Ochre Point

Biodiversity Action Plan

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T&M Ecologists

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Contents

EXECUTIVE SUMMARY

This Biodiversity Action Plan has been developed for a section of land known colloquially as Ochre Point. The area is of high significance for its cultural values, being part of the Tjilbruke (walking) Trail, and it includes significant springs and an ochre pit. The area is known as Potartang, and the presence of fresh water and ochre mean it was of high importance spiritually and economically for the Kaurna people. However, there has been little investigation of the biodiversity values in the area. The *Beyeria lechenaultii/ Acrotriche patula* shrublands found in the site show a degree of endemism and rarity for South Australia. This shrubland has been acknowledged as being in good condition in Ochre Point, and forms a structurally diverse plant community with herbs, other shrubs, grasses and sedges and a moderately high number of native plant species.

This Biodiversity Action Plan provides an inventory of the flora and fauna habitat values in the site, and identifies and prioritises actions necessary to improve the biodiversity values/environmental assets of the area. The Plan also provides baseline biodiversity data which underpins the targets provided in the Plan, and enables cost-effective monitoring for the future.

Over 100 native vegetation species have been recorded in the area, which is considered to be a high species richness for remnant coastal vegetation in an urbanised setting. One species, *Myoporum parvifolium* (Creeping Boobialla) is listed as Rare at State level. At a Regional level, twenty nine species are considered to be Near Threatened, sixteen species are Rare and four are considered Vulnerable. This high proportion of species of regional significance underlines the importance of the coastal heath habitat that makes up much of the site. The beach adjacent to the site forms habitat for the Nationally Vulnerable Hooded Plover (*Thinornis cucullatus cucullatus*), and the site itself would provide habitat for numerous birds, reptiles and bats, as well as providing known habitat for butterfly species of conservation significance.

There are numerous threats to the biodiversity values in the site. Anthropogenic impacts, through unconsolidated trails, dumping, foraging/prospecting, inappropriate garden plantings and recreational activities are significant, and these will be expected to increase as a large housing development is in the process of being established immediately to the east of central sections of the site. Pest animals are also a key threat, with rabbits suppressing recruitment of native plant species, and foxes impacting native fauna, including the Hooded Plover. There are also many species of introduced plants present, many of which are considered to be highly threatening in coastal environments, with key species including Western Coastal Wattle (**Acacia cyclops*), Boneseed (**Chrysanthemoides monilifera*), White Weeping Broom (**Retama raetam*), Olive (**Olea europaea*) and African Boxthorn (**Lycium ferocissimum*), Pincushion (**Scabiosa atropurpurea*), Gazania (**Gazania linearis*), Sea Spurge (**Euphorbia paralias*), Sea Wheat-grass (**Thinopyrum junceiforme*), Perennial Veldt Grass (**Ehrharta calycina*) and Century Plant (**Agave americana*). Whilst some of these species have been the focus of control programs, there are still significant infestations in some areas, particularly in the central sections of the site.

The Figure overleaf provides a snapshot overview of key actions that should be undertaken to protect the biodiversity assets of Ochre Cove.


N
Shrubland on steep cliffs. Control Gazania and Acacia cyclops HIGH PRIORITY
Moderate/high quality remnant shrubland.
Consolidate trails EXTREME PRIORITY
Control key woody and herb weeds VERY HIGH PRIORITY
Very high quality remnant shrubland.
Control key woody and herb weeds EXTREME PRIORITY
Adjoining properties with high threat weeds as garden plants
Ensure no spread and educate landholders HIGH PRIORITY
Species rich remnant shrubland, with many management issues.
Consolidate trails EXTREME PRIORITY
Control key woody and herb weeds VERY HIGH PRIORITY
Patch of high threat grass Ehrharta calycina. Staged removal and revegetation VERY HIGH PRIORITY
Poor quality vegetation, with woody weeds abundant, likely to be source for other areas.
Control rabbits VERY HIGH PRIORITY
Control key woody and herb weeds MODERATE PRIORITY
Small patch of sand dune shrubland. Control Thinopyrum junceiforme and Euphorbia paralias VERY HIGH PRIORITY
Control other key woody and herbaceous weeds HIGH PRIORITY
Small patch of Eucalyptus porosa woodland. Control key woody and herb weeds VERY HIGH PRIORITY
Beach forms habitat for Nationally Vulnerable Hooded Plover. Continue fencing/signage/monitoring EXTREME PRIORITY
Control foxes (whole of site) VERY HIGH PRIORITY
Very poor quality introduced grassland areas. Control key woody and herb weeds
MODERATE PRIORITY
High quality remnant shrubland.
Consolidate trails EXTREME PRIORITY
Control key woody and herb weeds VERY HIGH PRIORITY
125 62.5 0 125 Meters
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

1 INTRODUCTION

This Biodiversity Action Plan has been developed for a section of land known colloquially as Ochre Point. The area is of high significance for its cultural values, being part of the Tjilbruke (walking) Trail, and it includes significant springs and an ochre pit. The area is known as Potartang, and the presence of fresh water and ochre mean it was of high importance spiritually and economically for the Kaurna people.

However, despite this significant cultural value and the presence of remnant coastal heath vegetation, there has been little investigation of the biodiversity values in the area. The *Beyeria lechenaultii/ Acrotriche patula* shrublands found in the site show a degree of endemism and rarity for South Australia. This shrubland forms a structurally diverse plant community with herbs, other shrubs, grasses and sedges and a moderately high number of native plant species[1].

The Metropolitan Adelaide and Northern Coastal Action Plan (MANCAP)[1] notes that "In 1972 Dr John Jessop from the Botanic Gardens (State Herbarium) provided advice to the Coast Protection Board on the vegetation condition of 16 coastal locations with remnant vegetation values from the Aldinga Scrub in the south to the Barkers Inlet in the north. In general many areas were described as in poor condition with an acute need for rehabilitation. Areas with good values were discussed and included Aldinga Scrub, Ochre Point, north of Grange jetty, Tennyson, Fort Glanville and North Haven."

This Biodiversity Action Plan is intended to align with, and contribute to, the objectives of the MANCAP. 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. The MANCAP identified the Ochre Cove and Ochre Cliffs area as one of the significant areas where the conservation status and management investment needed to be raised.

The Plan is intended as a guide for specific and prioritised "on-ground" works over the next 5 years, with the aim being to maximise the protection of the biodiversity values of the area.

The preparation of this Management Plan has involved:

- review of previous biodiversity surveys and related studies;
- field survey to map and record vegetation associations, plants of conservation significance, weeds and other management issues;
- recording of vertebrate pest evidence;
- identification and prioritisation of actions necessary to improve the biodiversity values/environmental assets of the area; and
- identification of appropriate and cost effective monitoring and research requirements.

[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 forEnvironment and Heritage.

The preparation of this Plan is somewhat timely, as a large housing development is in the process of being established immediately to the east of central sections of the site. This development, and the associated population increase, will place further pressure on the biodiversity assets of Ochre Point.

2 STUDY AREA

Ochre Point lies approximately 34 km south-south-west of the Adelaide city centre (Figure 1). The area that is the subject of this Biodiversity Action Plan is approximately 30 hectares in area, comprising 3 land parcels and a section of road reserve along the eastern side (Table 1, Figure 2).

Table 1. Land Parcel details for Ochre Point

Parcel(s)	Title details	Location	Area (ha)	Land Manager
H106000 S590	CR/5752/691	Northern Section	10.28	City of Onkaparinga
H106000 S594	CR/5752/692	Central Section	12.65	City of Onkaparinga
H106000 S805	CR/5417/990	Southern Section	4.26	Department for Environment and Water
Road Reserve		Eastern boundary	3.83	City of Onkaparinga
TOTAL			**31.02**	

2.1 Current land management

The sections of land in this Biodiversity Action Plan are under the care and control of the City of Onkaparinga and the Department for Environment and Water as per Table 1. Green Adelaide has also invested in weed control activities in the area.

2.2 Surrounding and historical land use

Pre-European Settlement

The Kaurna people are the traditional custodians of the Adelaide Plains. Their country extends as far south as Myponga, just east of Williamstown at its most easterly point, to the north west at the Australian International Bird Sanctuary and as far north as Hamley Bridge, and also comprises the near coastal waters of the Adelaide plains[2]. Traditionally Kaurna families and clans generally moved inland to more sheltered locations in the Mount Lofty Ranges foothills in winter, and spent much of the summer fishing and hunting along the coastline of St Vincent Gulf[3]. 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)[4]. 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.

[2] Consent Determination for Kaurna. Agius v State of South Australia (No 6) [2018] FCA 358 (nntt.gov.au).
[3] Tindale, NB 1987. Wanderings of Tjibruki: A Tale of the Kaurna People of Adelaide. Records of the South Australian Museum V20: 5-13.
[4] 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.

Some Kaurna places are known, including the sites and springs along the Tjilbruke Dreaming Track, and the archaeological campsites and burial sites along the coastal cliffs and dunes of the Adelaide coastline, and throughout the Fleurieu Peninsula[5].

"Tjilbruke is pivotal to the creation theories of the Kaurna people. He is an important Creation Ancestor in the lore of the Adelaide Plains. His tale tells of a time when peaceful laws governed the land and people. Tjilbruke lived as a mortal man and was one to whom the law was entrusted. Tjilbruke's nephew, Kulutuwi was killed as punishment for breaking the law by killing a female emu. Tjilbruke then carried his nephew's body down the Fleurieu Peninsula coast into Ngarrindjeri country near Goolwa. Where Tjilbruke rested on his journey, his luki (tears) of overwhelming grief formed the freshwater springs at Kareildung (Hallett Cove), Tainbarang (Port Noarlunga), Potartang (Red Ochre Cove), Ruwarunga (Port Willunga), Witawali (Sellicks Beach), and Kongaratinga (near Wirrina Cove); this trail is known as the Tjilbruke Dreaming Tracks. Eventually Tjilbruke placed the body of his nephew into a cave at Rapid Bay and transformed himself into the glossy ibis bird, known in the Kaurna language as Tjilbruke."[5]

At Red Ochre Cove, or Potartang, a sign erected by the City of Onkaparinga notes that "At this place Tjilbruke created another fresh water spring on the beach. This area had great economic and spiritual significance for the Kaurna people; this remains true even today. The red ochre from the pit was used to paint the Kaurna Aborigines' bodies when performing ceremonial dances. The ochre was also used in trade with people from other regions. North of Red Ochre Cove, several Aboriginal camp sites have been recorded in the Moana sand hills by archaeological research".

The area has been mapped as "*Beyeria lechenaultii* +/- *Calytrix tetragona* +/- *Alyxia buxifolia* +/- *Acacia cupularis* +/- *Santalum acuminatum* +/- *Pomaderris paniculosa* ssp. Shrubland" on DEW's pre-European vegetation mapping layer[6].

Post-European Settlement

Whist there is little data that relates specifically to this site, 1949 aerial imagery (Figure 3) shows that the land to the east of the site had been cleared at that time, and was likely used for agricultural activities. The 2021 comparative image shows that much of the land to the east of the site at the northern end is now devoted to housing. The 1949 image also shows a number of tracks through the site, and degradation is evident from the lack of vegetative cover, indicating that the area may have been grazed at that time.

[5] https://kaurnaculture.wordpress.com/tjilbruke-dreaming-tracks/ accessed 11/4/22.
[6] www.naturemaps.sa.gov.au accessed 11/4/22.

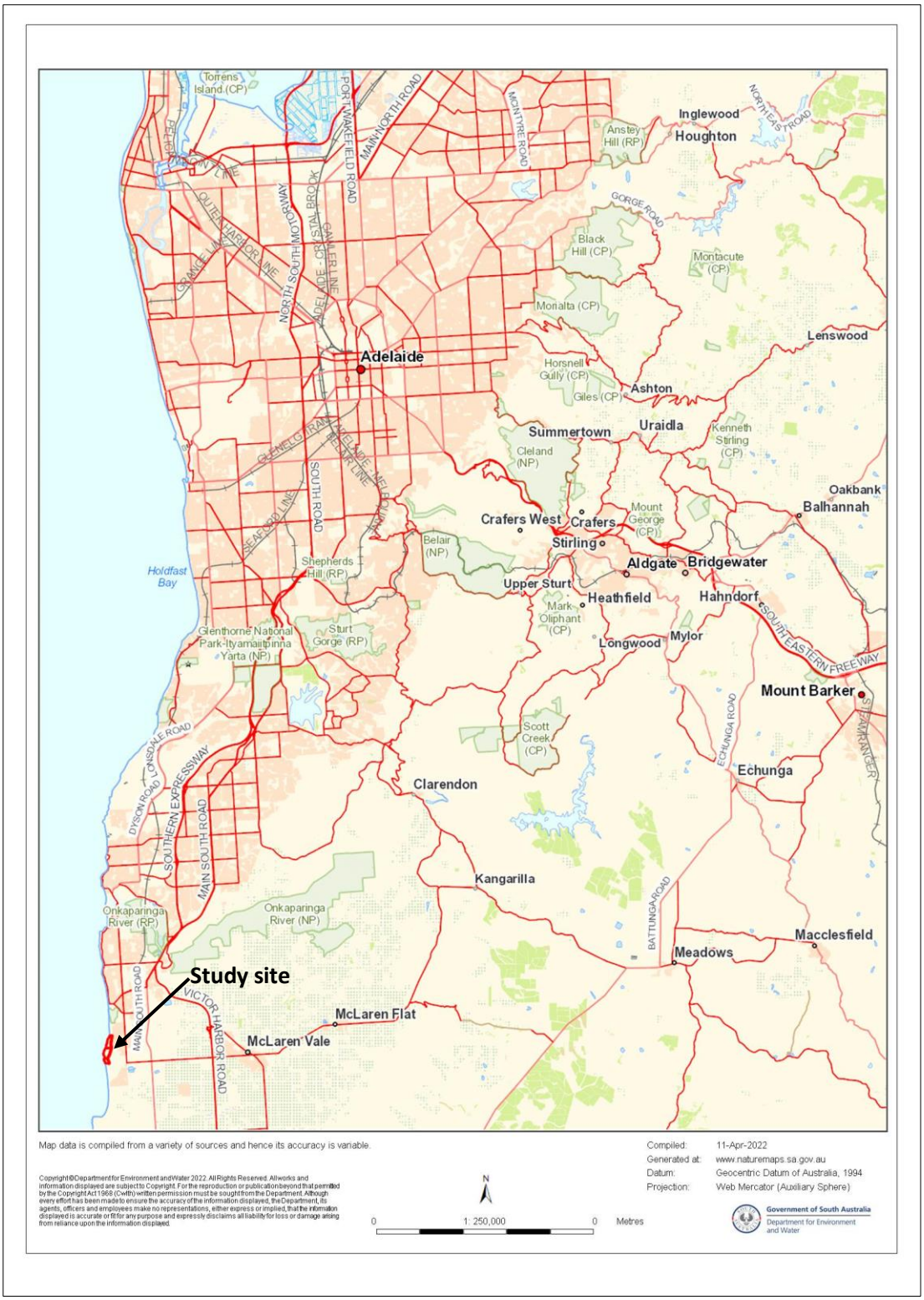

Figure 1: Location of the area that is the focus of this Biodiversity Action Plan

Figure 2: Cadastral boundaries of the area that is the focus of this Biodiversity Action Plan

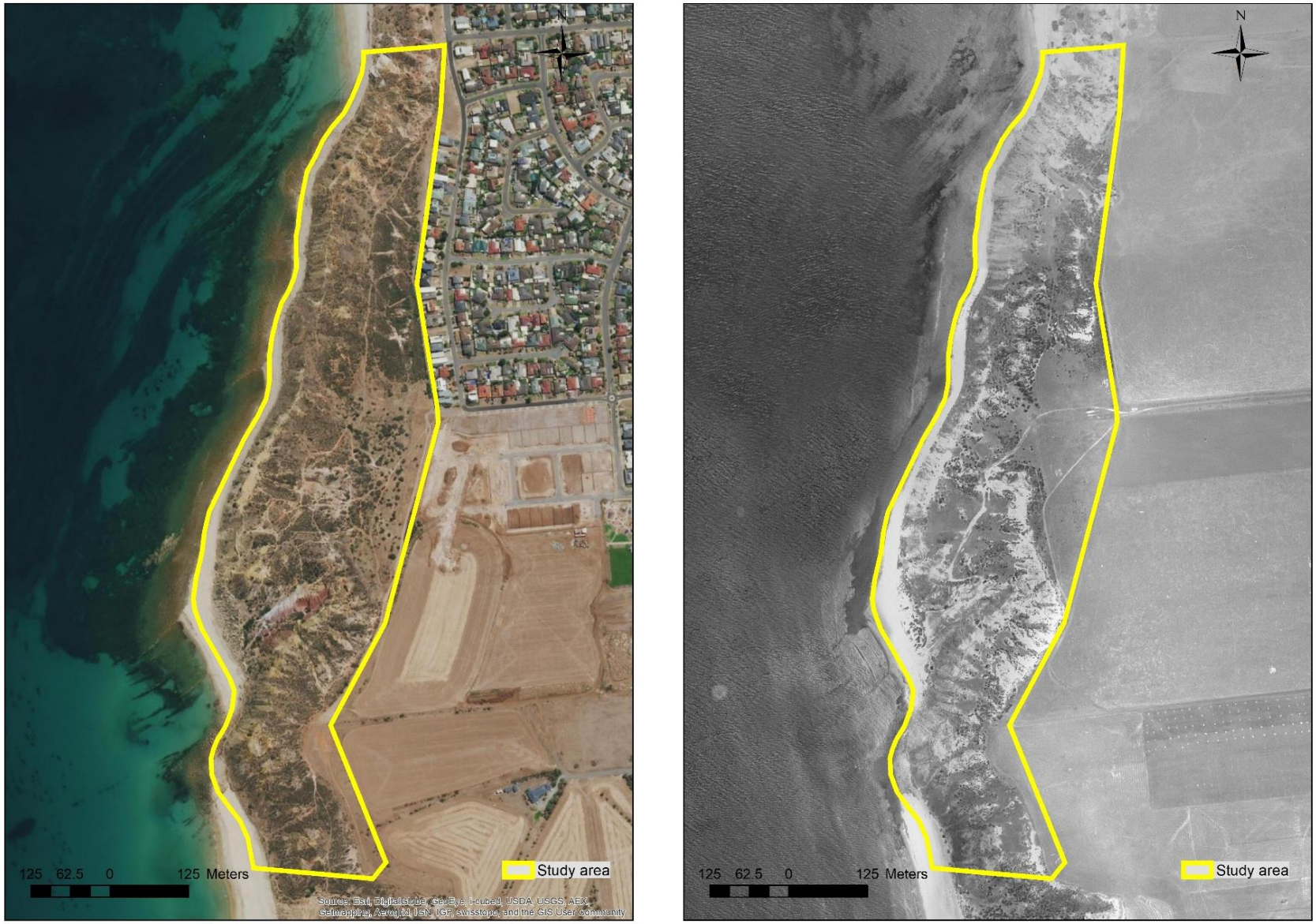

Figure 3: Comparison of current imagery (left) and 1949 aerial imagery (right) of the site

3 ENVIRONMENTAL ASSETS

3.1 Vegetation

The following description is an overview of the vegetation in the study area and Figure 4 shows the vegetation communities present in the site. More extensive descriptions are provided in Section 5.2.

The steep sloping sections on skeletal soils support low heath vegetation, mostly dominated by *Beyeria lechenaultii* (Pale Turpentine Bush), with *Acrotriche patula* (Prickly Ground-berry) often present as a co-dominant (Figure 4). Condition is highest in the north-eastern sections, where there is a diverse understorey and relatively few weeds, and also emergent tree and taller shrub species, including *Melaleuca lanceolata* (Dryland Tea-tree)*, Eucalyptus porosa* (Mallee Box)*, Santalum acuminatum* (Quandong) and *Allocasuarina verticillata* (Drooping She-oak). Other areas of this vegetation type are more disturbed, with grassy weeds prominent, and in some areas problematic woody weeds, including **Acacia cyclops* (Western Coastal Wattle), **Retama raetam* (White Weeping Broom), **Olea europaea ssp. europaea* (Olive) and **Chrysanthemoides monilifera ssp. monilifera* (Boneseed) are present as emergent species. On very steep cliff slopes adjacent to the coast, *Atriplex paludosa ssp. cordata* (Marsh Saltbush) becomes a co-dominant with *Beyeria lechenaultii* (Pale Turpentine Bush) in a low shrubland formation.

At the base of the valley in the central part of the site, there is a small section of *Olearia axillaris* (Coast Daisy-bush) shrubland on a portion of white sand dune adjacent to the beach. This vegetation is of moderate diversity for its type, but is also significantly invaded by a number of high threat weeds, including **Acacia cyclops* (Western Coastal Wattle), **Euphorbia paralias* (Sea Spurge) and **Lycium ferocissimum* (African Boxthorn). The flat, upland areas to the east of the steeply sloping land are generally highly disturbed. There is a section in the central part of the site (Figure 4) where the weeds **Acacia cyclops* (Western Coastal Wattle), **Retama raetam* (White Weeping Broom) and **Olea europaea ssp. europaea* (Olive) form a woodland/shrubland formation, with scattered low native shrubs in the understorey. To the immediate west of this area, there is an open low woodland of *Eucalyptus porosa* (Mallee Box) with a moderately diverse native understorey. There is also a narrow to moderately wide strip of highly disturbed annual grassland along the eastern side of the site. Annual grassy weeds are the most prominent species, including **Avena barbata* (Wild Oats) and **Brachypodium distachyon* (False Brome), but there are also significant infestations of **Cynara cardunculus ssp. flavescens* (Artichoke Thistle) (central sections), and **Aizoon pubescens* (Coastal Galenia) and **Retama raetam* (White Weeping Broom) at the southern end.

Table 2 provides a list of records from the Biological Database of South Australia for the site, along with records from this study. Over 100 species have been recorded in the area, which is considered to be a high species richness for remnant coastal vegetation in an urbanised setting. One species, *Myoporum parvifolium* (Creeping Boobialla) is listed as Rare at State level. At a Regional level, twenty nine species are considered to be Near Threatened, sixteen species are Rare and four are considered Vulnerable. This high proportion of species of regional significance underlines the importance of the coastal heath habitat that makes up much of the site. It should also be noted that the assessment undertaken for this report was undertaken in autumn, and that some annual species may not have been evident at that time.

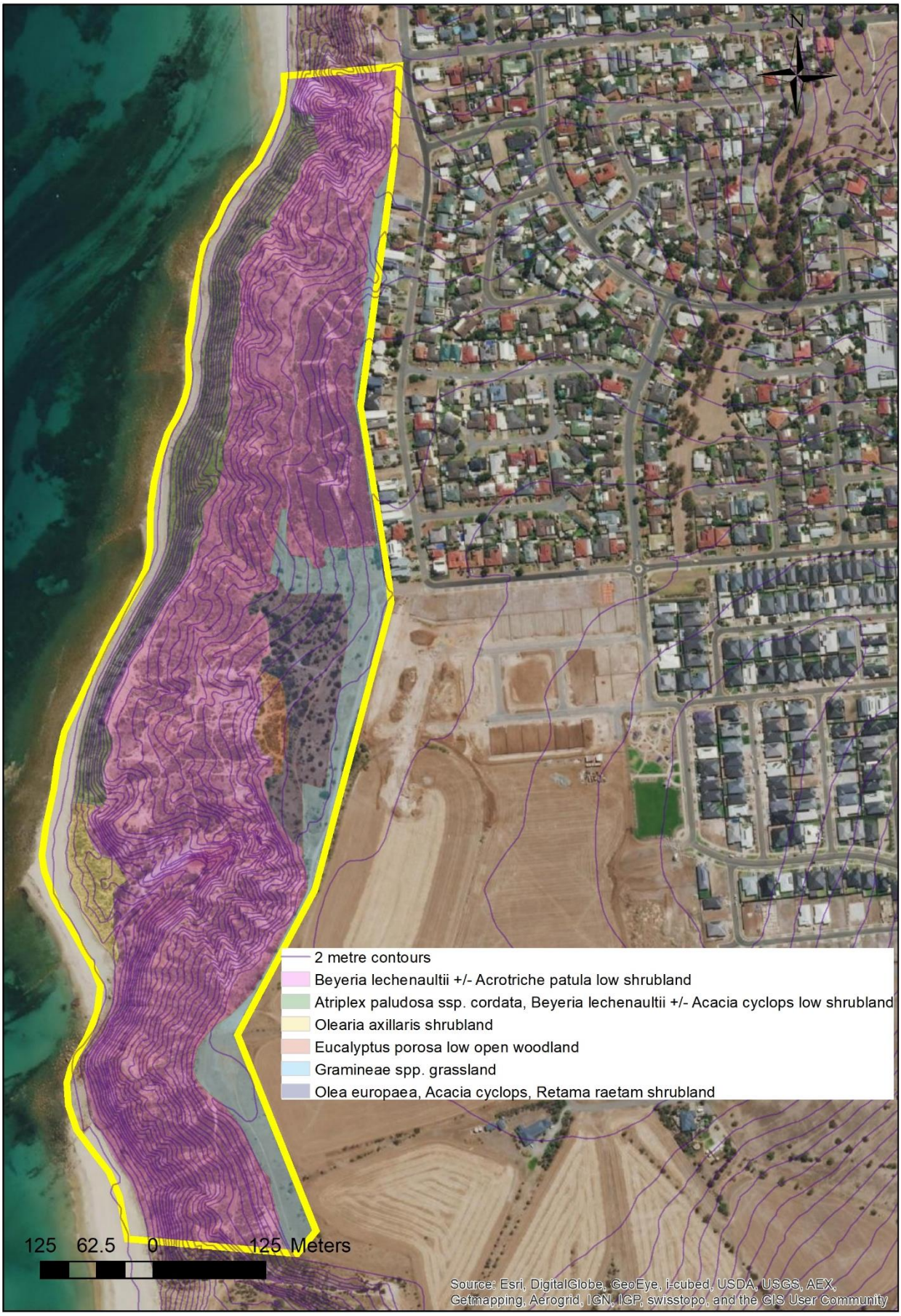

Figure 4: Topography and vegetation types present in the study area

Table 2: List of native plant species recorded in the study area

Species	Common Name	Conservation Status			Date last record [7]	Recorded this survey
		AUS[8]	SA[9]	Bioregion [10]		
Acacia acinacea	Wreath Wattle			NT	20/6/2022	1
Acacia cupularis	Cup Wattle			RA	18/6/2022	1
Acacia ligulata	Umbrella Bush			RA	3/11/1993	
Acacia longifolia ssp. sophorae	Coastal Wattle			LC	22/10/1997	
Acacia paradoxa	Kangaroo Thorn			LC	20/6/2022	1
Acrotriche patula	Prickly Ground-berry			NT	13/6/2022	1
Allocasuarina verticillata	Drooping Sheoak			LC	16/6/2022	1
Alyxia buxifolia	Sea Box			RA	21/6/2022	1
Aristida behriana	Brush Wire-grass			LC	15/4/2022	1
Atriplex cinerea	Coast Saltbush			LC	1/01/1990	
Atriplex paludosa ssp. cordata	Marsh Saltbush			LC	16/6/2022	1
Austrostipa drummondii	Cottony Spear-grass			NT	3/11/1993	1
Austrostipa elegantissima	Feather Spear-grass			LC	9/5/2022	1
Austrostipa flavescens	Coast Spear-grass			LC	17/1/2022	
Austrostipa mollis	Soft Spear-grass			LC	22/10/1997	1
Austrostipa sp.	Spear-grass				3/11/1993	1
Beyeria lechenaultii	Pale Turpentine Bush			NT	9/6/2022	1
Billardiera cymosa ssp. cymosa	Sweet Apple-berry			LC	3/11/1993	
Burchardia umbellata	Milkmaids			LC	22/10/1997	
Caesia calliantha	Blue Grass-lily			LC	22/10/1997	
Calocephalus citreus	Lemon Beauty-heads			NT	3/11/1993	
Carpobrotus rossii	Native Pigface			LC	1/01/1990	1
Cassytha glabella f. dispar	Slender Dodder-laurel			LC	22/10/1997	1
Cassytha pubescens	Downy Dodder-laurel			LC		1
Chloris truncata	Windmill Grass			LC	22/10/1997	1
Comesperma volubile	Love Creeper			RA	22/10/1997	1
Convolvulus angustissimus ssp. angustissimus (NC)	Narrow-leaf Bindweed			NT		1
Convolvulus erubescens (NC)	Australian Bindweed				3/11/1993	
Dampiera rosmarinifolia	Rosemary Dampiera			NT	8/11/2021	1
Dianella brevicaulis	Short-stem Flax-lily			NT	22/10/1997	1
Dianella revoluta var. revoluta	Black-anther Flax-lily			LC		1
Disphyma crassifolium ssp. clavellatum	Round-leaf Pigface			LC	20/6/2022	1
Distichlis distichophylla	Emu-grass			LC	22/10/1997	1
Dodonaea viscosa ssp. spatulata	Sticky Hop-bush			LC	21/6/2022	1
Enchylaena tomentosa var. tomentosa	Ruby Saltbush			LC	21/6/2022	1
Eucalyptus porosa	Mallee Box			NT	3/11/1993	1
Eutaxia microphylla	Common Eutaxia			LC	14/6/2022	1
Ficinia nodosa	Knobby Club-rush			LC	3/11/1993	1

[7] These data have been sourced from the South Australian Department for Environment and Water Biological Database of SA. Recordset number DEWNRBDBSA220329-2, or from iNaturalist https://www.inaturalist.org/projects/naturehoodz-moana-south-conservation-area?tab=stats, https://www.inaturalist.org/projects/naturehoodz-ochre-point-cliff-reserven accessed 22/6/2022.

[8] Environment Protection and Biodiversity Conservation Act 1999

[9] Schedules of the National Parks and Wildlife Act 1972

[10] 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.

Species	Common Name	Conservation Status			Date last record [7]	Recorded this survey
		AUS[8]	SA[9]	Bioregion [10]		
Gahnia filum	Thatching Grass			VU	20/6/2022	1
Gahnia lanigera	Black Grass Saw-sedge			RA	2/12/2021	1
Geranium sp.	Geranium				3/11/1993	
Glycine rubiginosa	Twining Glycine			LC	3/11/1993	
Goodenia arguta	Toothed Velleia			RA	3/11/1993	1
Goodenia pinnatifida	Cut-leaf Goodenia			NT	22/10/1997	
Goodenia willisiana	Silver Goodenia			RA	16/6/2022	1
Grevillea lavandulacea ssp. lavandulacea	Spider-flower			LC	3/11/1993	1
Hakea rugosa	Dwarf Hakea			NT	19/6/2022	1
Helichrysum leucopsideum	Satin Everlasting			NT	22/10/1997	1
Juncus kraussii	Sea Rush			LC	1/01/1990	
Kennedia prostrata	Scarlet Runner			LC		1
Kunzea pomifera	Muntries			RA	3/11/1993	1
Lepidosperma congestum (NC)	Clustered Sword-sedge			RA	3/11/1993	1
Lepidosperma viscidum	Sticky Sword-sedge			LC	22/10/1997	1
Leptorhynchos squamatus ssp. squamatus	Scaly Buttons			LC	22/10/1997	1
Leptorhynchos tetrachaetus	Little Buttons			RA	17/11/2021	
Leucophyta brownii	Coast Cushion Bush			NT	1/01/1990	
Leucopogon parviflorus	Coast Beard-heath			NT	20/6/2022	1
Lomandra densiflora	Soft Tussock Mat-rush			LC	3/11/1993	1
Lomandra effusa	Scented Mat-rush			RA	21/6/2022	1
Lomandra micrantha ssp.	Small-flower Mat-rush			LC	22/10/1997	1
Maireana brevifolia	Short-leaf Bluebush			LC	1/01/1990	
Maireana enchylaenoides	Wingless Fissure-plant			LC	22/10/1997	1
Melaleuca lanceolata	Dryland Tea-tree			RA	18/6/2022	1
Minuria leptophylla	Minnie Daisy			RA	3/11/1993	1
Muehlenbeckia gunnii	Coastal Climbing Lignum			LC	18/6/2022	1
Myoporum insulare	Common Boobialla			NT	3/11/1993	1
Myoporum parvifolium	Creeping Boobialla		R	VU	21/6/2022	1
Nitraria billardierei	Nitre-bush			RA	12/6/2022	1
Olearia axillaris	Coast Daisy-bush			NT	20/6/2022	1
Olearia ramulosa	Twiggy Daisy-bush			LC	22/10/1997	
Opercularia turpis	Twiggy Stinkweed			NT	3/11/1993	1
Opercularia varia	Variable Stinkweed			LC	22/10/1997	
Oxalis perennans (NC)	Native Sorrel			LC	3/11/1993	
Oxalis perennans/exilis	Native Oxalis				22/10/1997	
Pimelea flava ssp. dichotoma	Diosma Riceflower			NT	22/10/1997	
Pimelea glauca	Smooth Riceflower			NT	3/11/1993	1
Pimelea micrantha	Silky Riceflower			NT	3/11/1993	
Pimelea serpyllifolia ssp. serpyllifolia	Thyme Riceflower			NT	16/6/2022	1
Pittosporum angustifolium	Native Apricot			NT	3/11/1993	1
Plantago hispida	Hairy Plantain			NT	22/10/1997	
Poa poiformis var. poiformis	Coast Tussock-grass			LC		1
Poa sp.	Meadow-grass/Tussock-grass				3/11/1993	
Pogonolepis muelleriana	Stiff Cup-flower			NT	22/10/1997	
Pomaderris paniculosa ssp. paniculosa	Mallee Pomaderris			NT	13/6/2022	1
Pultenaea tenuifolia	Narrow-leaf Bush-pea			RA	1/01/1990	

Species	Common Name	Conservation Status			Date last record [7]	Recorded this survey
		AUS[8]	SA[9]	Bioregion [10]		
Rhagodia candolleana ssp. candolleana	Sea-berry Saltbush			LC	21/6/2022	1
Roepera aurantiaca ssp. aurantiaca	Shrubby Twinleaf					1
Roepera confluens	Forked Twinleaf			VU	3/11/1993	
Rytidosperma caespitosum (NC)	Common Wallaby-grass			LC	8/5/2022	
Rytidosperma sp.	Wallaby-grass				3/11/1993	1
Salsola australis	Buckbush			LC		1
Santalum acuminatum	Quandong			RA	21/6/2022	1
Scaevola albida var. albida	Pale Fanflower			LC	18/6/2022	1
Scaevola crassifolia	Cushion Fanflower			VU	3/11/1993	1
Sclerolaena diacantha	Grey Bindyi			RA		1
Sebaea ovata	Yellow Sebaea			NT	22/10/1997	
Senecio pinnatifolius var.	Variable Groundsel				22/10/1997	1
Spergularia marina	Salt Sand-spurrey			NE		1
Spinifex hirsutus	Rolling Spinifex			LC	14/6/2022	1
Stackhousia monogyna (NC)	Creamy Candles			NT	3/11/1993	1
Styphelia humifusa	Cranberry Heath			LC	22/10/1997	1
Suaeda australis	Austral Seablite			NT		1
Tetragonia implexicoma	Bower Spinach			LC	3/11/1993	1
Themeda triandra	Kangaroo Grass			LC	3/11/1993	1
Threlkeldia diffusa	Coast Bonefruit			NT	13/6/2022	1
Thysanotus patersonii	Twining Fringe-lily			LC	22/10/1997	
Velleia arguta	Toothed Velleia			RA	17/6/2022	

Rating codes: LC= Least Concern, NT = Near Threatened; RA = Rare; VU = Vulnerable; EN=Endangered

3.2 Native vertebrate fauna (including fauna of conservation significance)

3.3.1 Terrestrial vertebrates

The Biological Database of South Australia (BDBSA) lists no reptile records in the study area. It is likely the area would form habitat for several small skink and gecko species, including the Four-toed Earless Skink (*Hemiergis peronii*), Marbled Gecko (*Christinus marmoratus*), the Three-toed Earless Skink (*Hemiergis decresiensis*), the Eastern Striped Skink (*Ctenotus spaldingi*), Southern Four-toed Slider (*Lerista dorsalis*), Bougainville's Skink (*Lerista bougainvillii*) and the Dwarf Skink (*Menetia greyii*), with the latter species observed during field inspection. The area would also likely form habitat for larger reptile species including the Sleepy Lizard (*Tiliqua rugosa*), Eastern Bluetongue (*Tiliqua scincoides*) and Eastern Brown Snake (*Pseudonaja textilis*). The Eastern Bearded Dragon (*Pogona barbata*) has been observed in the site.[11]

The Western Grey Kangaroo (*Macropus fuliginosus*) may possibly occur in the study area from time to time, and the State Rare Common Brush-tailed Possum (*Trichosurus vulpecula*) may also be present.

3.3.2 Birds

Only one species has been recorded in the study area on the Biological Database of South Australia, or the Birds Australia database - the Nationally Vulnerable Hooded Plover (*Thinornis cucullatus*

[11] Matt Endacott, pers. comm.

cucullatus). A search of these two databases indicates that there have been over 200 bird species recorded from within 5km of the site (Appendix 2). However, this would include historical records of species that are no longer present, and seabirds and ocean-going birds that would not use inland habitat. Common native species encountered during field survey included the Singing Honeyeater (*Gavicalis virescens*), Magpielark (*Grallina cyanoleuca*), Australian Magpie (*Gymnorhina tibicen*), Crested Pigeon (*Ocyphaps lophotes*), New Holland Honeyeater (*Phylidonyris novaehollandiae*), Willie Wagtail (*Rhipidura leucophrys leucophrys*) and Nankeen Kestrel (*Falco cenchroides*). The City of Onkaparinga has been gathering data for Moana South and Ochre Point though the inaturalist program, where community members contribute flora and fauna records to the inaturalist website. Species recorded for these sites are the Singing Honeyeater (*Gavicalis virescens*) and Australian Magpie (*Gymnorhina tibicen*).

The Nationally Vulnerable Hooded Plover (Eastern) (*Thinornis rubricollis rubricollis*) is known to nest on the beach adjacent to the site, and likely utilises the dune area for shelter at times. Hooded Plovers nest on beaches between the high water mark and the dunes and are therefore vulnerable to the impacts of people and predators such as dogs and foxes[12]. Volunteers for Birdlife Australia monitor the Hooded Plovers at Ochre Cove. This monitoring has been undertaken since 2014-15, when the pair of Hooded Plovers moved to the site from their previous nesting site in the dunes alongside the creek at the carpark at the end of Gulf Parade. Birdlife Australia also actively manages the site with fences around nesting areas and signage to help prevent disturbance. Despite this intensive effort, in the eight breeding seasons since they arrived at the site, from 29 nesting attempts, only 5 chicks have fledged. Nest failures have been mostly attributed to foxes or unknown predators, although on six occasions the nest has also been washed out by the tide[13]. This loss due to tidal surges has been attributed to the predation of nests by foxes causing the birds to move their nests from the dunes to the beach where they have better visibility of predators, but higher risk of loss through tidal surges. It is estimated that there are 50-70 Hooded Plovers remaining on the Fleurieu coastline.

BirdLife Australia and Deakin University are looking to trial acoustic and scent deterrent trials (with Green Adelaide support) to reduce the impact of foxes, and Green Adelaide are looking to implement a den detector dog program[14]. Ochre Cove would be a high priority site for these methods to be trialled.

City of Onkaparinga Council, at the time of writing this plant. had their Dog By-law out for public consultation which incorporates some changes to protect Hooded Plovers. There is a proposal that dogs should be on-leash 100m from a sign that indicates Hooded Plover breeding, and Council will continue with their current by-law that prohibits dogs from within the fenced areas established during Hooded Plover breeding season. If the proposal is implemented, it would mean that dogs will need to be on leash for about 200m outside the fenced zone which would benefit chicks (and adults) that go outside the fenced area to feed[14].

[12] Department of the Environment (2014). Conservation Advice *Thinornis rubricollis rubricollis* hooded plover (eastern). Canberra: Department of the Environment.
[13] Sue and Ash Read, pers. comm..
[14] Emma Stephens, pers. comm.

3.3.3 Bats

There are eight species of bats that commonly occur in the Mount Lofty Ranges[15], namely Gould's Wattled Bat (*Chalinolobus gouldii*), Chocolate Wattled Bat (*Chalinolobus morio),* Southern Freetail Bat (*Mormopterus planiceps*), Lesser Long-eared Bat (*Nyctophilus geoffroyi*), White-striped Freetail bat (*Austronomus australis*), Large Forest Bat (*Vespadelus darlingtonia*), Southern Forest Bat (*Vespadelus regulus*) and Little Forest Bat (*Vespadelus vulturnus*). All of these species except the Little Forest Bat have been recorded within 5km of the site. Whilst there are limited hollows available in the site, the aerial space above the site is likely to be used for foraging for many of these species.

3.3.4 Invertebrates

The suite of habitats within Ochre Point would provide habitat for a broad array of invertebrate species. However there has been no specific survey for invertebrates in the Park, and no records exist on the Biological Database of South Australia. Table 3 provides a list of butterflies that do or may occur in the site, based upon the known distribution of butterflies and the host plants present in the site.

[15] Armstrong, D.M., Croft, S.J., and Foulkes, J.N. (2003). A biological Survey of the Southern Mount Lofty Ranges, South Australia , 2000-2001. Department for Environment and Heritage, South Australia.

Table 3: Butterflies previously recorded or inferred for Ochre Point[16]

Species Name	Common Name	Food plants	Observed / inferred
**Pieris rapae*	Cabbage white	Wild mustards	Observed
Anisynta cynone	Grass skipper	Native and weedy grasses. In this site it has been observed in the patch of Perennial Veldt Grass (**Ehrharta calycina*).	Observed
Antipoda atralba	Diamond hedge skipper	*Gahnia lanigera*	Observed
Belenois java teutonia	Caper White	Caper bush, *Capparis mitchellii*	Inferred
Candalides acasta	Blotched blue	*Cassytha spp.*	Inferred
Candalides heathi	Rayed blue	*Pimelea spp*.; weedy *Plantago spp.*	Inferred
Danaus chrysippus	Lesser wanderer	Broad Leaf Cotton Bush (*Gomphocarpos cancellatus*) milkweed	Inferred
Danaus plexippus	wanderer		Inferred
Eurema smilax	Small grass-yellow	Low *Senna spp.*	Inferred
Geitoneura kluggii	Klug's Xenica	Native grasses	Inferred
Heteronympha merope	Common brown	Grasses	Inferred
Jalmenus icilius	Icilius blue	*Acacia victoriae, A. pycnantha*	Inferred
Junonia/Precis villida	Meadow argus	Weedy *Plantago spp.*	Inferred
Lucia limbaria	Grassland copper	*Oxalis perennans*	Inferred
Nacaduba biocellata	Blue-spotted blue-line	*Acacia ligulata; A. victoriae*	Inferred
Ocybadistes walkeri hypochlorus	Southern Grass-dart	Native Grasses	Inferred
Ogyris amaryllis	Satin azure	*Amyema melaleuca*	Inferred
Papilio anactus	Dainty Swallowtail	Citrus	Inferred
Papilio demoleus	Chequered swallowtail	*Psoralea spp.*	Inferred
Theclinesthes miskini		*Acacia pycnantha, A. victoriae*	Inferred
Theclinesthes serpentata	Chequered blue	Chenopods	Inferred
Vanessa itea	Australian Admiral	Stinging Nettle	Inferred
Vanessa kershawi	Painted lady	Helichrysum spp., Cape Weed	Inferred
Zizina labradus/otis	Common grass blue	Lotus australis, *Psoralea spp.,* clover	Inferred

4 ENVIRONMENTAL THREATS (management issues)

Management issues that are of particular concern in terms of biodiversity conservation at Ochre Point include:

- weed infestation;
- pest animals;
- impacts from adjoining landholders;
- dumping;
- prospecting/foraging in the site
- erosion;
- inappropriate plantings; and
- unmanaged trails.

[16] Table provided by Matt Endacott, Metro Coastal Conservation Officer

4.1 Invasive weeds

Invasive weed species have the potential to dominate the understorey, impact on the overstorey, and reduce habitat values for native fauna, as well as competing with native flora. Table 4 lists the weeds of concern that have been recorded in the area, from both this survey and the Biological Database of South Australia. These are high threat weeds that meet one or more of the following criteria:

- Declared under the *Landscapes South Australia Act 2019;* and/or
- Red Alert weed rating of 3 or more (the rating is from 1-5, with 5 representing highest threat); and/or
- Metropolitan Adelaide and Northern Coastline Action Plan weed threat rating of 3 or more (the threat rating is from 1-10, with 10 being extremely threatening); and/or
- non-indigenous woody and herbaceous species noted to be proliferating in the site.

Table 4: List of Priority Weeds for control in Ochre Point

Species	Common Name	[17]Red Alert	MANCAP[1] rating	[18]Declared	Lifeform	Notes[19]
Acacia cyclops	Western Coastal Wattle	3	7		Shrub	Non-indigenous native shrub species originating from sandy environments in western South Australia. Proliferates widely in coastal environments. Figure 5b shows that this species is abundant through central parts of the site, but less prevalent in the good condition coastal heath areas.
Acacia saligna	Golden Wreath Wattle	2	2		Shrub	Non-indigenous Australian native shrub. Can spread, but not as aggressive as *Acacia cyclops*. Detected in good condition coastal heath areas (Figure 5c).
Agave americana	Century Plant	2	3		Succulent	Large cacti with distinctive long flowering stems. Patches in central sections of the site as per Figure 5a.
Aizoon pubescens	Coastal Galenia	2	5		Mat plant	Long lived perennial herbaceous plant which forms a dense mat of vegetation on the ground. A weed of highly disturbed sites, waste areas and coastal environs[20]. Generally found in more disturbed introduced grassland areas on the eastern side of the site (Figure 5d)..
Asparagus asparagoides forma	Bridal Creeper	5	7	Y	Climber	A winter-growing, summer-dormant climbing perennial. Widespread in South Australia and considered to be a Weed of National Significance. Noted as plentiful in more disturbed heath areas in northern sections of the site (Figure 5e) when field

[17] Refer to Croft, S.J., J.A. Pedler & T.I. Milne (2005 – 2008) Bushland Condition Monitoring Manual. Nature Conservation Society of SA Inc.
[18]Under the *Landscape South Australia Act 2019*
[19] Specific information on Declared plants sourced through Declared Plant Policies in South Australia: https://pir.sa.gov.au/biosecurity/weeds_and_pest_animals/weeds_in_sa/plant_policies
[20] https://keyserver.lucidcentral.org/weeds/data/media/Html/galenia_pubescens_var._pubescens.htm accessed 3/6/21.

Species	Common Name	[17]Red Alert	MANCAP[1] rating	[18]Declared	Lifeform	Notes[19]
						assessment undertaken (March 2022), but may be more abundant as this species would have died back at this time of the year.
Asteriscus spinosus	Golden Pallensis	2			Forb	Forb to 50cm with characteristic spiny bracts. May spread widely in this site, and able to colonise heathland environments. Currently heavily grazed by rabbits, and only scattered plants noted in disturbed central sections of the site.
Cenchrus clandestinus	Kikuyu	3	5		Perennial grass	Rhizomatous grass, which can aggressively spread, particularly in moist environments.
Chrysanthemoides monilifera ssp. monilifera	Boneseed	3	6	Y	Shrub	A Weed of National Significance (WONS). Introduced from South Africa as an ornamental garden plant, and is now established as a significant weed of native bushland in coastal and inland South Australia[21]. Sparsely present in areas in good condition, abundant in central sections (Figure 5f).
Cynara cardunculus ssp. flavescens	Artichoke Thistle	2	3		Tall forb	Tall thistle that can proliferate in disturbed environments. Dense patches in introduced grassland on eastern boundary of site, and in the coastal dunes, but generally scattered elsewhere (Figure 5g).
Echium plantagineum	Salvation Jane	2	2	Y	Forb	Short-lived herbaceous plant usually growing 20-60 cm tall. Only noted as scattered plants (Figure 5h) when inspections undertaken (March 2022), but may be more abundant in winter/spring.
Ehrharta calycina	Perennial Veldt Grass	4	6		Perennial grass	Tussocky grass introduced to South Australia to stabilise sandy soils. One main patch in central parts of the site (see Figure 5a).
Ehrharta villosa var. maxima	Pyp Grass		8		Perennial rhizomatous grass	Pyp Grass is a rhizomous perennial grass that grows to 1.2 metres high. In sandy areas it has the capacity to spread widely, forming thick mats and preventing native plant species recruitment, as well as fundamentally changing dune structure. Not noted during field inspection. High priority to eradicate if present.
Euphorbia paralias	Sea Spurge	3	5		Forb	Long-lived perennial herbaceous plant. Generally colonises the foredunes at the back of the beach, forming dense infestations that stabilise the dunes, preventing natural sand movement inland, and creating a different dune structure to that created by native species. This can also decrease the availability of beach

[21] Government of South Australia Declared Plant Policy Boneseed (*Chrysanthemoides monilifera*).

Species	Common Name	[17]Red Alert	MANCAP[1] rating	[18]Declared	Lifeform	Notes[19]
						nesting sites for shore birds[22]. Dense in dune environments (Figure 5i).
Euphorbia terracina	False Caper	3	5	Y	Forb	A perennial native to the coastal sand dunes bordering the Mediterranean, now widespread in South Australia on sandy and coastal soils.
Gazania linearis	Gazania	4	6	Y	Forb	A tough, low-growing perennial with brightly coloured daisy flowers, native to South Africa. It invades coastal habitats, and can severely alter the vegetation structure in plant communities by replacing and suppressing native plants[23]. Generally scattered in more disturbed habitats (Figure 5j), but could spread widely though much of the site if left untreated.
Gomphocarpus cancellatus	Broad-leaved Cotton-bush	2	3		Shrub	Shrub to 1.2m high. A common environmental weed of the Adelaide region. Scattered only. Food plant for the Lesser Wanderer (*Danaus chrysippus petilia*) and Wanderer (*Danus plexippus*). Scattered through southern sections of the site (Figure 5k).
Leptospermum laevigatum	Coast Tea-tree	4	6		Shrub	Non-indigenous Australian native that can spread widely in coastal environments. Not observed during field survey.
Lycium ferocissimum	African Boxthorn	3	6	Y	Shrub	African boxthorn is a large spiny shrub, introduced by settlers as a hedge plant and now widespread across South Australia. It invades unimproved grazing land and native vegetation, particularly on coasts and creeklines where it can form dense thickets. Considered a Weed of National Significance. Patchily present throughout, with highest density in snad dunes area (Figure 5l), but appears to have been the focus of weed control activities.
Marrubium vulgare	Horehound	3	5	Y	Forb	Horehound is an unpalatable perennial herb that increases by seed produced in tiny burrs. Only noted in disturbed introduced grassland areas along the eastern side of the site.
Olea europaea	Olive	4	4	Y	Tree	Olives are evergreen trees that originate from the Mediterranean region. They were first introduced to South Australia in 1836 and have since become naturalised, especially in woodland habitats. Widespread through the site but generally

[22] https://keyserver.lucidcentral.org/weeds/data/media/Html/euphorbia_paralias.htm accessed 26/5/21.
[23] https://keyserver.lucidcentral.org/weeds/data/media/Html/gazania_linearis.htm#:~:text=Gazania%20(Gazania%20linearis) %20is%20regarded,open%20woodlands%20in%20inland%20areas accessed 26/5/21.

Species	Common Name	[17]Red Alert	MANCAP[1] rating	[18]Declared	Lifeform	Notes[19]
						scattered aside from central sections, where cover is up to 5% (Figure 5m).
Opuntia sp.	Opuntioid cacti	2	1		Succulent	Only noted at one location in a gully on the southern side of Ochre Cove. May spread more widely if left untreated. Figure 5a shows the location of the one specimen observed.
Oxalis pes-caprae	Soursob	4	5		Bulb/forb	Soursob is a bulbous perennial with conspicuous yellow flowers, and is a widespread weed in gardens, broadacre cropping and pasture. The forms of soursob naturalised in Australia do not produce seed, and so it is spread only as bulbs, which are moved in contaminated soil.
Polygala myrtifolia	Myrtle-leaf Milkwort	4	6	Y	Shrub	*Polygala myrtifolia* is a South African garden escape, a shrub growing up to 3 metres tall. It has become established in some coastal areas on Eyre Peninsula, Yorke Peninsula, Kangaroo Island, and more generally in the Hills and Fleurieu and Limestone Coast regions. Not dertected during field survey.
Retama raetam	White Weeping Broom	2	4	Y	Shrub	The weeping white brooms are shrubs from the Mediterranean basin that are planted as ornamentals and encroach into native vegetation. In this site, they are a significant issue, especially through central parts (Figure 5n), where cover is estimated as 1-5% overall..
Scabiosa atropurpurea	Pincushion	3	3		Forb	Annual or short lived perennial herb. Prefers coastal soils with free lime[24]. Plentiful but generally low cover through central and western sections of the site (Figure 5o).
Thinopyrum junceiforme	Sea Wheat-grass	4	3		Grass	Sea Wheat-grass is an introduced species that often occurs on the incipient dune in dune systems, as it is a rapidly colonising species. In this site it is highest cover in the dune vegetation (Figure 5p).

[24] http://www.herbiguide.com.au/Descriptions/hg_Pincushion.htm accessed 3/6/21.

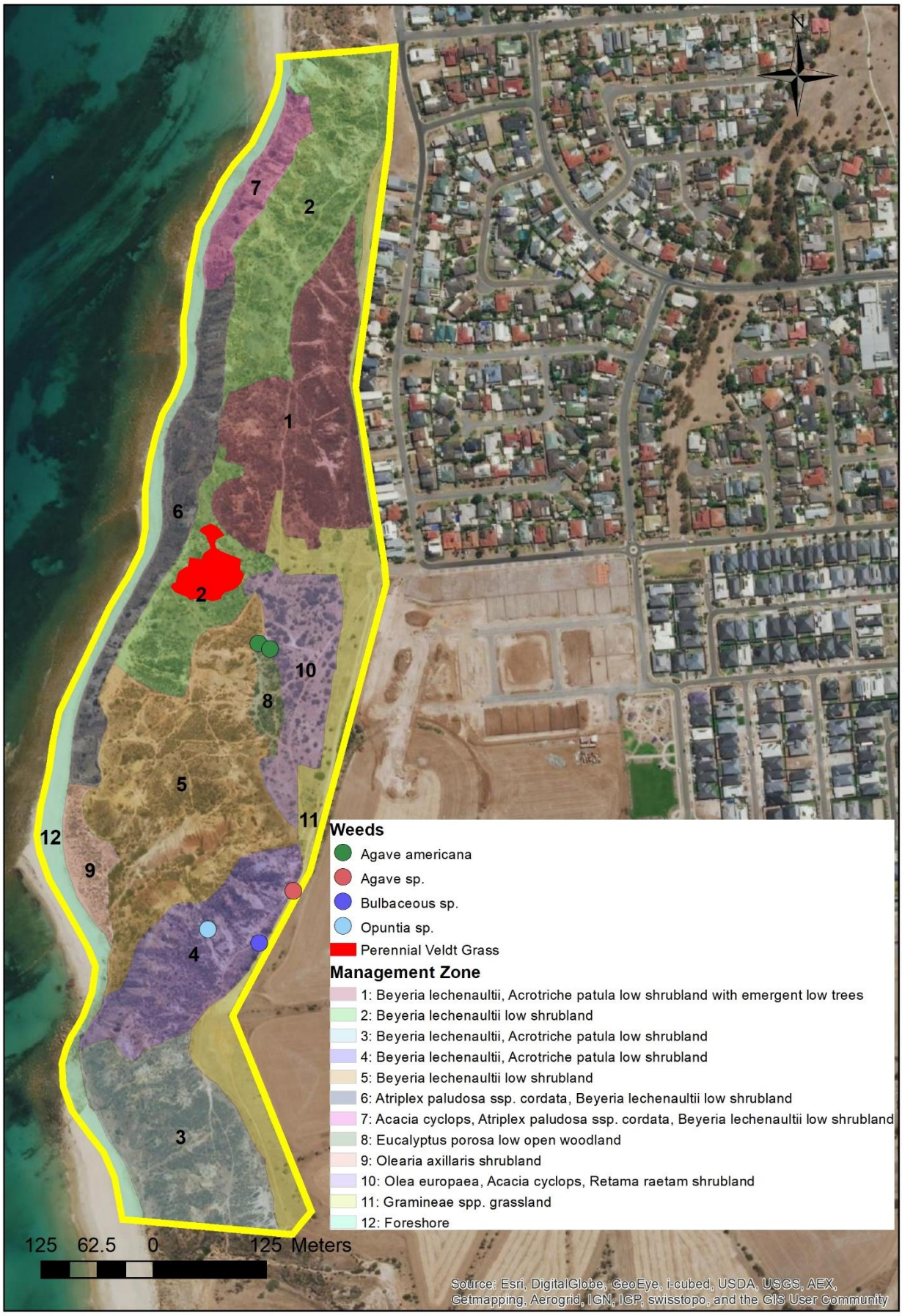

Figure 5a: Specific locations of priority weeds that are of limited distribution in the site.

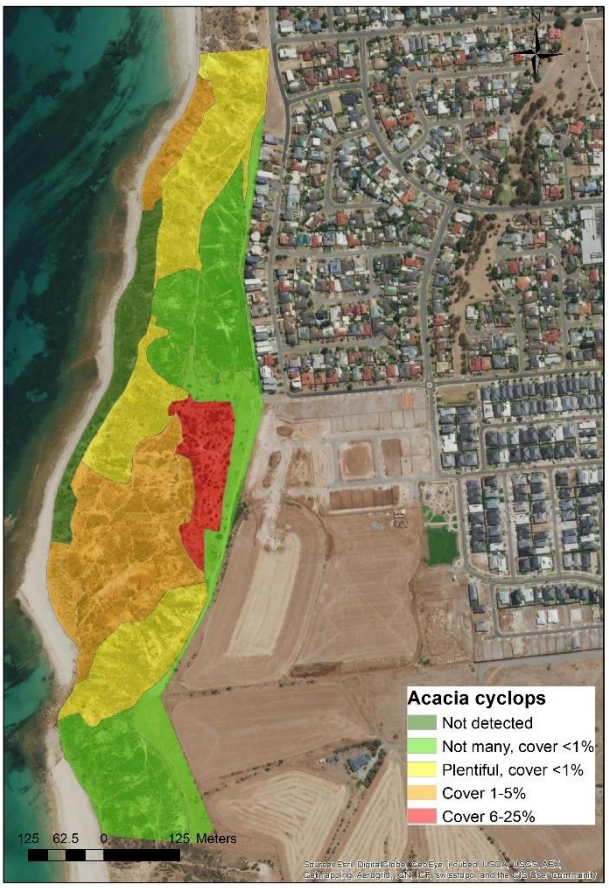

Figure 5b: Current distribution of *Acacia cyclops*

Figure 5c: Current distribution of *Acacia saligna*

Figure 5d: Current distribution of *Aizoon pubescens*

Figure 5e: Current distribution of *Asparagus asparagoides*

Figure 5f: Current distribution of *Chrysanthemoides monilifera*

Figure 5g: Current distribution of *Cynara cardunculus*

Figure 5h: Current distribution of *Echium plantagineum*

Figure 5i: Current distribution of *Euphorbia paralias*

Figure 5j: Current distribution of *Gazania linearis*

Figure 5k: Current distribution of *Gomphocarpos cancellatus*

Figure 5l: Current distribution of *Lycium ferocissimum*

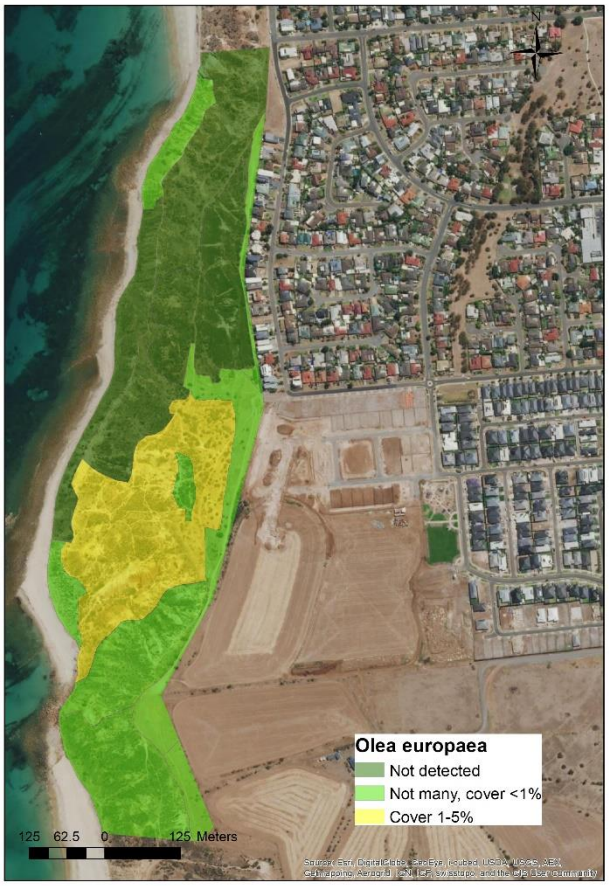

Figure 5m: Current distribution of *Olea europaea*

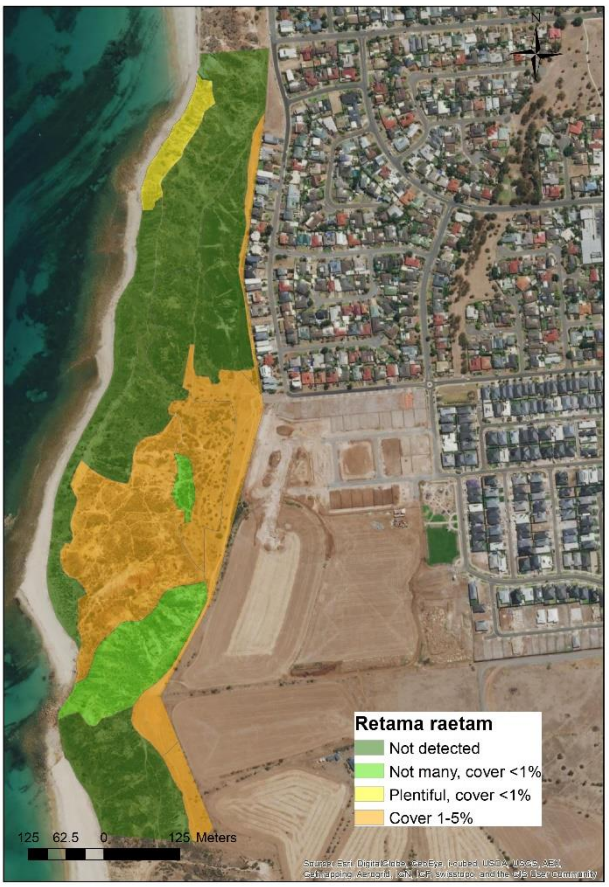

Figure 5n: Current distribution of *Retama raetam*

Figure 5o: Current distribution of *Scabiosa atropurpurea*

Figure 5p: Current distribution of *Thinopyrum junceiforme*

Figure 6: *Agave americana* patch. Image taken at 269767, 6099941 (Zone 54, WGS 84) on 30/3/2022.

Figure 7: *Ehrharta calycina* patch. Note also the large hole, considered likely to be a rabbit warren that has been converted to a fox den. Image taken at 269747, 6100010 (Zone 54, WGS 84) on 23/3/2022.

Figure 8: *Opuntia sp.*. Only one individual was noted, but this species has the potential to spread and should be eradicated. Image taken at 269711, 6099623 (Zone 54, WGS 84) on 30/3/2022.

4.2 Pest animals

Table 5 lists the introduced animal species that are considered likely to be present in the site.

Table 5: List of introduced animal species present, or considered likely to be present, in the site

Species	Common Name
Mammals	
Felis catus	Feral Cat
Mus musculus	House Mouse
Rattus rattus	Black Rat
Canis familiaris	Dog
Vulpes vulpes	Fox
Oryctolagus cuniculus	Rabbit
Lepus europaeus	Hare
Birds	
Carduelis carduelis	European Goldfinch
Columba livia	Feral Pigeon
Passer domesticus	House Sparrow
Spilopelia chinensis	Spotted Dove
Sturnus vulgaris	Common Starling
Turdus merula	Blackbird

Of these introduced animals, rabbits and hares pose a significant concern due to potential impacts on regeneration of native species, along with possible erosion impacts. Active rabbit warrens were noted during field inspection (see Figure 9). Feral cats and foxes that will prey on native fauna are likely to be impacting insect, bird and reptile populations in the study site, and foxes are known to

be preying on eggs and young of the nationally Vulnerable Hooded Plover (Eastern) (*Thinornis rubricollis rubricollis*) (see section 3.3.2). Off-leash dogs will also disturb Hooded Plovers and other native fauna.

Figure 9: Active rabbit warren. Image taken at 269778,6099898 (Zone 54, WGS 84) on 30/3/2022.

4.3 Recreation activities

Management of pedestrian traffic and inappropriate recreational activities is essential to help prevent unwanted impacts, such as:

- trampling or crushing of vegetation;
- compacting soil, which limits natural regeneration;
- disturbance of soil/erosion, which encourages weeds;
- introduction of weed seed; and
- disturbance/predation on native animals by domestic pets such as dogs.

There are no consolidated trails in the study area. The site is frequented by many walkers, and this activity is likely to increase given new adjacent housing developments. There is mountain bike use through the site, and there are reports of motorbike use through the area at times[25]. Many sections of the study area show multiple trails in close proximity, as shown in Figure 10. This is a significant management issue for the site, and is causing ongoing loss of vegetative cover which can lead to erosion.

[25] Matt Endacott pers. comm.

Figure 10a: Example of multiple unconsolidated trails causing loss/damage to remnant vegetation. Image taken at 269662, 6099859 (Zone 54, WGS 84) facing SW on 30/3/2022.

Figure 10b: Trail along natural crest, likely to accentuate erosion issues. Image taken at 269893,6100553 (Zone 54, WGS 84) facing W on 23/3/2022.

Towards the southern end of the site there is a launch pad for hang-gliding and para-gliding activities (see Figure 11). Whilst the area at the launch pad site is very disturbed, and little native vegetation is present, the steeply sloping land immediately to the west of the lauch site supports remnant coastal shrubland of *Beyeria lechenaultii* (Pale Turpentine Bush), with *Acrotriche patula* (Prickly Ground-berry). There have been some inappropriate activities in this area, such as dumping of old couches and garden refuse.

Figure 11: Hang-gliding / para-gliding launch pad. Image taken at 269696, 6099474 (Zone 54, WGS 84) facing S on 30/3/2022.

4.4 Erosion

Vegetation, both native and introduced, can help to reduce erosion as the roots and stems of plants help to bind the soil and reduce soil mobility. There are some sections of the study area, especially where plant cover is low and slope is steep, that show significant water erosion.

Soil landscape mapping[26] for the site shows Water Erosion Potential is Extreme. Water Erosion Potential indicates where land is inherently susceptible to sheet or rill erosion caused by overland flows (not where water erosion has been or is currently a problem). The assessment is based on inherent slope and soil erodibility characteristics. Vegetation and other protective cover occurring at the time of assessment are ignored as these can vary significantly over time[27]. This indicates that retention of significant vegetative cover is important to minimise erosion for this site.

[26] Sourced from www.naturemaps.sa.gov.au on 13/4/22
[27] https://location.sa.gov.au/lms/Reports/ReportMetadata.aspx?p_no=1049+&pa=dewnr accessed 13/4/22

4.5 Dumping

There has been historic dumping of building material and other waste over the edge of the flat land into the steep slopes and gullies, especially above Ochre Cove.

Figure 12: Detritus from past dumping activities. Image taken at 269752, 6100006 (Zone 54, WGS 84) facing SE on 23/3/2022.

4.6 Foraging/prospecting

There have been foraging/prospecting activites in some of the dumping areas, presumably from individuals searching for historic items such as old bottles (Figure 13). This digging potentially accelerates erosion and may expose dangerous items. It may also expose the prospector to risk, due to the very steep slopes on which the digging is being undertaken.

Figure 13: Diggings/foraging in old dumping area. Image taken at 269762, 6099813 (Zone 54, WGS 84) facing SSW on 30/3/2022.

4.7 Inappropriate plantings

There are a number of species that have been planted in adjoining properties towards the northern end of the site that pose a risk of spreading into the study area, including succulents, Gazania (*Gazania linearis*) (Figure 14), Rodondo creeper (*Drosanthemum candens*), Trailing African Daisy (*Osteospermum fruticosum*) and Pigface (*Ruschia tumidula*).

Figure 14: *Gazania linearis* in property adjoining the site. Image taken at 269892, 6100104 (Zone 54, WGS 84) facing S on 23/3/2022.

Figure 15: Garden plantings that may spread into the site. Image taken at 269896,6100078 (Zone 54, WGS 84) facing S on 23/3/2022.

4.8 Urbanisation and development pressure

Urbanisation and associated development within the surrounding landscape pose a significant threat to biodiversity values within the project area. New residential developments are currently being built adjacent to the study site. New residential developments coupled with the existing urban environment are likely to exacerbate threats already discussed, including;

- Increase in human interaction with fauna and flora within the project area.
- Disturbance of threatened species, especially the Nationally Vulnerable Hooded Plover (Eastern) (*Thinornis rubricollis rubricollis*).
- Potential increase in unconsolidated trails.
- Potential increase in dumping/foraging activities
- Increase in domestic animals interacting with native flora and fauna (such as local cats and dogs entering remnant vegetation, disturbing flora and preying upon or disturbing fauna species).
- Spread of weed species from local gardens.

4.9 Climate Change

In regard to climate change, the following changes are projected[28]:

a) Sea Level Rise and Storm magnitude

By 2030, a sea level rise of around 13 cm is projected compared with the average level during 1986–2005. By 2050, a sea level rise of 22–25 cm is projected compared with the average level during 1986–2005. By the end of the century, a sea level rise of between 39 and 85 cm is projected. However, if Antarctic ice sheet collapse occurs, these projections could be several tenths of a metre higher.

b) Increasing average temperatures and aridity

By 2030 annual mean daily maximum temperatures are projected to increase by up to 1.3°C, and by 2050 annual mean maximum temperatures are projected to increase by up to 2.1°C. By 2030 the frequency of days per year above 35°C in most regional centres is projected to increase by more than 30% from the baseline period of 1981 to 2010 and by 2030 the frequency of days per year above 40°C is projected to increase by more than 50% from the baseline period of 1981 to 2010. By 2030 annual rainfall across the state is projected to decline by 4.4–9.0%, from the baseline period of 1981 to 2010, and by 2050 annual rainfall is projected to decline by 6.6–15.0%. Spring rainfall declines will be greater than any other season.

c) Run-off regime change

Increasing aridity will be reflected in reduced run off: some seasonal streams will flow for fewer months, others will not flow. The intensity of rare extreme rainfall events will increase, and this will be reflected in flash floods in creeks and storm drains. What are now semi arid creeks will behave more as arid land creeks.

d) Sea surface temperature, salinity and acidification

[28] Green G and Pannell A (2020). Guide to Climate Projections for Risk Assessment and Planning in South Australia, Government of South Australia, Department for Environment and Water, Adelaide.

By 2030, mean sea surface temperatures are projected to increase by 0.5°C at Port Adelaide and Victor Harbor. pH is projected to decrease by 0.08 units (i.e. become more acidic). Salinity is projected to decrease by between 0.02 and 0.07 g/kg compared to baseline concentrations.

With regard to dune environments, the following specific threatening processes may occur as a result of climate change:

- Increasing temperatures and aridity will affect the structure and composition of vegetation communities.
- There will be reductions in geographic range of species and ecological communities and increased risk of extinction for species that are already vulnerable.
- Increasing CO_2 concentrations may impact on germination, establishment, growth and regeneration of native plant species.
- Highly invasive exotic plant and animal species may become more dominant.

This Plan recognises these potential impacts, and provides actions that will help provide resilience to the ongoing effects of climate change.

5 BIODIVERSITY MANAGEMENT STRATEGIES

5.1 Management objectives for Ochre Point

Management of the study area at Ochre Point needs to consider:

- Cultural values
- High quality remnant vegetation
- Habitat values for native flora and fauna
- Recreational and amenity values
- The need for cost effective management

The biodiversity management objectives for Ochre Point 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 whilst remaining cognisant of the recreational, cultural, educational and amenity values of the site.

5.2 Management zones

As part of this Management Plan, the area has been divided into management zones, to provide context and simplicity for management actions. These management zones are shown in Figure 16, and a description of each of the zones, representative photographs, and notes on key issues and actions for each zone is provided in following sections.

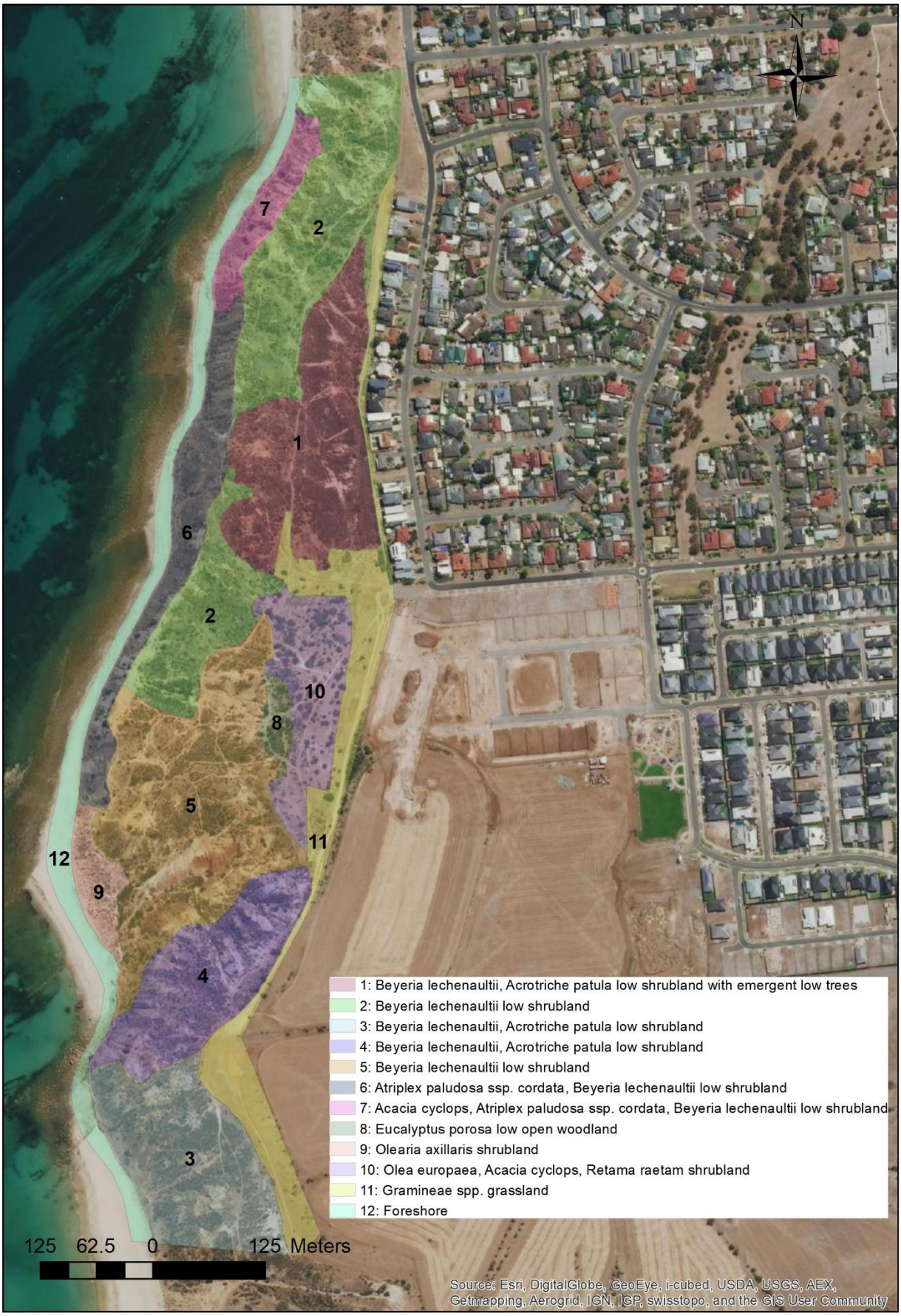

Figure 16: Management Zones for the study area

Management Zone 1

Vegetation Association: *Beyeria lechenaultii, Acrotriche patula* low shrubland with emergent *Melaleuca lanceolata, Eucalyptus porosa, Santalum acuminatum, Allocasuarina verticillata*

Photopoint 1.1, in Management Zone 1, facing NW at 269885, 6100072 (Zone 54, WGS 84) on March 23, 2022

Description of this area: This Management Zone is considered to support the vegetation in best condition in the study area, with a high species richness (40 species), good diversity of plant lifeforms, and a relatively low cover and abundance of weeds.

Beyeria lechenaultii (Pale Turpentine Bush) and *Acrotriche patula* (Prickly Ground-berry) are the dominant species in a low shrub cover of moderate density (estimated 40% projective foliage cover). There are scattered emergent tree and taller shrub species, including *Melaleuca lanceolata* (Dryland Tea-tree)*, Eucalyptus porosa* (Mallee Box)*, Santalum acuminatum* (Quandong) and *Allocasuarina verticillata* (Drooping She-oak).

Whilst grassy weeds are relatively prominent, they are estimated at <10% cover overall, with the most abundant species being **Brachypodium distachyon*. There are several high threat woody weeds present, but these are only scattered and would be a high priority for control, including Western Coastal Wattle (**Acacia cyclops*), Golden Wreath Wattle (**Acacia saligna*), Boneseed (**Chrysanthemoides monilifera*), and African Boxthorn (**Lycium ferocissimum*). Two herbaceous weed species that are considered high threat for this environment were also detected, but only at low levels – Gazania (**Gazania linearis*) and Pincushion (**Scabiosa atropurpurea*).

Key management issues in this Management Zone

- Woody and herbaceous weeds
- Maintenance of high biodiversity values, including threatened flora species

Priority activities in this Management Zone

- Control of woody weeds - Western Coastal Wattle (**Acacia cyclops*), Golden Wreath Wattle (**Acacia saligna*), Boneseed (**Chrysanthemoides monilifera*), and African Boxthorn (**Lycium ferocissimum*)
- Control of priority herbaceous/vine weeds - Bridal Creeper (**Asparagus asparagoides),* Gazania (**Gazania linearis*) and Pincushion (**Scabiosa atropurpurea*).

Management Zone 2

Vegetation Association: *Beyeria lechenaultii* low shrubland

Photopoint 2.1, in Management Zone 2, facing SW at 269862, 6100411 (Zone 54, WGS 84) on March 23, 2022

Description of this area: This vegetation is similar to Management Zone 1, however there is a significantly higher biomass of introduced grassy species, the dominant shrub layer of *Beyeria lechenaultii* (Pale Turpentine Bush) is more open, and species richness, whilst still good, is lower (31 species).

This Management Zone appears to have been exposed to higher levels of past disturbance than Zone 1. There are no emergent trees. Western Coastal Wattle (**Acacia cyclops*) is the most abundant woody weed, considered to be plentiful but overall <1% cover. There is also a patch of Perennial Veldt Grass (**Ehrharta calycina*) on a small section of sandy soil in this Zone (see Figure 6). There are several herbaceous weed species that are considered high threat for this environment, most notably Gazania (**Gazania linearis*), Coastal Galenia (**Aizoon pubescens*) and Pincushion (**Scabiosa atropurpurea*).

Key management issues in this Management Zone

- Woody, grass and herbaceous weeds

- Unconsolidated trails

Priority activities in this Management Zone

- Control of woody weeds - Western Coastal Wattle (**Acacia cyclops*),
- Control of priority herbaceous/vine weeds - Bridal Creeper (**Asparagus asparagoides),* Gazania (**Gazania linearis*), Coastal Galenia (**Aizoon pubescens*) and Pincushion (**Scabiosa atropurpurea*),
- Staged removal of Perennial Veldt Grass (**Ehrharta calycina*) (as the species is binding sandy soils, but also forms habitat for the Grass Skipper *Anisynta cynone*). Plant in *Poa poiformis var. poiformis* (Coast Tussock-grass) as a replacement species.

Management Zone 3

Vegetation Association: *Beyeria lechenaultii, Acrotriche patula* low shrubland

Photopoint 3.1, in Management Zone 3, facing SSE at 269627, 6099466 (Zone 54, WGS 84) on March 30, 2022

Description of this area: This management zone is located at the southern end of the site. *Beyeria lechenaultii* (Pale Turpentine Bush) and *Acrotriche patula* (Prickly Ground-berry) are the dominant species in a low shrub cover of moderate density (estimated 30% projective foliage cover). Species richness is good (36 species) and whilst grassy weeds, especially **Brachypodium distachyon* are prominent in the understorey, woody weeds are generally only scattered. These woody weeds include Western Coastal Wattle (**Acacia cyclops*), Boneseed (**Chrysanthemoides monilifera*), Olive (*Olea europaea*) and African Boxthorn (**Lycium ferocissimum*). There is also the herbaceous weed Pincushion (**Scabiosa atropurpurea*) that is considered high threat for this environment, and it is currently patchily present but <1% cover overall.

Key management issues in this Management Zone

- Woody and herbaceous weeds
- Unconsolidated trails
- Dumping of garden refuse and other materials

Priority activities in this Management Zone

- Control of woody weeds -Western Coastal Wattle (**Acacia cyclops*), Boneseed (**Chrysanthemoides monilifera*), Olive (*Olea europaea*) and African Boxthorn (**Lycium ferocissimum*)
- Control of priority herbaceous weed - Pincushion (**Scabiosa atropurpurea*)
- Trail consolidation

Management Zone 4

Vegetation Association: *Beyeria lechenaultii, Acrotriche patula* low shrubland

Photopoint 4.1, in Management Zone 4, facing SW at 269716, 6099590 (Zone 54, WGS 84) on March 30, 2022

Description of this area: This vegetation is similar to Management Zone 3, however woody weeds are more plentiful, most notably Western Coastal Wattle (**Acacia cyclops*), and the species richness recorded (28 species) is slightly lower. There is also scattered Boneseed (**Chrysanthemoides monilifera*), Olive (**Olea europaea*), White Weeping Broom (**Retama raetam*) and one Opuntioid Cacti (*Opuntia sp.) was also observed in a gully.

Key management issues in this Management Zone

- Woody weeds
- Unconsolidated trails

Priority activities in this Management Zone

- Control of woody weeds - Western Coastal Wattle (**Acacia cyclops*), Boneseed (**Chrysanthemoides monilifera*), Olive (**Olea europaea*), White Weeping Broom (**Retama raetam*) and one Opuntioid Cacti (*Opuntia sp.)

Management Zone 5

Vegetation Association: *Beyeria lechenaultii* low shrubland

Photopoint 5.1, in Management Zone 5, facing S at 269742, 6099925 (Zone 54, WGS 84) on March 30, 2022

Description of this area: This Management Zone incorporates the deep gully that leads to Ochre Point. The vegetation is a dominant shrub layer of *Beyeria lechenaultii* (Pale Turpentine Bush) in an open formation, and native plant species richness is moderately high at 33.

However there a number of significant management issues in this area. There are numerous unconsolidated trails, significant erosion and past dumping from the level land on the eastern side down the steeply sloping land. There is also evidence of recent digging/prospecting in this dumped material.

In addition, there are abundant high threat weeds, including Western Coastal Wattle (**Acacia cyclops*), Boneseed (**Chrysanthemoides monilifera*), Olive (**Olea europaea*) and White Weeping Broom (**Retama raetam*) all individually estimated at 1-5% cover. There is also the herbaceous weed Pincushion (**Scabiosa atropurpurea*) that is considered high threat for this environment, which is currently patchily present but <1% cover overall.

Key management issues in this Management Zone

- Woody and herbaceous weeds
- Unconsolidated trails
- Historic dumping
- Prospecting/digging in old dumped material
- Significant erosion

Priority activities in this Management Zone

- Control of woody weeds - Western Coastal Wattle (**Acacia cyclops*), Boneseed (**Chrysanthemoides monilifera*), White Weeping Broom (**Retama raetam*), Olive (**Olea europaea*) and African Boxthorn (**Lycium ferocissimum*)
- Control of priority herbaceous weed - Pincushion (**Scabiosa atropurpurea*)
- Trail consolidation
- Signage and policing to prevent dumping and prospecting

Management Zone 6

Vegetation Association: *Atriplex paludosa ssp. cordata, Beyeria lechenaultii* low shrubland

Photopoint 6.1, in Management Zone 6, facing SSW at 269707, 6100174 (Zone 54, WGS 84) on March 23, 2022

Description of this area: This Management Zone is the very steeply sloping land immediately abutting the beach in northern sections of the site. *Atriplex paludosa ssp. cordata* (Marsh Saltbush) is a co-dominant with *Beyeria lechenaultii* (Pale Turpentine Bush) in a low open shrubland formation. Species richness is moderate at 15 species, but this is considered appropriate for such steeply sloping, shallow soils in a coastal environment.

There are scattered Gazania (**Gazania linearis*) present, and annual grassy weeds are moderately abundant, but there appears to have been recent control of Western Coastal Wattle (**Acacia cyclops*) in this Zone, and no mature individuals were noted.

Key management issues in this Management Zone

- Woody and herbaceous weeds

Priority activities in this Management Zone

- Control of woody weed - Western Coastal Wattle (**Acacia cyclops*)
- Control of priority herbaceous weed - Gazania (**Gazania linearis*)

Management Zone 7

Vegetation Association: *Acacia cyclops, Atriplex paludosa ssp. cordata, Beyeria lechenaultii* low shrubland

Photopoint 7.1, in Management Zone 7, facing NW at 269741, 6100352 (Zone 54, WGS 84) on March 23, 2022

Description of this area: This Management Zone is similar to Management Zone 6, but there are higher levels of Western Coastal Wattle (**Acacia cyclops*) and Gazania (**Gazania linearis*).

Key management issues in this Management Zone

- Woody and herbaceous weeds

Priority activities in this Management Zone

- Control of woody weed - Western Coastal Wattle (**Acacia cyclops*)
- Control of priority herbaceous weed - Gazania (**Gazania linearis*)

Management Zone 8

Vegetation Association: *Eucalyptus porosa* low open woodland

Photopoint 8.1, in Management Zone 8, facing S at 269770, 6099866 (Zone 54, WGS 84) on March 30, 2022

Description of this area: This Management Zone is a small section on the plateau to the east of the steeply sloping land in the central parts of the site. It contains a small remnant of low open Mallee Box (*Eucalyptus porosa*) woodland. The trees, due to exposure to the prevailing westerly coastal winds, are stunted and less than 4m in height.

Whilst to the south, east and north the area is abutted by highly disturbed vegetation dominated by weeds (Management Zone 10), in this zone weeds are generally of lower cover, and the understorey is considered to be 71-80% native biomass. Species richness is only moderate at 22, however there is a good diversity of different plant lifeforms present.

Key weeds that are present include Western Coastal Wattle (**Acacia cyclops*) (estimated 1-5% cover), African Boxthorn (**Lycium ferocissimum*), Olive (**Olea europaea*), White Weeping Broom (**Retama raetam*) and Century Plant (**Agave americana*). Rabbit warrens were noted in this Management Zone.

Key management issues in this Management Zone

- Woody weeds
- Rabbit warrens

Priority activities in this Management Zone

- Control of woody weeds - Western Coastal Wattle (**Acacia cyclops*), African Boxthorn (**Lycium ferocissimum*), Olive (**Olea europaea*), White Weeping Broom (**Retama raetam*) and Century Plant (**Agave americana*).

- Rabbit control and warren destruction

Management Zone 9

Vegetation Association: *Olearia axillaris* shrubland

Photopoint 9.1, in Management Zone 9, facing S at 269573, 6099764 (Zone 54, WGS 84) on March 30, 2022

Description of this area: This Management Zone is at the base of the valley in the central part of the site where there is a small section of white sand dune. The vegetation is a shrubland of Coast Daisy-bush (*Olearia axillaris*), with a moderate species richness. However, the area is also significantly invaded by a number of high threat weeds, including Western Coastal Wattle (**Acacia cyclops*), Olive (**Olea europaea*), Boneseed *(*Chrysanthemoides monilifera*), Sea Spurge (**Euphorbia paralias*) and African Boxthorn (**Lycium ferocissimum*). There is also a significant infestation of Artichoke Thistle (**Cynara cardunculus*) at the back of the dune. The foredune is also heavily colonised by Sea Wheat-grass (**Thinopyrum junceiforme*). The adjacent beach is used for nesting by the Nationally Vulnerable Hooded Plover (Eastern) (*Thinornis rubricollis rubricollis*).

Key management issues in this Management Zone

- Woody, grass and herbaceous weeds
- Presence of Nationally Vulnerable Hooded Plover (Eastern) (*Thinornis rubricollis rubricollis*) on adjacent beach

Priority activities in this Management Zone

- Control of woody weeds - Western Coastal Wattle (**Acacia cyclops*), Olive (**Olea europaea*), Boneseed *(*Chrysanthemoides monilifera*), and African Boxthorn (**Lycium ferocissimum*),

- Sensitive control of Sea Spurge (**Euphorbia paralias*) and Sea Wheat-grass (**Thinopyrum junceiforme*) to optimise habitat for the Hooded Plover. Plant Rolling Spinifex (*Spinifex hirsutus*) as a replacement.

Management Zone 10

**Vegetation Association: ***Olea europaea, *Acacia cyclops, *Retama raetam* shrubland

Photopoint 10.1, in Management Zone 10, facing SE at 269752, 6100006 (Zone 54, WGS 84) on March 23, 2022

Description of this area: This Management Zone is situated on the flat land to the east of the steep slopes. It is highly disturbed, such that the vegetation present is predominantly weedy species, with **Acacia cyclops* (Western Coastal Wattle), **Retama raetam* (White Weeping Broom) and **Olea europaea ssp. europaea* (Olive) forming a woodland/shrubland. Boneseed (**Chrysanthemoides monilifera*) is also prolific, and there are patches of Century Plant (**Agave americana*). The high priority herbaceous weeds Golden Pallensis (**Asteriscus spinosus*) and Pincushion (**Scabiosa atropurpurea*) are also present. Interestingly there is a moderate native species richness in the understorey, although native plants are generally scattered amongst the dominant weedy species. There is evidence of past dumping activities, and rabbit warrens are also present.

Key management issues in this Management Zone

- Woody and herbaceous weeds
- Low cover of native plant species
- Historic dumping
- Rabbit warrens

Priority activities in this Management Zone

- Control of woody weeds - Western Coastal Wattle (**Acacia cyclops*), African Boxthorn (**Lycium ferocissimum*), Boneseed (**Chrysanthemoides monilifera*), Olive (**Olea europaea*), White Weeping Broom (**Retama raetam*) and Century Plant (**Agave americana*),
- Control spread of priority herbaceous weeds - Golden Pallensis (**Asteriscus spinosus*) and Pincushion (**Scabiosa atropurpurea*)
- Rabbit control and warren destruction

Management Zone 11

Vegetation Association: *Gramineae spp.* grassland

Photopoint 11.1, in Management Zone 11, facing SSW at 269902, 6100467 (Zone 54, WGS 84) on March 23, 2022

Description of this area: This Management Zone comprises a narrow to moderately wide strip of highly disturbed land that runs along the eastern side of the study area. Annual grassy weeds are the most prominent species, including Wild Oats (**Avena barbata*) and False Brome (**Brachypodium distachyon*), however there are also significant infestations of Artichoke Thistle (**Cynara cardunculus ssp. flavescens*) (central sections), Coastal Galenia (**Aizoon pubescens*) and White Weeping Broom (**Retama raetam*) at the southern end. This zone also includes a trail along the front of adjoining properties in the northern section of the study area.

Key management issues in this Management Zone

- Low cover of native plant species
- Spread of non-indigenous species from adjoining properties
- Source populations of key woody and herbaceous weeds, including Artichoke Thistle (**Cynara cardunculus ssp. flavescens*), Coastal Galenia (**Aizoon pubescens*) and White Weeping Broom (**Retama raetam*)

Priority activities in this Management Zone

- Control of source populations of key woody and herbaceous weeds, including Artichoke Thistle (**Cynara cardunculus ssp. flavescens*), Coastal Galenia (**Aizoon pubescens*) and White Weeping Broom (**Retama raetam*),
- Education program with adjoining landholders regarding appropriate plantings for coastal environments
- Revegetation to buffer adjoining higher quality areas from new developments

6 MONITORING

As part of the assessment process for this Biodiversity Action Plan, a series of photopoints were established. The location of these photopoints is shown in Figure 17 and these images and associated location data are provided in Appendix 3.

Bushland Assessments were also undertaken in each Management Zone – these can be used to provide a broad overview of change over time. Appendix 3 provides the Bushland Assessment data and a description of this methodology. In addition, a series of targets have been established as part of the Biodiversity Action Plan and are provided in Table 6. These targets can be used to track change, and progress towards the desired goal.

7 BIODIVERSITY ACTION PLAN

Table 7 lists the key biodiversity management threats/issues for Ochre Point, their related objectives, and further actions being proposed, as well as prioritisation of these actions. Note that weeds that have been targeted for control over the next 5 years are based on the priority weeds as described in Section 4.1.

Note regarding prioritising and developing actions and targets for weed species

Specific actions and targets for each weed are based upon factors such as the risk posed by that particular species, as well as its current distribution in the Park and associated feasibility of containment. This approach has been adopted by many regional Landscape Management Regions in South Australia[29], and is based upon the methodology of Virtue, 2008[30]. This helps to ensure resources are invested efficiently and effectively. For example, weeds that are currently at low levels, but are high risk, are targeted for eradication to ensure the species does not proliferate and become a much larger (and more costly) problem in the future. Widespread weeds of high risk are specifically targeted where they pose a risk to an asset, for example in the coastal heath community.

With regard to this Management Plan, Table 6 summarises the broad approach which has been taken to setting actions and targets for priority weeds.

[29] Adelaide and Mount Lofty Ranges Natural Resources Management Board (2009). *Pest Prioritisation Management Actions*. AMLRNRM, Adelaide
Anderson, N., Drew, J. and Virtue, J. (2005). *South East Weed Risk Assessment*. Lacepede Tatiara Robe Animal & Plant Control Board. For the South East Natural Resource Consultative Committee.
[30] Virtue, J. (2008). SA Weed Risk Management Guide, February 2008. Department of Water, Land and Biodiversity Conservation, Adelaide.

Table 6: Approach taken to management strategies and targets, based upon risk and feasibility of containment

Weed Risk *	**Feasibility of Containment (based upon available resources and current distribution)**		
	Low	**Medium**	**High**
Low/Moderate	Monitor and implement new management strategies if significant spread occurs		
High	Protect significant sites (such as areas of remnant vegetation in best condition)	Contain weed spread	Destroy infestations and (if possible) eradicate weed
Extreme	Implement whole of Park management strategies to reduce level of weed		

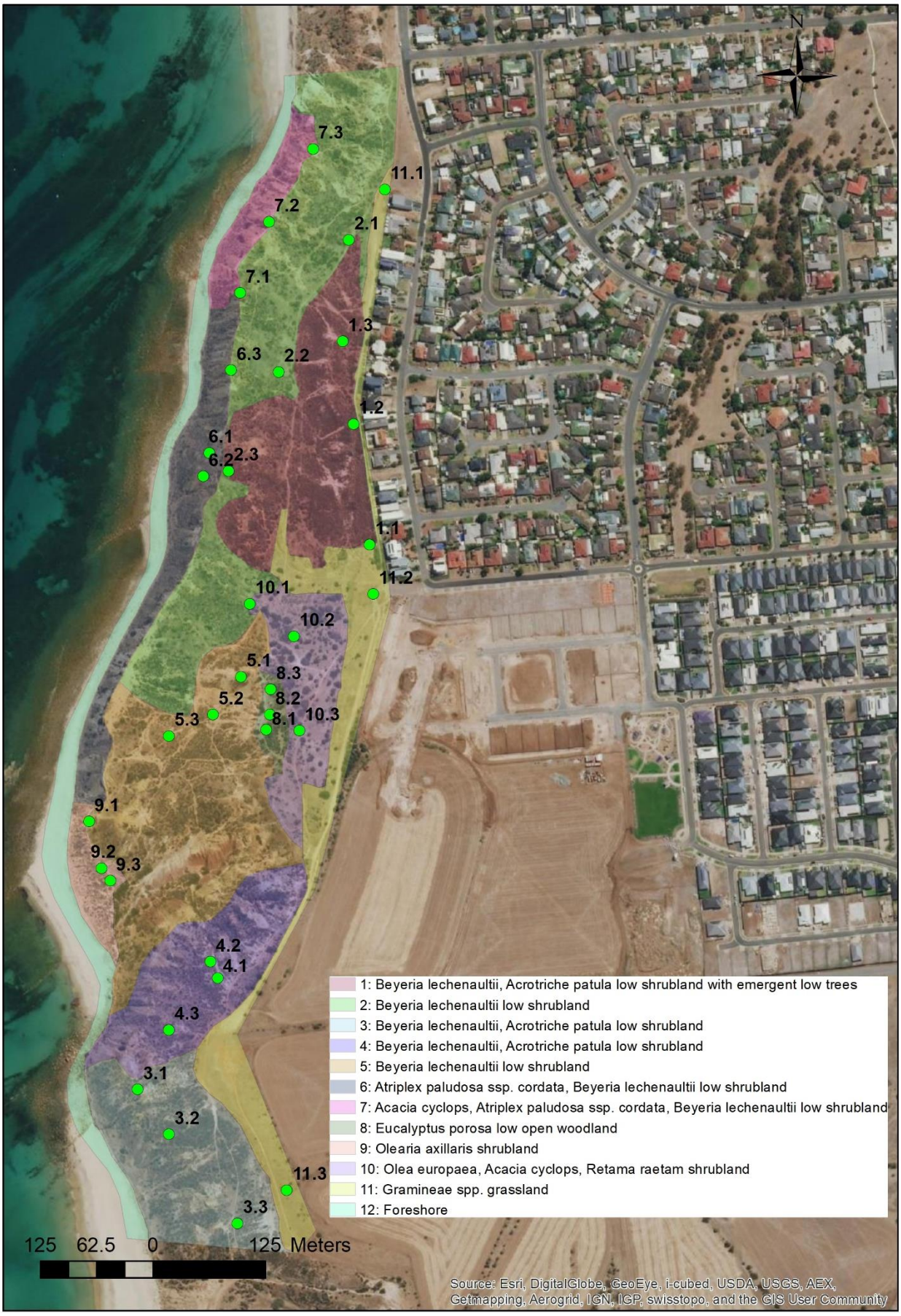

Figure 17: Location of photographic images from section 5.2 and Appendix 3

Table 7: Biodiversity Action Plan summary table for Ochre Point

ISSUE/THREAT	5-Yr Objective / Milestone	Proposed actions - what/ where/how	Management Zone(s)	Priority*
High threat woody weeds: *Acacia saligna* (Golden Wreath Wattle) *Acacia cyclops* (Western Coastal Wattle) *Chrysanthemoides monilifera* (Boneseed) *Lycium ferocissimum* (African Boxthorn) *Olea europaea* (Olive) *Retama raetam* (White Weeping Broom)	Eradicate all mature plants of these species from high quality habitats in Ochre Point (Management Zones 1-9). Reduce density and biomass in highly disturbed areas of Ochre Point (Zones 10,11).	Annually patrol, mark all specimens, and hand pull or cut and swab as required.	1 2-9 10,11	E VH M
High threat forb and herbaceous weeds: *Aizoon pubescens* (Galenia) *Asparagus asparagoides* (Bridal Creeper) *Asteriscus spinosus* (Golden Pallensis) *Cynara cardunculus* (Artichoke Thistle) *Euphorbia spp.* (Capers) *Gazania linearis* (Gazania) *Scabiosa atropurpurea* (Scabious)	Eradicate these species from high priority coastal heath habitats (Zones 1-5). Reduce to scattered, <1% cover in Zones 6-9. Reduce cover in Zones 10,11.	Annually patrol and spot spray / hand pull if observed. Ensure all work is bushcare sensitive (ie no off target damage).	1-5 6-9 10,11	VH H M
High threat grassy weed: *Ehrharta calycina* (Perennial Veldt Grass)	Eradicate and replace with appropriate native grass species.	Staged removal of Veldt Grass such that circa 20% of the population is treated each year. Plant in *Poa poiformis var. poiformis* (Coast Tussock-grass) as a replacement species.	2	VH
High threat grassy and herbaceous weeds: *Thinopyrum junceiforme* (Sea Wheat Grass) *Euphorbia paralias* (Sea Spurge)	Reduce cover in Management Zone 9 to <1%.	Staged removal of Sea Wheat Grass such that circa 20% of the population is treated each year. Plant in *Spinifex hirsutus* (Coastal Spinifex) as a replacement species.	2	VH
High threat succulent weed *Opuntia sp.*	Eradicate.	Locate and remove the one specimen present in the study area, and be vigilant for others.	4	VH
New weed incursions	No new weed species in Ochre Point.	Continue ongoing vigilance by Council/Green Adelaide staff for any new weed incursions into the study site. Continue vigilance for high threat coastal weeds in adjoining gardens. Provide resource and educational materials to landholders as appropriate.	All	H
Rabbits	Anecdotal evidence that rabbit density has decreased. No warrens in study area.	Traverse the site and map rabbit warrens. Employ contractor to fumigate warrens. Commence rabbit baiting program	2,9-11	VH

ISSUE/THREAT	5-Yr Objective / Milestone	Proposed actions - what/ where/how	Management Zone(s)	Priority*
Foxes	No active fox dens. No impacts of foxes on Hooded Plover nesting success.	Traverse the site and map fox dens / rabbit warrens. Employ contractor to fumigate warrens. Trial use of Foxwatch, an ultrasonic deterrent which may prevent or reduce fox predation of nests. Trial use of scent-deterrents. Implement a den detector dog program.	2,9-11	VH
Dogs	Dogs remain on leash within vicinity of Hooded Plover nesting areas.	Maintain signage. Patrol as appropriate.	9	VH
Unconsolidated trails	Appropriate trail network developed. Unused trails revegetated with appropriate local species.	Undertake planning and research into appropriate locations of trails. From a biodiversity perspective, it is recommended that any major north-south multi-use trail (if required) should be confined to disturbed habitats on the flat upland sections of the site ie Management Zones 10,11. Signage to specify appropriate use (ie pushbike/walking as appropriate, no motorised vehicles)	All, but especially 5	E

ISSUE/THREAT	5-Yr Objective / Milestone	Proposed actions - what/ where/how	Management Zone(s)	Priority*
Hooded Plovers (*Thinornis rubricollis rubricollis*)	Hooded Plovers nesting and fledging successfully on the beach adjacent to the study site.	Clarify nesting status before undertaking any on-ground works near the beach, especially Management Zone 9. First nesting is usually mid to late August, but can continue (if unsuccessful) into summer. Continue ongoing fencing/monitoring program associated with Hooded Plovers. Trial use of Foxwatch, an ultrasonic deterrent which may prevent or reduce fox predation of nests. Change Council by-law to minimise impacts of dogs – preferably to a permanent on-leash zone, but at a minimum to an on-leash zone within 100 metres of signage indicating Hooded Plover breeding. Removal of *Thinopyrum junceiforme* (Sea Wheat-grass) and *Euphorbia paralias* (Sea spurge) and replacement with *Spinifex hirsutus* (Coastal Spinifex).	9	E E VH VH VH
Illegal dumping	No recent illegal dumping detected.	Prevent site access to all other than authorised vehicles. Patrol as appropriate.	11	VH
Foraging/prospecting	No active prospecting/foraging areas noted.	Signage in key areas to note the risks, both personal and to ecology of the site, of digging in the old dumping areas.	4,5,10,11	H
New development adjacent to the study site	Aerial photography shows: No new trails from development No clearance/reduction in habitat Field evidence shows: No dumping No new introduced plant incursions	If preceding steps in this plan are implemented, it should help minimise impacts from the new housing development. New residents should be provided information on the importance of the area in a biodiversity context.	All	VH
Monitoring and evaluation	Progress and success of works undertaken is monitored on an ongoing and regular basis. Plan reviewed on this basis at end of 5 years.	Re-do BushRATs in each Management Zone every 3-5 years. Review objectives/milestones in this table.	All	H

*E = extreme, VH = very high, H = high, M = medium, L = low

Appendix 1: Native Plant and Weed Lists for the site

Table A1: Native plant lists for the site (including records from the Biological Database of South Australia[31] and Research Grade records from iNaturalist)

Species	Common Name	Conservation Status			Management Zone										
		AUS[32]	SA[33]	Bioregion[34]	1	2	3	4	5	6	7	8	9	10	11
Acacia acinacea	Wreath Wattle			NT	R	1			1		1				
Acacia cupularis	Cup Wattle			RA	R			1	1		1			1	
Acacia ligulata	Umbrella Bush			RA											
Acacia longifolia ssp. sophorae	Coastal Wattle			LC											
Acacia paradoxa	Kangaroo Thorn			LC					1					1	
Acrotriche patula	Prickly Ground-berry			NT	R	1	1	1	R	1	1	1	1	1	
Allocasuarina verticillata	Drooping Sheoak			LC	R										
Alyxia buxifolia	Sea Box			RA	1		1			R					
Aristida behriana	Brush Wire-grass			LC		1			1						1
Atriplex cinerea	Coast Saltbush			LC											
Atriplex paludosa ssp. cordata	Marsh Saltbush			LC		1	R	1	R	R	R		R		
Austrostipa drummondii	Cottony Spear-grass			NT	1	1		1						1	1
Austrostipa elegantissima	Feather Spear-grass			LC	1	1						1			
Austrostipa flavescens	Coast Spear-grass			LC											
Austrostipa mollis	Soft Spear-grass			LC	1	1	1	1	1			1			1
Austrostipa sp.	Spear-grass								1					1	1
Beyeria lechenaultii	Pale Turpentine Bush			NT	R	R	R	R	R	R	R	R		R	1
Billardiera cymosa ssp. cymosa	Sweet Apple-berry			LC											
Burchardia umbellata	Milkmaids			LC											
Caesia calliantha	Blue Grass-lily			LC											
Calocephalus citreus	Lemon Beauty-heads			NT											
Carpobrotus rossii	Native Pigface			LC											
Cassytha glabella f. dispar	Slender Dodder-laurel			LC	1										
Cassytha pubescens	Downy Dodder-laurel			LC			1								

[31] These data have been sourced from the South Australian Department for Environment and Water Biological Database of SA. Recordset number DEWNRBDBSA220329-2, or from iNaturalist https://www.inaturalist.org/projects/naturehoodz-moana-south-conservation-area?tab=stats, https://www.inaturalist.org/projects/naturehoodz-ochre-point-cliff-reserven accessed 22/6/2022.

[32] Environment Protection and Biodiversity Conservation Act 1999

[33] Schedules of the National Parks and Wildlife Act 1972

[34] 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.

Species	Common Name	Conservation Status			Management Zone										
		AUS[32]	SA[33]	Bioregion[34]	1	2	3	4	5	6	7	8	9	10	11
Chloris truncata	Windmill Grass			LC		1								1	1
Comesperma volubile	Love Creeper			RA	1							1			
Convolvulus angustissimus ssp. angustissimus (NC)	Narrow-leaf Bindweed			NT										1	
Convolvulus erubescens (NC)	Australian Bindweed														
Dampiera rosmarinifolia	Rosemary Dampiera			NT	1	1								1	
Dianella brevicaulis	Short-stem Flax-lily			NT	1			1	1	1	1	1	1	1	
Dianella revoluta var. revoluta	Black-anther Flax-lily			LC	1	1						1			
Disphyma crassifolium ssp. clavellatum	Round-leaf Pigface			LC		1	1	1	1	1	1				
Distichlis distichophylla	Emu-grass			LC			1			1	1		1	1	
Dodonaea viscosa ssp. spatulata	Sticky Hop-bush			LC			1	1	1					1	
Enchylaena tomentosa var. tomentosa	Ruby Saltbush			LC	1	1	1	1	1	1		1	1	1	1
Eucalyptus porosa	Mallee Box			NT	R			1				1			
Eutaxia microphylla	Common Eutaxia			LC	R	1	1	1	1	1	1	1			
Ficinia nodosa	Knobby Club-rush			LC									1		
Gahnia filum	Thatching Grass			VU					1	1	1				
Gahnia lanigera	Black Grass Saw-sedge			RA	1	1	1	1	1			1			
Geranium sp.	Geranium														
Glycine rubiginosa	Twining Glycine			LC											
Goodenia arguta	Toothed Velleia			RA	1										
Goodenia pinnatifida	Cut-leaf Goodenia			NT											
Goodenia willisiana	Silver Goodenia			RA	1			1							
Grevillea lavandulacea ssp. lavandulacea	Spider-flower			LC		1									
Hakea rugosa	Dwarf Hakea			NT			1							1	
Helichrysum leucopsideum	Satin Everlasting			NT	1										
Juncus kraussii	Sea Rush			LC											
Kennedia prostrata	Scarlet Runner			LC			1								
Kunzea pomifera	Muntries			RA			1								
Lepidosperma congestum (NC)	Clustered Sword-sedge			RA	1	1	1	1	1						
Lepidosperma viscidum	Sticky Sword-sedge			LC	1		1		1					1	
Leptorhynchos squamatus ssp. squamatus	Scaly Buttons			LC	1			1							
Leptorhynchos tetrachaetus	Little Butons			RA											

Species	Common Name	Conservation Status			Management Zone										
		AUS[32]	SA[33]	Bioregion[34]	1	2	3	4	5	6	7	8	9	10	11
Leucophyta brownii	Coast Cushion Bush			NT											
Leucopogon parviflorus	Coast Beard-heath			NT			1								
Lomandra densiflora	Soft Tussock Mat-rush			LC			1								
Lomandra effusa	Scented Mat-rush			RA	1	1	1	1	1			1		R	1
Lomandra micrantha ssp.	Small-flower Mat-rush			LC			1		1			1			
Maireana brevifolia	Short-leaf Bluebush			LC											
Maireana enchylaenoides	Wingless Fissure-plant			LC	1	1	1	1							1
Melaleuca lanceolata	Dryland Tea-tree			RA	1							1			
Minuria leptophylla	Minnie Daisy			RA	1										
Muehlenbeckia gunnii	Coastal Climbing Lignum			LC	1	1	1		1				1	1	
Myoporum insulare	Common Boobialla			NT					1						
Myoporum parvifolium	Creeping Boobialla		R	VU			1		1		1				
Nitraria billardierei	Nitre-bush			RA	1	1	1	1	R		1	1			
Olearia axillaris	Coast Daisy-bush			NT	1		1		1				R		
Olearia ramulosa	Twiggy Daisy-bush			LC											
Opercularia turpis	Twiggy Stinkweed			NT	1		1								
Opercularia varia	Variable Stinkweed			LC											
Oxalis perennans (NC)	Native Sorrel			LC											
Oxalis perennans/exilis	Native Oxalis														
Pimelea flava ssp. dichotoma	Diosma Riceflower			NT											
Pimelea glauca	Smooth Riceflower			NT			1								
Pimelea micrantha	Silky Riceflower			NT											
Pimelea serpyllifolia ssp. serpyllifolia	Thyme Riceflower			NT	1	1		1	R			1		R	
Pittosporum angustifolium	Native Apricot			NT	1	1		1				1			
Plantago hispida	Hairy Plantain			NT											
Poa poiformis var. poiformis	Coast Tussock-grass			LC		1	1		1	1			1		
Poa sp.	Meadow-grass/Tussock-grass														
Pogonolepis muelleriana	Stiff Cup-flower			NT											
Pomaderris paniculosa ssp. paniculosa	Mallee Pomaderris			NT	R	1	R	1	1	1	1	1		1	
Pultenaea tenuifolia	Narrow-leaf Bush-pea			RA											
Rhagodia candolleana ssp. candolleana	Sea-berry Saltbush			LC	1	1	1		1			1	R	1	
Roepera aurantiaca ssp. aurantiaca	Shrubby Twinleaf							1							

Species	Common Name	Conservation Status			Management Zone										
		AUS[32]	SA[33]	Bioregion[34]	1	2	3	4	5	6	7	8	9	10	11
Roepera confluens	Forked Twinleaf			VU											
Rytidosperma caespitosum (NC)	Common Wallaby-grass			LC											
Rytidosperma sp.	Wallaby-grass				1	1	1	1	1	1		1		1	
Salsola australis	Buckbush			LC		1									1
Santalum acuminatum	Quandong			RA	1							1		1	R
Scaevola albida var. albida	Pale Fanflower			LC										1	
Scaevola crassifolia	Cushion Fanflower			VU			1	1							
Sclerolaena diacantha	Grey Bindyi			RA	1	1				1	1				
Sebaea ovata	Yellow Sebaea			NT											
Senecio pinnatifolius var.	Variable Groundsel				1	1	1		1		1		1		
Spergularia marina	Salt Sand-spurrey			NE						1					
Spinifex hirsutus	Rolling Spinifex			LC									1		
Stackhousia monogyna (NC)	Creamy Candles			NT										1	
Styphelia humifusa	Cranberry Heath			LC					1						
Suaeda australis	Austral Seablite			NT				1							
Tetragonia implexicoma	Bower Spinach			LC		1	1	1					1		
Themeda triandra	Kangaroo Grass			LC					1						
Threlkeldia diffusa	Coast Bonefruit			NT			1	1				1	1		
Thysanotus patersonii	Twining Fringe-lily			LC											
Velleia arguta	Toothed Velleia			RA											

Key to codes: X = present, R = present and noted to be regenerating/recruiting, O= Overstorey dominant, U = understorey dominant, E = emergent species, LC= Least Concern, NT = Near Threatened; RA = Rare; VU = Vulnerable; EN=Endangered.

Table A2: Weed plant lists for the site (including records from the Biological Database of South Australia[35])

Species name	Common name	Weed threat rating[36]	Declared[37]	Cover by Management Zone										
				1	2	3	4	5	6	7	8	9	10	11
Acacia cyclops	Western Coastal Wattle	3		1	1a	1	1a	2		2	2	2	3	1
Acacia saligna	Golden Wreath Wattle	2		1										
Agave americana	Century Plant	3									1		1	
Aizoon pubescens	Coastal Galenia	2			1a									3
Allium sp.		2			1									
Arctotheca calendula	Cape Weed	2												
Arundo donax	Giant Reed	2												
Asparagus asparagoides f.	Bridal Creeper	5	Y		1a							1		
Asphodelus fistulosus	Onion Weed	2			1		1a				1		1	1a
Asteriscus spinosus	Golden Pallensis	2											1	
Avena barbata	Bearded Oat	2		1a	2	1a	1a	1a	1a	1a	1a		2	2
Brachypodium distachyon		2		2	3	3	3	3	2	1a	2		3	2
Brassica tournefortii	(blank)	2												1
Briza maxima	Large Quaking-grass	2		1a	2	1a	1a	1a	1a		1a			
Briza minor	Lesser Quaking-grass	2												
Cakile maritima ssp. maritima	Two-horned Sea Rocket	2										1		
Cenchrus clandestinus	Kikuyu	3												
Chrysanthemoides monilifera ssp. monilifera	Boneseed	3	Y	1		1	1	2		1		1	2	1
Conyza bonariensis		2												1
Cynara cardunculus ssp. flavescens	Artichoke Thistle	2			1	1		1				3	1	2
Cynodon dactylon (NC)	Couch	2												
Echium plantagineum	Salvation Jane	2	Y		1		1							
Ehrharta calycina	Perennial Veldt Grass	4			1a									
Ehrharta villosa var. maxima	Pyp Grass	4	Y											
Euphorbia paralias		3										3		
Euphorbia terracina	False Caper	3	Y											
Gazania linearis	Gazania	3	Y	1					1	1a				1a
Gomphocarpus cancellatus		2				1	1	1				1		
Hypochaeris radicata	Rough Cat's Ear	2												
Lactuca serriola		2												1
Lagurus ovatus	Hare's Tail Grass	2			1a	1a	1a	1a	1a					
Leptospermum laevigatum	Coast Tea-tree	4												

[35] These data have been sourced from the South Australian Department for Environment and Water Biological Database of SA. Recordset number DEWNRBDBSA210601-1

[36] As per Department for Environment and Water (2019). Bushland Assessment Manual. Unpublished document.

[37] Under the *Landscapes Act 2019*

Species name	Common name	Weed threat rating[36]	Declared[37]	Cover by Management Zone										
				1	2	3	4	5	6	7	8	9	10	11
Limonium companyonis	Sea-lavender	2								1a				
Lycium ferocissimum	African Boxthorn	3	Y	1		1		1		1	1	2		
Marrubium vulgare	Horehound	3	Y											1
Medicago polymorpha		2					1a		1a	1a				
Mesembryanthemum crystallinum		2												1
Oenothera stricta ssp. stricta	Common Evening Primrose	2												
Olea europaea ssp. europaea	Olive	4	Y			1	1	2		1	1	1	2	1
Opuntia sp.	Opuntioid cacti	2					1							
Oxalis pes-caprae	Soursob	4												
Parapholis incurva	Curly Ryegrass	2												
Pinus sp.	Pine	3												
Piptatherum miliaceum		2								1			1	
Pittosporum undulatum	Sweet Pittosporum	3	Y											
Plantago lanceolata var.	Ribwort	2		1	1	1		1a		1a			1a	
Poa annua (NC)	Winter Grass	2												
Polygala myrtifolia	Myrtle-leaf Milkwort	4	Y											
Rapistrum rugosum		2		1		1a				1a	1a			
Reichardia tingitana		2			1	1			1					
Retama raetam	White Weeping Broom	2	Y				1	2		1a	1		2	2
Romulea rosea var. australis	Common Onion-grass	2												
Salvia verbenaca		2												1
Scabiosa atropurpurea	Pincushion	2		1	1a	1a		1a		1a			1a	
Thinopyrum junceiforme	Sea Wheat-grass	4										2		
Trifoium angustifolium		2		1	1a	1	1a						1a	
Trifolium arvense var. arvense	Hare's-foot Clover	2												
Trifolium campestre	Hop Clover	2				1a	1a							
Trifolium sp.	Clover	2												
Vulpia myuros f. myuros	Rat's-tail Fescue	2		1a			1a	1a		2			1a	

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

Appendix 2: Fauna records from within 5km of the site

Records from within 5km of the site, from Biological Database of South Australia incorporating BirdLife Australia data[38].

Class	Species name	Common name	AUS	SA	Number of records	Date last sighting
AMPHIBIA	*Crinia signifera*	Common Froglet			38	16/09/2005
AMPHIBIA	*Limnodynastes dumerilii*	Banjo Frog			5	9/10/2003
AMPHIBIA	*Limnodynastes tasmaniensis*	Spotted Marsh Frog			18	16/09/2005
AMPHIBIA	*Litoria ewingii*	Brown Tree Frog			1	7/09/2004
AMPHIBIA	*Neobatrachus pictus*	Burrowing Frog			1	3/04/1987
AVES	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill			21	13/07/2011
AVES	*Acanthiza lineata*	Striated Thornbill	ssp		1	1/01/1900
AVES	*Acanthiza lineata*	Striated Thornbill			4	4/10/2004
AVES	*Acanthiza nana*	Yellow Thornbill			2	10/05/2010
AVES	*Acanthiza reguloides australis*	Buff-rumped Thornbill			1	20/07/2004
AVES	*Acanthorhynchus tenuirostris*	Eastern Spinebill			1	12/06/2015
AVES	*Accipiter cirrocephalus cirrocephalus*	Collared Sparrowhawk			9	20/11/2014
AVES	*Accipiter fasciatus fasciatus*	Brown Goshawk			10	5/11/2017
AVES	*Acrocephalus australis australis*	Australian Reed Warbler			93	29/01/2020
AVES	*Actitis hypoleucos*	Common Sandpiper		R	8	26/02/2013
AVES	*Agapornis roseicollis*	Rosy-faced Lovebird			2	26/01/1985
AVES	*Alauda arvensis arvensis*	Eurasian Skylark			177	15/11/2016
AVES	*Anas castanea*	Chestnut Teal			20	30/07/2020
AVES	*Anas gracilis gracilis*	Grey Teal			165	30/07/2020
AVES	*Anas platyrhynchos platyrhynchos*	Mallard			48	18/04/2015
AVES	*Anas superciliosa*	Pacific Black Duck			305	10/08/2020
AVES	*Anas superciliosa x platyrhynchos*	Pacific Black Duck x Mallard hybrid			33	12/01/2020
AVES	*Anhinga novaehollandiae novaehollandiae*	Australasian Darter		R	8	22/06/2014
AVES	*Anser anser*	Greylag Goose			1	24/02/2008
AVES	*Anthochaera carunculata*	Red Wattlebird			432	10/10/2020
AVES	*Anthochaera chrysoptera*	Little Wattlebird			25	10/10/2020
AVES	*Anthochaera chrysoptera chrysoptera*	Little Wattlebird (mainland SA)			3	22/03/2000
AVES	*Anthus australis*	Australian Pipit			12	1/05/2015
AVES	*Aphrodroma brevirostris*	Kerguelen Petrel			2	20/09/1984

[38] These data have been sourced from the South Australian Department for Environment and Water Biological Database of SA. Recordset number DEWNRBDBSA220329-2

AVES	*Aquila audax audax*	Wedge-tailed Eagle			2	26/04/2014
AVES	*Ardea alba modesta*	Great Egret			102	10/12/2019
AVES	*Ardea intermedia plumifera*	Plumed Egret		R	4	19/09/2008
AVES	*Ardea pacifica*	White-necked Heron			6	22/06/2014
AVES	*Ardenna tenuirostris*	Short-tailed Shearwater			6	10/05/1985
AVES	*Arenaria interpres interpres*	Ruddy Turnstone		R	2	27/08/2001
AVES	*Artamus cyanopterus*	Dusky Woodswallow			55	5/11/2017
AVES	*Aythya australis*	Hardhead			85	30/07/2020
AVES	*Barnardius zonarius*	Australian Ringneck			2	5/11/2017
AVES	*Biziura lobata menziesi*	Musk Duck		R	2	26/09/2018
AVES	*Botaurus poiciloptilus*	Australasian Bittern	EN	E	1	23/01/2004
AVES	*Bubulcus ibis coromandus*	Eastern Cattle Egret		R	1	13/07/2011
AVES	*Cacatua galerita*	Sulphur-crested Cockatoo			21	12/07/2020
AVES	*Cacatua sanguinea gymnopis*	Little Corella			26	23/04/2013
AVES	*Cacatua sanguinea sanguinea*	Little Corella			159	4/04/2020
AVES	*Cacatua tenuirostris*	Long-billed Corella			14	12/02/2020
AVES	*Cacomantis flabelliformis flabelliformis*	Fan-tailed Cuckoo			3	10/08/2001
AVES	*Cacomantis pallidus*	Pallid Cuckoo			5	18/09/2001
AVES	*Cairina moschata*	Muscovy Duck			5	22/06/2014
AVES	*Calidris acuminata*	Sharp-tailed Sandpiper			2	16/11/2001
AVES	*Calidris ferruginea*	Curlew Sandpiper	CR	E	1	1/10/1984
AVES	*Calidris ruficollis*	Red-necked Stint			8	16/02/2000
AVES	*Carduelis carduelis britannica*	European Goldfinch			165	22/08/2020
AVES	*Cereopsis novaehollandiae novaehollandiae*	Cape Barren Goose		R	8	17/11/2009
AVES	*Chalcites basalis*	Horsfield's Bronze Cuckoo			23	14/09/2013
AVES	*Charadrius bicinctus bicinctus*	Double-banded Plover			4	1/08/1985
AVES	*Charadrius ruficapillus*	Red-capped Plover			26	17/11/2018
AVES	*Chenonetta jubata*	Maned Duck			119	22/08/2020
AVES	*Chlidonias hybrida javanicus*	Whiskered Tern			2	26/09/2018
AVES	*Chloris chloris*	European (Common) Greenfinch			50	25/05/2008
AVES	*Chroicocephalus novaehollandiae novaehollandiae*	Silver Gull			382	22/08/2020
AVES	*Cincloramphus cruralis*	Brown Songlark			9	14/09/2013
AVES	*Cincloramphus mathewsi*	Rufous Songlark			3	30/10/2001
AVES	*Circus approximans*	Swamp Harrier			3	10/12/2019
AVES	*Cisticola exilis exilis*	Golden-headed Cisticola			75	10/12/2019
AVES	*Cladorhynchus leucocephalus*	Banded Stilt		V	1	23/11/2001

AVES	*Colluricincla harmonica*	Grey Shrikethrush			94	30/07/2020
AVES	*Columba livia*	Feral Pigeon			467	5/06/2020
AVES	*Coracina novaehollandiae*	Black-faced Cuckooshrike			123	22/08/2020
AVES	*Corvus mellori*	Little Raven			441	22/08/2020
AVES	*Corvus sp.*	Crows			11	26/09/2018
AVES	*Coturnix pectoralis*	Stubble Quail			1	1/01/1984
AVES	*Coturnix ypsilophora australis*	Brown Quail		V	5	16/11/2011
AVES	*Cracticus torquatus leucopterus*	Grey Butcherbird			1	2/04/2001
AVES	*Cygnus atratus*	Black Swan			81	10/12/2019
AVES	*Dacelo novaeguineae*	Laughing Kookaburra			25	2/08/2014
AVES	*Dacelo novaeguineae novaeguineae*	Laughing Kookaburra			1	21/06/1992
AVES	*Dicaeum hirundinaceum hirundinaceum*	Mistletoebird			8	13/07/2011
AVES	*Dromaius novaehollandiae*	Emu	ssp	ssp	1	1/01/1900
AVES	*Egretta garzetta nigripes*	Little Egret		R	13	10/12/2019
AVES	*Egretta novaehollandiae*	White-faced Heron			208	10/08/2020
AVES	*Egretta sacra sacra*	Pacific Reef Heron		R	2	23/05/2012
AVES	*Elanus axillaris*	Black-shouldered Kite			138	22/01/2020
AVES	*Elseyornis melanops*	Black-fronted Dotterel			60	24/03/2019
AVES	*Eolophus roseicapilla*	Galah			236	22/08/2020
AVES	*Epthianura albifrons*	White-fronted Chat			12	12/05/2010
AVES	*Epthianura tricolor*	Crimson Chat			2	1/01/1900
AVES	*Erythrogonys cinctus*	Red-kneed Dotterel			29	20/11/2014
AVES	*Eudyptula minor novaehollandiae*	Little Penguin			3	10/11/1992
AVES	*Euplectes orix*	Southern Red Bishop			1	18/01/1936
AVES	*Eurostopodus argus*	Spotted Nightjar			1	8/04/1988
AVES	*Falco berigora*	Brown Falcon			16	13/07/2011
AVES	*Falco berigora berigora*	Brown Falcon			2	26/06/1993
AVES	*Falco cenchroides*	Nankeen Kestrel			128	12/01/2020
AVES	*Falco cenchroides cenchroides*	Nankeen Kestrel			16	22/03/2000
AVES	*Falco longipennis*	Australian Hobby			29	21/12/2017
AVES	*Falco longipennis murchisonianus*	Australian Hobby			1	22/03/2000
AVES	*Falco peregrinus macropus*	Peregrine Falcon		R	41	2/03/2019
AVES	*Falco subniger*	Black Falcon		R	1	8/07/1998
AVES	*Falcunculus frontatus frontatus*	Eastern Shriketit		R	4	10/08/2001
AVES	*Fulica atra*	Eurasian Coot			128	10/08/2020
AVES	*Gallinago hardwickii*	Latham's Snipe		R	7	21/02/2019

AVES	*Gallinula tenebrosa*	Dusky Moorhen			163	30/07/2020
AVES	*Gallinula tenebrosa tenebrosa*	Dusky Moorhen			2	21/06/1992
AVES	*Gallirallus philippensis mellori*	Buff-banded Rail			2	3/11/2012
AVES	*Gavicalis virescens*	Singing Honeyeater			191	10/12/2019
AVES	*Gavicalis virescens sonorus*	Singing Honeyeater (EP, YP, FR, MN, AP, MM, coastal SE)			1	28/01/2022
AVES	*Geopelia placida placida*	Peaceful Dove			2	18/09/2001
AVES	*Gerygone olivacea olivacea*	White-throated Gerygone		R	4	1/01/1900
AVES	*Gliciphila melanops*	Tawny-crowned Honeyeater			1	1/03/1905
AVES	*Glossopsitta concinna*	Musk Lorikeet			53	15/02/2020
AVES	*Grallina cyanoleuca*	Magpielark			605	22/08/2020
AVES	*Grallina cyanoleuca cyanoleuca*	Magpielark			16	22/03/2000
AVES	*Gymnorhina tibicen*	Australian Magpie			510	28/01/2022
AVES	*Haematopus fuliginosus fuliginosus*	Sooty Oystercatcher		R	2	30/12/2019
AVES	*Haliaeetus leucogaster*	White-bellied Sea Eagle		E	2	24/03/2006
AVES	*Haliastur sphenurus*	Whistling Kite			2	23/03/2008
AVES	*Halobaena caerulea*	Blue Petrel	VU		1	27/04/1914
AVES	*Himantopus leucocephalus*	Pied Stilt			86	10/08/2020
AVES	*Hirundo neoxena neoxena*	Welcome Swallow			390	22/08/2020
AVES	*Hydroprogne caspia*	Caspian Tern			27	10/12/2019
AVES	*Lalage tricolor*	White-winged Triller			7	3/10/2009
AVES	*Larus pacificus*	Pacific Gull			9	15/11/2016
AVES	*Larus pacificus georgii*	Pacific Gull			1	1/01/1984
AVES	*Malacorhynchus membranaceus*	Pink-eared Duck			14	29/01/2020
AVES	*Malurus cyaneus*	Superb Fairywren			111	22/08/2020
AVES	*Malurus sp.*	fairywrens			1	26/09/2018
AVES	*Manorina melanocephala*	Noisy Miner			57	5/06/2020
AVES	*Melanodryas cucullata cucullata*	Hooded Robin (YP, MN, AP, MLR, MM, SE)		R	1	1/10/1984
AVES	*Melithreptus gularis*	Black-chinned Honeyeater		ssp	9	13/04/2010
AVES	*Melithreptus lunatus*	White-naped Honeyeater			4	11/01/2013
AVES	*Melopsittacus undulatus*	Budgerigar			1	27/12/1999
AVES	*Merops ornatus*	Rainbow Bee-eater			1	17/10/2000
AVES	*Microcarbo melanoleucos melanoleucos*	Little Pied Cormorant			258	4/04/2020
AVES	*Mirafra javanica*	Horsfield's Bush Lark			2	15/11/2016
AVES	*Morus serrator*	Australasian Gannet			4	24/07/2011
AVES	*Neochmia temporalis temporalis*	Red-browed Finch			7	10/08/2020
AVES	*Neophema chrysostoma*	Blue-winged Parrot		V	1	31/07/2013

AVES	*Neophema elegans elegans*	Elegant Parrot		R	13	11/01/2017
AVES	*Ninox boobook*	Australian Boobook			4	17/04/2013
AVES	*Nycticorax caledonicus*	Nankeen Night Heron			64	4/04/2020
AVES	*Nycticorax caledonicus australasiae*	Nankeen Night Heron			9	15/04/2010
AVES	*Nymphicus hollandicus*	Cockatiel			3	23/07/2000
AVES	*Ocyphaps lophotes*	Crested Pigeon			450	10/10/2020
AVES	*Ocyphaps lophotes lophotes*	Crested Pigeon			17	15/04/2010
AVES	*Oxyura australis*	Blue-billed Duck		R	33	30/07/2020
AVES	*Pachycephala fuliginosa fuliginosa*	Western Whistler			7	16/10/1985
AVES	*Pachycephala pectoralis*	Australian Golden Whistler			4	12/06/2015
AVES	*Pachycephala rufiventris rufiventris*	Rufous Whistler			12	29/12/2013
AVES	*Pachyptila belcheri*	Slender-billed Prion			1	30/08/1991
AVES	*Pachyptila salvini*	Salvin's Prion			1	20/07/1973
AVES	*Pachyptila sp.*	prions			1	23/08/1981
AVES	*Pachyptila turtur*	Fairy Prion			1	23/09/1974
AVES	*Pandion haliaetus cristatus*	Eastern Osprey		E	3	23/03/2008
AVES	*Pardalotus punctatus*	Spotted Pardalote			8	30/07/2020
AVES	*Pardalotus striatus substriatus*	Striated Pardalote			21	5/11/2017
AVES	*Parvipsitta porphyrocephala*	Purple-crowned Lorikeet			42	27/12/2014
AVES	*Passer domesticus domesticus*	House Sparrow			489	10/10/2020
AVES	*Pelecanus conspicillatus*	Australian Pelican			149	22/08/2020
AVES	*Petrochelidon ariel*	Fairy Martin			36	9/01/2019
AVES	*Petrochelidon nigricans*	Tree Martin			58	9/01/2019
AVES	*Phalacrocorax carbo*	Great Cormorant			39	12/01/2020
AVES	*Phalacrocorax fuscescens*	Black-faced Cormorant			15	3/12/2015
AVES	*Phalacrocorax sulcirostris*	Little Black Cormorant			126	22/08/2020
AVES	*Phalacrocorax varius*	Great Pied Cormorant			27	3/12/2015
AVES	*Phalacrocorax varius hypoleucos*	Australian Pied Cormorant			6	21/03/1987
AVES	*Phaps chalcoptera*	Common Bronzewing			8	12/10/2013
AVES	*Phylidonyris novaehollandiae*	New Holland Honeyeater			448	10/10/2020
AVES	*Phylidonyris novaehollandiae novaehollandiae*	New Holland Honeyeater (mainland SA)			9	15/04/2010
AVES	*Platalea flavipes*	Yellow-billed Spoonbill			10	12/06/2015
AVES	*Platalea regia*	Royal Spoonbill			28	9/01/2019
AVES	*Platycercus elegans*	Crimson Rosella	ssp		2	21/06/1992
AVES	*Platycercus elegans*	Crimson Rosella			64	10/12/2019
AVES	*Platycercus eximius eximius*	Eastern Rosella			40	12/01/2020

AVES	*Plegadis falcinellus*	Glossy Ibis		R	1	5/10/2001
AVES	*Podargus strigoides*	Tawny Frogmouth			5	26/09/2001
AVES	*Podiceps cristatus australis*	Great Crested Grebe		R	5	26/02/2013
AVES	*Poliocephalus poliocephalus*	Hoary-headed Grebe			87	30/07/2020
AVES	*Pomatostomus superciliosus*	White-browed Babbler			6	5/11/2017
AVES	*Poodytes gramineus goulburni*	Little Grassbird			98	30/07/2020
AVES	*Porphyrio melanotus melanotus*	Australasian Swamphen			121	10/08/2020
AVES	*Porzana fluminea*	Australian Crake (Australian Spotted Crake)			21	24/11/2019
AVES	*Psephotus haematonotus*	Red-rumped Parrot			10	10/12/2019
AVES	*Psephotus haematonotus haematonotus*	Red-rumped Parrot (eastern SA except NE)			3	9/03/1985
AVES	*Ptilotula penicillata*	White-plumed Honeyeater			433	10/08/2020
AVES	*Puffinus gavia*	Fluttering Shearwater			2	27/09/2009
AVES	*Puffinus huttoni*	Hutton's Shearwater			2	27/02/1986
AVES	*Puffinus sp.*	Puffinus shearwaters			1	24/04/1914
AVES	*Pycnonotus jocosus*	Red-whiskered Bulbul			1	1/02/1986
AVES	*Recurvirostra novaehollandiae*	Red-necked Avocet			1	18/01/2002
AVES	*Rhipidura albiscapa*	Grey Fantail			26	12/06/2015
AVES	*Rhipidura leucophrys leucophrys*	Willie Wagtail			501	10/08/2020
AVES	*Rostratula australis*	Australian Painted-snipe	EN	E	9	1/12/2012
AVES	*Sericornis frontalis (NC)*	White-browed Scrubwren			1	9/03/1985
AVES	*Smicrornis brevirostris*	Weebill			42	30/07/2020
AVES	*Spatula rhynchotis*	Australasian Shoveler		R	55	29/01/2020
AVES	*Spilopelia chinensis*	Spotted Dove			522	28/01/2022
AVES	*Stercorarius antarcticus lonnbergi*	Brown Skua		V	1	9/06/1985
AVES	*Sternula nereis nereis*	Fairy Tern	VU	E	3	1/08/1985
AVES	*Stictonetta naevosa*	Freckled Duck		V	2	16/11/2001
AVES	*Stiltia isabella*	Australian Pratincole			1	2/02/1961
AVES	*Strepera versicolor*	Grey Currawong		ssp	7	30/07/2020
AVES	*Sturnus vulgaris vulgaris*	Common Starling			610	10/10/2020
AVES	*Tachybaptus novaehollandiae*	Australasian Grebe			130	30/07/2020
AVES	*Tachybaptus novaehollandiae novaehollandiae*	Australasian Grebe			1	1/08/1985
AVES	*Tadorna tadornoides*	Australian Shelduck			3	16/01/2011
AVES	*Taeniopygia guttata castanotis*	Zebra Finch			1	2/05/1988
AVES	*Thalassarche cauta cauta*	Shy Albatross	VU	V	2	28/05/1975
AVES	*Thalassarche chrysostoma*	Grey-headed Albatross	EN	V	2	26/09/2000
AVES	*Thalassarche melanophris*	Black-browed Albatross	VU	ssp	1	27/06/1987

AVES	*Thalasseus bergii cristatus*	Greater Crested Tern			36	3/12/2015
AVES	*Thinornis cucullatus cucullatus*	Hooded Plover	VU	V	48	4/10/2020
AVES	*Threskiornis molucca molucca*	Australian White Ibis			153	11/04/2020
AVES	*Threskiornis spinicollis*	Straw-necked Ibis			7	17/12/2009
AVES	*Todiramphus sanctus sanctus*	Sacred Kingfisher			1	9/03/1985
AVES	*Tribonyx ventralis*	Black-tailed Nativehen			59	24/03/2019
AVES	*Trichoglossus haematodus*	Rainbow Lorikeet			222	22/08/2020
AVES	*Trichoglossus moluccanus moluccanus*	Rainbow Lorikeet			2	9/06/1985
AVES	*Tringa nebularia*	Common Greenshank			26	26/02/2013
AVES	*Tringa stagnatilis*	Marsh Sandpiper			3	14/12/2000
AVES	*Turdus merula merula*	Common Blackbird			336	28/01/2022
AVES	*Turnix varius varius*	Painted Buttonquail		R	1	23/05/1930
AVES	*Turnix velox*	Little Buttonquail			1	1/01/1900
AVES	*Tyto javanica delicatula*	Eastern Barn Owl			2	27/10/2017
AVES	*Tyto novaehollandiae novaehollandiae*	Australian Masked Owl		E	1	26/04/1975
AVES	*Vanellus miles*	Masked Lapwing			127	10/12/2019
AVES	*Vanellus tricolor*	Banded Lapwing			2	26/10/2009
AVES	*Zanda funerea whiteae*	Yellow-tailed Black Cockatoo		V	10	29/05/2011
AVES	*Zapornia pusilla palustris*	Baillon's Crake			6	20/11/2014
AVES	*Zapornia tabuensis*	Spotless Crake		R	1	3/11/2012
AVES	*Zosterops lateralis*	Silvereye			84	30/07/2020
MAMMALIA	*Arctocephalus forsteri*	Long-nosed Fur Seal (New Zealand Fur Seal)			2	2/09/2007
MAMMALIA	*Austronomus australis*	White-striped Free-tailed Bat			2	1/02/2019
MAMMALIA	*Chalinolobus gouldii*	Gould's Wattled Bat			3	1/02/2019
MAMMALIA	*Chalinolobus morio*	Chocolate Wattled Bat			1	1/02/2019
MAMMALIA	*Delphinus delphis*	Short-beaked Common Dolphin			13	14/07/2009
MAMMALIA	*Kogia breviceps*	Pygmy Sperm Whale		R	1	13/02/1991
MAMMALIA	*Lepus europaeus*	European Brown Hare			1	21/01/2001
MAMMALIA	Macropus fuliginosus	Western Grey Kangaroo			1	28/01/2022
MAMMALIA	Mormopterus planiceps	Southern Free-tailed Bat			3	1/02/2019
MAMMALIA	Mus musculus	House Mouse			1	28/01/2022
MAMMALIA	Neophoca cinerea	Australian Sea Lion	EN	V	1	11/04/1990
MAMMALIA	Nyctophilus geoffroyi	Lesser Long-eared Bat			3	1/02/2019
MAMMALIA	Physeter macrocephalus	Sperm Whale		R	1	1/03/1993
MAMMALIA	Pteropus poliocephalus	Grey-headed Flying-fox	VU	R	16	24/01/2022
MAMMALIA	Rattus rattus	Black Rat (Ship Rat, Roof Rat)			2	28/01/2022

MAMMALIA	Saccolaimus flaviventris	Yellow-bellied Sheath-tailed Bat		R	1	25/04/1990
MAMMALIA	Tachyglossus aculeatus	Short-beaked Echidna	ssp	ssp	1	23/12/1985
MAMMALIA	Trichosurus vulpecula	Common Brushtail Possum		R	1	5/12/2000
MAMMALIA	Tursiops aduncus	Indo-Pacific Bottlenose Dolphin			4	22/01/2009
MAMMALIA	Vespadelus darlingtoni	Large Forest Bat			2	1/02/2019
MAMMALIA	Vespadelus regulus	Southern Forest Bat			1	1/02/2019
MAMMALIA	Vulpes vulpes	Fox (Red Fox)			1	5/12/2000
MAMMALIA	Ziphius cavirostris	Cuvier's Beaked Whale (Goose-beaked Whale)		R	1	27/04/1966
REPTILIA	Aprasia striolata	Lined Worm-lizard			2	16/06/1987
REPTILIA	Caretta caretta	Loggerhead Sea Turtle	EN	E	1	23/04/2012
REPTILIA	Chelonia mydas	Green Sea Turtle	VU	V	1	29/10/1988
REPTILIA	Christinus marmoratus	Marbled Gecko			1	3/11/1999
REPTILIA	Ctenophorus decresii (revised)	Tawny Rock Dragon			2	16/02/1986
REPTILIA	Delma molleri	Gulfs Delma			1	1/01/1950
REPTILIA	Dermochelys coriacea	Leatherback Turtle	EN	V	2	1/01/2010
REPTILIA	Egernia cunninghami	Cunningham's Skink		E	1	1/01/1950
REPTILIA	Hemiergis decresiensis	Three-toed Earless Skink			1	3/11/1999
REPTILIA	Hemiergis peronii	Four-toed Earless Skink			1	3/11/1999
REPTILIA	Lepidochelys olivacea	Olive Ridley Turtle			1	23/04/2012
REPTILIA	Lerista dorsalis	Southern Four-toed Slider			3	28/01/2022
REPTILIA	Menetia greyii	Dwarf Skink			1	28/01/2022
REPTILIA	Morethia obscura	Mallee Snake-eye			5	3/11/1999
REPTILIA	Notechis scutatus	Tiger Snake	ssp		1	1/01/1950
REPTILIA	Pogona barbata	Eastern Bearded Dragon			2	8/12/2016
REPTILIA	Pseudonaja textilis	Eastern Brown Snake			1	24/10/1985
REPTILIA	Tiliqua rugosa	Sleepy Lizard			3	28/01/2022
REPTILIA	Tympanocryptis lineata complex	Lined Earless Dragon			1	6/01/1993

Appendix 3: Photopoints and Bushland Assessment data for the site

T&M Ecologists divided the site into assessment areas based largely on the type of vegetation present and the condition of the vegetation. In each of these Management Zones an assessment was undertaken using the "BushRAT" technique developed by the SA Department for Environment, Water and Natural Resources. Eight areas were assessed on 19th June 2020, and an additional area , Management Zone 1.1, was assessed on 30th April 2021. The assessment areas are shown in Figure 3.

The Bushland Assessment technique is derived from the Nature Conservation Society of South Australia's 'Bushland Condition Monitoring' (BCM) methodology, including a Rapid Assessment version (Croft et al, 2005), 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. At least one photopoint was installed in each assessment area, with additional photopoints shown on Figure 3. Details of additional photopoints are provided in Appendix 1.

Three 'components' of the biodiversity value of the site are measured and scored:

- vegetation condition;
- conservation value; and
- landscape context.

For the purposes of this study, only vegetation condition has been scored.

It should be noted that the DEWNR BushRAT system was updated in 2017, and again in early 2019 and re-named "Native Vegetation Bushland Assessment"[39]. This update includes modifications to the scoring sheet and methodology for calculating vegetation condition, conservation significance and landscape context. However, this report has continued to use the BushRAT system as per DEWNR 2012[40], to retain compatibility with data that has previously been collected in coastal sites.

Scoring Components in the BushRAT metric

It is not the intent of this report to provide an extensive overview of the use and application of the BushRAT methodology. A full description of the method and its application can be found within DEWNR (2012)[41]. For this project, only the vegetation condition components of the BushRAT metric 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 1 describes the scoring components for Vegetation Condition.

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

Table A4.1: Scoring components for the BushRAT metric

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.
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 following pages provide Bushland Assessment data gathered in the site during field assessment.

Assessment Area: Ochre Point **Unit:** 1
Date: March 23, 2022
Vegetation Association: *Beyeria lechenaultii, Acrotriche patula low shrubland with emergent Melaleuca lanceolata, Eucalyptus porosa, Santalum acuminatum, Allocasuarina verticillata*
Benchmark Community[42]: SMLR 7.4 Coastal Cliff Low Shrublands, Hummock Grasslands & Very Low Open Woodlands
Nationally (EPBC) rated ecosystems present: Nil
State (provisional DEW) rated ecosystems present: Nil
Indicative photopoint images (in addition to photopoint images provided in Management Zone descriptions)

Indicative image of the site, facing SSE at 269867, 6100206 (WGS 84, Zone 54)

[42] As per Milne, T., Croft, S., and Pedler, J. (2005). Bushland Condition Monitoring Manual Southern Mount Lofty Ranges. Volume 3: Vegetation Communities of the Southern Mount Lofty Ranges. Nature Conservation Society of South Australia, Adelaide.

Indicative image of the site, facing NW at 269855, 6100298 (WGS 84, Zone 54)

BushRAT assessment data:

Native understorey biomass: 91+%
Native Plant species count: 40
Native Plant Lifeform Cover Score: 16
Weed abundance and Threat Score: 16
Regeneration score: 8

Native Understorey Biomass Score (/10):	10
Native Plant Species benchmark score (/15):	15
Native Plant Lifeform benchmark score (/10):	9
Weed abundance/threat benchmark score (/15):	6
Regeneration benchmark score (/8)	8
Tree Health Score (/5)	NA
Tree Hollows Score (/5)	NA
Fallen Timber Score (/5)	NA
Grazing Evidence score (/4)	3
Bare Ground Score (/3)	3
TOTAL (/65)	**54**

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	4	'Sedges' ≤ 1m	3
Trees < 5m	1	Herbs	1	Hummock grass	
Mallee > 5m		Mat Plants	1	Vines,scramblers	1a
Mallee ≤ 5m		Grasses >0.2m	1a	Mistletoe	
Shrubs > 2 m	1	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%

Assessment Area: Ochre Point **Unit:** 2
Date: March 23, 2022
Vegetation Association: *Beyeria lechenaultii low shrubland*
Benchmark Community[43]: SMLR 7.4 Coastal Cliff Low Shrublands, Hummock Grasslands & Very Low Open Woodlands
Nationally (EPBC) rated ecosystems present: Nil
State (provisional DEW) rated ecosystems present: Nil
Indicative photopoint images (in addition to photopoint images provided in Management Zone descriptions)

Indicative image of the site, facing SW at 269784, 6100264 (WGS 84, Zone 54)

[43] As per Milne, T., Croft, S., and Pedler, J. (2005). Bushland Condition Monitoring Manual Southern Mount Lofty Ranges. Volume 3: Vegetation Communities of the Southern Mount Lofty Ranges. Nature Conservation Society of South Australia, Adelaide.

Indicative image of the site, facing SSW at 269728, 6100154 (WGS 84, Zone 54)

BushRAT assessment data:

Native understorey biomass: 41-50%
Native Plant species count: 31
Native Plant Lifeform Cover Score: 13
Weed abundance and Threat Score: 23
Regeneration score: 1

Native Understorey Biomass Score (/10):	5
Native Plant Species benchmark score (/15):	15
Native Plant Lifeform benchmark score (/10):	8
Weed abundance/threat benchmark score (/15):	3
Regeneration benchmark score (/8)	2
Tree Health Score (/5)	NA
Tree Hollows Score (/5)	NA
Fallen Timber Score (/5)	NA
Grazing Evidence score (/4)	3
Bare Ground Score (/3)	3
TOTAL (/65)	**39**

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	1
Trees < 5m		Herbs	1a	Hummock grass	
Mallee > 5m		Mat Plants	1	Vines,scramblers	1
Mallee ≤ 5m		Grasses >0.2m	1	Mistletoe	
Shrubs > 2 m		Grasses ≤ 0.2m	2	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%

Assessment Area: Ochre Point **Unit:** 3
Date: March 30, 2022
Vegetation Association: *Beyeria lechenaultii, Acrotriche patula low shrubland*
Benchmark Community[44]: SMLR 7.4 Coastal Cliff Low Shrublands, Hummock Grasslands & Very Low Open Woodlands
Nationally (EPBC) rated ecosystems present: Nil
State (provisional DEW) rated ecosystems present: Nil
Indicative photopoint images (in addition to photopoint images provided in Management Zone descriptions)

Indicative image of the site, facing E at 269662, 6099416 (WGS 84, Zone 54)

[44] As per Milne, T., Croft, S., and Pedler, J. (2005). Bushland Condition Monitoring Manual Southern Mount Lofty Ranges. Volume 3: Vegetation Communities of the Southern Mount Lofty Ranges. Nature Conservation Society of South Australia, Adelaide.

Indicative image of the site, facing E at 269738, 6099317 (WGS 84, Zone 54)

BushRAT assessment data:

Native understorey biomass: 71-80%
Native Plant species count: 36
Native Plant Lifeform Cover Score: 15
Weed abundance and Threat Score: 19
Regeneration score: 3

Native Understorey Biomass Score (/10):	8
Native Plant Species benchmark score (/15):	15
Native Plant Lifeform benchmark score (/10):	8
Weed abundance/threat benchmark score (/15):	5
Regeneration benchmark score (/8)	4
Tree Health Score (/5)	NA
Tree Hollows Score (/5)	NA
Fallen Timber Score (/5)	NA
Grazing Evidence score (/4)	4
Bare Ground Score (/3)	3
TOTAL (/65)	**47**

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	4	'Sedges' ≤ 1m	2
Trees < 5m		Herbs	1a	Hummock grass	
Mallee > 5m		Mat Plants	1a	Vines,scramblers	1a
Mallee ≤ 5m		Grasses >0.2m	1a	Mistletoe	
Shrubs > 2 m		Grasses ≤ 0.2m	2	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%

Assessment Area: Ochre Point **Unit:** 4
Date: March 30, 2022
Vegetation Association: *Beyeria lechenaultii, Acrotriche patula low shrubland*
Benchmark Community[45]: SMLR 7.4 Coastal Cliff Low Shrublands, Hummock Grasslands & Very Low Open Woodlands
Nationally (EPBC) rated ecosystems present: Nil
State (provisional DEW) rated ecosystems present: Nil
Indicative photopoint images (in addition to photopoint images provided in Management Zone descriptions)

Indicative image of the site, facing NE at 269708, 6099608 (WGS 84, Zone 54)

[45] As per Milne, T., Croft, S., and Pedler, J. (2005). Bushland Condition Monitoring Manual Southern Mount Lofty Ranges. Volume 3: Vegetation Communities of the Southern Mount Lofty Ranges. Nature Conservation Society of South Australia, Adelaide.

Indicative image of the site, facing SSE at 269662, 6099532 (WGS 84, Zone 54)

BushRAT assessment data:

Native understorey biomass: 71-80%
Native Plant species count: 28
Native Plant Lifeform Cover Score: 15
Weed abundance and Threat Score: 18
Regeneration score: 1

Native Understorey Biomass Score (/10):	8
Native Plant Species benchmark score (/15):	14
Native Plant Lifeform benchmark score (/10):	8
Weed abundance/threat benchmark score (/15):	5
Regeneration benchmark score (/8)	2
Tree Health Score (/5)	NA
Tree Hollows Score (/5)	NA
Fallen Timber Score (/5)	NA
Grazing Evidence score (/4)	2
Bare Ground Score (/3)	3
TOTAL (/65)	**42**

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	4	'Sedges' ≤ 1m	2
Trees < 5m	1	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	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%

Assessment Area: Ochre Point **Unit:** 5
Date: March 30, 2022
Vegetation Association: *Beyeria lechenaultii low shrubland*
Benchmark Community[46]: SMLR 7.4 Coastal Cliff Low Shrublands, Hummock Grasslands & Very Low Open Woodlands
Nationally (EPBC) rated ecosystems present: Nil
State (provisional DEW) rated ecosystems present: Nil
Indicative photopoint images (in addition to photopoint images provided in Management Zone descriptions)

Indicative image of the site, facing SSW at 269711, 6099883 (WGS 84, Zone 54)

[46] As per Milne, T., Croft, S., and Pedler, J. (2005). Bushland Condition Monitoring Manual Southern Mount Lofty Ranges. Volume 3: Vegetation Communities of the Southern Mount Lofty Ranges. Nature Conservation Society of South Australia, Adelaide.

Indicative image of the site, facing SW at 269662, 6099859 (WGS 84, Zone 54)

BushRAT assessment data:

Native understorey biomass: 61-70%
Native Plant species count: 33
Native Plant Lifeform Cover Score: 14
Weed abundance and Threat Score: 30
Regeneration score: 5

Native Understorey Biomass Score (/10):	7
Native Plant Species benchmark score (/15):	15
Native Plant Lifeform benchmark score (/10):	8
Weed abundance/threat benchmark score (/15):	1
Regeneration benchmark score (/8)	7
Tree Health Score (/5)	NA
Tree Hollows Score (/5)	NA
Fallen Timber Score (/5)	NA
Grazing Evidence score (/4)	3
Bare Ground Score (/3)	3
TOTAL (/65)	**44**

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	1a
Trees < 5m		Herbs	1a	Hummock grass	
Mallee > 5m		Mat Plants	1a	Vines,scramblers	1
Mallee ≤ 5m		Grasses >0.2m	2	Mistletoe	
Shrubs > 2 m		Grasses ≤ 0.2m	2	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%

Assessment Area: Ochre Point **Unit:** 6
Date: March 23, 2022
Vegetation Association: *Atriplex paludosa ssp. cordata, Beyeria lechenaultii low shrubland*
Benchmark Community[47]: SMLR 7.4 Coastal Cliff Low Shrublands, Hummock Grasslands & Very Low Open Woodlands
Nationally (EPBC) rated ecosystems present: Nil
State (provisional DEW) rated ecosystems present: Nil
Indicative photopoint images (in addition to photopoint images provided in Management Zone descriptions)

Indicative image of the site, facing SSW at 269700, 6100148 (WGS 84, Zone 54)

[47] As per Milne, T., Croft, S., and Pedler, J. (2005). Bushland Condition Monitoring Manual Southern Mount Lofty Ranges. Volume 3: Vegetation Communities of the Southern Mount Lofty Ranges. Nature Conservation Society of South Australia, Adelaide.

Indicative image of the site, facing SSW at 269731, 6100266 (WGS 84, Zone 54)

BushRAT assessment data:

Native understorey biomass: 81-90%
Native Plant species count: 15
Native Plant Lifeform Cover Score: 12
Weed abundance and Threat Score: 13
Regeneration score: 3

Native Understorey Biomass Score (/10):	9
Native Plant Species benchmark score (/15):	9
Native Plant Lifeform benchmark score (/10):	7
Weed abundance/threat benchmark score (/15):	7
Regeneration benchmark score (/8)	4
Tree Health Score (/5)	NA
Tree Hollows Score (/5)	NA
Fallen Timber Score (/5)	NA
Grazing Evidence score (/4)	4
Bare Ground Score (/3)	3
TOTAL (/65)	**43**

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		Shrubs < 0.5 m	4	'Sedges' ≤ 1m	1a
Trees < 5m		Herbs	1a	Hummock grass	
Mallee > 5m		Mat Plants	2	Vines,scramblers	
Mallee ≤ 5m		Grasses >0.2m	1	Mistletoe	
Shrubs > 2 m		Grasses ≤ 0.2m	2	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%

Assessment Area: Ochre Point **Unit:** 7
Date: March 23, 2022
Vegetation Association: *Acacia cyclops, Atriplex paludosa ssp. cordata, Beyeria lechenaultii low shrubland*
Benchmark Community[48]: SMLR 7.4 Coastal Cliff Low Shrublands, Hummock Grasslands & Very Low Open Woodlands
Nationally (EPBC) rated ecosystems present: Nil
State (provisional DEW) rated ecosystems present: Nil
Indicative photopoint images (in addition to photopoint images provided in Management Zone descriptions)

Indicative image of the site, facing SW at 269773, 6100431 (WGS 84, Zone 54)

[48] As per Milne, T., Croft, S., and Pedler, J. (2005). Bushland Condition Monitoring Manual Southern Mount Lofty Ranges. Volume 3: Vegetation Communities of the Southern Mount Lofty Ranges. Nature Conservation Society of South Australia, Adelaide.

Indicative image of the site, facing SW at 269822, 6100512 (WGS 84, Zone 54)

BushRAT assessment data:

Native understorey biomass: 61-70%
Native Plant species count: 15
Native Plant Lifeform Cover Score: 9
Weed abundance and Threat Score: 20
Regeneration score: 2

Native Understorey Biomass Score (/10):	7
Native Plant Species benchmark score (/15):	9
Native Plant Lifeform benchmark score (/10):	5
Weed abundance/threat benchmark score (/15):	4
Regeneration benchmark score (/8)	3
Tree Health Score (/5)	NA
Tree Hollows Score (/5)	NA
Fallen Timber Score (/5)	NA
Grazing Evidence score (/4)	4
Bare Ground Score (/3)	3
TOTAL (/65)	**35**

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	4	'Sedges' ≤ 1m	1
Trees < 5m		Herbs	1a	Hummock grass	
Mallee > 5m		Mat Plants	2	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%

Assessment Area: Ochre Point **Unit:** 8
Date: March 30, 2022
Vegetation Association: *Eucalyptus porosa low open woodland*
Benchmark Community[49]: SMLR 7.4 Coastal Cliff Low Shrublands, Hummock Grasslands & Very Low Open Woodlands
Nationally (EPBC) rated ecosystems present: Nil
State (provisional DEW) rated ecosystems present: Nil
Indicative photopoint images (in addition to photopoint images provided in Management Zone descriptions)

Indicative image of the site, facing S at 269774, 6099883 (WGS 84, Zone 54)

[49] As per Milne, T., Croft, S., and Pedler, J. (2005). Bushland Condition Monitoring Manual Southern Mount Lofty Ranges. Volume 3: Vegetation Communities of the Southern Mount Lofty Ranges. Nature Conservation Society of South Australia, Adelaide.

Indicative image of the site, facing SSE at 269775, 6099911 (WGS 84, Zone 54)

BushRAT assessment data:

Native understorey biomass: 71-80%
Native Plant species count: 22
Native Plant Lifeform Cover Score: 15
Weed abundance and Threat Score: 20
Regeneration score: 1

Native Understorey Biomass Score (/10):	8
Native Plant Species benchmark score (/15):	12
Native Plant Lifeform benchmark score (/10):	8
Weed abundance/threat benchmark score (/15):	4
Regeneration benchmark score (/8)	2
Tree Health Score (/5)	4
Tree Hollows Score (/5)	0
Fallen Timber Score (/5)	0
Grazing Evidence score (/4)	2
Bare Ground Score (/3)	2
TOTAL (/80)	**42**

Structural Diversity Plant Lifeforms data:

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

Assessment Area: Ochre Point **Unit:** 9
Date: March 30, 2022
Vegetation Association: *Olearia axillaris shrubland*
Benchmark Community[50]: SMLR Co 7.2 - Coastal Shrublands & Tall Shrublands
Nationally (EPBC) rated ecosystems present: Nil
State (provisional DEW) rated ecosystems present: Nil
Indicative photopoint images (in addition to photopoint images provided in Management Zone descriptions)

Indicative image of the site, facing SSW at 269587, 6099712 (WGS 84, Zone 54)

[50] As per Milne, T., Croft, S., and Pedler, J. (2005). Bushland Condition Monitoring Manual Southern Mount Lofty Ranges. Volume 3: Vegetation Communities of the Southern Mount Lofty Ranges. Nature Conservation Society of South Australia, Adelaide.

Indicative image of the site, facing SE at 269597, 6099698 (WGS 84, Zone 54)

BushRAT assessment data:

Native understorey biomass: 51-60%
Native Plant species count: 14
Native Plant Lifeform Cover Score: 15
Weed abundance and Threat Score: 35
Regeneration score: 3

Native Understorey Biomass Score (/10):	6
Native Plant Species benchmark score (/15):	9
Native Plant Lifeform benchmark score (/10):	8
Weed abundance/threat benchmark score (/15):	2
Regeneration benchmark score (/8)	4
Tree Health Score (/5)	NA
Tree Hollows Score (/5)	NA
Fallen Timber Score (/5)	NA
Grazing Evidence score (/4)	1
Bare Ground Score (/3)	3
TOTAL (/65)	**33**

Structural Diversity Plant Lifeforms data:

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

Assessment Area: Ochre Point **Unit:** 10
Date: March 23, 2022
Vegetation Association: *Olea europaea, Acacia cyclops, Retama raetam shrubland*
Benchmark Community[51]: SMLR 7.4 Coastal Cliff Low Shrublands, Hummock Grasslands & Very Low Open Woodlands
Nationally (EPBC) rated ecosystems present: Nil
State (provisional DEW) rated ecosystems present: Nil
Indicative photopoint images (in addition to photopoint images provided in Management Zone descriptions)

Indicative image of the site, facing SE at 269801, 6099970 (WGS 84, Zone 54)

[51] As per Milne, T., Croft, S., and Pedler, J. (2005). Bushland Condition Monitoring Manual Southern Mount Lofty Ranges. Volume 3: Vegetation Communities of the Southern Mount Lofty Ranges. Nature Conservation Society of South Australia, Adelaide.

Indicative image of the site, facing SSW at 269807, 6099865 (WGS 84, Zone 54)

BushRAT assessment data:

Native understorey biomass: 0-10%
Native Plant species count: 24
Native Plant Lifeform Cover Score: 6
Weed abundance and Threat Score: 33
Regeneration score: 3

Native Understorey Biomass Score (/10):	1
Native Plant Species benchmark score (/15):	13
Native Plant Lifeform benchmark score (/10):	3
Weed abundance/threat benchmark score (/15):	0
Regeneration benchmark score (/8)	4
Tree Health Score (/5)	0
Tree Hollows Score (/5)	0
Fallen Timber Score (/5)	0
Grazing Evidence score (/4)	1
Bare Ground Score (/3)	3
TOTAL (/80)	**25**

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	0	'Sedges' ≤ 1m	
Trees < 5m		Herbs		Hummock grass	
Mallee > 5m		Mat Plants	1	Vines,scramblers	1
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%

Assessment Area: Ochre Point **Unit:** 11
Date: March 23, 2022
Vegetation Association: *Gramineae spp. grassland*
Benchmark Community[52]: SMLR 7.4 Coastal Cliff Low Shrublands, Hummock Grasslands & Very Low Open Woodlands
Nationally (EPBC) rated ecosystems present: Nil
State (provisional DEW) rated ecosystems present: Nil
Indicative photopoint images (in addition to photopoint images provided in Management Zone descriptions)

Indicative image of the site, facing S at 269889, 6100017 (WGS 84, Zone 54)

[52] As per Milne, T., Croft, S., and Pedler, J. (2005). Bushland Condition Monitoring Manual Southern Mount Lofty Ranges. Volume 3: Vegetation Communities of the Southern Mount Lofty Ranges. Nature Conservation Society of South Australia, Adelaide.

Indicative image of the site, facing N at 269793, 6099354 (WGS 84, Zone 54)

BushRAT assessment data:

Native understorey biomass: 0-10%
Native Plant species count: 11
Native Plant Lifeform Cover Score: 3
Weed abundance and Threat Score: 22
Regeneration score: 1

Native Understorey Biomass Score (/10):	1
Native Plant Species benchmark score (/15):	6
Native Plant Lifeform benchmark score (/10):	1
Weed abundance/threat benchmark score (/15):	4
Regeneration benchmark score (/8)	2
Tree Health Score (/5)	0
Tree Hollows Score (/5)	0
Fallen Timber Score (/5)	0
Grazing Evidence score (/4)	3
Bare Ground Score (/3)	3
TOTAL (/80)	**20**

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	1	'Sedges' ≤ 1m	
Trees < 5m		Herbs		Hummock grass	
Mallee > 5m		Mat Plants		Vines,scramblers	
Mallee ≤ 5m		Grasses >0.2m	1a	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%