing birds;
- predation on native animals by domestic pets such as cats and dogs (which are not permitted in conservation parks);
- the illegal dumping of rubbish; and
- the wash up of marine debris.

5.5 Climate change

It is expected that the current mean sea level rise of 3mm/year in the region will accelerate over the next 50-100 years. Much of the eastern half of Torrens Island could be inundated, unless the rise is

offset by sedimentation within the saltmarsh areas. Such a scenario may have impacts on species such as the Nationally Vulnerable *Tecticornia flabelliformis* which may be threatened by excessive and prolonged flooding, especially given the apparent narrow ecotonal band occupied by the species. Conversely, draining or prolonged drought may dry out sites and lead to decline of this species[30].

Increases in mean annual temperatures and a corresponding decrease in annual rainfall for coastal areas are also forecast. Many saltmarsh species flourish in northern Spencer Gulf and rising mean temperatures may not adversely impact on these species[31].

6. Biodiversity management strategies

6.1 Biodiversity management objectives

The biodiversity management objectives for Torrens Island Conservation Park and surrounds are to manage the native vegetation in such a manner as to:

- prevent any further loss of biodiversity; and
- strengthen the long term viability of the existing biodiversity assets.

6.2 Management units

To facilitate the ongoing management of threats to biodiversity on Torrens Island (most notably weed and pest animal control), areas of the Conservation Park and the AGL land parcel which are targeted for active management have been divided into management units. Delineation of management units or zones is based largely on the type of vegetation present and the condition of the vegetation. The management units are shown on Figure 5 and listed below.

Management Unit 1: Coastal dune community – northern end of Torrens Island (TICP)

These low-lying sandy rises support a range of coastal dune plant species and several weed species have been controlled here in the past, notably Coastal Galenia, Hotentot Fig and Boxthorn (only one individual Boxthorn was noted on the northern end of the island in May 2021).

Management Unit 2: Coastal dune community – directly north of the Quarantine Station (TICP)

These relatively intact dunes have been the focus of much weed control and revegetation efforts over the last 10-15 years, due at least in part to the fact that little of this vegetation type (*Allocasuarina verticillata* and *Callitris gracilis* Low woodland) remains on the LeFevre Peninsula. Kraehenbuehl[32] believes that much destruction of standing timber was undertaken in this part of Torrens Island during the First Word War when German prisoners of war were interned in a camp sited near the Quarantine Station.

Ongoing management of this unit should focus on further control of a range of high threat weeds (including Boxthorn on the eastern boundary which provide an ongoing seed source for re-invasion into this area) and revegetation of *Callitris gracilis* and *Allocasuarina verticillata* as there is presently little regeneration of these overstorey species.

[30] Carter, 2010.
[31] MANCAP, 2009
[32] Kraehenbuehl, DN, 1996. *Pre-European Vegetation of Adelaide: A survey from the Gawler River to Hallett Cove*, Nature Conservation Society of South Australia Inc.

Management Unit 3.1: Open planted woodland to the east of the Quarantine Station (TICP)

This area comprises an overstorey of planted eucalypts and *Callitris gracilis* with an understorey which is dominated by Perennial Veldt Grass (**Ehrharta calycina*) and Soursob (**Oxalis pes-caprae*). Recent scattered plantings have occurred in the south-east corner of this block and include *Adriana quadripitarta, Acacia ligulata, Allocasuarina verticillata, Dodonaea viscosa, Olearia axillaris* and *Cullen australasicum*.

The focus in this management unit should be ongoing weed control (notably Perennial Veldt Grass) around these plantings and it is recommended that further supplementary revegetation occurs in this area. Another priority is to prevent any further spread of Swamp Gum from the adjoining dense stand (Management Unit 3.2).

Management Unit 3.2: Dense stands of maturing and regenerating **Casuarina glauca* to the east and south of the Quarantine Station (TICP)

A dense stand of Swamp Gum (**Casuarina glauca*) occurs east of the Quarantine Station. The Swamp Gum is regenerating and spreading. Only 3 native plant species were recorded in this unit. Swamp Gum seedlings/suckers are spreading into the adjacent areas (Management Unit 3.1) and these should be controlled and contained as a matter of high priority. Also present are large mature Boxthorn (**Lycium ferocissimum*) which are scattered throughout

Management Unit 4: Quarantine Station

The land surrounding the built structures which comprise the historic Torrens Island Quarantine Station supports a range of planted mature tree species, including *Eucalyptus leucoxylon, E. camaldulensis, *Eucalyptus* spp., **Casuarina glauca, *Pinus halepensis, *Tamarix aphylla.* The understorey is dominated by a range of grassy and herbaceous weeds, most notably Perennial Veldt Grass (**Ehrharta calycina*), Coastal Galenia (**Aizoon pubescens*) and Soursob (**Oxalis pes-caprae*). Other weeds of concern in this area include Boxthorn (**Lycium ferocissimum*), Sallow Wattle (*A*cacia saligna*), Bridal Creeper (**Asparagus asparagoides*) and dense infestations of weedy grasses and herbaceous species which are preventing the regeneration of native flora species.

Management Unit 5.1: More 'intact' dune vegetation – AGL land

This unit comprises more 'intact' patches of Golden Wattle (*Acacia pycnantha*) Low woodland over a variety of native understorey low shrubs, sedges, herbaceous species and climbers. Kraehenbuehl attributes the occurrence of this vegetation to a concerted effort by the Electricity Trust of South Australia to destroy rabbit populations (some time prior to the 1990's) which had eaten out "all and sundry" on the island.

There has been little active management in this area in the last 10 – 15 years and weeds of concern include Boxthorn, Olive, Bridal Creeper, Pampas Grass and dense Perennial Veldt Grass.

Management Unit 5.2: More degraded 'open' dune vegetation – AGL land

These areas are more degraded due to past disturbances including sand removal, rubbish dumping, rabbits and weed invasion. Very little native vegetation remains with only the occasional small tree (*Acacia pycnantha, A. ligulata*) and widely scattered low shrubs, sedges and climbers.

Management in this area should focus on control of high threat woody weeds, in the first instance (i.e. Boxthorn, Olive, Bridal Creeper, Pampas Grass, Peppercorns etc).

Management Unit 5.3: Revegetation patches – AGL land

Patches of mature revegetation occur at the northern end of the AGL land. The understorey beneath these mature trees is in relatively good condition and comprises a range of chenopod shrub species and dense leaf litter, particularly beneath the eucalypts.

Management in this area should focus on control of high threat woody weeds.

Management Unit 5.4: Sandy rise – AGL land

This area supports a patch of *Olearia axillaris* Shrubland with emergent *Acacia pycnantha* on a low sandy rise towards the southern edge of the AGL land. Management issues include scattered Boxthorn and patches of Coastal Galenia.

Management Unit 6: Revegetation areas opposite AGL land

This unit can be described as revegetated sandy rises and 'islands' which occur between lower-lying samphire flats. There is a relatively good diversity of low tree, shrub and groundcover species which have been planted in these areas. Weeds of concern include dense infesations of Perennial Veldt Grass, scattered Olives and Boxthorn, several Prickly Pear, patches of Coastal Galenia and several clumps of Pampas Grass (at southern end of the management unit).

6.3 Managing weeds

As stated previously, on-ground weed control work to date has been undertaken largely in the coastal dune vegetation at the northern end of Torrens Island Conservation Park (Management Units 1 and 2). Targeted weeds in these areas has included Boxthorn (**Lycium ferocissimum*), Pyp Grass (**Ehrharta villosa*), Bridal Creeper (**Asparagus asparagoides*), Perennial Veldt Grass (**Ehrharta calycina*), Marram Grass (**Ammophila arenaria*), Coastal Tea-tree (**Leptospermum laevigatum*), Hottentot Fig (**Carpobrotus edulis*), Cotton Bush (**Gomphocarpus cancellatus*), Onion Weed (**Asphodelus fistulosus*), Sea Spurge (**Euphorbia terracina*), African Corn Flag (**Chasmanthe floribunda*), Skeleton Weed (**Chondrilla juncea*) and Coastal Galenia (**Aizoon pubescens*).

Densities of many of these weeds have been significantly reduced, however, further work is required to ensure that gains made are not lost and to encourage natural regeneration wherever possible. Weed control should be undertaken using minimum impact management techniques, starting from areas of highest biodiversity and working outwards.

Control of high threat weeds is recommended across Torrens Island to encourage further regeneration of native species and improve habitat values. The table in Section 8 describes weed control strategies, priorities and targets in each management unit over the next 5-10 years.

On-going monitoring and mapping of new weed infestations should also be undertaken as part of the weed control program.

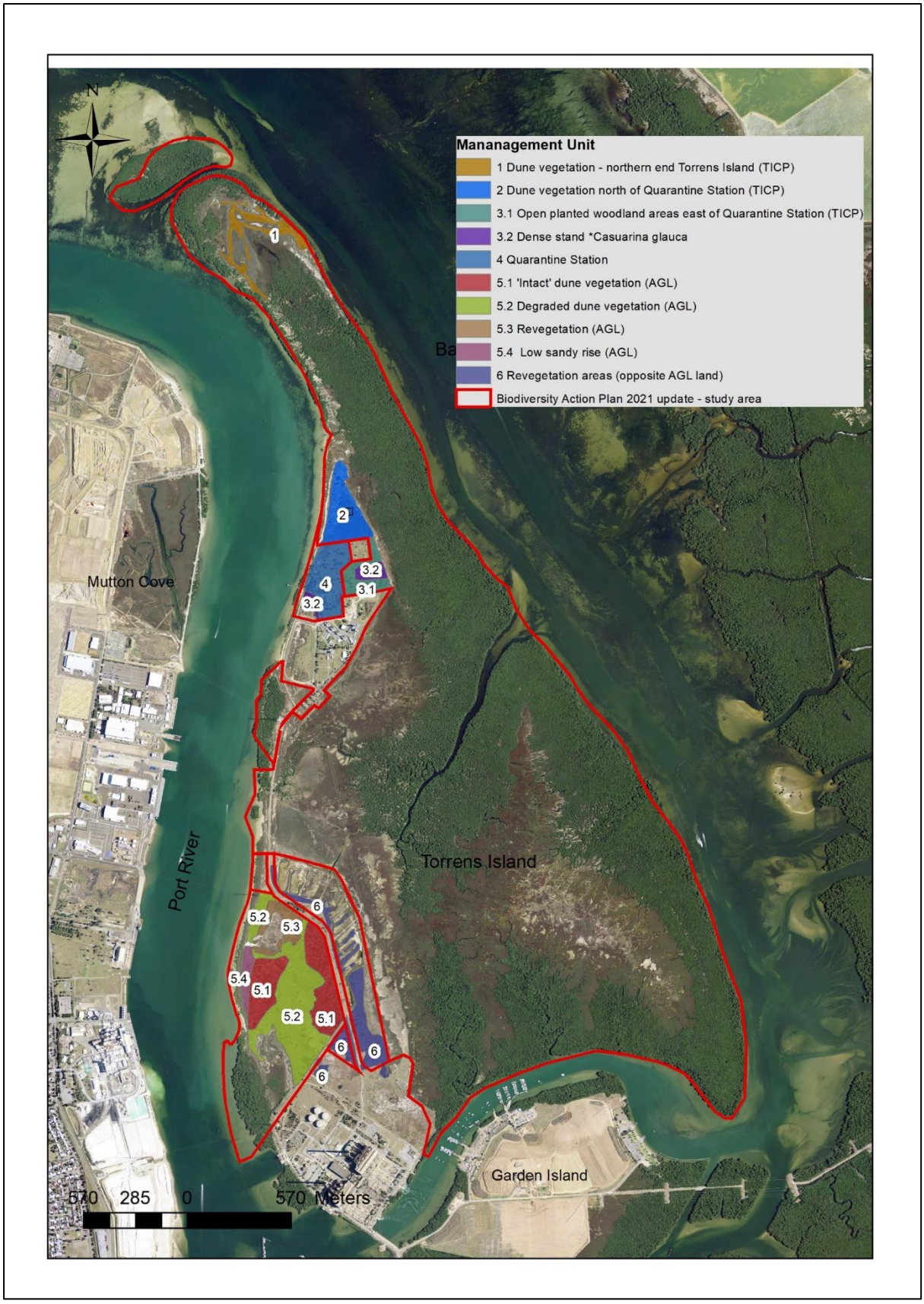

Figure 5: Torrens Island Biodiversity Action Plan – Management units

6.4 Managing pest animals

Foxes and feral cats

Fox and feral cat control is seen as a high priority on Torrens Island, due to the impact on the range of bird and reptile species that rely on Torrens Island for habitat. It should be noted that foxes access the important bird colonies of Section Bank / Bird Island by crossing from Torrens Island.

Feral cats are notoriously difficult to control as they are reluctant to take baits or enter traps, particularly when prey, such as small native mammals, are abundant.

The Thylation group of companies has developed and patented, with assistance from several NGOs and Government grants, the 'Felixer'[33] - a novel, humane and automated tool to help control and reduce the number of feral cats and foxes, and thus improve the welfare of native animals.

Felixers use rangefinder sensors to distinguish target cats and foxes from non-target native wildlife and humans, and spray targets with a measured dose of toxic 1080 gel. The solar-powered Felixer which can hold 20 sealed cartridges of toxic 1080 gel, resets automatically after firing. Felixers photograph all animals detected (including non-targets that are not fired upon) and can be programmed to play a variety of audio lures to attract feral cats and foxes. A choice of software settings control the sensitivity and likelihood of firing on target cats and foxes. Felixer units for fox and cat control are currently being trialled on both Torrens Island and Bird Island.

Rabbits and hares

Monitoring for the presence of rabbits and hares should be undertaken on an on-going basis, with appropriate control techniques undertaken if they re-colonise as they can have significant negative impacts on the regeneration of native species

The Felixer unit which has been installed to assist with feral cat and fox control on Torrens Island (on southern edge of dunes to the north of the Quarantine Station).

[33] https://thylation.com/felixer-faqs/

6.5 Rubbish/debris removal

The work undertaken in the past by AMWRRO, Conservation Volunteers Australia and AGL to systematically collect, document and remove rubbish and marine debris from Torrens Island is supported by Green Adelaide. Regular rubbish collection 'working bees', for example undertaken by FOTI and other volunteer groups on an annual or bi-annual basis, are highly recommended to manage this high priority issue.

6.6 Managing use conflicts – people and recreation

Management actions should be aimed at reducing the conflicts between the needs of people and biodiversity on Torrens Island. Interpretive and regulatory signage to inform visitors about the biodiversity and cultural values of the island has been installed at several park access points, in particular in areas sensitive to foot traffic, soil compaction and erosion such as the dune areas (Management Units 1-2).

6.7 Revegetation

Revegetation efforts should focus upon supplementing existing habitat, using appropriate species for the vegetation type and planting at appropriate (natural) densities. Supplementary planting following weed removal, for example Spinifex infill planting to replace Pyp Grass, as has previously occurred in the dune area to the north of the Quarantine Station.

Revegetation on the sandy dune soils of Torrens Island has proven to be challenging in recent years because of the difficulty of providing water to seedlings. In 2021/22 Green Adelaide is trialling a technique called the Cocoon Plant Incubator® which is a patented, 100% biodegradable planting technology that eliminates irrigation, by supporting a seedling through its critical first year with an accessible reservoir of water and moisture. The Cocoon technique requires one single fill of 25 litres at planting to help establish deeper tap roots for improved plant sustainability.

Green Adelaide intend to trial 20 Cocoons in 2021 and a further 20 in 2022 in order to assess their success in the dune communities to the north of the Quarantine Station on Torrens Island.

In terms of plant species to be revegetated, Table 3 provides a revegetation plant list which can be used as a suggested guide. At this point in time revegetation is only considered appropriate in Management Units 2 and 3 (dune community north of the Quarantine Station and AGL land). Revegetation in dune areas should aim to re-create an open woodland structure which comprises a low tree canopy cover of 10-30% with a shrubby and herbaceous/grassy understorey canopy cover of 30-70%.

Table 3: Suggested revegetation plant list – Torrens Island

Scientific name	Common name
Acacia pycnantha	Golden Wattle
Adriana quadripitarta	Coast Bitter-bush
Allocasuarina verticillata	Drooping Sheoak
Austrostipa drummondii	Cottony Spear-grass
Austrostipa nodosa	Tall Spear-grass
Callitris gracilis	Southern Cypress-pine
Chloris truncate	Windmill Grass
Dianella brevicaulis	Short-stem Flax-lily
Dodonaea viscosa ssp. spatulata	Sticky Hopbush
Kennedia prostrata	Scarlet Runner

Scientific name	Common name
Rytidosperma pilosum	Velvet Wallaby-grass
Rytidosperma setaceum	Small-flower Wallaby-grass
Spinifex hirsutus	Rolling Spinifex

7. Monitoring

7.1 Bushland Assessments

In January 2017 six Bushland Rapid Assessment[34] sites were established at the northern end of Torrens Island and a further 14 sites were established across other parts of Torrens Island in May – July 2021.

The BushRAT method incorporates a representative photopoint and is derived from the Nature Conservation Society of South Australia's 'Bushland Condition Monitoring' (BCM) methodology, however it assesses an area of vegetation of one hectare of consistent condition rather than the 30m x 30m quadrats used in the BCM methodology.

It should be noted that the original DEWNR Bushland Rapid Assessment Technique (BushRAT) was updated/modified in 2017, and again in early 2019 when it was re-named "Native Vegetation Bushland Assessment"[35].

Bushland Assessment scoring components

It is not the intent of this report to provide an extensive overview of the use and application of the Bushland Assessment methodology. A full description of the method and its application can be found within DEWNR (2012)[36]. For this project, only the Vegetation Condition components of the methodology (which also includes Landscape Context and Conservation Significance components) were scored as these are the components that would be expected to change over time with management intervention. The Vegetation Condition Score is from a total of 80 points, or 65 points where the community is a treeless community type (such as coastal shrubland). Table 4 describes the scoring components for Vegetation Condition.

Table 4: Vegetation Condition scoring components of the BushRAT method.

Vegetation condition component	Overview description
Native Plant Species Diversity	A count of the number of species present is compared to a "benchmark" value for that vegetation type. This is then allocated a score from 0-15.
Weed Score	The cover and abundance of all weed species present is recorded. The 5 weeds with the highest product of threat rating and cover are summed to provide a score. This is then compared to a "benchmark" value for that vegetation type, and allocated a score from 0-15.
Native Plant Life Forms	The cover of different native plant life forms is compared to a "benchmark" value for that vegetation type. This is then allocated a score from 0-10.

[34] DEWNR, 2012. *NVBMU BushRAT assessment and scoring manual. Unpublished document*, Department for Environment, Water and Natural Resources, Waite.
[35] Native Vegetation Management Unit, 2017. *Native Vegetation Council (NVC) Bushland Assessment Manual*. Department for Environment, Water and Natural Resources, Adelaide.
[36] DEWNR, 2012. NVBMU *BushRAT assessment and scoring Manual*. Unpublished document, Department for Environment, Water and Natural Resources, Waite.

Vegetation condition component	Overview description
Regeneration	The total number of woody native species in juvenile or seedling form is recorded and compared to a "benchmark" value for that vegetation type. This is then allocated a score from 0-8.
Native:exotic Understorey Biomass	The percentage of the total *vegetative biomass* of shrubs and groundcover plants < 2m high that is native is noted. This is then allocated a score from 0-10.
Bare Ground	The percentage of the grounds surface that is truly bare is noted and allocated a score from 0-3.
Tree Health	Average overall overstorey canopy health is allocated to a category, and then a score from 0-5. Scored only where trees are an expected component of the vegetation community.
Tree Hollows	This score relates to the number of small and large tree hollows present, with a rating of 0-5. Scored only where trees are an expected component of the vegetation community.
Fallen timber	This score relates to the amount of branch and trunk sized logs present, with a rating of 0-5. Scored only where trees are an expected component of the vegetation community.
Grazing Evidence	This score relates to evidence of grazing pressure, including pugging, compacting and chewing. The score is from 0-4.

The Bushland Assessment method was chosen as it provides useful data on biodiversity assets and threats, but also a repeatable series of observations that can underpin ongoing monitoring. A summary of the data gathered in June 2021 at each Bushland Assessment site which has been established on Torrens Island is included in Appendix 5.

7.2 Plan implementation – progress reporting

A series of photopoints have been established as part of the bushland assessment process, and these images and associated location data are provided in Appendix 5. Photopoints are very useful for seeing change in the landscape over time. This is particularly useful when describing what an area looked like before changes occurred. It is much easier to understand a picture than a paragraph of text. Photopoints can be used to monitor effectiveness of weed control work, revegetation, regeneration and changes between seasons, i.e. summer versus winter vegetation. The location of the photopoints associated with the Bushland Assessments is shown in Figure 6.

The Bushland Assessments undertaken in each Management Zone can also be used to provide a broad overview of change over time. In addition, a series of targets have been established as part of the Biodiversity Action Plan and are provided in Section 8. These targets can be used to track change, and progress towards the desired goals and objectives.

Measuring success of on-ground weed control since 2013

Table 5 shows land management issues identified in the 2013 Torrens Island Biodiversity Action Plan and any changes that could be detected, based on a comparison of current observations and data to the information contained in the 2013 Plan. Note that the AGL parcel was not included in the 2013 BAP.

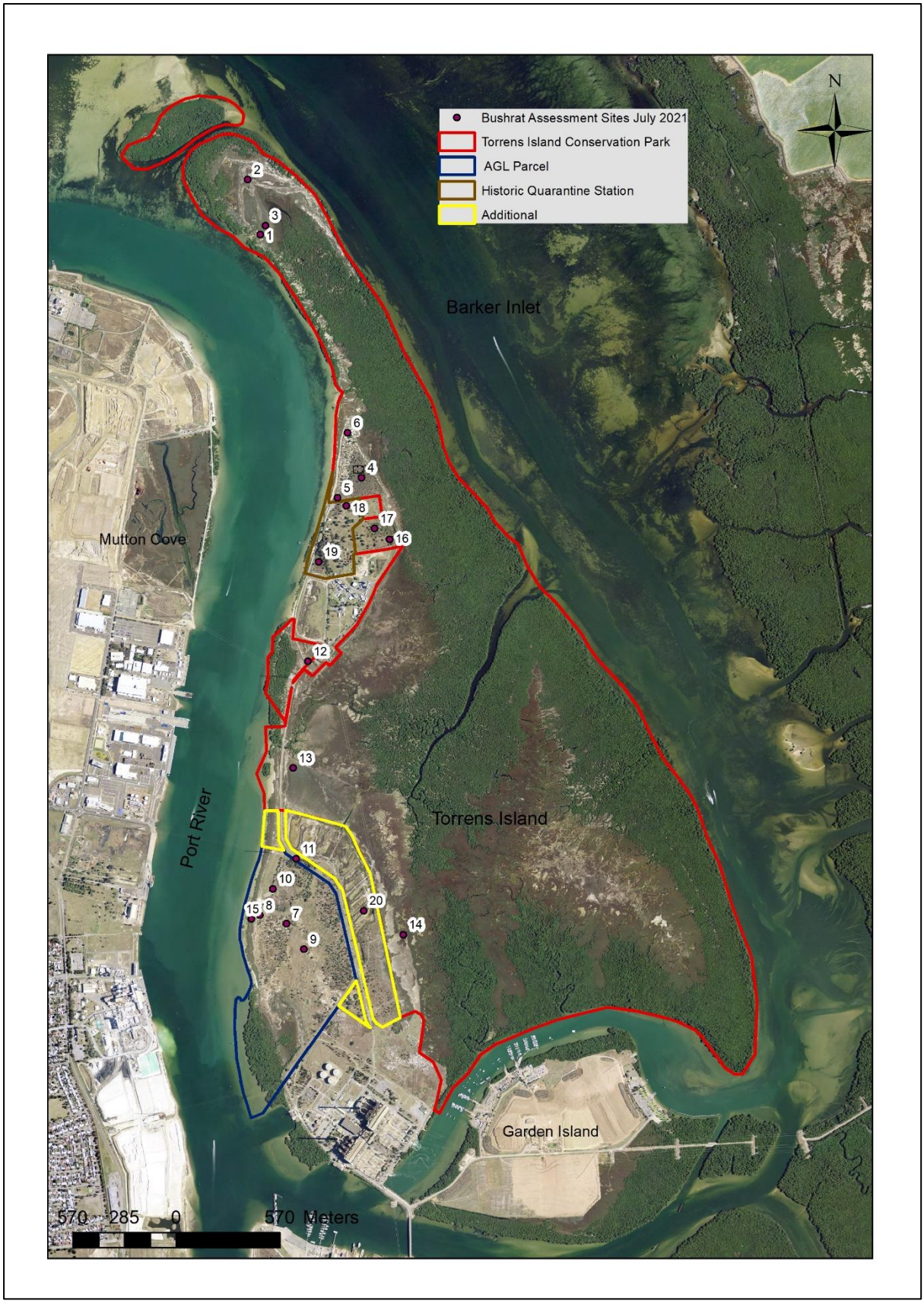

Figure 6: Torrens Island Bushland Assessment site locations 2021

Table 5: Changes in weed density/covers observed since the 2013 Torrens Island Biodiversity Action Plan, and possible causative reasons for those changes

Specific detail	Positive or negative change	Confidence change is real	Possible causative reasons
Boxthorn (*_Lycium ferocissimum_) individuals were previously mapped in MU1 and MU2.	Positive	High	Annual monitoring and control of this species is ongoing in MU1 and MU2.
Bridal Creeper (*_Asparagus asparagoides_) was previously dense in MU2 (pers. comm. M. Endacott, Coastal Conservation Officer, Green Adelaide).	Positive	Moderate	Annual monitoring and control of this species is ongoing in MU2.
Coastal Galenia (*_Aizoon pubescens_) patches were previously mapped for active control in MU1 and MU2.	Neutral	Moderate	Annual monitoring and control of this species has occurred in MU1 and MU2, however it persists.
Coastal Tea-tree (*_Leptospermum laevigatum_) - . individuals were previously mapped in MU2.	Positive	High	No individuals detected in 2021.
Hotentot Fig (*_Carpobrotus edulis_) has been targeted for control in MU1 and MU2.	Neutral	Moderate	Covers have not increased in MU1 and MU2, however this difficult to control species persists.
Marram Grass (*_Ammophila arenaria_) cover has decreased in MU2.	Positive	Moderate	This species has seen considerable investment in control in the last 10 years.
The density of Perennial Veldt Grass (*_Ehrharta calycina_) in all dune communities is very high overall.	Negative	High	Difficult to control and also problematic, given that extensive removal would lead to erosion issues (requires a staged approach).
Pyp Grass (*_Ehrharta villosa_) has all but disappeared from MU2.	Positive	High	This species has seen considerable investment in control in the last 10 years.
Sea Lavender (*_Limonium companyonis_) has seen some control effort in MU1, however it is an issue on the edges of the samphire communities and may be spreading.	Negative	Moderate	Little (if any) active control in samphire communities.
Skeleton Weed (*_Chondrilla juncea_) has previously been targeted in MU2, however this deep rooted perennial is difficult to control and there seems to be little change in its cover.	Neutral	Moderate	Difficult species to control.

8. Biodiversity action plan

The table below lists the **priority** biodiversity management threats/issues for Torrens Island Conservation Park and the AGL land parcel, their related objectives, actions already taken to address them, and further actions being proposed over the next five years.

Table 6: Biodiversity Action Plan summary table for Torrens Island

ISSUE/THREAT	5-Yr Objective/ Milestone[37]	Actions to date – what/ who	Proposed actions- what/ where/how	Priority (VH, H, M, L)
Weeds				
Boxthorn (**Lycium ferocissimum*)	Eradicate from MU1, MU2, MU MU3.1, MU4, MU6.	Contractor –mapping of individuals; cutting & swabbing with Garlon; hand-pulling seedlings**.**	Annual patrol of entire area, mark all specimens and control as necessary.	VH
	Eradicate all mature individuals in MU3.2, MU4, MU5.1, MU 5.2, MU 5.3, MU5.4 – scattered seedlings only.	-	Contractor to map individuals. Cut & swab mapped individuals with Garlon. Spread out the cut material so it is not left in dense stands. Chainsaw may be required for the larger bushes. Follow-up control may be required. Continue patrol of entire area and control as necessary.	VH
Bridal Creeper (**Asparagus asparagoides*)	Eradicate from MU2	Contractor – spraying or wiping (Glyphosate 360g/L and Pulse) or intensive grubbing.	Annually patrol and spot spray/grub as required.	VH
	Maintain cover at <1% in MU3.1, MU5.1, MU 5.2, MU 5.3, MU5.4	-	In areas clear of native vegetation – spray with Glyphosate 360g/L and Pulse or grub. Where Bridal Creeper is growing on/through native vegetation –pull individuals off native plants, cut off all but 15-20cm leafy material, carefully wipe (Glyphosate 360g/L and Pulse) and place/pin in a location where there will be no off-target damage.	H
	Reduce cover to <5% in MU3.2			

[37] Note that percentage covers are based on Bushland Assessment data as collected in May/June 2021.

ISSUE/THREAT	5-Yr Objective/ Milestone[37]	Actions to date – what/ who	Proposed actions- what/ where/how	Priority (VH, H, M, L)
Coastal Galenia (*_Aizoon pubescens_)	Eradicate from MU1 and MU2	Contractor – grubbing/hand-pulling individual plants	Continue actions to date, gradually working outwards into the remainder of the area. If grubbing causes too much damage to surrounding vegetation, then cut at base and swab the tap root.	H
	Reduce cover to <1% in MU3.1, MU5.1, MU 5.2, MU 5.3, MU5.4	-	Contractor – map infestations. Grubbing/hand-pulling individual plants.	H
	Reduce cover to <5% MU4 and MU6			
Coastal Wattle (*_Acacia cyclops_)	Eradicate from MU5.1	-	Hand removal of small plants by pulling. Cut larger plants with hand-held equipment, such as loppers or a chainsaw, and swab with herbicide.	H
Evening Primrose (*_Oenothera stricta_)	Maintain infestations in MU1 and MU2 at <1% cover	Contractor – hand-pulling of scattered individuals throughout.	Continue actions to date and monitor for new emergent. Bag and remove from site if seed is present.	L
False Caper (*_Euphorbia terracina_)	Maintain cover at <1% in MU2	Contractor – hand pull or spot-spray.	Continue to patrol and control as necessary.	H
Hottentot Fig (*_Carpobrotus edulis_)	Eradicate from MU1 and MU2	Contractor – spraying with Glyphosate 360g/L and Pulse, as well as grubbing, hand-pulling.	Continue actions to date and monitor for new emergents. Push the weed front from better condition vegetation on the western side of the dunes towards the east where vegetation condition is not as good.	VH
	Maintain cover at <1% in MU3.1, MU4, MU5.1, MU5.2, MU5.4	-	Contractor – spraying with Glyphosate 360g/L and Pulse, as well as grubbing, hand-pulling. Bag and remove from site if seed is present.	M
Marram Grass (*_Ammophila arenaria_)	Eradicate in MU2	Contractor - strategic slashing, followed immediately by spraying or wiping with Glyphosate 360g/L.	Continue actions to date and monitor for new emergence. Do not control on fore-dunes - stay at least 10m back from fore-dunes to avoid erosion issues.	VH
Olive (*_Olea europaea_)	Eradicate from MU5.1, MU5.2,	-	Contractor – grubbing, hand-pulling smaller individuals; cut & swab or drill/fill larger individuals	H

ISSUE/THREAT	5-Yr Objective/ Milestone[37]	Actions to date – what/ who	Proposed actions- what/ where/how	Priority (VH, H, M, L)
	MU5.4 and MU6			
Prickly Pear (**Opuntia stricta*)	Eradicate from MU6	-	Apply the appropriate herbicide by sprya on injection. There a two biological control agents, a moth and a scale insect which have been effective in reducing the abundance of Prickly Pear.	VH
Pampas Grass (**Cortaderia selloana*)	Eradicate from MU 5.1 and MU6	Some control has previously been undertaken.	First cut plant as close to the ground as possible. Once the grass is cut down, you can apply a herbicide. Several treatments may be necessary for established plants.	VH
Pepper Tree (**Schinus molle*)	Eradicate from MU 3.1	-	Dig out seedlings and small plants. Drill and fill or cut and swab larger individuals (follow up treatment may be necessary as plants may reshoot).	H
Perennial Veldt Grass (**Ehrharta calycina*)	Reduce infestations to <1% in MU1 and to <25% in MU2	Contractor – grubbing and strategic slashing, followed immediately by spraying or wiping with Glyphosate 360g/L.	Continue actions to date and monitor for new emergence.	M
	Reduce cover to <25% in MU5.1	-	Contractor – grubbing and strategic slashing, followed immediately by spraying or wiping with Glyphosate 360g/L.	M
	Maintain cover at 25-50% in MU4 and MU6			
Sea-lavender (**Limonium companyonis*)	Reduce infestations in MU1 to <1%	Contractor – mapping of infestations in MU1 (2011).	Grub/hand-pull individual plants scattered throughout mapped zones (MU1), gradually working outwards into the remainder of the areas.	L
Skeleton Weed (**Chondrilla juncea*)	Reduce/ maintain cover to <1% in MU 2	Contractor – spot spray with Metsulfuron and Lontrel herbicide.	Continue with spot-spraying starting in area to the east of the fenced off cemetery and heading south.	H
Swamp Oak (**Casuarina glauca*)	Maintain cover at 25-50% in MU3.1 and MU4. (Contain	-	Prevent any further spread via suckering – spot spray or cut and swab.	H

ISSUE/THREAT	5-Yr Objective/ Milestone[37]	Actions to date – what/ who	Proposed actions- what/ where/how	Priority (VH, H, M, L)
	spread from MU3.2)			
Pest animals				
Foxes	Reduce fox numbers by 80% across Torrens Island	Installation of Felixer	Maintain the Felixer units which are currently being trialled on Torrens Island.	VH
			Map fox dens (both inside and outside Park boundaries) and fumigate as required. Undertake a baiting program (both inside and outside the Park boundaries) twice per year - late summer/early autumn and late winter/early spring Enlist the support of other landholders (eg AGL, Origin Energy, DEW).	H
Feral Cats	Reduce feral cat numbers by 80% across Torrens Island	Installation of Felixer	Maintain the Felixer units which are currently being trialled on Torrens Island.	VH
			Undertake a baiting program (both inside and outside the Park boundaries) on an annual basis, in conjunction with fox baiting Enlist the support of other landholders (eg AGL, Origin Energy, DEW).	H
Rubbish/debris removal				
Scattered rubbish/marine debris	Reduce the amount in MU1 and MU2 by 80%	Conservation Volunteers Australia, AGL – systematic collection and recording of rubbish/marine debris.	Re-instate the regular and systematic collection and recording of rubbish/marine debris Enlist the support of other stakeholders, eg. Clean-Up Australia, Australian Microplastic Assessment Project (AUSMAP)	VH
Scrap metal piles, northern end TICP	Remove	-	Remove piles of scrap metal which occur at the northern end of Conservation Park (see Figure 4 for location).	H
Revegetation				
Woodland	Provide self-sustaining woodland habitat in MU2 and MU3.1	DEW/Green Adelaide – scattered tree and shrub plantings throughout MU2. Contractor – planting and staking of *Spinifex hirsutus* in areas previously infested with Marram Grass (MU2).	Continue revegetation works as appropriate, with densities and species appropriate for the habitat type. Include *Adriana quadripitarta* (habitat for the Bitter-bush Blue Butterfly), *Callitris gracilis* and *Allocasuarina verticillata*. See revegetation species list in Table 3.	M

ISSUE/THREAT	5-Yr Objective/ Milestone[37]	Actions to date – what/ who	Proposed actions- what/ where/how	Priority (VH, H, M, L)
Sandhill Greenhood (*Pterostylis arenicola*)	Maintain Sandhill Greenhood population so that it is self-sustaining	Adelaide and Mount Lofty Ranges Natural Resources Management Board, and the Australian Government's National Landcare Program - translocation in 2019.	Weed control around translocated individuals.	H
Coast Bitterbush (*Adriana quadripitarta*)	Increase and expand the population of *Adriana* to provide sustainable habitat for the Bitterbush Blue Butterfly.	Scattered revegetation in dune areas of Conservation Park.	Management of heavy grass infestations around existing populations. Test options such as burning or disturbing soil around existing Adriana (as per the *Action Plan for the Bitterbush Blue Butterfly*. Further revegetation of Adriana in dune areas.	VH
Monitoring				
	Monitor progress and success of works undertaken	Bushland Assessments established in MU 1 and MU2 in 2017. Bushland Assessments established in all other management units in 2021.	Repeat Bushland Assessments (including photopoints) every 5 years.	M

Appendix 1: Torrens Island Vegetation Management Plan (RMP Environmental Pty Ltd and EcoProTem)

Torrens Island
VEGETATION MANAGEMENT PLAN

Dept for Planning, Transport and Infrastructure
Metropolitan Region

Roger Playfair* & Faith Cook^

* RMP Environmental Pty Ltd, ^ EcoProTem

10 March, 2013

CONTENTS

This plan should be read and used in conjunction with the Torrens Island Vegetation Survey VS2012/109, Torrens Island Vegetation Management Plan Sheets 1 – 4 and Torrens Island Vegetation Management Plan Photographs.

1. INTRODUCTION

This plan provides an overall strategy for the management of vegetation in the area of the Torrens Island Quarantine Station and surrounds. The Vegetation Survey VS2012/109 covering the same area, provides the background vegetation information upon which the management actions outlined in this plan are based. This plan is a practical, action-oriented document and must be read in conjunction with the vegetation survey, where more background information is provided.

This vegetation management plan covers the area shown in Figure 1. The Management Area has been divided into 10 "Management Zones" that have either different environmental characteristics, or require different management regimes from each other. Refer to Fig 2.

2 VEGETATION MANAGEMENT OBJECTIVES

The future use of the site and the existing buildings and infrastructure is currently unknown, so the ongoing management needs to aim at minimising risk and keeping future land use options open until such time as some decisions are reached.

General objectives, through appropriate vegetation management, are to:

1. preserve and protect native vegetation within the site
2. minimise fire risks
3. minimise safety risks – eg trees which are structurally unsound and which pose a real safety risk to person or property
4. minimise impacts on infrastructure – vegetation which is or may structurally impact infrastructure (buildings etc) within the site
5. where possible minimise on-going maintenance requirements
6. if appropriate maintain the integrity of the cultural heritage values of the site
7. fulfil legal obligations with regard to:
    - Natural Resources Management Act (NRM Act) – pest plants and animals
    - Native Vegetation Act – clearance of native vegetation
    - Development Act – 'regulated' and 'regulated significant' trees

The type and condition of the vegetation has determined the focus of management activities in a given area. Some issues will require a single one-off action, whereas others will need ongoing, regular activities.

2.1 MANAGEMENT ISSUES

The priority management issues in this site are:

1. Biodiversity retention
2. Soil conservation
3. Prevention of impacts on surrounding biodiversity,
4. Invasive weed control
5. Fire risk minimisation

Other issues noted during the site inspection that may affect future land uses and pose potential environmental problems include:

- Tidal flushing regime in Management Zones D and F will affect trends in salinity and sodicity, possibly leading to acid-forming soil chemistry
- Further decay of the buildings in Management Zone B (Quarantine Station) may lead to asbestos being released into the environment that could require extensive and expensive remediation works to make it safe

2.2 ACTION PRIORITIES

Priorities for action are based on an assessment of potential cost benefits. The assessment includes considerations of:

- conservation/habitat value (intrinsic, and as part of the regional network of native vegetation)
- previous management practices
- risk of weed reinfestation from adjacent areas
- level of confidence in long-term benefit
- cost effectiveness

- safety
- amenity value

Individual weeds may be higher or lower priority depending on their location or situation, and these priorities will change over time as control work is done.

Figure 1 Torrens Island Vegetation Management Key Plan for Sheets 1 - 4

Figure 2 Torrens Island Vegetation Management Zones

3. VEGETATION MANAGEMENT

3.1 BIODIVERSITY

3.1.1 VEGETATION ASSOCIATIONS IN THE MANAGEMENT AREA

Plant Associations

1 *Tecticornia arbuscula, T. halocnemoides, Sarcocornia quinqueflora* low shrubland

The salt marsh community in the intertidal zone (generally less than 1.0 m above AHD) is dominated by samphires. Salt marshes exhibit zonation related to inundation. Low-lying salt marsh, where it is open to the sea, is inundated daily, and the plant associations are dominated by *Tecticornia arbuscula* and *Sarcocornia quinqueflora*. *Suaeda australis* is often present and can become codominant. These areas are used heavily by shorebirds (Coleman and Cook 2009).

The higher salt marsh, in areas less frequently tidally inundated, are dominated by *Tecticornia pergranulata*, *T. halocnemoides, Maireana oppositifolia, Frankenia pauciflora* and *Wilsonia humilis*. Being considerably drier than the low-lying salt marshes, the upper saltmarsh supports a wide variety of more "terrestrial" species, both plant and animal (Coleman and Cook 2009).

2 Exotic grassland/herbland with non-indigenous tree and shrub plantings

This is a non-native mix of vegetation and whilst in some small areas there are some native species occurring, they are most likely regenerating from a modified environment either from a seed source that has been planted or from propagules blown in from the nearby sand dune communities north and south of the survey area.

The grasses are dominated by *Ehrharta calycina* (Perennial veldt grass), *Avena barbata* (wild oats), and in some parts *Pennisetum clandestinum* (Kikuyu) and *Cynodon dactylon* (Couch). *Galenia pubescens* (Coastal Galenia) is very prominent in most areas.

Tree and shrub plantings are varied and include a range of *Eucalyptus* spp., *Acacia* spp., *Tamarix aphylla* (Athel Pine) and *Casuarina glauca* (Swamp Oak). Regeneration of Swamp Oak from suckers and *Acacia saligna* (Golden Wreath Wattle) from seed is becoming quite dense in some places. Many of the "native" tree and shrub species that have been planted originate from other areas of Australia, and were selected for their salt and sandy soil tolerance rather than their appropriateness for provision of locally indigenous habitat.

3.1.2 THREATENED PLANT SPECIES IN THE MANAGEMENT AREA

Based on previous surveys in the region two species of conservation significance were identified as possibly occurring in the study area, Both are rated as "Uncommon" in the Southern Lofty Botanical Region. They are *Wilsonia humilis* (Silky Wilsonia) and *Adriana quadripartita* (Rare Bitterbush). Neither were noted on site at the time of survey, though both are known to occur nearby to the south.

The site is geomorphologically unsuitable for *Tecticornia flabelliformis* (Beaded Glasswort) although it does occur nearby.

3.1.3 THREATENED FAUNA SPECIES IN THE MANAGEMENT AREA

Birds

Most of the migratory birds that visit the area are shorebirds and waterbirds that generally inhabit tidal mudflats, estuaries, sandy and rocky beaches, saltfields, samphire swamps, sewerage ponds and mangroves, though some species have preferential habitat types (Pizzey and Knight 1997, Marchant and Higgins 1993). Suitable habitat for these waders and deep water feeders exists in coastal areas north of the survey area around Saint Kilda and Port Gawler.

Their migration route generally passes along the East Asian Flyway. As a result they are listed:

- on treaties Australia has signed with China, the Republic of Korea and Japan
- as migratory and marine under the Environment Protection & Biodiversity Conservation Act (EPBC Act)
- under the Convention on Migratory Species (CMS or Bonn Convention) to which Australia is a party (Coleman & Cook 2009).

The management of terrestrial vegetation on Torrens Island is unlikely to directly affect birds that frequent coastal wetlands, sand flats or those that feed over the open water. If any other type of development is proposed in the future, this assessment would need to be reconsidered.

The saltmarsh areas on the survey site are tidally restricted, but some will hold small amounts of water with king tides and heavy summer rains. High tide habitats that have low dog and people disturbance are disproportionally significant to shorebirds, even if they only occur for a couple of weeks a season or every couple of years, as they allow the animals to feed when they would normally rest, gaining more weight, resulting in higher survivals on the trip home. Allowing tidal inflow more frequently would enhance their value.

3.2 WEED CONTROL

3.2.1 LEGISLATIVE REQUIREMENTS TO CONTROL DECLARED PLANTS

The Department for Planning, Transport and Infrastructure is bound by the *Natural Resources Management Act 2004* to take specific actions regarding occurrences of "declared" pest plant species (Table 1).

Table 1 relevant declared species under *Natural Resources Management Act 2004*

Botanical name	Common name	Relevant section of NRM Act*
Asparagus asparagoides	Bridal creeper	175, 182, 185, WoNS
Lycium ferocissimum	African Boxthorn	175, 182, 185, WoNS
Tamarix aphylla	Athel Pine	WoNS

* relevant NRM Act section

175(1)(2)	Controls transport of plants
180(1)(2)(3)	Requires notification of NRMB
181(2)	Compliance with Authorised Officer's instructions
182(1)(2)(3)	Destruction and/or control of plants
185(1)	Cost recovery by NRM for roadside control works
WoNS	listed as a Weed of National Significance (WoNS), but not necessarily declared in SA (http://www.weeds.org.au/natsig.htm)

3.2.2 ENVIRONMENTAL WEEDS

As well as the infestations of declared species, some "environmental weeds" were recorded that are vigorous and invasive and compete with native species. Whilst there is no legislative requirement to control these species, without some control the remnant vegetation will gradually die out through its inability to compete. Although most of the vegetation on the site is not a native remnant, control of environmental weeds can still provide a regional environmental benefit through limiting the production and dispersal of seed and other propagules.

Table 2 Key environmental weeds on the site.

Species	Common Name	
Acacia saligna	Golden Wreath Wattle	Shrub to 4 m
Asparagus asparagoides	Bridal Creeper (also declared)	Creeper
Casuarina glauca	Swamp Oak	Tree to 15 m
Ehrharta calycina	Veldt Grass	Grass
Pinus halepensis	Aleppo Pine	Tree to 20 m
Piptatherum miliaceum	Rice Millet	Grass
Galenia pubescens	Coastal Galenia	Spreading herbaceous ground cover

WOODY WEED CONTROL

Some woody weed species have very successfully expanded their range on the site because of their vigorous growth and high reproductive capabilities. *Casuarina glauca* (Swamp Oak) and *Acacia saligna* (Golden Wreath Wattle) are the two main problem plants. As removal of these species once they become adult plants is difficult, ongoing control (following initial removals) of newly germinated plants is very important. Where very dense infestations are removed, the open bare areas may be susceptible to regeneration from the seed bank in the soil or reinfestation by other colonising exotic plant species. Follow-up is essential. If budget allows replacement with appropriate native species can be used to reinstate the removed habitat, while reducing re-colonisation by undesirable species.

Fruit from *Lycium ferocissimum* (African Boxthorn) is very attractive to a variety of fauna; consequently its seed is readily spread by birds and foxes in particular. Currently *Lycium ferocissimum* occurs within the survey site as occasional scattered individuals; therefore control should be relatively easy at this stage.

HERBACEOUS WEED CONTROL

Asparagus asparagoides (Bridal Creeper) is present under the canopies of some areas of *Melaleuca* spp. shrubs. Berries are ingested and spread by birds and foxes and eradication of this small infestation before it spreads would be beneficial. Annual follow-up is essential to ensure populations do not spread or re-establish.

Galenia pubescens (Coastal Galenia) is an extremely common colonising exotic ground cover in coastal situations around South Australia and was recorded within the site. However, as it occurs in areas dominated by exotic grasses, specific control is not required.

GRASSY WEED CONTROL

Grassy weeds, particularly *Ehrharta calycina* (Perennial veldt grass), *Avena barbata* (Wild Oats), *Pennisetum clandestinum* (Kikuyu) and *Cynodon dactylon* (Couch) are highly competitive exotic grasses that create a very dense sward with high levels of fine fuel. Mowing at least biannually is usually required to reduce their impact. This is more difficult around revegetated areas, close to tree bases and on steep or rocky sites.

3.2.3 HIGH PRIORITY TARGET WEED SPECIES

WOODY WEEDS

Species	Common Name	Control Methods
Casuarina glauca	Swamp Oak	Mechanically remove, cut and swab, or spot spray suckers, frill or drill and fill larger plants
Lycium ferocissimum	African Boxthorn	Winter to Spring. Spot spray or handpull seedlings, cut and swab larger plants
Acacia saligna	Golden Wreath Wattle	Spot spray or hand pull seedlings, cut and swab, frill or drill and fill larger plants

HERBACEOUS/GRASSY WEEDS

Species	Common Name	Control Methods
Asparagus asparagoides	Bridal Creeper	June to August. Spot spray

3.3 FIRE PREVENTION

The Fire and Emergency Services Act 2005 places an onus on land managers (owners of private land, rural councils or responsible agencies) to take reasonable steps to prevent or inhibit the outbreak and spread of fire.

When fuel loadings are high and moisture content low, the highest risk of fire ignition is from lightning strike. Other fire triggers originate from preventable causes such as machinery/vehicle use, human carelessness (poorly planned burn-offs, campfires/BBQs not properly extinguished etc) and arson.

Fuel reduction management within the survey site can primarily be achieved through a regular mowing regime as well as insuring areas adjacent to housing and other built assets are kept clear of rubbish, dead vegetation and debris build-up.

The main tasks associated with vegetation management with respect to fire prevention are:

- maintenance of existing emergency access tracks
- maintenance of adequate firebreaks (discontinuous fine fuel)
- removal of flammable dry vegetation, particularly close to buildings

Grasses

Build-up of fuel from the growth of winter-active grasses that dry off over the summer provides a continuous source of combustible fine fuel that can allow a wildfire to spread to other vegetation and structures.

A regular mowing regime is recommended.

Trees and shrubs

It is recommended that all dead trees and shrubs within the site be removed to reduce the fire risk. Any removed hollows should be relocated to an appropriate alternative tree nearby.

Some mature *Casuarina glauca* trees, which overhang the buildings in Area B, are dropping leaf litter on roofs and filling gutters with flammable material. This material needs to be removed.

Additionally the removal/control of woody weeds such as *Casuarina glauca* (self-seeded specimens) and *Acacia saligna* will further reduce the fire risk.

4. MANAGEMENT ZONES (REFER TO PART 5 'BUDGET ESTIMATES' FOR TIMING & APPENDIX A FOR HERBICIDE NOTES)

4.1 MANAGEMENT ZONE A – Area Approx 1.4 ha. Refer Aerials, Sheet 1

Description

Flat area covered with exotic grasses and herbs with very occasional planted or self-sown non-indigenous trees. Occasional *Acacia saligna* seedling, pigface or saltbush.

Enclosed by mesh fence with locked gates to restrict access to the telecommunications infrastructure in the southwest corner.

Management Objectives

- Weed Control – woody and grassy weeds
- Minimise fire fuel build-up

Management Actions

- Slash grass area twice yearly (ongoing work).
- Remove occasional *Acacia saligna* seedling (with possible occasional follow-up)

4.2 MANAGEMENT ZONE B – Area Approx 7.30 ha. Refer Aerials, Sheets 1 and 2

Description

Flat area covered with exotic grasses and herbs with very occasional planted or self-sown non-indigenous trees. Very occasional native grasses or saltbush was recorded in the bulk of the area, with a reasonable patch of regrowth and revegetation in the north-western corner.

Substrate is deep sand, some areas being fill from the dredging of the Port River.

Casuarina glauca and other non-indigenous trees and shrubs have been planted around the buildings and in the open areas.

Casuarina glauca limbs overhang some buildings, filling gutters and covering roofs with fine flammable dead vegetation material.

A small amount of Bridal Creeper was recorded within the *Acacia saligna* at the southern end, near the most southern building, and also in the northwest corner.

Management Objectives

- Weed Control – woody and grassy weeds
- Minimise fire fuel build-up
- Biodiversity retention in north-west corner

Management Actions

- Slash grass area twice yearly (ongoing work)
- Remove and burn four dead trees (initial work)
- Burn or dispose of offsite (licensed dump) seven existing piles of dead vegetation debris (initial work).
- Remove and poison stems of approx. 0.35 ha of *Casuarina glauca* suckers (west of old Doctor's residence). Dispose of offsite (licensed dump) removed vegetation material (initial work with ongoing follow-up once a year).
- Remove and poison stems of approx. 0.1 ha of *Casuarina glauca* suckers and *Acacia saligna* seedlings (south-west corner of management zone). Dispose of offsite (licensed dump) removed vegetation material (initial work with ongoing follow-up once a year).
- Trim *Casuarina glauca* limbs overhanging buildings. Dispose of offsite (licensed dump) removed material (initial work).
- Remove occasional African Boxthorn (initial work with possible occasional follow-up).
- Control Bridal Creeper in northwest corner, making sure to avoid native creepers (*Muehlenbeckia adpressa*) by using bushcare methodology (initial work with possible occasional follow-up).

4.3 MANAGEMENT ZONE C – Area Approx 0.08 ha. Refer Aerials, Sheet 1

Description

Flat paved, unvegetated area.

Enclosed by mesh fence with locked gates to restrict access to the gas pipeline valve infrastructure.

Management Objectives

- No vegetation management required

Management Actions

- None required

4.4 MANAGEMENT ZONE D – Area Approx 0.94 ha. Refer Aerials, Sheet 2

Description

Flat area with a levee bank along eastern and western sides. Lower lying saline area is covered with *Tecticornia* spp and *Sarcoconia quinqueflora* low shrubland that is not tidally flushed. Eastern side is slightly higher, less saline ground with exotic grasses and herbs and very occasional planted or self-sown non-indigenous trees. Some *Melaleuca halmaturorum* has been planted along the levee bank.

Management Objectives

- Weed Control – woody and grassy weeds
- Biodiversity enhancement

Management Actions

- Slash grasses on higher ground twice yearly (ongoing work)

4.5 MANAGEMENT ZONE E – Area Approx 4.15 ha. Refer Aerials, Sheets 3 and 4

Description

Low lying saline area with a levee bank with vehicle track along western side, covered with *Tecticornia* spp and *Sarcoconia quinqueflora* low shrubland. Substantial patches dominated *Atriplex paludosa* and *Sueada australis*, particularly along the eastern side were recorded. This low-lying saline area is only occasionally tidally flushed. If it is not flushed more frequently, sodicity may increase and the potential for acid sulphate soil could develop. Some *Melaleuca halmaturorum* has been planted along the edge at the northern end.

This area could be environmentally enhanced by allowing more frequent tidal flushing and some planting of *Adriana quadripartita* along the eastern margin providing some possible habitat for the Bitter-bush Blue Butterfly.

Bitter-bush Blue Butterfly (*Theclinesthes albocincta*)

The Bitter-bush Blue Butterfly (*Theclinesthes albocincta*), a butterfly of the coastal strip in the Adelaide area, is now very rare on the Adelaide plains, the Fleurieu Peninsula and the south coast. The caterpillars rely upon the rated 'Rare' Bitter-bush (*Adriana quadripartita, klotzschii* form) as a food source, eating its leaves, fruit and male flowers. This butterfly that would benefit from some active cultivation of its caterpillar food plant in dune revegetation and Coastcare schemes (pers. comm. Roger Grund).

Management Objectives

- Biodiversity enhancement

Management Actions

- Open up the drain to the Port River on the southern end (optional biodiversity enhancement)
- Plant some *Adriana quadripartite, klotzschii* form along western margin (along edge of Management Zone F) (optional biodiversity enhancement)
- Maintain current low levels of human/dog access

4.6 MANAGEMENT ZONE F – Area Approx 3.75 ha. Refer Aerials, Sheets 3 and 4

Description

Flat area, slightly higher than the adjacent saline wetland area, which is covered with exotic grasses and herbs with very occasional planted or self-sown non-indigenous trees.

Management Objectives

- Weed Control – woody and grassy weeds
- Minimise fire fuel build-up

Management Actions

- Burn or dispose of offsite (licensed dump) two existing piles of dead vegetation debris (initial work)
- Slash grass area twice yearly (ongoing work)

4.7 MANAGEMENT ZONE G – Area Approx 5.36 ha. Refer Aerials, Sheets 3 and 4

Description

Flat area on deep sand from dredged material, covered with exotic grasses and herbs with very occasional planted or self-sown non-indigenous trees.

Eastern part enclosed by mesh fence with locked gates to restrict access to the avian quarantine facility. This area is currently mown and maintained.

Western part is currently slashed regularly and dead trees and shrubs have been removed and material stockpiled.

Management Objectives

- Weed Control – woody and grassy weeds
- Minimise fire fuel build-up

Management Actions

- Burn or dispose of offsite (licensed dump) existing pile of dead vegetation debris (initial work)
- Remove and burn or dispose of offsite (licensed dump) three dead *Melaleuca halmaturorum* (initial work)
- Control Bridal Creeper under *Melaleuca halmaturorum* (initial work with possible occasional follow-up).
- Maintain the current slashing regime (ongoing work)

4.8 MANAGEMENT ZONE H – Area Approx 0.18 ha. Refer Aerials, Sheet 4

Description

Flat area on shallow dredge fill with a levee bank along eastern side. Vegetation cover is *Tecticornia* spp and *Sarcoconia quinqueflora* low shrubland gradually regenerating with significant densities of *Atriplex paludosa*.

Adjacent to housing with managed garden species around dwelling. Mildly saline area that has no invasive weed issues.

Area has low levels of human and dog access which is beneficial in preventing weed intrusion.

Management Objectives

- Weed Prevention – woody and grassy weeds, including garden escapees.

Management Actions

- None initially. Monitor and undertake weed control as required in the future.
- Maintain current low levels of human/dog access

4.9 MANAGEMENT ZONE I – Area Approx 0.09 ha. Refer Aerials, Sheet 4

Description

Flat area with a levee bank along eastern side. This lower lying area is on the western edge of the Torrens Island Conservation Park. It is covered with *Tecticornia* spp and *Sarcoconia quinqueflora* low shrubland that is not tidally flushed except during extremely high tides. East of the levee bank the Mangrove forest begins. This mangrove forest covers the majority of the Conservation Park area.

Saline area that has no invasive weed issues.

Area has low levels of human and dog access which is beneficial in preventing weed intrusion.

Management Objectives

- Weed Prevention – woody and grassy weeds

Management Actions

- None initially. Monitor and undertake weed control as required in the future.
- Maintain current low levels of human/dog access

4.10 MANAGEMENT ZONE J – Area Approx 0.68 ha. Refer Aerials, Sheets 3 and 4

Description

Flat area with a levee bank along eastern side. This lower lying area is on the western edge of the Torrens Island Conservation Park. It is covered with *Tecticornia* spp and *Sarcoconia quinqueflora* low shrubland that is not tidally flushed except during extremely high tides. East of the levee bank the Mangrove forest begins. This mangrove forest covers the majority of the Conservation Park area.

Saline area that has no invasive weed issues.

Enclosed by mesh fence with locked gates to restrict access to the avian quarantine facility.

Area has low levels of human and dog access which is beneficial in preventing weed intrusion.

Management Objectives

- Weed Prevention – woody and grassy weeds

Management Actions

- None initially. Monitor and undertake weed control as required in the future.
- Maintain current low levels of human/dog access

5. BUDGET ESTIMATES

Action	Mgt Zones	*Mgt Type	Extent	Timing	Priority	Cost Year 1 (initial)	Annual Cost (ongoing)
Remove juvenile *Casuarina glauca* and poison cut ends of stems	B	W, F	0.6 ha.	Late winter year 1 *(2 treatments @ 2days x $600) + $200*	High	**$2,600**	-
Remove occasional *Lycium ferocissimum* and follow-up	B	W	~ 10 plants	Winter/late winter *(2 treatments x 2days @ $600) + $200*	Moderate	**$2,600**	**$2,400** *(2 treatments x 2days @ $600)*
Remove *Asparagus asparagoides* and follow-up	B	W	~ 3 patches		Moderate		
Remove adult and juvenile *Acacia saligna* and poison cut ends of stems	B	W, F	0.1 ha.		High		
Follow-up broad spray control of juvenile *Acacia saligna*	B	W	0.1 ha	Once annually in September/October	Moderate	-	
Follow-up control of scattered juvenile *Acacia saligna*	A	W		As required September/October *(as required, possibly some work every year)*	Moderate	-	
Follow-up to poison juvenile *Casuarina glauca*	B	W, F	0.6 ha.	Once annually in September/October	Moderate	-	
Slashing of long grass	A, B, D, F, G	F, W	4 ha.	Twice each year in August and October *(Depending on conditions $600 per ha)*	High	**$4,800**	**$4,800**
Burn dead vegetation debris piles	B, F	F	12 piles	During low fire risk season (May-Sept)	High	**$1,500**	**$2,400** *(2 treatments x 2 days @ $600 - as required, possibly some work every 3-4 years)*
Fell dead trees and burn	B	F, S	6 trees	During low fire risk season (May-Sept)	Moderate	**$1,500**	
Prune *Casuarina glauca* trees that overhang buildings	B	F, S		Late winter year 1	High	**$1,200**	
Clear *Casuarina glauca* debris from roof and gutters		F		Late winter year 1	High	**$500**	
					Total	**$14,700**	**$9,600 (maximum)**
Plant seedlings of *Adriana quadripartite* Optional biodiversity enhancement – cost **has not** been included in the above total	F, B	B	500 seedlings	Winter year 1 plus 2 waterings in first summer	Low	**$5,000****	-

***W** – Weed Control; **F** – Fire Risk Minimisation; **B** - Biodiversity Enhancement; **S** - Safety

Based on contractor rates of $1,200 / day

Based on contractor being able to undertake work using a broad acre slasher in most areas

Areas are approximate only

**Commercial rate – will be significantly less if work is undertaken by conservation group.

REFERENCES

Coleman, P. & F. Cook (2009) Adelaide & Mt Lofty Ranges Natural Resources Management Board: Shorebird Management and Conservation. AMLRNRM

Marchant, S. and Higgins, P.J., Eds. (1993). *The Handbook of Australian, New Zealand and Antarctic Birds*. Oxford University Press, Melbourne.

Pizzey, G. and Knight, F. (1997). *The Field Guide to the Birds of Australia*. Harper Collins, Sydney.

APPENDIX A – Herbicide notes

Suggested method of *Casuarina glauca* management and control.

- Hand pull seedlings.
- For mature plants apply Trichlopyr™-based herbicide diluted in diesel to basal bark of trunk, or drill and fill with 50% Glyphosate™.
- Cut down dead timber and move to a safe place for burning.
- Follow-up required every year in Spring to remove new sucker growth by Glyphosate™ spot spray.

Suggested method of *Acacia saligna* management and control.

- Hand pull seedlings.
- For mature plants apply Trichlopyr™-based herbicide diluted in diesel to basal bark of trunk, or drill and fill with 50% Glyphosate™.
- Cut down dead timber and move to a safe place for burning.
- Follow-up required every year in spring to remove new seedling germination by Glyphosate™ spot spray.

Suggested method of *Lycium ferocisssimum* management and control.

- Hand pull/grub seedlings and small plants, removing the entire root.
- For mature plants, cut and swab with Trichlopyr™-based herbicide diluted in diesel.
- Cut down dead timber and move to a safe place for burning.
- Follow-up required annually in spring to kill regrowth by spot spraying Trichlopyr™-based herbicide diluted in diesel and to remove any newly germinated seedlings.

Suggested method of *Asparagus asparagoides* management and control.

- Grub rhizomes and tubers in winter before fruits form.
- Pull seedlings in winter before fruits form.
- Spot spray in winter with 1:100 dilution Glyphosate™ 360g/L.
- Follow-up required every year in winter to remove new above-ground growth by Glyphosate™ spot spray.

Note: Read the manufacturers' labels and material safety data sheets before using herbicides. For further information consult the Australian Pesticides and Veterinary Medicines Authority to determine the status of permits for your situation or state.

Appendix 2: Plant species list

Torrens Island indigenous plant species lists

Species Name	Common Name	Conservation Status			Location/Vegetation Association (2021)									*Additional Sources		
		AUS	SA	AD	Northern TI Low dunes	Dunes north of Quarantine Station	AGL Dune areas	AGL Revegetation	Block east of Quarantine Station	Quarantine Station	Revegetation opposite AGL	Samphire	Mangroves	Recorded in MANCAP	Recorded EAC - 2013	Recorded by AMWRO
Acacia cupularis	Cup Wattle			RA		✓								✓	✓	✓
Acacia leiophylla	Coast Golden Wattle													✓		
Acacia ligulata	Umbrella Bush			RA		✓	✓		PL		✓			✓		
Acacia longifolia ssp. sophorae	Coastal Wattle			LC		✓								✓	✓	✓
Acacia paradoxa	Kangaroo Thorn			LC										✓		
Acacia pycnantha	Golden Wattle			LC		O/R	O/R		R	✓	R			✓	✓	✓
Adriana quadripartita	Coast Bitter-bush			RA			✓		PL					✓		✓
Allocasuarina verticillata	Drooping Sheoak			LC		R			PL		✓			✓	✓	
Angianthus preissianus	Salt Angianthus			VU										✓	✓	
Apium annuum	Annual Celery			VU										✓	✓	
Atriplex cinerea	Coast Saltbush			LC	O	✓	✓			✓	✓			✓	✓	
Atriplex nummularia ssp. nummularia (planted)	Old-man Saltbush														✓	
Atriplex paludosa	Marsh Saltbush				O									✓		✓
Atriplex paludosa ssp. cordata	Marsh Saltbush			LC			✓	U				E/R		✓	✓	
Atriplex semibaccata	Berry Saltbush			LC										✓		✓
Atriplex suberecta	Lagoon Saltbush			NT										✓		
Austrostipa drummondii	Cottony Spear-grass			NT										✓		
Austrostipa flavescens	Coast Spear-grass			LC										✓		
Austrostipa nodosa	Tall Spear-grass			LC		✓								✓		
Austrostipa sp.	Spear-grass						✓	✓		✓	✓				✓	✓
Avicennia marina ssp. marina	Grey Mangrove											E	O/R	✓	✓	✓
Bolboschoenus caldwellii	Salt Club-rush			RA										✓		

Species Name	Common Name	Conservation Status			Location/Vegetation Association (2021)									*Additional Sources		
		AUS	SA	AD	Northern TI Low dunes	Dunes north of Quarantine Station	AGL Dune areas	AGL Revegetation	Block east of Quarantine Station	Quarantine Station	Revegetation opposite AGL	Samphire	Mangroves	Recorded in MANCAP	Recorded EAC - 2013	Recorded by AMWRO
Bromus sp.	Brome													✓		
Calandrinia eremaea	Dryland Purslane			NT										✓	✓	
Callitris gracilis	Southern Cypress Pine			LC		O/R	✓		✓	✓	R			✓	✓	✓
Calotis scapigera	Tufted Burr-daisy		R	X										✓		
Campanulaceae sp.	Bluebell Family													✓		
Carpobrotus rossii	Native Pigface			LC	U/R	✓	✓				✓			✓	✓	✓
Centrolepis cephaloformis ssp. cephaloformis	Cushion Centrolepis		R	VU										✓		
Centrolepis polygyna	Wiry Centrolepis			NT										✓	✓	
Chamaesyce drummondii														✓		
Chloris truncata	Windmill Grass			LC											✓	✓
Clematis microphylla var. microphylla	Old Man's Beard			NE										✓		✓
Compositae sp.	Daisy Family													✓		
Cotula australis	Common Cotula			LC											✓	
Crassula colligata ssp. colligata				LC											✓	
Crassula colorata	Dense Crassula			LC											✓	
Crassula exserta	Large-fruit Crassula		R	RA										✓		
Crassula sieberiana	Sieber's Crassula		E	VU										✓		
Cullen australasicum	Tall Scurf-pea			RA					PL							✓
Dianella brevicaulis	Short-stem Flax-lily			NT	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓
Dianella revoluta var. revoluta	Black-anther Flax-lily			LC										✓		
Disphyma crassifolium ssp. clavellatum	Round-leaf Pigface			LC	✓	✓	✓	✓		✓		✓		✓	✓	✓
Distichlis distichophylla	Emu Grass			LC	✓		✓				✓				✓	
Dodonaea viscosa	Sticky Hop-bush													✓		✓

Species Name	Common Name	Conservation Status			Location/Vegetation Association (2021)									*Additional Sources		
		AUS	SA	AD	Northern TI Low dunes	Dunes north of Quarantine Station	AGL Dune areas	AGL Revegetation	Block east of Quarantine Station	Quarantine Station	Revegetation opposite AGL	Samphire	Mangroves	Recorded in MANCAP	Recorded EAC - 2013	Recorded by AMWRO
Dodonaea viscosa ssp. spatulata	Sticky Hop-bush			LC	R		R		PL		✓			✓	✓	
Enchylaena tomentosa var. tomentosa	Ruby Saltbush			LC	✓	✓	✓	✓	✓	✓	R			✓	✓	✓
Enneapogon nigricans	Black-head Grass			LC				✓			✓			✓		✓
Eucalyptus camaldulensis	River Red Gum			NT						PL						
Eucalyptus diversifolia	Coastal White Mallee			RA						PL						
Eucalyptus leucoxylon ssp. leucoxylon	South Australian Blue Gum			NT				PL	PL	PL				✓		
Ficinia nodosa	Little Club-rush				✓	U	✓				✓			✓		
Fimbristylis velata	Veiled Fringe-rush			RA										✓		
Frankenia foliosa	Leafy Sea-heath			NE										✓		
Frankenia pauciflora	Southern Sea-heath			NE								✓		✓	✓	
Gahnia filum	Thatching Grass			VU										✓		
Hemichroa pentandra	Trailing Hemichroa			EN										✓	✓	
Hypoxis glabella var. glabella	Tiny Star			LC										✓		
Isolepis nodosa	Knobby Club-rush													✓	✓	✓
Kennedia prostrata	Scarlet Runner			LC			✓				✓			✓		✓
Kunzea pomifera	Muntries			RA		PL										
Lawrencia squamata	Thorny Lawrencia			VU								✓		✓	✓	
Lepilaena cylindrocarpa	Long-fruit Water-mat			VU										✓		
Lomandra juncea	Desert Mat-rush			RA										✓		
Lomandra leucocephala ssp. robusta	Woolly Mat-rush			VU										✓		
Lotus australis	Austral Trefoil			NT	R/U	✓								✓		✓
Maireana brevifolia	Short-leaf Bluebush			LC			✓	✓		✓				✓		
Maireana oppositifolia	Salt Bluebush			LC	✓		✓	✓		✓		✓		✓	✓	✓

Species Name	Common Name	Conservation Status			Location/Vegetation Association (2021)									*Additional Sources		
		AUS	SA	AD	Northern TI Low dunes	Dunes north of Quarantine Station	AGL Dune areas	AGL Revegetation	Block east of Quarantine Station	Quarantine Station	Revegetation opposite AGL	Samphire	Mangroves	Recorded in MANCAP	Recorded EAC - 2013	Recorded by AMWRO
Melaleuca halmaturorum	Swamp Paper-bark			EN			✓	PL		✓				✓		✓
Muehlenbeckia gunnii	Coastal Climbing Lignum			LC	✓	✓	✓			✓	✓			✓	✓	✓
Myoporum insulare	Common Boobialla			NT	R						✓			✓	✓	✓
Nitraria billardierei	Nitre-bush			RA	✓	✓	✓	✓		✓		E/ R		✓	✓	✓
Olearia axillaris	Coast Daisy-bush			NT			✓							✓		✓
Pelargonium australe	Australian Pelargonium			RA	✓	R	✓				✓			✓	✓	✓
Phlegmatospermum eremaeum	Spreading Cress														✓	
Pittosporum angustifolium	Sweet Pittosporum			NT						✓						
Puccinellia stricta var. stricta	Australian Saltmarsh-grass			RA										✓	✓	
Rhagodia candolleana ssp. candolleana	Sea-berry Saltbush			LC	✓	U/R	✓	U	✓	✓	R			✓	✓	✓
Rhagodia crassifolia	Fleshy Saltbush			RA			✓							✓		
Rorippa laciniata	Jagged Bitter-cress		R	EN										✓		
Rytidosperma caespitosum	Common Wallaby-grass			LC							✓			✓		
Rytidosperma laeve	Smooth Wallaby-grass		R	RA										✓		
Rytidosperma setaceum	Small-flower Wallaby-grass			LC										✓		
Rytidosperma sp.	Spear-grass														✓	✓
Salsola australia	Buckbush			LC										✓		
Samolus repens	Creeping Brookweed			NT			✓			✓				✓	✓	
Salicornia blackiana	Thick-head Samphire			RA								✓	U	✓	✓	
Salicornia quinqueflora	Beaded Samphire			NT				✓				✓	✓	✓	✓	

Species Name	Common Name	Conservation Status			Location/Vegetation Association (2021)									*Additional Sources		
		AUS	SA	AD	Northern TI Low dunes	Dunes north of Quarantine Station	AGL Dune areas	AGL Revegetation	Block east of Quarantine Station	Quarantine Station	Revegetation opposite AGL	Samphire	Mangroves	Recorded in MANCAP	Recorded EAC - 2013	Recorded by AMWRO
Sclerolaena muricata var. villosa	Five-spine Bindyi		R	RA										✓		
Senecio glossanthus	Annual Groundsel			NT										✓		
Senecio pinnatifolius	Variable Groundsel				✓	✓	✓			✓	✓			✓		✓
Spergularia marina	Salt Sand-spurrey			NE										✓		
Spinifex hirsutus	Rolling Spinifex			LC		✓									✓	
Sporobolus virginicus	Salt Couch			LC										✓	✓	
Suaeda australis	Austral Seablite			NT	✓	✓	✓	✓				✓	✓	✓	✓	
Tecticornia arbuscula	Shrubby Samphire			VU										✓	✓	
Tecticornia flabelliformis	Bead Samphire		V									✓		✓	✓	
Tecticornia halocnemoides ssp.	Grey Samphire			VU								✓		✓	✓	
Tecticornia indica ssp. leiostachya	Brown-head Samphire											✓		✓	✓	
Tecticornia pergranulata ssp. pergranulata	Black-head Samphire			RA				✓				✓		✓	✓	
Tecticornia pruinosa	Bluish Samphire			RA				✓				✓		✓	✓	
Tecticornia sp.	Samphire											✓				✓
Threlkeldia diffusa	Coast Bonefruit			NT	✓	✓	✓	✓				✓		✓	✓	✓
Triglochin mucronata	Prickly Arrowgrass			VU										✓		
Triglochin nana	Dwarf Arrowgrass			NT										✓		
Triglochin striata	Streaked Arrowgrass			NT										✓		
Typha domingensis	Narrow-leaf Bulrush			LC										✓		✓
Vittadinia cervicularis var. cervicularis	Waisted New Holland Daisy			RA										✓		
Vittadinia cuneata	Fuzzy New Holland Daisy			LC										✓	✓	
Vittadinia gracilis	Woolly New Holland Daisy			LC										✓		

Species Name	Common Name	Conservation Status			Location/Vegetation Association (2021)									*Additional Sources		
		AUS	SA	AD	Northern TI Low dunes	Dunes north of Quarantine Station	AGL Dune areas	AGL Revegetation	Block east of Quarantine Station	Quarantine Station	Revegetation opposite AGL	Samphire	Mangroves	Recorded in MANCAP	Recorded EAC - 2013	Recorded by AMWRO
Vittadinia sp.	New Holland Daisy				✓	✓										✓
Wahlenbergia communis	Tufted Bluebell			RA										✓		✓
Wahlenbergia littoricola	Coast Bluebell			NE	✓		✓				✓				✓	
Wahlenbergia sp.	Native Bluebell													✓		
Wilsonia humilis	Silky Wilsonia			VU								✓		✓	✓	
Wilsonia rotundifolia	Round-leaf Wilsonia			VU										✓	✓	
Wurmbea dioica				LC										✓		
Conservation Status **AUS = Australia *EPBC Act 1999*:** CR = Critically Endangered, EN = Endangered, VU = Vulnerable **SA = South Australia *NPW Act 1972:*** E = Endangered, V = Vulnerable, R = Rare **AD = Adelaide Region[38] EN=Endangered, VU=Vulnerable, RA=Rare, NT = Near Threatened, LC = Least Concern, NE = Not Evaluated**																

Key to codes: ✓ = present, R = present and noted to be regenerating/recruiting, O= Overstorey dominant, U = understorey dominant, E = emergent species, PL = Planted

*Additional Sources

MANCAP – Metropolitan Adelaide and Northern Coastal Action Plan – Flora species list for Cell MA16 Torrens Island (also includes Section Banks and Garden Island)

AMWRRO – AMWRRO Vegetation Survey in the area proposed for the Torrens Island Greenhouse Precinct, May 2005

EAC – Species recorded as part of 2013 Biodiversity Action Plan

[38] Gillam, S. and Urban, R. (2014) Regional Species Conservation Assessment Project, Phase 1 Report: Regional Species Status Assessments, Adelaide and Mount Lofty Ranges NRM Region. Department of Environment, Water and Natural Resources, South Australia.

Torrens Island introduced plant species lists

Species Name	Common Name	WONS[39]	Declared[40]	*Bushland Assessment Site (2021)																			Additional Sources	
				1 MU1	2 MU1	3 MU1	4 MU2	5 MU2	6 MU2	7 MU 5.1	8 MU 5.4	9 MU5.2	10 MU 5.3	11 MU5.3	12	13	14	15	16	17 MU3.2	18 MU4	19 MU3.2	20 MU6	MANCAP	EAC 2013
**Acacia cyclops*	Coastal Wattle									1a														
**Acacia longifolia*	Sallow Wattle																				1			
**Acacia saligna*	Golden Wreath Wattle																				1		✓	
**Agave americana*	Century Plant																						✓	
**Agonis flexuosa (planted)*	Willow Myrtle																				1			
**Aizoon pubescens*	Coastal Galenia			2	2			1	1a	2	1a	1a	1a	1a	1a				1a	2	3		3	✓	✓
**Ambrosia psilostachya*	Perennial Ragweed																						✓	
**Ammophila arenaria*	Marram Grass							2																✓
**Anagallis arvensis*	Pimpernel																						✓	
**Arctotheca calendula*	Cape Weed																						1a	✓	
**Arenaria leptoclados*	Lesser Thyme-leaved Sandwort																							✓	
**Asparagus asparagoides*	Bridal Creeper	Y	Y				1	1		1a	1a	1a		1a					1a	1a		3		✓	✓
**Asphodelus fistulosus*	Onion Weed																							✓	✓
**Avena barbata*	Bearded Oat						3		1a	3		4		2									2	✓	✓
**Brassica tournefortii*	Wild Turnip																						1	✓	✓
**Bromus diandrus*	Great Brome						3		1a	2		4							2	1a	2			✓	✓
**Bromus madritensis*	Compact Brome																								✓
**Bromus rubens*	Red Brome																						1	✓	
**Cakile maritima ssp. maritima*	Two-horned Sea Rocket			2	1a			1	1a															✓	✓
**Callistemon sp. (planted)*																					1				
**Carpobrotus edulis*	Hottentot Fig				1a		2	1a		1a	1	1a							1a		1a			✓	✓
**Casuarina glauca*			Y										2						2	4	2	4			
**Chondrilla juncea*	Skeleton Weed		Y		2		1a			2		1a												✓	✓
**Cirsium vulgare*	Spear Thistle																							✓	
**Conyza albida*	Tall Fleabane																							✓	
**Conyza bonariensis*	Flax-leaf Fleabane																								✓
**Cortaderia selloana*	Common Pampas Grass		Y							1													1	✓	
**Cotyledon orbiculata*	Cotyledon																							✓	
**Cucumis myriocarpus*	Paddy Melon																							✓	
**Cynara cardunculus ssp. flavescens*	Artichoke Thistle																							✓	
**Cynodon dactylon*	Couch									1											2		1a	✓	
**Dittrichia graveolens*	Stinkweed																							✓	
**Ecballium elaterium*	Squirting Cucumber																							✓	
**Echium plantagineum*	Salvation Jane																						1	✓	

[39] Australian Weeds Committee (2012), Weeds of National Significance 2012. Department of Agriculture, Fisheries and Forestry, Canberra, ACT http://www.weeds.org.au/WoNS/
[40] Pest plants that are a significant threat to agriculture, the natural environment and public health and safety are called declared plants and land owners have a legal responsibility to manage these plants under the *Landscape South Australia Act 2019*

Species Name	Common Name	WONS[9]	Declared[10]	*Bushland Assessment Site (2021)																				Additional Sources	
				1 MU1	2 MU1	3 MU1	4 MU2	5 MU2	6 MU2	7 MU 5.1	8 MU 5.4	9 MU5.2	10 MU 5.3	11 MU5.3	12	13	14	15	16	17 MU3.2	18 MU4	19 MU3.2	20 MU6	MANCAP	EAC 2013
*Ehrharta calycina	Perennial Veldt Grass				2		4	3	2	4	4	3							4	4	4		4	✓	
*Ehrharta longiflora	Annual Veldt Grass						2	1a		2		2		1a										✓	
*Ehrharta villosa var. maxima	Pyp Grass																								✓
*Eragrostis cilianensis	Stink Grass																							✓	
*Erodium botrys	Long Heron's-bill																							✓	
*Eucalyptus sp. (planted)																					2				
*Euphorbia paralias	Sea Spurge																								✓
*Euphorbia terracina	False Caper		Y				1a	1	1	1a	1	3		1a					1a		1a		2	✓	✓
*Ficus sp. (planted)																					1				
*Fumaria capreolata	White-flower Fumitory																							✓	
*Fumaria muralis	Wall Fumitory																							✓	
*Galenia secunda	Galenia																							✓	
*Gomphocarpus cancellatus	Broad-leaf Cotton-bush																							✓	✓
*Heliotropium curassovicum	Smooth Heliotrope																							✓	
*Hordeum sp.	Barley Grass											1a	1a	1a										✓	
*Hypochaeris glabra	Smooth Cat's Ear						2			1a									1				1a	✓	✓
*Hypochaeris radicata	Rough Cat's Ear																							✓	✓
*Juncus acutus	Sharp Rush																								
*Lactuca serriola	Prickly Lettuce									2		3												✓	
*Lagurus ovatus	Hare's Tail Grass						2			2										1a	1a			✓	✓
*Leptospermum laevigatum	Coast Tea-tree																								✓
*Limonium companyonis	Sea-lavender					2						1a	1		3									✓	✓
*Lolium perenne	Perennial Ryegrass																							✓	
*Lolium perenne X Lolium rigidum	Hybrid Ryegrass																							✓	
*Lolium rigidum	Wimmera Ryegrass																							✓	
*Lolium sp.	Ryegrass																								✓
*Lycium ferocissimum	African Boxthorn	Y	Y						1	2	1a	2							1a	2	1a	2	1a		✓
*Medicago minima var. minima	Little Medic																							✓	
*Medicago polymorpha var. polymorpha	Burr-medic																							✓	
*Medicago sp.	Medic																								✓
*Medicago truncatula	Barrel Medic																							✓	
*melaleuca armillaris (planted)	Bracelet Honey Myrtle																				1				
*Mesembryanthemum crystallinum	Common Iceplant											1	1											✓	✓
*Mesembryanthemum nodiflorum	Slender Iceplant												3	2										✓	✓
*Moenchia erecta	Erect Chickweed																								✓
*Moraea setifolia	Thread Iris																				1a	2	1a		✓

Species Name	Common Name	WONS[9]	Declared[10]	*Bushland Assessment Site (2021)																			Additional Sources	
				1 MU1	2 MU1	3 MU1	4 MU2	5 MU2	6 MU2	7 MU 5.1	8 MU 5.4	9 MU5.2	10 MU 5.3	11 MU5.3	12	13	14	15	16	17 MU3.2	18 MU4	19 MU3.2	20 MU6	MANCAP	EAC 2013
Nicotiana glauca	Tree Tobacco																						✓	
Oenothera stricta ssp. stricta	Common Evening Primrose				1			1a		2	1	1a											✓	✓
Olea europaea ssp. europaea	Olive									1a	1	1a										1a	✓	
Opuntia monacantha	Drooping Prickly Pear	Y	Y																				✓	
Opuntia stricta	Erect Prickly Pear	Y	Y																			1	✓	
Oxalis pes-caprae	Soursob			1	1		1a	1a	1a	1a			1a	3	1a								✓	✓
Parapholis incurva	Curly Ryegrass																		5	5	3	5	3	✓	✓
Petrorhagia dubia	Velvet Pink																						✓	
Phoenix dactylifera	Date Palm																						1		
Pinus halepensis	Aleppo Pine		Y																		2				
Piptatherum miliaceum	Rice Millet																							✓	
Plantago coronopus ssp. coronopus	Buck-horn Plantain				1a					1a											1		1	✓	✓
Polypogon maritimus	Coast Beard-grass																							✓	
Polypogon monspeliensis	Annual Beard-grass																							✓	
Reichardia tingitana	False Sowthistle				1a			1a	1a		1a	1											1a	✓	✓
Ricinus communis	Castor Oil Plant																							✓	
Rostraria cristata	Annual Cat's-tail																							✓	
Schinus molle	Pepper-tree											1										1			
Schismus barbatus	Arabian Grass																							✓	
Senecio pterophorus	African Daisy																							✓	
Sonchus asper	Rough Sow-thistle																								✓
Sonchus oleraceus	Common Sow-thistle									1		1a												✓	
Spergularia diandra	Lesser Sand-spurrey																							✓	
Spergularia sp.	Sand-spurrey																							✓	
Stenoptophrum secundatum	Buffalo Grass																				1a				
Suaeda baccifera	Seablite																							✓	
Tamarix aphylla (planted)	Athel Pine	Y	Y																		1				
Taraxacum officinale	Dandelion																								✓
Trifolium angustifolium	Narrow-leaf Clover																							✓	✓
Trifolium arvense var. arvense	Hare's-foot Clover						1a																	✓	
Trifolium glomeratum	Cluster Clover																								✓
Urtica urens	Small Nettle																				1			✓	✓
Vulpia bromoides	Squirrel-tail Fescue																							✓	✓
Vulpia fasciculata	Sand Fescue																							✓	✓
Vulpia myuros f. myuros	Rat's-tail Fescue																								✓

***Bushland Assessment Sites (2021):**

1. Atriplex paludosa +/- *Nitraria billardierei* +/- *Atriplex cinerea* Shrubland – northern end of Torrens Island

2. Atriplex paludosa +/- *Nitraria billardierei* +/- *Atripex cinerea* Shrubland – northern end of Torrens Island

3. Samphire Community – northern end of Torrens Island
4. Callitris gracilis, Acacia pycnantha Low open woodland – north of Quarantine Station
5. Callitris gracilis, Acacia pycnantha Low open woodland – north of Quarantine Station
6. Callitris gracilis, Acacia pycnantha Low open woodland – north of Quarantine Station
7. Acacia pycnantha Low open woodland – AGL parcel
8. Olearia axillaris Shrubland – AGL parcel
9. More degraded open areas – AGL parcel
10. Revegetation (**Casuarina glauca, Melaleuca halmaturorum* Low woodland) – AGL parcel
11. Revegetation (*Eucalyptus* spp.) – AGL parcel
12. *Atriplex paludosa, Lawrencia squamata* +/- *Maireana oppositifolia* Low shrubland
13. *Wilsonia humilis* Herbland with emergent *Maireana oppositifolia, Tecticornia* spp.
14. *Tecticornia flabelliformis, T. halocnemoides, T. pergranulata, Salicornia* sp. Low samphire shrubland
15. *Avicennia marina* Mangrove Forest
16. Planted *Eucalyptus* spp., *Callitris gracilis* Very open woodland – Allotment 300 east of Quarantine Station
17. **Casuarina glauca* Woodland - Allotment 300 east of Quarantine Station
18. Planted *Eucalyptus leucoxylon* spp., *E. camaldulensis, *Eucalyptus sp., *Pinus halepenis, *Casuarina glauca* Very open woodland – Quarantine Station
19. **Casuarina glauca* Woodland - Quarantine Station
20. *Acacia pycnantha, Callitris gracilis* Low open woodland (revegetation) – opposite AGL land

Cover categories:
1 = few individuals, <1%
1a = plentiful <1%
2 = 1-5%
3 = 5-25%
4 = 26-50%.

Appendix 3: Fauna species lists

Torrens Island bird species list

Recorded within a 5km radius of Torrens Island from Biological Database of SA and Birdlife SA records (sourced in May 2021)

Scientific Name	Common Name	Conservation Significance			Comments
		AUS	SA	AD	
Platycercus elegans fleurieuensis & elegans subadelaidae	Adelaide Rosellas				
Pachyptila desolata	Antarctic Prion				
Sterna paradisaea	Arctic Tern				
Botaurus poiciloptilus	Australasian Bittern	EN	E	CR	More coastal reedy swamps, lagoons, rivers, so more likely fresher water. Feeds at night in shallow water on fish, frogs, crustaceans, invertebrates.
Anhinga novaehollandiae novaehollandiae	Australasian Darter		R	VU	Found in wetlands and sheltered coastal waters, mainly in the Tropics and Subtropics. It prefers smooth, open waters, for feeding, with tree trunks, branches, stumps or posts fringing the water, for resting and drying its wings[41].
Morus serrator	Australasian Gannet				
Tachybaptus novaehollandiae	Australasian Grebe			LC	
Spatula rhynchotis	Australasian Shoveler		R	RA	Swamps and permanent water, preferring more undisturbed well vegetated freshwater areas. Occasionally coast. Filter feeder of shallow water or wet mud for invertebrates, crustaceans, water plants.
Porphyrio melanotus melanotus	Australasian Swamphen			LC	
Ninox boobook	Australian Boobook			VU	Seen in a variety of habitats from dense forest to open desert[42].
Porzana fluminea	Australian Crake (Australian Spotted Crake)			RA	Inhabit the margins of well vegetated saline, brackish freshwater or wetlands—swamps, estuaries, saltmarsh lagoons, billabongs and sewage ponds, for example—where they usually remain hidden among dense shrubs, grass or thickets, though they are sometimes seen out in the open on areas of bare mud[43].
Pachycephala pectoralis	Australian Golden Whistler				

[41] https://www.birdlife.org.au/bird-profile/australasian-darter
[42] https://birdlife.org.au/bird-profile/southern-boobook
[43] https://birdlife.org.au/bird-profile/australian-spotted-crake

Scientific Name	Common Name	Conservation Significance			Comments
		AUS	SA	AD	
Falco longipennis	Australian Hobby			LC	
Gymnorhina tibicen	Australian Magpie			LC	
Rostratula australis	Australian Painted-snipe	EN	E	EN	Inhabits many different types of shallow, brackish or freshwater terrestrial wetlands, especially temporary ones which have muddy margins and small, low-lying islands. Suitable wetlands usually support a mosaic of low, patchy vegetation, as well as lignum and canegrass[44].
Pelecanus conspicillatus	Australian Pelican			LC	
Anthus australis	Australian Pipit			LC	
Stiltia isabella	Australian Pratincole			RA	Especially drier areas. Commonly found near water, in open inland plains, sparsely wooded plains and tussock grasslands. Feeds on insects, spiders and centipedes. Salt glands enables it to drink salt and freshwater.
Corvus coronoides	Australian Raven				
Acrocephalus australis australis	Australian Reed Warbler				
Tadorna tadornoides	Australian Shelduck			LC	
Gelochelidon macrotarsa	Australian Tern			LC	
Threskiornis molucca molucca	Australian White Ibis				
Zapornia pusilla palustris	Baillon's Crake			VU	Cosmopolitan. Inhabits freshwater, brackish or saline marshy wetlands both inland and coastal, with dense vegetation. Feeds on invertebrates, crustaceans, molluscs, small fish, frogs, some vegetation.
Vanellus tricolor	Banded Lapwing			EN	Open areas such as paddocks with sparse short grass, overgrazed or ploughed farmland, stony ground, bare dry mud at the edge of swamps, saline herbland. Feeds on invertebrates, worms, molluscs, and at times seeds.
Cladorhynchus leucocephalus	Banded Stilt		V		Nomadic. Inhabit mostly saline and hypersaline water, typically large, open and shallow water of the inland and coast. Feed on crustaceans, molluscs, insects, vegetation, seeds and roots.
Hirundo rustica	Barn Swallow				
Limosa lapponica ssp.	Bar-tailed Godwit		R		Both sub-species occur in Gulf St Vincent.

[44] https://www.birdlife.org.au/bird-profile/australian-painted-snipe

Scientific Name	Common Name	Conservation Significance			Comments
		AUS	SA	AD	
Falco subniger	Black Falcon		R	RA	Prefers tree-lined watercourses (eg. River Murray) and tree clumps. Feeds mostly on birds, small mammals, reptiles, insects.
Milvus migrans migrans	Black Kite			RA	Found in a variety of habitats, from timbered watercourses to open plains, and is often observed in and around outback towns[45].
Cygnus atratus	Black Swan			LC	
Melithreptus gularis	Black-chinned Honeyeater		ssp	CR	Found in the upper levels of open eucalypt forests and woodlands dominated by box and ironback eucalypts. It is often found along waterways, especially in arid and semi-arid areas and in northern Australia. It is occasionally seen in gardens and street trees[46].
Chalcites osculans	Black-eared Cuckoo			EN	Found in drier country where species such as mulga and mallee form open woodlands and shrublands. It is often found in vegetation along creek beds[47].
Phalacrocorax fuscescens	Black-faced Cormorant			LC	
Coracina novaehollandiae	Black-faced Cuckooshrike			LC	
Elseyornis melanops	Black-fronted Dotterel				
Elanus axillaris	Black-shouldered Kite			LC	
Limosa limosa melanuroides	Black-tailed Godwit		R	VU	Migratory sp. breeding in N hemisphere. In Australia inhabits estuarine mudflats, beaches and mangroves. More common in coastal areas around Australia. Probe shallows of exposed mud for molluscs, worms and aquatic insects.
Tribonyx ventralis	Black-tailed Nativehen			LC	
Oxyura australis	Blue-billed Duck		R	VU	Almost entirely aquatic preferring deeper open freshwater lakes and dams. Feeds on water surface and by diving for aquatic insects and less so aquatic plants. Rare salty areas.
Neophema chrysostoma	Blue-winged Parrot		V		Mainly breed SE Aust. Disperses non-breeding. Found coastal, sub-coastal, inland areas to semi-arid zones. Favour grasslands and grassy woodlands often near wetlands. Feeds mainly on ground for grass and herb seeds.

[45] https://birdlife.org.au/bird-profile/black-kite
[46] https://www.birdlife.org.au/bird-profile/black-chinned-honeyeater
[47] https://birdlife.org.au/bird-profile/black-eared-cuckoo

Scientific Name	Common Name	Conservation Significance			Comments
		AUS	SA	AD	
Calidris falcinellus sibirica	Broad-billed Sandpiper				
Falco berigora	Brown Falcon			LC	
Accipiter fasciatus fasciatus	Brown Goshawk			LC	
Coturnix ypsilophora australis	Brown Quail		V		Inhabits rank, overgrown grassy areas, often in damp, low-lying patches beside wetlands. Feeds on ground, mainly on seeds and green shoots, but also insects.
Cincloramphus cruralis	Brown Songlark			LC	
Acanthiza pusilla	Brown Thornbill			VU	Found in dense shrubby habitats including wet and dry forests, woodlands, shrublands, heathlands and rainforests, as well as along watercourses. Found regularly in parks and gardens, especially close to large patches of remnant vegetation and along nature strips in towns and suburbs[48].
Acanthiza pusilla samueli	Brown Thornbill (MLR)				
Phaps elegans	Brush Bronzewing				
Melopsittacus undulatus	Budgerigar				
Gallirallus philippensis mellori	Buff-banded Rail			RA	Utilises a range of moist or wetland habitats with low, dense vegetation for cover[49].
Radjah radjah rufitergum	Burdekin Duck				
Cereopsis novaehollandiae novaehollandiae	Cape Barren Goose		R	RA	Found on offshore islands, usually granite, in areas of pasture, tussock grass or low heathy scrub[50].
Daption capense	Cape Petrel				
Hydroprogne caspia	Caspian Tern			LC	
Anas castanea	Chestnut Teal				
Acanthiza uropygialis	Chestnut-rumped Thornbill			VU	Widespread throughout inland Australia. Dry woodlands and shrublands in a wide variety of landforms including sand dunes, flood plains, rocky hillsides plateaux and gorges[51].
Nymphicus hollandicus	Cockatiel			RA	Widespread mainland Aust. but more likely inland open country. Feed on ground or in trees on grass seeds, nuts, berries. Nests tree hollows.

[48] https://birdlife.org.au/bird-profile/Brown-Thornbill
[49] https://en.wikipedia.org/wiki/Buff-banded_rail
[50] https://www.birdsinbackyards.net/species/Cereopsis-novaehollandiae
[51] https://en.wikipedia.org/wiki/Chestnut-rumped_thornbill#Habitat

Scientific Name	Common Name	Conservation Significance			Comments
		AUS	SA	AD	
Accipiter cirrocephalus cirrocephalus	Collared Sparrowhawk			LC	
Irediparra gallinacea	Comb-crested Jacana				
Phaps chalcoptera	Common Bronzewing			LC	
Tringa nebularia	Common Greenshank				
Actitis hypoleucos	Common Sandpiper		R	EN	Migratory sp. breeding in N hemisphere. In Australia inhabits coastal or inland wetlands, both saline or fresh. Found mainly on muddy edges or rocky shores. Feeds on small molluscs, aquatic and terrestrial insects.
Sterna hirundo longipennis	Common Tern		R		Migratory sp. breeding in N hemisphere. In Australia inhabits mainly coastal areas and offshore waters, ocean beaches, estuaries and large lakes. Feeds on small marine fish, also aquatic insects and crustaceans
Ocyphaps lophotes	Crested Pigeon			LC	
Epthianura tricolor	Crimson Chat			RA	Found semi-arid and arid areas mainly dominated by open shrublands, dunes, plains or grasslands. Feed mostly on insects on or near ground.
Platycercus elegans	Crimson Rosella			LC	
Calidris ferruginea	Curlew Sandpiper	CR	E	CR	Migratory sp. breeding in N hemisphere. In Australia inhabits intertidal mudflats of estuaries, lagoons, mangroves, beaches, rocky shores, lakes, dams and floodwaters. Feeds on small marine invertebrates, especially worms.
Charadrius bicinctus bicinctus	Double-banded Plover				
Gallinula tenebrosa	Dusky Moorhen			LC	
Tyto javanica delicatula	Eastern Barn Owl			RA	A bird of open country such as farmland or grassland with some interspersed woodland[52].
Bubulcus ibis coromandus	Eastern Cattle Egret		R	LC	
Pandion haliaetus cristatus	Eastern Osprey		E		Found on the coast and in terrestrial wetlands of tropical and temperate Australia and off-shore islands, occasionally ranging inland along rivers, though mainly in the north of the country[53].
Platycercus eximius eximius	Eastern Rosella				
Acanthorhynchus tenuirostris halmaturinus	Eastern Spinebill (KI, MLR, southern FR)				

[52] https://en.wikipedia.org/wiki/Eastern_barn_owl
[53] https://birdlife.org.au/bird-profile/eastern-osprey

Scientific Name	Common Name	Conservation Significance			Comments
		AUS	SA	AD	
Neophema elegans elegans	Elegant Parrot		R	VU	Feeds on grass seeds on ground. Nests eucalypt tree hollows.
Fulica atra	Eurasian Coot			LC	
Petrochelidon ariel	Fairy Martin			RA	Widespread largely where open country near water, usually near its nest sites, in cliffs, culverts or bridges. Feeds high in the air on flying insects.
Pachyptila turtur	Fairy Prion				
Sternula nereis nereis	Fairy Tern	VU	E	CR	Inhabits isolated sandy inlets and along the coast, including beaches, inshore and offshore islands, sheltered inlets, sewage farms, harbours, estuaries and lagoons. It favours both fresh and saline wetlands and near-coastal terrestrial wetlands .Feeds almost entirely on fish.
Cacomantis flabelliformis flabelliformis	Fan-tailed Cuckoo			NT	Where eucalypt forest, woodland, mallee, heath. Feeds on insects and larvae, especially hairy caterpillars.
Numenius madagascariensis	Far Eastern Curlew	CR	E	VU	Found on intertidal mudflats and sandflats, often with beds of seagrass, on sheltered coasts, especially estuaries, mangrove swamps, bays, harbours and lagoons[54].
Ardenna carneipes	Flesh-footed Shearwater		R		Nests in colonies in burrows under trees or shrubs. Most feeding is undertaken offshore[55].
Puffinus gavia	Fluttering Shearwater			LC	
Leucophaeus pipixcan	Franklin's Gull				
Stictonetta naevosa	Freckled Duck		V	VU	Prefers permanent fresh water swamps and creeks with heavy growth of cumbungi (bullrushes), lignum or tea-tree[56].
Eolophus roseicapilla	Galah			LC	
Pachycephala inornata	Gilbert's Whistler		R	CR	Usually inhabit semi-arid mallee or box–ironbark eucalypt, acacia, cypress-pine or Belah shrublands and woodlands, usually with a dense, continuous or patchy understorey of shrubs. They also inhabit thickets of paperbarks, including Broombush, or mixed patches of mallee–Broombush[57].

[54] https://birdlife.org.au/bird-profile/eastern-curlew
[55] https://www.environment.gov.au/system/files/resources/9f9a6424-7ceb-4be0-b41b-c2b8e1d06160/files/flesh-footed-shearwater-conservation-advice.pdf
[56] https://www.birdlife.org.au/bird-profile/freckled-duck
[57] https://www.birdlife.org.au/bird-profile/gilberts-whistler

Scientific Name	Common Name	Conservation Significance			Comments
		AUS	SA	AD	
Plegadis falcinellus	Glossy Ibis		R	RA	Nomadic, following Australian rainfall events, but found along margins of rivers and swamps in summer. However more common in Nthn Aust. than SA. Needs shallow water such as floodplains and mudflats, including mangroves. Feeds by probing mud on crustaceans, frogs, invertebrates.
Cisticola exilis exilis	Golden-headed Cisticola				
Phalacrocorax carbo	Great Cormorant			LC	
Podiceps cristatus australis	Great Crested Grebe		R	VU	Aquatic species. Open fresh and salt water areas. Nomadic. Feeds on aquatic insects and fish.
Ardea alba modesta	Great Egret			LC	
Calidris tenuirostris	Great Knot	CR	E		Migratory sp. breeding in N hemisphere. In Australia found where coastal mudflats. Feeds in shallow water on invertebrates.
Phalacrocorax varius	Great Pied Cormorant				
Thalasseus bergii cristatus	Greater Crested Tern			LC	
Charadrius leschenaultii leschenaultii	Greater Sand Plover	sp	R		Migratory sp. breeding in N hemisphere. In Austrlia found on coastal tidal sandbanks. Feeds on insects and crustaceans.
Cracticus torquatus leucopterus	Grey Butcherbird			VU	Inhabit a range of wooded habitats, especially drier areas. Prey on small birds, lizards and insects, and at times feed on fruits and seeds.
Strepera versicolor	Grey Currawong		ssp	EN	
Rhipidura albiscapa	Grey Fantail			LC	
Colluricincla harmonica	Grey Shrikethrush				
Anas gracilis gracilis	Grey Teal				
Tringa brevipes	Grey-tailed Tattler		R	CR	Migratory sp. breeding in N hemisphere. In Aust. Inhabits sheltered coasts with reefs, rock platforms or intertidal mudflats. Feeds on worms, molluscs, crustaceans (especially small crabs), insects and, occasionally, fish.
Aythya australis	Hardhead				
Poliocephalus poliocephalus	Hoary-headed Grebe			LC	
Chalcites basalis	Horsfield's Bronze Cuckoo			NT	

Scientific Name	Common Name	Conservation Significance			Comments
		AUS	SA	AD	
Mirafra javanica	Horsfield's Bush Lark			RA	Occurs in tropical and temperate grasslands, open woodlands, cereal crops and sparse sugar cane fields[58].
Thalassarche carteri	Indian Yellow-nosed Albatross	VU	E		
Acanthiza apicalis	Inland Thornbill				
Larus dominicanus dominicanus	Kelp Gull		R		Became established in Australia in the 1940s. Prefers sheltered bays, inlets and estuaries, and also beaches and reefs on off-shore islands. Feeds mainly on fish and crustaceans.
Aphrodroma brevirostris	Kerguelen Petrel				
Gallinago hardwickii	Latham's Snipe		R	EN	Seen in small groups or singly in freshwater wetlands on or near the coast, generally among dense cover. They are found in any vegetation around wetlands, in sedges, grasses, lignum, reeds and rushes and also in saltmarsh and creek edges on migration. They also use crops and pasture[59].
Dacelo novaeguineae	Laughing Kookaburra			LC	
Lewin pectoralis pectoralis	Lewin's Rail		V	EN	Inhabits dense reeds and vegetation bordering many types of wetlands or crops, including sewage ponds and drainage channels. Feeds on crustaceans, molluscs, insects, seeds, fruit, frogs, carrion and refuse.
Phalacrocorax sulcirostris	Little Black Cormorant				
Turnix velox	Little Buttonquail			RA	Found in grasslands and woodlands of tropical and temperate regions, particularly in the arid and semi-arad areas. It is rare at higher altitudes and in ranges near the coast[60].
Cacatua sanguinea sanguinea	Little Corella			LC	
Numenius minutus	Little Curlew				
Hieraaetus morphnoides	Little Eagle		V	EN	Found open woodland and open forest, also open areas. Mostly hunt rabbits, but also small to medium-sized reptiles, birds and mammals, insects.

[58] https://birdlife.org.au/bird-profile/horsfields-bushlark
[59] https://www.birdlife.org.au/bird-profile/lathams-snipe
[60] https://www.birdsinbackyards.net/species/Turnix-velox

Scientific Name	Common Name	Conservation Significance			Comments
		AUS	SA	AD	
Egretta garzetta nigripes	Little Egret		R	VU	Coastal and inland fresh and salt water wetlands including mangroves and tidal flats. Feeds on invertebrates, and also fish, frogs hunting in shallow water. Rare in SA & Torren Is area. More common northern Aust.
Poodytes gramineus goulburni	Little Grassbird			LC	
Eudyptula minor novaehollandiae	Little Penguin				
Microcarbo melanoleucos melanoleucos	Little Pied Cormorant				
Corvus mellori	Little Raven			LC	
Anthochaera chrysoptera chrysoptera	Little Wattlebird (mainland SA)				
Calidris subminuta	Long-toed Stint		R	RA	Migratory sp. breeding in N hemisphere. In Aust. Inhabits drying margins of shallow freshwater lakes and ponds, and less often beaches. Feeds on invertebrates by probing mud.
Grallina cyanoleuca	Magpielark			LC	
Chenonetta jubata	Maned Duck			LC	
Tringa stagnatilis	Marsh Sandpiper			EN	Migratory sp. breeding in N hemisphere. In Aust. inhabits fresh or brackish wetlands such as rivers, water meadows, sewage ponds, drains, lagoons and swamps. Feed by wading through shallow water on aquatic insects, larvae, molluscs and crustaceans.
Vanellus miles	Masked Lapwing			LC	
Artamus personatus	Masked Woodswallow			RA	Widespread in open woodlands. Feeds on flying insects on the wing, at times nectar.
Dicaeum hirundinaceum hirundinaceum	Mistletoebird				
Biziura lobata menziesi	Musk Duck		R	VU	Found on most waters, freshwater or salt in southern Aust. But often freshwater fringed with reeds. Can be found in water just offshore along the coast. Feed by diving for aquatic invertebrates, fish, frogs, crustaceans, molluscs.
Glossopsitta concinna	Musk Lorikeet			LC	
Falco cenchroides	Nankeen Kestrel			LC	

Scientific Name	Common Name	Conservation Significance			Comments
		AUS	SA	AD	
Nycticorax caledonicus	Nankeen Night Heron				
Phylidonyris novaehollandiae novaehollandiae	New Holland Honeyeater (mainland SA)			LC	
Manorina melanocephala	Noisy Miner			LC	
Epthianura aurifrons	Orange Chat			VU	Widespread, especially inland Aust., mostly absent from ag regions. Feeds on ground on insects.
Anas superciliosa superciliosa	Pacific Black Duck				
Anas superciliosa x platyrhynchos	Pacific Black Duck x Mallard hybrid				
Pluvialis fulva	Pacific Golden Plover		R	CR	Migratory sp. breeding in N hemisphere. In Australia inhabits muddy, rocky and sandy wetlands, seashore, paddocks, saltmarsh, coastal golf courses, estuaries and lagoons. Feeds on molluscs, insects, worms, crustaceans, lizards, at times bird eggs and small fish.
Larus pacificus	Pacific Gull				
Egretta sacra sacra	Pacific Reef Heron		R		Lives on beaches, rocky shores, tidal rivers and inlets, mangroves, and exposed coral reefs[61].
Apus pacificus pacificus	Pacific Swift			RA	A mainly aerial species, this swift is not limited to particular land habitats or climatic zone[62].
Cacomantis pallidus	Pallid Cuckoo			RA	Widespread, where open forests and woodlands, also cleared and cultivated open country. Has a liking for hairy caterpillars, but will take other insects and their larvae.
Stercorarius parasiticus	Parasitic Jaeger (Arctic Jaeger)			LC	
Calidris melanotos	Pectoral Sandpiper		R		Migratory sp. breeding in N hemisphere. In Australia inhabits fresh and saltwater marshes, mudflats, or drying lakes and wet meadows. Feed on small crustaceans, aquatic invertebrates.

[61] https://www.birdlife.org.au/bird-profile/eastern-reef-egret
[62] https://en.wikipedia.org/wiki/Pacific_swift#Distribution_and_habitat

Scientific Name	Common Name	Conservation Significance			Comments
		AUS	SA	AD	
Falco peregrinus macropus	Peregrine Falcon		R	RA	Cosmopolitan. For nesting prefers coastal and inland cliffs or open woodlands near water, and may even be found nesting on high city buildings. Feeds on small to medium birds especially feral pigeons in flight, rabbits on ground.
Strepera graculina ashbyi	Pied Currawong		E		Subspecies which breeds in the Otway Ranges of souther Victoria and in Geelong and surrounding areas[63].
Haematopus longirostris	Pied Oystercatcher		R		Mudflats, sandbanks and sandy ocean beaches. Less common along rocky or shingle coastlines. Feeds bivalve molluscs, also worms, crustaceans and insects.
Himantopus leucocephalus	Pied Stilt				
Malacorhynchus membranaceus	Pink-eared Duck			RA	Widespread and nomadic species. Prefers warm shallow temporary water with adjacent well timbered areas, although can congregate in open water. Filter feeds algae and invertebrates.
Ardea intermedia plumifera	Plumed Egret		R		Mostly a denizen of the shallows in terrestrial wetlands, the Intermediate Egret prefers freshwater swamps, billabongs, floodplains and wet grasslands with dense aquatic vegetation, and is only occasionally seen in estuarine or intertidal habitats[64].
Parvipsitta porphyrocephala	Purple-crowned Lorikeet			LC	
Merops ornatus	Rainbow Bee-eater			VU	Most often found in open forests, woodlands and shrublands, and cleared areas, usually near water. It will be found on farmland with remnant vegetation and in orchards and vineyards. It will use disturbed sites such as quarries, cuttings and mines to build its nesting tunnels[65].
Trichoglossus haematodus	Rainbow Lorikeet			LC	
Calidris canutus rogersi	Red Knot	sp	E		Migratory sp. breeding in N hemisphere. In Australia inhabits on the coast in sandy estuaries with tidal mudflats
Anthochaera carunculata woodwardi	Red Wattlebird (MLR, AP, YP, EP, far west, Yellabinna)			LC	

[63] https://www.birdlife.org.au/afo/index.php/afo/article/view/2073
[64] https://birdlife.org.au/bird-profile/intermediate-egret
[65] https://birdlife.org.au/bird-profile/rainbow-bee-eater

Scientific Name	Common Name	Conservation Significance			Comments
		AUS	SA	AD	
Todiramphus pyrrhopygius	Red-backed Kingfisher			VU	Inhabits dry forests, mulga and mallee country, to spinifex and almost treeless country, often far from water[66].
Neochmia temporalis temporalis	Red-browed Finch			NT	Found in grassy areas interspersed with dense understorey vegetation, often along creek lines[67].
Charadrius ruficapillus	Red-capped Plover			LC	
Petroica goodenovii	Red-capped Robin			RA	More common in semi-arid or arid areas, but generally inland habitats with eucalypts, Acacia, Callitris woodlands. Forages on the ground or in low vegetation for insects and other invertebrates.
Erythrogonys cinctus	Red-kneed Dotterel			LC	
Recurvirostra novaehollandiae	Red-necked Avocet			LC	
Calidris ruficollis	Red-necked Stint				
Psephotus haematonotus haematonotus	Red-rumped Parrot (eastern SA except NE)				
Neophema petrophila zietzi	Rock Parrot		R	EN	Inhabits and restricted to coastlines and offshore rocky islands, frequenting windswept coastal dunes, mangroves, saline swamps and rocky islets. Feeds on seeds, fruits of grasses, rushes, shrubs and salt-tolerant plants. Mostly nests on offshore Is in rock crevices, abandoned seabird nesting burrow, or on a rocky ledges. Not Torrens Is.
Petroica rosea	Rose Robin			RA	Prefers wet forest and rainforest habitats during spring and summer, moving into drier, more open habitats during autumn and winter[68].
Platalea regia	Royal Spoonbill			LC	
Arenaria interpres interpres	Ruddy Turnstone		R	EN	Migratory sp. breeding in N hemisphere. Widespread around coast of Aust. mainland. In Aust. inhabits mainly exposed rocks or reefs, often with shallow pools, also beaches. Feeds by turning over stones and seaweed to find insects, crustaceans, molluscs and spiders.
Calidris pugnax	Ruff		R		Migratory sp. breeding in N hemisphere. In Australia generally found on fresh, brackish or saline wetlands with exposed mudflats at the edges. Includes lakes,

[66] https://en.wikipedia.org/wiki/Red-backed_kingfisher#Distribution_and_habitat
[67] http https://birdlife.org.au/bird-profile/rose-robin s://birdlife.org.au/bird-profile/red-browed-finch
[68] https://birdlife.org.au/bird-profile/rose-robin

Scientific Name	Common Name	Conservation Significance			Comments
		AUS	SA	AD	
					swamps, pools, lagoons, tidal rivers, swampy fields, floodlands, and occasionally sheltered coasts, harbours, estuaries, seashores, saltworks. Forages on exposed mudflats, in shallow water and occasionally on dry mud.
Pachycephala rufiventris rufiventris	Rufous Whistler				
Todiramphus sanctus	Sacred Kingfisher			NT	Inhabits woodlands, mangroves and forests. More a terrestrial hunter than fishing in water, it mainly feeds on crustaceans, reptiles, insects, larvae and at times fish.
Pachyptila salvini	Salvin's Prion				
Calidris acuminata	Sharp-tailed Sandpiper			LC	
Chalcites lucidus	Shining Bronze Cuckoo			RA	Inhabit eucalypt forest and woodland. Feeds on insects, spiders, caterpillars.
Ardenna tenuirostris	Short-tailed Shearwater				
Chroicocephalus novaehollandiae novaehollandiae	Silver Gull			LC	
Zosterops lateralis pinarochrous	Silvereye (SE, MM, MLR, FR, YP, EP)				
Gavicalis virescens	Singing Honeyeater			LC	
Acanthiza iredalei rosinae	Slender-billed Thornbill (Gulf St Vincent)	VU	V	VU	Inhabits samphire. Feeds largely on insects.
Haematopus fuliginosus fuliginosus	Sooty Oystercatcher		R	EN	Strictly coastal, usually forage along rocky or coral coasts, but sometimes also on adjacent sandy beaches. Feeds on molluscs, crustaceans, also at times marine worms, starfish and sea urchins, and small fish.
Macronectes giganteus	Southern Giant Petrel	EN	V	VU	Breed on the Antarctic continent, Antarctic Peninsula and on subantarctic islands. Nest in ice-free coastal areas, rocky bluffs, open flats, edges of plateaux or offshore rocks[69].
Aphelocephala leucopsis leucopsis	Southern Whiteface			EN	Typically inhabits arid open woodlands with a shrubby or grassy understory, as well as grass plains throughout much of southern Australia. Not present in Tasmania or in coastal areas of the mainland[70].

[69] https://www.antarctica.gov.au/about-antarctica/animals/flying-birds/petrels-and-shearwaters/southern-giant-petrel/
[70] https://en.wikipedia.org/wiki/Southern_whiteface#Distribution_and_habitat

Scientific Name	Common Name	Conservation Significance			Comments
		AUS	SA	AD	
Acanthagenys rufogularis	Spiny-cheeked Honeyeater				
Zapornia tabuensis	Spotless Crake		R	EN	Inhabits mangroves, marsh, saltmarsh, bogs, scrub. Feeds on insects and at times berries.
Circus assimilis	Spotted Harrier			RA	Sparsely distributed, but widespread, its stronghold more the arid & semi-arid areas. Mostly open woodland. Hunts ground birds (eg. quail and pipits), also mice, rats, rabbits and lizards.
Pardalotus punctatus	Spotted Pardalote				
Vanellus miles novaehollandiae	Spur-winged Plover				
Threskiornis spinicollis	Straw-necked Ibis			LC	
Pardalotus striatus substriatus	Striated Pardalote			LC	
Coturnix pectoralis	Stubble Quail			LC	
Cacatua galerita	Sulphur-crested Cockatoo			LC	
Malurus cyaneus	Superb Fairywren			LC	
Malurus cyaneus leggei	Superb Fairywren (Mainland SA)				
Circus approximans	Swamp Harrier			VU	Mainly seen in fresh or salt wetlands, often in deep swamps with emergent reeds and over open water. Hunt for birds and eggs, large insects, frogs, reptiles and small mammals up to the size of hares or rabbits.
Xenus cinereus	Terek Sandpiper		R	RA	Migratory sp. breeding in N hemisphere. In Australia inhabits coast in mangrove swamps, tidal mudflats, seashore. Probe shallow water and soft wet intertidal mudflalts for crustaceans and insects.
Petrochelidon nigricans	Tree Martin				
Aquila audax audax	Wedge-tailed Eagle			LC	
Hirundo neoxena neoxena	Welcome Swallow			LC	
Numenius phaeopus variegatus	Whimbrel		R		Migratory sp. breeding in N hemisphere. In Australia, inhabits mainly coast, on tidal and estuarine mudflats, especially near mangroves. Feed on intertidal mudflats day and night, on worms, crustaceans, occasionally fish and nestling birds.

Scientific Name	Common Name	Conservation Significance			Comments
		AUS	SA	AD	
Chlidonias hybrida javanicus	Whiskered Tern				
Haliastur sphenurus	Whistling Kite				
Haliaeetus leucogaster	White-bellied Sea Eagle		E	EN	Normally seen perched high in a tree, or soaring over waterways and adjacent land[71].
Sericornis frontalis	White-browed Scrubwren				
Artamus superciliosus	White-browed Woodswallow			RA	Found in a wide range of inland habitats, from eucalypt forests and woodlands to dry heaths and spinifex. It can also be found in farmlands, orchards and towns[72].
Egretta novaehollandiae	White-faced Heron				
Pelagodroma marina dulciae	White-faced Storm Petrel			NT	Breeds on remote islands in the south Atlantic and also Australia and New Zealand. It nests in colonies close to the sea in rock crevices and spends the rest of the year at sea[73].
Epthianura albifrons	White-fronted Chat				
Sterna striata	White-fronted Tern				
Pterodroma lessonii	White-headed Petrel				
Melithreptus lunatus	White-naped Honeyeater			VU	Found in open forests and woodlands, mainly in the temperate zone, and rarely in drier areas. Found in urban gardens, commonly visiting nectar feeders in areas near forests[74].
Ardea pacifica	White-necked Heron			LC	
Ptilotula penicillata	White-plumed Honeyeater			LC	
Hirundapus caudacutus caudacutus	White-throated Needletail	sp	V	CR	Aerial birds.

[71] https://www.birdlife.org.au/bird-profile/white-bellied-sea-eagle
[72] https://www.birdlife.org.au/bird-profile/white-browed-woodswallow
[73] https://en.wikipedia.org/wiki/White-faced_storm_petrel
[74] https://birdlife.org.au/bird-profile/white-naped-honeyeater

Scientific Name	Common Name	Conservation Significance			Comments
		AUS	SA	AD	
Corcorax melanorhamphos	White-winged Chough		R	RA	Found in open forests and woodlands. Tends to prefer the wetter areas, with lots of leaf-litter, for feeding, and available mud for nest building[75].
Malurus leucopterus leuconotus	White-winged Fairywren				
Chlidonias leucopterus	White-winged Tern			LC	
Lalage tricolor	White-winged Triller				
Rhipidura leucophrys leucophrys	Willie Wagtail				
Oceanites oceanites exasperatus	Wilson's Storm Petrel			LC	
Tringa glareola	Wood Sandpiper		R	EN	Migratory sp. breeding in N hemisphere. In Australia widespread inhabiting shallow freshwater wetlands, often with other waders. Prefer areas with emergent reeds and grass, surrounded by tall plants or dead trees. Feed on aquatic insects and larvae, molluscs in moist or dry mud.
Platalea flavipes	Yellow-billed Spoonbill			LC	
Ptilotula ornata	Yellow-plumed Honeyeater			RA	Temperate forests and Mediterranean-type shrubby vegetation[76].
Acanthiza chrysorrhoa	Yellow-rumped Thornbill				
Pardalotus xanthopygus (NC)	Yellow-tailed Pardalote				
Manorina flavigula	Yellow-throated Miner	ssp	ssp	RA	Found in dry forests and woodlands, especially mallee. It is also seen in parks, gardens and farmlands[77].

Key to codes: LC= Least Concern, NT = Near Threatened; R/RA = Rare; V/VU = Vulnerable;E/EN=Endangered; CR = Critically Endangered.

[75] https://www.birdlife.org.au/bird-profile/white-winged-chough
[76] https://en.wikipedia.org/wiki/Yellow-plumed_honeyeater
[77] https://birdlife.org.au/bird-profile/yellow-throated-miner

Torrens Island reptile list - recorded within a 5km radius of Torrens Island from Biological Database of SA (sourced in May 2021).

Family	Scientific Name	Common Name	Rating			Comments[78]
			AUS	SA	AD	
Sea Turtles	*Chelonia mydas*	Green Turtle	VU	V		Comes ashore to lay eggs. This species nests in tropical and subtropical areas[79].
	Lepidochelys olivacea	Olive Ridley Turtle				This species generally confined to northern Australia.
Turtles	*Chelodina longicollis*	Eastern Long-necked Turtle			-	Lives in freshwater habitats including wetlands.
Dragon Lizards	*Ctenophorus pictus*	Painted Dragon			RA	This species is still found in sand dunes along the Adelaide coastline, but has not been recorded on Torrens Island.
	Pogona barbata	Eastern Bearded Dragon			LC	Semi-arboreal species. Has been observed on Torrens Island[80].
Typical Geckos	*Christinus marmoratus*	Marbled Gecko			LC	Nocturnal gecko. Has been recorded from Torrens Island (BDBSA).
Legless Lizards	*Aprasia striolata*	Lined Worm-lizard			VU	Legless lizard, usually found sheltering under rocks, logs and other ground debris. Recorded on Torrens Island in 2017.
Skinks	*Hemiergis decresiensis*	Three-toed Earless Skink			LC	
	Hemiergis peronii	Four-toed Earless Skink			LC	Requires rocks, logs and natural ground debris for shelter. Has been recorded on Torrens Island.
	Lerista bougainvillii	Bougainville's Skink			LC	Requires rocks, logs and natural ground debris for shelter. Has been recorded on Torrens Island (BDBSA).
	Lerista dorsalis	Four-toed Slider			RA	Requires rocks, logs and natural ground debris for shelter. Has been recorded on Torrens Island (BDBSA).
	Menetia greyii	Dwarf Skink			LC	Small, active diurnal skink. Widespread across Australia. Has been recorded on Torrens Island (BDBSA).
	Morethia adelaidensis	Adelaide Snake-eye			LC	Active diurnal skink, requiring ground litter and fallen timber. May be present on Torrens Island.
	Pseudemoia entrecasteauxii	Southern Grass Skink			VU	Active diurnal skink, found "in a variety of forest and grassland habitats throughout its range; usually seen on or around fallen timber, or foraging in leaf litter. [81]"
	Tiliqua adelaidensis	Pygmy Bluetongue	EN	E	CR	Recorded on the BDBSA from Cavan. Not previously recorded on Torrens Island.
	Tiliqua rugosa	Sleepy Lizard			LC	Widely distributed large skink. Shelters under "fallen timber, leaf litter, spinifex and other grasses[82]". Has been observed on Torrens Island[83].

[78] Dr Tim Milne, Herpetologist

[79] Department of Sustainability, Environment, Water, Population and Communities (2013). *Chelonia mydas* — Green Turtle SPRAT Profile. http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=1765. Accessed 5/8/13.

[80] A. Machado, pers. comm., 2013.

[81] Cogger, H.G. (1992). *Reptiles and Amphibians of Australia*. Reed Books, Chatswood.

[82] Cogger, H.G. (1992). *Reptiles and Amphibians of Australia*. Reed Books, Chatswood.

[83] A. Machado, pers. comm., 2013.

Family	Scientific Name	Common Name	Rating			Comments[78]
			AUS	SA	AD	
	Tiliqua scincoides	Eastern Bluetongue			LC	Widely distributed large skink. "Shelters at night in hollow logs, ground debris etc. [84]" Has been observed on Torrens Island[85].
Elapid Snakes	*Demansia psammophis*	Yellow-faced Whipsnake			VU	Not recorded from Torrens Island. Last nearby records are from the 1970s. Unlikely to be present on Torrens Island.
	Pseudonaja textilis	Eastern Brown Snake			LC	Common diurnal snake. It has been recorded on Torrens Island.
Burrowing Snake	*Anilios bituberculatus*	Rough-nosed Blind Snake			LC	An arid aadapted species, occurring in varied habitats from coastal areas to drier parts of southern Australia.
Limbless Lizards	*Delma molleri*	Gulfs Delma			LC	Reasonably common in Adelaide suburbs. Has been recorded from a variety of habitats ranging from grassland to woodland beneath rocks, timber, and rubbish.

Torrens Island amphibian list - recorded within a 5km radius of Torrens Island from Biological Database of SA (sourced in May 2021).

Scientific Name	Common Name	Rating		Comments
		AUS	SA	
Crinia signifera	Common Froglet			Small frog, found in close proximity to fresh water.
Limnodynastes dumerilii	Banjo Frog			Burrowing frog, often found well away from freshwater bodies, but requires standing water to breed.
Limnodynastes tasmaniensis	Spotted Marsh Frog			Medium sized frog, found in close proximity to fresh water.
Litoria ewingii	Brown Tree Frog			
Neobatrachus pictus	Burrowing Frog			Burrowing frog, often found well away from freshwater bodies, but requires standing water to breed.

[84] Cogger, H.G. (1992). *Reptiles and Amphibians of Australia*. Reed Books, Chatswood.
[85] A. Machado, pers. comm., 2013.

Torrens Island mammal species list - recorded within a 5km radius of Torrens Island from Biological Database of SA (sourced in May 2021).

Scientific Name	Common Name	Rating			Comments
		AUS	SA	AD	
Arctocephalus forsteri	Australian Fur Seal		R	RA	Prefers rocky parts of islands with jumbled terrain and boulders. Feeds principally on cephalopods and fish, but also seabirds and occasionally penguins.
Arctocephalus tropicalis	Sub-Antarctic Fur Seal	VU	E		Prefers rocky beaches with abundant boulders and shade.
Balaenoptera musculus	Blue Whale	EN	E	E	Marine species.
Delphinus delphis	Short-beaked Common Dolphin			LC	Marine species.
Eubalaena australis	Southern Right Whale	EN	V	VU	Marine species.
Globicphala macrorhynchus	Short-finned Pilot Whale		R		Marine species.
Hydromys chrysogaster	Water Rat			VU	Lives within close proximity to permanent bodies of fresh or brackish water, and even on some beaches. This species is common along the River Torrens[86]. Has been observed on Torrens Island[87].
Hydrurga leptonyx	Leopard Seal		R		Resides mostly on and around the pack ice of Antarctica, but may also be seen on the subantarctic islands if there is enough ice substrate.
Kogia breviceps	Pygmy Sperm Whale		R		Marine species.
Kogia sima	Dwarf Sperm Whale		R	RA	Marine species.
Macropus eugenii eugenii	Tammar Wallaby			RE	Records from 1892. No longer present.
Macropus robustus	Euro			RA	
Macropus fuliginosus	Western Grey Kangaroo			VU	
Megaptera novaeangliae	Humpback Whale	VU	V	VU	Marine species.
Neophoca cinerea	Australian Sea-lion	VU	V	RA	Live and breed on sandy beaches near their birth site in relatively large colonies.
Physeter macrocephalus	Sperm Whale		R		Marine species.
Pteropus poliocephalus	Grey-headed Flying-fox	VU	R	RA	
Tachyglossus aculeatus	Short-beaked Echidna			NT	
Tursiops aduncus	Indo-Pacific Bottlenose Dolphin			VU	Marine species.
Tursiops truncatus	Bottlenose Dolphin			LC	Marine species.
Bats					

[86] Turner, M. (2001). *Conserving Adelaide's Biodiversity Resources*. Urban Forest Biodiversity Program, Adelaide.
[87] Friends of Torrens Island, pers. comm. 2013

Scientific Name	Common Name	Rating			Comments
		AUS	SA	AD	
Austronomus australis	White-striped Free-tailed Bat			LC	Has been sighted in Torrens Island Conservation Park[88]. Found in a wide variety of habitats. One record on BDBSA from 1985.
Chalinolobus gouldii	Gould's Wattled Bat			LC	Roost in hollows in old trees, occasionally in ceilings or basements of buildings. They roost together in colonies of around 30 bats, sometimes smaller and other times larger.
Chalinolobus morio	Chocolate Wattled Bat		R	LC	Records from nearby localities. If present on Torrens Island, would be using small hollows and crevices in the larger tree species as habitat.
Mormopterus planiceps	Southern Free-tailed Bat				Has adapted well to fragmentation and is able to dwell around cities and towns. Can roost in tree hollows and man-made cavities such as sheds and barns. They have not been found in caves even where these are available.
Introduced mammals					
**Felis catus*	Cat	Still present on Torrens Island.			
**Lepus capensis*	European Brown Hare	Likely to still be present on Torrens Island.			
**Mus musculus*	House Mouse	Recorded from Torrens Island.			
**Oryctolagus cuniculus*	European Rabbit	Not recorded on Torrens Island in recent times.			
**Rattus rattus*	Black Rat	Probably present.			
**Vulpes vulpes*	Fox	Probably present.			

*denotes introduced species

[88] Turner, M. (2001). *Conserving Adelaide's Biodiversity Resources*. Urban Forest Biodiversity Program, Adelaide.

Appendix 4: List of butterfly species recorded on Torrens Island 2021

List of butterfly species recorded on Torrens Island in 2021 (EntoSearch)

Species	Common Name	Coastal Habitat *	Larval Food Plant +
Anisynta cynone #	Mottled Grass-skipper	S	G
Taractrocera papyria	White-banded Grass-dart	G	G
Ocybadistes walkeri	Green Grass-dart	G	G
Pieris rapae	Cabbage White	G	G
Belenois java	Caper White	V	S
Danaus petilia	Lesser Wanderer	G	S
Danaus plexippus	Monarch	G	S
Junonia villida	Meadow Argus	G	G
Heteronympha merope	Common Brown	G	G
Jalmenus icilius	Amethyst Hairstreak	G	S
Nacaduba biocellata	Two-spotted Line-blue	G	S
Theclinesthes albocincta #	Bitter-bush Blue	S	S
Theclinesthes miskini	Wattle Blue	G	S
Theclinesthes serpentatus	Saltbush Blue	G	G
Lampides boeticus	Long-tailed Pea-blue	G	G
Zizina otis	Common Grass-blue	G	G

List of butterflies observed.

* S = specialist, G = generalist, V = vagrant

\+ S = specialist, G = generalist

Appendix 5: Bushland Assessment data 2021

Torrens Island Assessment Area: 1 **Date:** 10th June 2021

Photo taken facing South (272812E 6150581S)

Vegetation Association: *Atriplex paludosa +/- A. cinerea +/- Nitraria billardierei Shrubland with emergent Myoporoum insulare, Dodonaea viscosa ssp.*

Benchmark Vegetation Community: SMLR Co 7.2 - Coastal Shrublands and Tall Shrublands

BushRAT assessment data:

Native understorey biomass: 91+%	Native Understorey Biomass Score (/10):	10
Native Plant species count: 10	Native Plant Species benchmark score (/15):	6
Native Plant Lifeform Cover Score: 10	Native Plant Lifeform benchmark score (/10):	6
Weed abundance and Threat Score: 10	Weed abundance/threat benchmark score (/15):	11
Regeneration score: 0	Regeneration benchmark score (/8)	0
	Tree Health Score (/5)	-
	Tree Hollows Score (/5)	-
	Fallen Timber Score (/5)	-
	Grazing Evidence score (/4)	4
	Bare Ground Score (/3)	3
	TOTAL (40/65)	

Structural Diversity Plant Lifeforms data:

Lifeform	Cover	Lifeform	Cover	Lifeform	Cover
Trees >15 m		Shrubs 0.5–2m	3	'Sedges' > 1m	
Trees 5 – 15 m		Shrubs < 0.5 m	3	'Sedges' ≤ 1m	
Trees < 5m		Herbs	2	Hummock grass	
Mallee > 5m		Mat Plants	2	Vines,scramblers	
Mallee ≤ 5m		Grasses >0.2m		Mistletoe	
Shrubs > 2 m		Grasses ≤ 0.2m		Ferns	

Cover categories: 1 = not many, cover <1%, 1a = plentiful but low cover (<1%), 2 = covers 1-5%, 3 = covers 6-25%, 4 = covers 26-50%

Torrens Island Assessment Area: 2 **Date:** 10th June 2021

Photo taken facing South (272743E 6150884S)

Vegetation Association: *Atriplex paludosa +/- A. cinerea +/- Nitraria billardierei Shrubland with emergent Myoporoum insulare, Dodonaea viscosa ssp.*

Benchmark Vegetation Community: SMLR Co 7.2 - Coastal Shrublands and Tall Shrublands

BushRAT assessment data:

Native understorey biomass: 81-90%%	Native Understorey Biomass Score (/10):	9
Native Plant species count: 16	Native Plant Species benchmark score (/15):	10
Native Plant Lifeform Cover Score: 16	Native Plant Lifeform benchmark score (/10):	9
Weed abundance and Threat Score: 23	Weed abundance/threat benchmark score (/15):	8
Regeneration score: 4	Regeneration benchmark score (/8)	6
	Tree Health Score (/5)	-
	Tree Hollows Score (/5)	-
	Fallen Timber Score (/5)	-
	Grazing Evidence score (/4)	4
	Bare Ground Score (/3)	3
	TOTAL (49/65)	

Structural Diversity Plant Lifeforms data:

Lifeform	Cover	Lifeform	Cover	Lifeform	Cover
Trees >15 m		Shrubs 0.5–2m	2	'Sedges' > 1m	
Trees 5 – 15 m		Shrubs < 0.5 m	3	'Sedges' ≤ 1m	3
Trees < 5m		Herbs	2	Hummock grass	
Mallee > 5m		Mat Plants	3	Vines,scramblers	1
Mallee ≤ 5m		Grasses >0.2m		Mistletoe	
Shrubs > 2 m	1a	Grasses ≤ 0.2m	1a	Ferns	

Cover categories: 1 = not many, cover <1%, 1a = plentiful but low cover (<1%), 2 = covers 1-5%, 3 = covers 6-25%, 4 = covers 26-50%

Torrens Island Assessment Area: 3 **Date:** 10th June 2021

Photo taken facing South (272841E 6150631S)

Vegetation Association: *Tecticornia halocnemoides, Salicornia quinqueflora Low shrubland*

Benchmark Vegetation Community: SMLR Co 8.1 - Coastal Samphire

BushRAT assessment data:

Native understorey biomass: 91+%	Native Understorey Biomass Score (/10):	10
Native Plant species count: 5	Native Plant Species benchmark score (/15):	14
Native Plant Lifeform Cover Score: 6	Native Plant Lifeform benchmark score (/10):	6
Weed abundance and Threat Score: 4	Weed abundance/threat benchmark score (/15):	10
Regeneration score: 0	Regeneration benchmark score (/8)	0
	Tree Health Score (/5)	-
	Tree Hollows Score (/5)	-
	Fallen Timber Score (/5)	-
	Grazing Evidence score (/4)	4
	Bare Ground Score (/3)	3
	TOTAL 47(/65)	

Structural Diversity Plant Lifeforms data:

Lifeform	Cover	Lifeform	Cover	Lifeform	Cover
Trees >15 m		Shrubs 0.5–2m		'Sedges' > 1m	
Trees 5 – 15 m		Shrubs < 0.5 m	6	'Sedges' ≤ 1m	
Trees < 5m		Herbs		Hummock grass	
Mallee > 5m		Mat Plants		Vines,scramblers	
Mallee ≤ 5m		Grasses >0.2m		Mistletoe	
Shrubs > 2 m		Grasses ≤ 0.2m		Ferns	

Cover categories: 1 = not many, cover <1%, 1a = plentiful but low cover (<1%), 2 = covers 1-5%, 3 = covers 6-25%, 4 = covers 26-50%

Torrens Island Assessment Area: 4 **Date:** 1st June 2021

Photo taken facing South (273369E 6149243S)

Vegetation Association: *Callitris gracilis, Acacia pycnantha Low Woodland*

Benchmark Vegetation Community: SMLR Co 7.3 - Non-Eucalypt Coastal Low Woodlands

BushRAT assessment data:

Native understorey biomass: 31-40%%		Native Understorey Biomass Score (/10):	4
Native Plant species count: 12		Native Plant Species benchmark score (/15):	7
Native Plant Lifeform Cover Score: 17		Native Plant Lifeform benchmark score (/10):	8
Weed abundance and Threat Score: 36		Weed abundance/threat benchmark score (/15):	1
Regeneration score: 3		Regeneration benchmark score (/8)	4
		Tree Health Score (/5)	4
		Tree Hollows Score (/5)	0
		Fallen Timber Score (/5)	5
		Grazing Evidence score (/4)	4
		Bare Ground Score (/3)	3
		TOTAL (40/80)	

Structural Diversity Plant Lifeforms data:

Lifeform	Cover	Lifeform	Cover	Lifeform	Cover
Trees >15 m		Shrubs 0.5–2m	3	'Sedges' > 1m	
Trees 5 – 15 m	2	Shrubs < 0.5 m	3	'Sedges' ≤ 1m	1
Trees < 5m	2	Herbs	1	Hummock grass	
Mallee > 5m		Mat Plants	1	Vines,scramblers	2
Mallee ≤ 5m		Grasses >0.2m		Mistletoe	
Shrubs > 2 m	2	Grasses ≤ 0.2m		Ferns	

Cover categories: 1 = not many, cover <1%, 1a = plentiful but low cover (<1%), 2 = covers 1-5%, 3 = covers 6-25%, 4 = covers 26-50%

Torrens Island Assessment Area: 5 **Date:** 1st June 2021

Photo taken facing South (273238E 6149132S)

Vegetation Association: *Callitris gracilis, Acacia pycnantha Low Woodland*

Benchmark Vegetation Community: SMLR Co 7.3 - Non-Eucalypt Coastal Low Woodlands

BushRAT assessment data:

Native understorey biomass: 31-40%%
Native Plant species count: 15
Native Plant Lifeform Cover Score: 16
Weed abundance and Threat Score: 29
Regeneration score: 4

Native Understorey Biomass Score (/10):	4
Native Plant Species benchmark score (/15):	8
Native Plant Lifeform benchmark score (/10):	8
Weed abundance/threat benchmark score (/15):	3
Regeneration benchmark score (/8)	5
Tree Health Score (/5)	3
Tree Hollows Score (/5)	0
Fallen Timber Score (/5)	1.5
Grazing Evidence score (/4)	4
Bare Ground Score (/3)	3
TOTAL (39.5/80)	

Structural Diversity Plant Lifeforms data:

Lifeform	Cover	Lifeform	Cover	Lifeform	Cover
Trees >15 m		Shrubs 0.5–2m	3	'Sedges' > 1m	
Trees 5 – 15 m		Shrubs < 0.5 m	3	'Sedges' ≤ 1m	2
Trees < 5m	1	Herbs	2	Hummock grass	1a
Mallee > 5m		Mat Plants	1a	Vines,scramblers	1a
Mallee ≤ 5m		Grasses >0.2m		Mistletoe	
Shrubs > 2 m	2	Grasses ≤ 0.2m		Ferns	

Cover categories: 1 = not many, cover <1%, 1a = plentiful but low cover (<1%), 2 = covers 1-5%, 3 = covers 6-25%, 4 = covers 26-50%

Torrens Island Assessment Area: 6 **Date:** 1st June 2021

Photo taken facing South (273292E 6149490S)

Vegetation Association: *Callitris gracilis, Acacia pycnantha Low Woodland*

Benchmark Vegetation Community: SMLR Co 7.3 - Non-Eucalypt Coastal Low Woodlands

BushRAT assessment data:

Native understorey biomass: 51-60%%
Native Plant species count: 19
Native Plant Lifeform Cover Score: 13
Weed abundance and Threat Score: 20
Regeneration score: 4

Native Understorey Biomass Score (/10):	6
Native Plant Species benchmark score (/15):	10
Native Plant Lifeform benchmark score (/10):	6
Weed abundance/threat benchmark score (/15):	6
Regeneration benchmark score (/8)	5
Tree Health Score (/5)	4
Tree Hollows Score (/5)	0
Fallen Timber Score (/5)	2.5
Grazing Evidence score (/4)	4
Bare Ground Score (/3)	2
TOTAL (45.5/80)	

Structural Diversity Plant Lifeforms data:

Lifeform	Cover	Lifeform	Cover	Lifeform	Cover
Trees >15 m		Shrubs 0.5–2m		'Sedges' > 1m	
Trees 5 – 15 m	3	Shrubs < 0.5 m		'Sedges' ≤ 1m	2
Trees < 5m	3	Herbs	2	Hummock grass	1a
Mallee > 5m		Mat Plants	1a	Vines,scramblers	1a
Mallee ≤ 5m		Grasses >0.2m		Mistletoe	
Shrubs > 2 m		Grasses ≤ 0.2m		Ferns	

Cover categories: 1 = not many, cover <1%, 1a = plentiful but low cover (<1%), 2 = covers 1-5%, 3 = covers 6-25%, 4 = covers 26-50%

Torrens Island Assessment Area: 7 **Date:** 1st June 2021

Photo taken facing South (272957E 6146789S)

Vegetation Association: *Acacia pycnantha Low open Woodland*

Benchmark Vegetation Community: SMLR Co 7.3 - Non-Eucalypt Coastal Low Woodlands

BushRAT assessment data:

Native understorey biomass: 0-10%%		Native Understorey Biomass Score (/10):	1
Native Plant species count: 17		Native Plant Species benchmark score (/15):	9
Native Plant Lifeform Cover Score: 13		Native Plant Lifeform benchmark score (/10):	6
Weed abundance and Threat Score: 39		Weed abundance/threat benchmark score (/15):	1
Regeneration score: 3		Regeneration benchmark score (/8)	4
		Tree Health Score (/5)	4
		Tree Hollows Score (/5)	0
		Fallen Timber Score (/5)	4
		Grazing Evidence score (/4)	4
		Bare Ground Score (/3)	3
		TOTAL (36/80)	

Structural Diversity Plant Lifeforms data:

Lifeform	Cover	Lifeform	Cover	Lifeform	Cover
Trees >15 m		Shrubs 0.5–2m	1a	'Sedges' > 1m	
Trees 5 – 15 m	1	Shrubs < 0.5 m	2	'Sedges' ≤ 1m	1a
Trees < 5m	3	Herbs	1a	Hummock grass	
Mallee > 5m		Mat Plants	1a	Vines,scramblers	2
Mallee ≤ 5m		Grasses >0.2m		Mistletoe	
Shrubs > 2 m	1	Grasses ≤ 0.2m		Ferns	

Cover categories: 1 = not many, cover <1%, 1a = plentiful but low cover (<1%), 2 = covers 1-5%, 3 = covers 6-25%, 4 = covers 26-50%

Torrens Island Assessment Area: 8 **Date:** 1st June 2021

Photo taken facing South (272810E 6146835S)

Vegetation Association: *Olearia axillaris Shrubland with emergent Acacia pycnantha*

Benchmark Vegetation Community: SMLR Co 7.2 - Coastal Shrublands and Tall Shrublands

BushRAT assessment data:

Native understorey biomass: 0-10%%
Native Plant species count: 13
Native Plant Lifeform Cover Score: 12
Weed abundance and Threat Score: 31
Regeneration score: 3

Native Understorey Biomass Score (/10):	1
Native Plant Species benchmark score (/15):	8
Native Plant Lifeform benchmark score (/10):	7
Weed abundance/threat benchmark score (/15):	3
Regeneration benchmark score (/8)	4
Tree Health Score (/5)	-
Tree Hollows Score (/5)	-
Fallen Timber Score (/5)	-
Grazing Evidence score (/4)	4
Bare Ground Score (/3)	3
TOTAL (30/65)	

Structural Diversity Plant Lifeforms data:

Lifeform	Cover	Lifeform	Cover	Lifeform	Cover
Trees >15 m		Shrubs 0.5–2m	3	'Sedges' > 1m	
Trees 5 – 15 m		Shrubs < 0.5 m	2	'Sedges' ≤ 1m	2
Trees < 5m		Herbs	1a	Hummock grass	
Mallee > 5m		Mat Plants	1a	Vines,scramblers	1a
Mallee ≤ 5m		Grasses >0.2m		Mistletoe	
Shrubs > 2 m	1a	Grasses ≤ 0.2m		Ferns	

Cover categories: 1 = not many, cover <1%, 1a = plentiful but low cover (<1%), 2 = covers 1-5%, 3 = covers 6-25%, 4 = covers 26-50%

Torrens Island Assessment Area: 9 **Date:** 1st June 2021

Photo taken facing South (2723053E 6146648S)

Vegetation Association: *Introduced Grassland/Herbland with emergent Acacia pycnantha*

Benchmark Vegetation Community: SMLR Co 7.3 - Non-Eucalypt Coastal Low Woodlands

BushRAT assessment data:

Native understorey biomass: 0-10%%
Native Plant species count: 12
Native Plant Lifeform Cover Score: 5
Weed abundance and Threat Score: 40
Regeneration score: 0

Native Understorey Biomass Score (/10):	1
Native Plant Species benchmark score (/15):	7
Native Plant Lifeform benchmark score (/10):	2
Weed abundance/threat benchmark score (/15):	0
Regeneration benchmark score (/8)	0
Tree Health Score (/5)	4
Tree Hollows Score (/5)	0
Fallen Timber Score (/5)	1.5
Grazing Evidence score (/4)	4
Bare Ground Score (/3)	3
TOTAL (22.5/80)	

Structural Diversity Plant Lifeforms data:

Lifeform	Cover	Lifeform	Cover	Lifeform	Cover
Trees >15 m		Shrubs 0.5–2m	1a	'Sedges' > 1m	
Trees 5 – 15 m		Shrubs < 0.5 m	1	'Sedges' ≤ 1m	1
Trees < 5m	1	Herbs	1a	Hummock grass	
Mallee > 5m		Mat Plants		Vines,scramblers	1
Mallee ≤ 5m		Grasses >0.2m		Mistletoe	
Shrubs > 2 m		Grasses ≤ 0.2m		Ferns	

Cover categories: 1 = not many, cover <1%, 1a = plentiful but low cover (<1%), 2 = covers 1-5%, 3 = covers 6-25%, 4 = covers 26-50%

Torrens Island Assessment Area: 10 **Date:** 1st June 2021

Photo taken facing South (272881E 6146980S)

Vegetation Association: *Planted Melaleuca halmaturorum, *Casuarina glauca over a chenopod shrub understorey*

Benchmark Vegetation Community: SMLR Co 7.3 - Non-Eucalypt Coastal Low Woodlands

BushRAT assessment data:

Native understorey biomass: 11-20%%	Native Understorey Biomass Score (/10):	2
Native Plant species count: 13	Native Plant Species benchmark score (/15):	7
Native Plant Lifeform Cover Score: 13	Native Plant Lifeform benchmark score (/10):	8
Weed abundance and Threat Score: 19	Weed abundance/threat benchmark score (/15):	7
Regeneration score: 1	Regeneration benchmark score (/8)	1
	Tree Health Score (/5)	5
	Tree Hollows Score (/5)	0
	Fallen Timber Score (/5)	1.5
	Grazing Evidence score (/4)	4
	Bare Ground Score (/3)	3
	TOTAL (38.5/80)	

Structural Diversity Plant Lifeforms data:

Lifeform	Cover	Lifeform	Cover	Lifeform	Cover
Trees >15 m		Shrubs 0.5–2m	1a	'Sedges' > 1m	
Trees 5 – 15 m	3	Shrubs < 0.5 m	3	'Sedges' ≤ 1m	
Trees < 5m	3	Herbs		Hummock grass	
Mallee > 5m		Mat Plants	1a	Vines,scramblers	
Mallee ≤ 5m		Grasses >0.2m		Mistletoe	
Shrubs > 2 m		Grasses ≤ 0.2m		Ferns	

Cover categories: 1 = not many, cover <1%, 1a = plentiful but low cover (<1%), 2 = covers 1-5%, 3 = covers 6-25%, 4 = covers 26-50%

Torrens Island Assessment Area: 11 **Date:** 1st June 2021

Photo taken facing South (273010E 6147145S)

Vegetation Association: *Planted *Eucalyptus spp. Woodland over a chenopod shrub understorey*

Benchmark Vegetation Community: SMLR 2 – Forests and Wooodlands with an open sclerophyll understorey

BushRAT assessment data:

Native understorey biomass: 41-50%%		Native Understorey Biomass Score (/10):	4
Native Plant species count: 12		Native Plant Species benchmark score (/15):	5
Native Plant Lifeform Cover Score: 14		Native Plant Lifeform benchmark score (/10):	6
Weed abundance and Threat Score: 28		Weed abundance/threat benchmark score (/15):	5
Regeneration score: 1		Regeneration benchmark score (/8)	1
		Tree Health Score (/5)	5
		Tree Hollows Score (/5)	0
		Fallen Timber Score (/5)	5
		Grazing Evidence score (/4)	4
		Bare Ground Score (/3)	3
		TOTAL (38/80)	

Structural Diversity Plant Lifeforms data:

Lifeform	Cover	Lifeform	Cover	Lifeform	Cover
Trees >15 m		Shrubs 0.5–2m	3	'Sedges' > 1m	
Trees 5 – 15 m	3	Shrubs < 0.5 m	3	'Sedges' ≤ 1m	1
Trees < 5m	3	Herbs		Hummock grass	
Mallee > 5m		Mat Plants		Vines,scramblers	
Mallee ≤ 5m		Grasses >0.2m	1a	Mistletoe	
Shrubs > 2 m		Grasses ≤ 0.2m		Ferns	

Cover categories: 1 = not many, cover <1%, 1a = plentiful but low cover (<1%), 2 = covers 1-5%, 3 = covers 6-25%, 4 = covers 26-50%

Torrens Island Assessment Area: 12 **Date:** 10th June 2021

Photograph taken facing NE – 273075E 6148232S

Vegetation Association: *Atriplex paludosa, Lawencia squamata +/- Maireana oppositifolia Low shrubland*
Benchmark Vegetation Community: SMLR Co 8.2 - Coastal Samphire +/- Saltbush & Bluebush Shrublands
BushRAT assessment data:

Native understorey biomass: 71-80%%	Native Understorey Biomass Score (/10):	8
Native Plant species count: 9	Native Plant Species benchmark score (/15):	13
Native Plant Lifeform Cover Score: 9	Native Plant Lifeform benchmark score (/10):	6
Weed abundance and Threat Score: 12	Weed abundance/threat benchmark score (/15):	6
Regeneration score: 2	Regeneration benchmark score (/8)	3
	Tree Health Score (/5)	
	Tree Hollows Score (/5)	
	Fallen Timber Score (/5)	
	Grazing Evidence score (/4)	4
	Bare Ground Score (/3)	3
	TOTAL (43/65)	

Structural Diversity Plant Lifeforms data:

Lifeform	Cover	Lifeform	Cover	Lifeform	Cover
Trees >15 m		Shrubs 0.5–2m	2	'Sedges' > 1m	
Trees 5 – 15 m		Shrubs < 0.5 m	5	'Sedges' ≤ 1m	
Trees < 5m		Herbs	2	Hummock grass	
Mallee > 5m		Mat Plants	1a	Vines,scramblers	
Mallee ≤ 5m		Grasses >0.2m		Mistletoe	
Shrubs > 2 m	1	Grasses ≤ 0.2m		Ferns	

Cover categories: 1 = not many, cover <1%, 1a = plentiful but low cover (<1%), 2 = covers 1-5%, 3 = covers 6-25%, 4 = covers 26-50%

Torrens Island Assessment Area: 13 **Date:** 10th June 2021

Photograph taken facing S – 272994E 6147645S

Vegetation Association: *Wilsonia humilis Herbland with emergent Maireana oppositifolia, Tecticornia sp.*

Benchmark Vegetation Community: SMLR Co 8.1 - Coastal Samphire

BushRAT assessment data:

Native understorey biomass: 91+%%	Native Understorey Biomass Score (/10):	10
Native Plant species count: 8	Native Plant Species benchmark score (/15):	15
Native Plant Lifeform Cover Score: 8	Native Plant Lifeform benchmark score (/10):	8
Weed abundance and Threat Score: 0	Weed abundance/threat benchmark score (/15):	15
Regeneration score: 0	Regeneration benchmark score (/8)	0
	Tree Health Score (/5)	
	Tree Hollows Score (/5)	
	Fallen Timber Score (/5)	
	Grazing Evidence score (/4)	4
	Bare Ground Score (/3)	3
	TOTAL (55/65)	

Structural Diversity Plant Lifeforms data:

Lifeform	Cover	Lifeform	Cover	Lifeform	Cover
Trees >15 m		Shrubs 0.5–2m		'Sedges' > 1m	
Trees 5 – 15 m		Shrubs < 0.5 m	3	'Sedges' ≤ 1m	
Trees < 5m		Herbs	5	Hummock grass	
Mallee > 5m		Mat Plants		Vines,scramblers	
Mallee ≤ 5m		Grasses >0.2m		Mistletoe	
Shrubs > 2 m		Grasses ≤ 0.2m		Ferns	

Cover categories: 1 = not many, cover <1%, 1a = plentiful but low cover (<1%), 2 = covers 1-5%, 3 = covers 6-25%, 4 = covers 26-50%

Torrens Island Assessment Area: 14 **Date:** 10th June 2021

Photograph taken facing S– 2735995E 6146728S

Vegetation Association: *Tecticornia flabelliformis, T. halocnemoides, T. pergranulata, Salicornia sp. Low shrubland*

Benchmark Vegetation Community: SMLR Co 8.1 - Coastal Samphire

BushRAT assessment data:

Native understorey biomass: 91+%%	Native Understorey Biomass Score (/10):	10
Native Plant species count: 4	Native Plant Species benchmark score (/15):	12
Native Plant Lifeform Cover Score: 6	Native Plant Lifeform benchmark score (/10):	6
Weed abundance and Threat Score: 0	Weed abundance/threat benchmark score (/15):	15
Regeneration score: 0	Regeneration benchmark score (/8)	0
	Tree Health Score (/5)	
	Tree Hollows Score (/5)	
	Fallen Timber Score (/5)	
	Grazing Evidence score (/4)	4
	Bare Ground Score (/3)	3
	TOTAL (50/65)	

Structural Diversity Plant Lifeforms data:

Lifeform	Cover	Lifeform	Cover	Lifeform	Cover
Trees >15 m		Shrubs 0.5–2m		'Sedges' > 1m	
Trees 5 – 15 m		Shrubs < 0.5 m	6	'Sedges' ≤ 1m	
Trees < 5m		Herbs		Hummock grass	
Mallee > 5m		Mat Plants		Vines,scramblers	
Mallee ≤ 5m		Grasses >0.2m		Mistletoe	
Shrubs > 2 m		Grasses ≤ 0.2m		Ferns	

Cover categories: 1 = not many, cover <1%, 1a = plentiful but low cover (<1%), 2 = covers 1-5%, 3 = covers 6-25%, 4 = covers 26-50%

Torrens Island Assessment Area: 15 **Date:** 10th June 2021

Photograph taken facing S – 272764E 6146814S

Vegetation Association: *Avicennia marina Low open forest*

Benchmark Vegetation Community: SMLR Co 9 - Mangroves on Intertidal Mudflats

BushRAT assessment data:

Native understorey biomass: 91+%%	Native Understorey Biomass Score (/10):	10
Native Plant species count: 4	Native Plant Species benchmark score (/SNB):	4
Native Plant Lifeform Cover Score: 7	Native Plant Lifeform benchmark score (/10):	8
Weed abundance and Threat Score: 0	Weed abundance/threat benchmark score (/15):	15
Regeneration score: 1	Regeneration benchmark score (/SNB)	0
	Tree Health Score (/5)	5
	Tree Hollows Score (/5)	0
	Fallen Timber Score (/5)	0
	Grazing Evidence score (/4)	4
	Bare Ground Score (/3)	3
	TOTAL (45/62)	
	SNB = No Benchmark for this community	

Structural Diversity Plant Lifeforms data:

Lifeform	Cover	Lifeform	Cover	Lifeform	Cover
Trees >15 m		Shrubs 0.5–2m		'Sedges' > 1m	
Trees 5 – 15 m		Shrubs < 0.5 m	3	'Sedges' ≤ 1m	
Trees < 5m	4	Herbs		Hummock grass	
Mallee > 5m		Mat Plants		Vines,scramblers	
Mallee ≤ 5m		Grasses >0.2m		Mistletoe	
Shrubs > 2 m		Grasses ≤ 0.2m		Ferns	

Cover categories: 1 = not many, cover <1%, 1a = plentiful but low cover (<1%), 2 = covers 1-5%, 3 = covers 6-25%, 4 = covers 26-50%

Torrens Island Assessment Area: 16 **Date:** 20th July 2021

Photo taken facing South (273524E 6148903S)

Vegetation Association: *Planted Eucalyptus spp., Callitris gracilis Very open woodland – Allotment 300 east of Quarantine Station*

Benchmark Vegetation Community: SMLR Co 7.31 Non-eucalypt Coastal Low Woodlands

BushRAT assessment data:

Native understorey biomass: 0-10%	Native Understorey Biomass Score (/10):	1
Native Plant species count: 14	Native Plant Species benchmark score (/15):	7
Native Plant Lifeform Cover Score: 8	Native Plant Lifeform benchmark score (/10):	4
Weed abundance and Threat Score: 48	Weed abundance/threat benchmark score (/15):	0
Regeneration score: 1	Regeneration benchmark score (/8)	2
	Tree Health Score (/5)	4
	Tree Hollows Score (/5)	1
	Fallen Timber Score (/5)	3
	Grazing Evidence score (/4)	4
	Bare Ground Score (/3)	1
	TOTAL (27/80)	

Structural Diversity Plant Lifeforms data:

Lifeform	Cover	Lifeform	Cover	Lifeform	Cover
Trees >15 m		Shrubs 0.5–2m	1a	'Sedges' > 1m	
Trees 5 – 15 m	2	Shrubs < 0.5 m	1a	'Sedges' ≤ 1m	1
Trees < 5m	2	Herbs		Hummock grass	
Mallee > 5m		Mat Plants		Vines,scramblers	
Mallee ≤ 5m		Grasses >0.2m		Mistletoe	
Shrubs > 2 m		Grasses ≤ 0.2m	1a	Ferns	

Cover categories: 1 = not many, cover <1%, 1a = plentiful but low cover (<1%), 2 = covers 1-5%, 3 = covers 6-25%, 4 = covers 26-50%

Torrens Island Assessment Area: 17 **Date:** 20th July 2021

Photo taken facing South (273440E 6148964S)

Vegetation Association: **Casuarina glauca Woodland - Allotment 300 east of Quarantine Station*
Benchmark Vegetation Community: SMLR Co 7.31 Non-eucalypt Coastal Low Woodlands
BushRAT assessment data:

Native understorey biomass: 0-10%	Native Understorey Biomass Score (/10):	1
Native Plant species count: 3	Native Plant Species benchmark score (/15):	2
Native Plant Lifeform Cover Score: 5	Native Plant Lifeform benchmark score (/10):	2
Weed abundance and Threat Score: 55	Weed abundance/threat benchmark score (/15):	0
Regeneration score: 1	Regeneration benchmark score (/8)	2
	Tree Health Score (/5)	5
	Tree Hollows Score (/5)	0
	Fallen Timber Score (/5)	0
	Grazing Evidence score (/4)	4
	Bare Ground Score (/3)	1
	TOTAL (17/80)	

Structural Diversity Plant Lifeforms data:

Lifeform	Cover	Lifeform	Cover	Lifeform	Cover
Trees >15 m		Shrubs 0.5–2m	1	'Sedges' > 1m	
Trees 5 – 15 m	1	Shrubs < 0.5 m	1	'Sedges' ≤ 1m	1
Trees < 5m	1	Herbs		Hummock grass	
Mallee > 5m		Mat Plants		Vines,scramblers	
Mallee ≤ 5m		Grasses >0.2m		Mistletoe	
Shrubs > 2 m		Grasses ≤ 0.2m		Ferns	

Cover categories: 1 = not many, cover <1%, 1a = plentiful but low cover (<1%), 2 = covers 1-5%, 3 = covers 6-25%, 4 = covers 26-50%

Torrens Island Assessment Area: 18 **Date:** 20th July 2021

Photo taken facing South (273286E 6149088S)

Vegetation Association: *Planted Eucalyptus leucoxylon spp., E. camaldulensis, *Eucalyptus sp., *Pinus halepenis, *Casuarina glauca Very open woodland –Quarantine Station*

Benchmark Vegetation Community: SMLR Co 7.31 Non-eucalypt Coastal Low Woodlands

BushRAT assessment data:

Native understorey biomass: 0-10%	Native Understorey Biomass Score (/10):	1
Native Plant species count: 9	Native Plant Species benchmark score (/15):	5
Native Plant Lifeform Cover Score: 5	Native Plant Lifeform benchmark score (/10):	2
Weed abundance and Threat Score: 40	Weed abundance/threat benchmark score (/15):	0
Regeneration score: 0	Regeneration benchmark score (/8)	0
	Tree Health Score (/5)	4
	Tree Hollows Score (/5)	1
	Fallen Timber Score (/5)	1
	Grazing Evidence score (/4)	4
	Bare Ground Score (/3)	1
	TOTAL (19/80)	

Structural Diversity Plant Lifeforms data:

Lifeform	Cover	Lifeform	Cover	Lifeform	Cover
Trees >15 m		Shrubs 0.5–2m	2	'Sedges' > 1m	
Trees 5 – 15 m		Shrubs < 0.5 m	2	'Sedges' ≤ 1m	1
Trees < 5m		Herbs	1	Hummock grass	
Mallee > 5m		Mat Plants		Vines,scramblers	1
Mallee ≤ 5m		Grasses >0.2m		Mistletoe	
Shrubs > 2 m		Grasses ≤ 0.2m		Ferns	

Cover categories: 1 = not many, cover <1%, 1a = plentiful but low cover (<1%), 2 = covers 1-5%, 3 = covers 6-25%, 4 = covers 26-50%

Torrens Island Assessment Area: 19 **Date:** 20th July 2021

Photo taken facing South-east (273134E 6148780S)

Vegetation Association: **Casuarina glauca Woodland - Quarantine Station*
Benchmark Vegetation Community: SMLR Co 7.31 Non-eucalypt Coastal Low Woodlands
BushRAT assessment data:

Native understorey biomass: 0-10%	Native Understorey Biomass Score (/10):	1
Native Plant species count: 11	Native Plant Species benchmark score (/15):	6
Native Plant Lifeform Cover Score: 8	Native Plant Lifeform benchmark score (/10):	4
Weed abundance and Threat Score: 53	Weed abundance/threat benchmark score (/15):	0
Regeneration score: 0	Regeneration benchmark score (/8)	0
	Tree Health Score (/5)	4
	Tree Hollows Score (/5)	0
	Fallen Timber Score (/5)	1
	Grazing Evidence score (/4)	4
	Bare Ground Score (/3)	1
	TOTAL (21/80)	

Structural Diversity Plant Lifeforms data:

Lifeform	Cover	Lifeform	Cover	Lifeform	Cover
Trees >15 m		Shrubs 0.5–2m	2	'Sedges' > 1m	
Trees 5 – 15 m	2	Shrubs < 0.5 m	2	'Sedges' ≤ 1m	
Trees < 5m		Herbs	1	Hummock grass	
Mallee > 5m		Mat Plants		Vines,scramblers	
Mallee ≤ 5m		Grasses >0.2m		Mistletoe	
Shrubs > 2 m		Grasses ≤ 0.2m	1a	Ferns	

Cover categories: 1 = not many, cover <1%, 1a = plentiful but low cover (<1%), 2 = covers 1-5%, 3 = covers 6-25%, 4 = covers 26-50%

Torrens Island Assessment Area: 20 **Date:** 20th July 2021

Photo taken facing South (273383E 6146517S)

Vegetation Association: *Acacia pycnantha, Callitris gracilis Low open woodland (revegetation) – opposite AGL land*
Benchmark Vegetation Community: SMLR Co 7.31 Non-eucalypt Coastal Low Woodlands
BushRAT assessment data:

Native understorey biomass: 21-30%	Native Understorey Biomass Score (/10):	3
Native Plant species count: 20	Native Plant Species benchmark score (/15):	10
Native Plant Lifeform Cover Score: 17	Native Plant Lifeform benchmark score (/10):	8
Weed abundance and Threat Score: 45	Weed abundance/threat benchmark score (/15):	0
Regeneration score: 4	Regeneration benchmark score (/8)	5
	Tree Health Score (/5)	4
	Tree Hollows Score (/5)	0
	Fallen Timber Score (/5)	1
	Grazing Evidence score (/4)	4
	Bare Ground Score (/3)	1
	TOTAL (36/80)	

Structural Diversity Plant Lifeforms data:

Lifeform	Cover	Lifeform	Cover	Lifeform	Cover
Trees >15 m		Shrubs 0.5–2m	3	'Sedges' > 1m	
Trees 5 – 15 m	2	Shrubs < 0.5 m	3	'Sedges' ≤ 1m	2
Trees < 5m	3	Herbs	1a	Hummock grass	
Mallee > 5m		Mat Plants	1a	Vines,scramblers	1
Mallee ≤ 5m		Grasses >0.2m	1a	Mistletoe	
Shrubs > 2 m		Grasses ≤ 0.2m		Ferns	

Cover categories: 1 = not many, cover <1%, 1a = plentiful but low cover (<1%), 2 = covers 1-5%, 3 = covers 6-25%, 4 = covers 26-50%