Flora survey of dunes

Semaphore South to Largs North

Report to
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T&M Ecologists

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Certain assumptions have been made in the preparation of this report. We have assumed that all information and documents provided to us by the Client or as a result of a specific request or enquiry were complete, accurate and up-to-date. Where we have obtained information from a government register or database, we have assumed that the information is accurate. Where an assumption has been made, we have not made any independent investigations with respect to the matters the subject of that assumption. We are not aware of any reason why any of the assumptions are incorrect.

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

Contents

1. Introduction

In order to contribute to a comprehensive and detailed understanding of the existing dune system between Point Malcolm Reserve at Semaphore Park and Strathfield Terrace at Largs North (Figure 1), a survey of the existing dune flora communities was undertaken in March 2020. This report includes:

- a description of the field assessment methodology;
- maps which show each vegetation type or 'unit';
- description of the vegetation present within each vegetation type/unit and its condition; and
- cover abundance of each native species and each native plant life form.

It is envisaged that the information gathered as part of this project will be used to develop a detailed planting plan for a dune buffer which is proposed to be established along a section of dune at Semaphore South where sand carting activities have been undertaken in recent times (Figure 2).

It should be noted that the seasonal nature of flora and fauna species means that not all plant species that occur within the project area would have been observed during this once-off field survey. Some plant species have short growth patterns and are typically only conspicuous at certain times of the year. Consequently some species may not have been readily 'detectable' at the time of field assessment.

Figure 1: Approximate location of project area (shown by blue line) – Semaphore South to Largs North.

Figure 2: Location of the section proposed for dune restoration and revegetation at Semaphore South.

2. Methodology

A flora assessment using the Bushland Assessment methodology[1] was undertaken during March 2020. The coastal dunes were divided into sections or 'units', based on the plant community present and on the condition of the vegetation. Bushland assessments were undertaken in each section.

The Bushland Assessment is undertaken in a one hectare area that is representative of vegetation with similar overstorey and understorey floristic compositions. The assessment involves three components:

- *vegetation condition* – conducted on rapid quantitative scoring of different condition attributes in the field
- *conservation significance* – based on both information obtained in the field and desktop assessments
- *landscape context* – based on desktop GIS analysis.

[1]DEW 2019, *Native Vegetation Council Bushland Assessment Manual*, July 2019.

Note that because the assessment was undertaken to provide the Department for Environment & Water (DEW) with an overview of the vegetation communities present and their condition, only the Vegetation Condition component of the methodology was used in this instance[2].

This method incorporates a representative photopoint, plus specific data on the following vegetation condition attributes.

- **Native Plant Species Diversity** – the native plant species present are recorded. In this case a cover estimate (% projected foliage cover) was made for every native species, which is beyond the scope of the Bushland Assessment Method.
- **Weeds** - the cover and abundance of all weed species present are recorded
- **Native Plant Life Forms** - the cover of different native plant life forms is allocated to a cover category as per that of weeds
- **Regeneration** - the total number of woody native species in juvenile or seedling form is recorded
- **Native:exotic Understorey Biomass** - the percentage of the total vegetative biomass of shrubs and groundcover plants < 2m high that is native is noted
- **Tree Health** - average overall overstorey canopy health is allocated to a category
- **Tree Hollows** – the number of small and large tree hollows present is categorised
- **Fallen timber** - the amount of branch and trunk sized logs present is allocated to a category

A total of 20 separate sections or 'units' were identified as part of the field assessment and Bushland Assessments were undertaken in each of these units as described below. Their location is shown in Figures 3.1-3.7. Appendix 1 includes the Bushland Assessment 'Vegetation Condition' summary scoresheets for each site.

3. Vegetation description per unit

Following is a description of the vegetation within each of the 20 separate sections/units which were identified within the project area, as well as representative photographs. The extent of these units is shown in Figures 3.1 – 3.7.

[2] The Conservation Significance and Landscape Context components of the methodology are included in native vegetation clearance and Significant Environmental Benefit assessments to provide context, however they are unlikely to change over time.

Unit1 Front of dune system–Semaphore South

The foredune which abuts the beach at Semaphore South is dominated by the introduced Sea Wheat-grass (**Thinopyrum junceiforme*). The cover of Sea Wheat-grass is estimated to be approximately 26-50%, whilst the native Rolling Spinifex (*Spinifex hirsutus*) and Knobby Club-rush (*Ficinia nodosa*) are both estimated to cover <1% respectively. There is the odd emergent low shrub in this highly saline and exposed environment, including Coast Saltbush (*Atriplex cinerea*), Coast Cushion Bush (*Leucopyhyta brownii*) and Coast Daisy-bush (*Olearia axillaris*).

Unit 1: Sea Wheat-grass (**Thinopyrum junceiforme*) Introduced grassland on the foredune at Semaphore South.

Unit 2 Hind-dune – Semaphore South

The low hind-dune and associated swale which runs from Point Malcolm Reserve to Fort Glanville Conservation Park is best described as a Coast Daisy Bush (*Olearia axillaris*) Shrubland. *Acacia cupularis/Acacia ligulata*[3] is also quite prominent, particularly on the landward side of the area.

A total of 23 native plant species was recorded and the Native:exotic understorey biomass was estimated to be 40-80%.

Weeds of concern include the occasional Boxthorn (**Lycium ferocissimum*) and Couch (**Cynodon dactylon*) which mainly occurs near more disturbed edges and around drainage infrastructure. Evidence of foxes, including active holes and dead birds, was also noted.

Unit 2: Coast Daisy-bush (*Olearia axillaris*) Shrubland at Semaphore South.

[3] Note that *Acacia cupularis* and *Acacia ligulata* are closely related and not always readily separated. It is possible/likely that both species have been used for revegetation in the Semaphore and Largs Bay dunes.

Unit 2: Coast Daisy-bush (*Olearia axillaris*) Shrubland at Semaphore South.

Unit 3 Top of the fore-dune – Semaphore South

A relatively narrow and more exposed strip of Coast Daisy Bush (*Olearia axillaris*), Coast Saltbush (*Atriplex cinerea*) Shrubland occurs along the top of the fore-dune (between Unit 1 and Unit 2). The native plant species diversity is lower here and the cover of bare sand is estimated to be 50% due to the ongoing accumulation of wind-blown sand.

Unit 3: Coast Daisy-bush (*Olearia axillaris*), Coast Saltbush (*Atriplex cinerea*) Shrubland at Semaphore South.

Unit 3: Coast Daisy-bush (*Olearia axillaris*), Coast Saltbush (*Atriplex cinerea*) Shrubland at Semaphore South.

Unit 4 Back-dune adjacent to Fort Glanville Conservation Park

A very small patch of Drooping Sheoak (*Allocasuarina verticillata*) Low open woodland occurs on the more sheltered back-dune adjacent to Fort Glanville Conservation Park. The understorey is essentially comprised of dune shrubs and groundcover species.

Unit 4: Drooping Sheoak (*Allocasuarina verticillata*) Low open woodland

Unit 5 Back-dune adjacent to Fort Glanville Conservation Park

A Dryland Tea-tree (*Melaleuca lanceolata*) Low open woodland is also present in front of Fort Glanville, to the south of Bower Road. It is likely that these small trees have been planted. Coastal dune shrub species are sparsely present in the understorey. Native: exotic understorey biomass is estimated at >40-80%..

Unit 5: Dryland Tea-tree (*Melaleuca lanceolata*) Low open woodland

Unit 6 Back-dune – North of Bower Road to Arthur Street, Semaphore South

This dune system in this area is quite disturbed and degraded and comprises a Knobby Club-rush (*Ficinia nodosa*) Sedgeland/ *Spinifex hirsutus* Grassland with emergent coastal shrubs. The native plant species diversity is lower here and the cover of bare sand is estimated to be 50% due to ongoing disturbances.

Of note is the presence of a large patch of Coast Tea-tree (**Leptospermum laevigatum*), a high threat woody weed, which is spreading.

Unit 6: Knobby Club-rush (*Ficinia nodosa*) Sedgeland/Rolling Spinifex (*Spinifex hirsutus*) Tussock grassland

Unit 7 Arthur Street to Hart Street Semaphore

The dune system has narrowed right down in this section and is dominated by the introduced Two-horned Sea Rocket (**Cakile maritima*) and Sea Wheat-grass (**Thinopyrum junceiforme)* with the occasional emergent native coastal shrub. Bare sand is estimated to be 75% in this highly degraded area where replenishment sand has been added in recent years to address erosion.

Unit 7: Two-horned Sea Rocket (**Cakile maritima*) Introduced herbland/ Sea Wheat-grass (**Thinopyrum junceiforme*) Introduced grassland

Unit 8 Back-dune areas - Semaphore

The vegetation in these areas is a Coastal Wattle (*Acacia longifolia* ssp. *sophorae*), Common Boobialla (*Myoporum insulare*) Tall shrubland with or without *Acacia ligulata/A. cupularis*. The shrubs in this section are up to 4 metres in height and form dense thickets in some areas, particularly where there is increased runoff/stormwater drains and/or nutrient levels adjacent to the paved Coast Park pathway. In particular, in the vicinity of the Semaphore jetty, *Acacia longifolia ssp. sophorae* has benefited and, whilst this species is indigenous, it is considered to have increased beyond its natural cover abundance for the dunes system. It is also considered that this species reaches a size beyond that generally observed in other coastal dune systems across the state, where it reaches a maximum height of circa 2.5 metres (T. Milne pers. obs.).

Native plant species diversity is moderately high and the native:exotic understorey biomass was estimated to be >80%.

Weeds of concern include the occasional Skeleton Weed (**Chondrilla juncea*), patches of Coastal Galenia (**Galenia* sp.), scattered Dune Onion Weed (**Trachyandra divaricata*) and patches of Couch (**Cynodon dactylon*) in more disturbed areas or where drainage infrastructure exists.

Unit 8: Coastal Wattle (*Acacia longifolia ssp. sophorae*), Common Boobialla (*Myoporum insulare*) +/- *Acacia ligulata/A. cupularis* Tall shrubland

Unit 8: Coastal Wattle (*Acacia longifolia ssp. sophorae*), Common Boobialla (*Myoporum insulare*) +/- *Acacia ligulata/A. cupularis* Tall shrubland

Unit 9 Fore-dune – Semaphore (south of jetty)

This vegetation comprises a Coast Daisy-bush (*Olearia axillaris) +/-* Cushion Fanflower *(Scaevola crassifolia*) Low shrubland which occurs on the sea-ward side of Unit 8. A total of 8 native plant species was recorded and the amount of bare sand present was estimated to be 55%. The cover of Sea Wheat-grass (**Thinopyrum junceiforme)* in this area is approximately 1-5%.

Unit 9: Coast Daisy-bush (*Olearia axillaris*) +/- Cushion Fanflower (*Scaevola crassifolia*) Low shrubland

Unit 10 Front of dune system– Semaphore (south of jetty)

The foredune which abuts the beach to the south of the Semaphore jetty is dominated by the native Spinifex (*Spinifex hirsutus*), with a cover estimated to be 6-25% overall. There is the odd emergent low shrub in this highly saline and exposed environment, including Coast Saltbush (*Atriplex cinerea*), Cushion Fanflower *(Scaevola crassifolia*) and Coast Daisy-bush (*Olearia axillaris*). Also present are small amounts of Native Pigface (*Carpobrotus rossii*) and Knobby Club-rush (*Ficinia nodosa*). The amount of bare sand is estimated to be approximately 50%, overall.

Unit 10: Rolling Spinifex (*Spinifex hirstus*) Tussock grassland

Unit 11 Top of fore-dune and back into the swale – north of Semaphore jetty

This section is described as Rolling Spinifex (*Spinifex hirsutus*) Grassland/Knobby Club-rush (*Ficinia nodosa*) Sedgeland with emergent coastal shrubs. Although native plant species diversity is not high in this area (13 species were recorded), there is low cover of weedy species and the native:exotic understorey biomass was estimated to be >80%. There is a good cover of Native Pigface (*Carpobrotus rossii*) and Knobby Club-rush (*Ficinia nodosa*). Bare sand was estimated to be around 35%.

Unit 11: Rolling Spinifex (*Spinifex hirstus*) Tussock grassland/Knobby Club-rush (*Ficinia nodosa*) Sedgeland with emergent shrubs

Unit 12 Front of dune system – north of Semaphore jetty

The narrow foredune which abuts the beach to the north of the Semaphore jetty is dominated by the introduced Sea Wheat-grass (**Thinopyrum junceiforme*) and Two-horned Sea Rocket (**Cakile maritima*). Little native vegetation occurs, apart from a cover of approximately 7% Rolling Spinifex (*Spinifex hirsutus*).

Unit 12: Sea Wheat-grass (**Thinopyrum junceiforme*) Introduced grassland/Two-horned Sea Rocket (**Cakile maritima*) Introduced herbland with emergent shubs

Unit 13 Swale - Semaphore jetty to Largs Bay jetty

A moderately high plant species diversity occurs in this more sheltered zone (23 native species were recorded). The vegetation comprises a Coast Daisy-bush (*Olearia axillaris*), Coastal Wattle (*Acacia longifolia* ssp. *sophorae*), Cushion Fanflower *(Scaevola crassifolia*) Shrubland. Shrubs tend to be taller towards the landward side of this area, possibly due to higher runoff and nutrient loads adjacent to the Coast Park pathway.

Weeds of concern include the odd scattered individual high threat Dune Onion Weed (**Trachyandra divaricata*), although some control of this species was noted.

Unit 13: Coast Daisy-bush (*Olearia axillaris*), Coastal Wattle (*Acacia sophorae*) +/- Cushion Fanflower (*Scaevola crassifolia*) Shrubland

Unit 14 Back-dune – Hannay Street to Largs Bay jetty

This unit is situated adjacent to the Coast Park pathway and comprises an *Acacia cupularis/Acacia ligulata*), Coastal Wattle (*Acacia longifolia* ssp. *sophorae*), Common Boobialla *(Myoporum insulare*) Shrubland. Total number of native plant species recorded is 14 and the native:exotic understorey biomass was estimated to be 40-80%. Weedy grasses are prominent in the understorey, particularly Wild Oats (**Avena barbata*) and Couch (**Cynodon dactylon*), as well as Coastal Galenia (**Galenia pubescens*).

Unit 14: *Acacia cupularis/A. ligulata*, Coastal Wattle (*Acacia sophorae*), Common Boobialla (*Myoporum insulare*) Shrubland

Unit 15 Hind dune – south of Largs Bay jetty

The vegetation in this area is quite degraded and is dominated by the introduced Sea Wheat-grass (**Thinopyrum junceiforme*) and Two-horned Sea Rocket (**Cakile maritima*). Emergent shrubs include Coastal Wattle (*Acacia longifolia* ssp. *sophorae*), Coast Saltbush (*Atriplex cinerea*), Nitre Bush (*Nitraria billardierei*), Sea-berry Saltbush (*Rhagodia candoleana*) and Coast Daisy-bush (*Olearia axillaris*). There are some good patches of Rolling Spinifex (*Spinifex hirsutus*), however the native:exotic understorey biomass was estimated to be 20-40%.

It was noted that the highly invasive Dune Onion Weed (**Trachyandra divaricata*) has been treated around the Largs Bay jetty.

Unit 15: Sea Wheat-grass (**Thinopyrum junceiforme*) Introduced grassland/ Two-horned Sea Rocket (**Cakile maritima*) Introduced herbland with emergent shrubs

Unit 16 – Back dune areas north of the Largs Bay Yacht Squadron

This unit comprises a Coastal Wattle (*Acacia longifolia* ssp. *sophorae*), *Acacia cupularis/Acacia ligulata*, Common Boobialla (*Myoporum insulare*) +/- Coast Daisy-bush (*Olearia axillaris*) Shrubland to Open shrubland. Lower-lying areas have larger weed issues, particularly Couch (**Cynodon dactylon*) and Kikuyu (**Cenchrus clandestinus*).

Unit 16: Coastal Wattle (*Acacia sophorae*), *Acacia cupularis/A; ligulata*, Common Boobialla (*Myoporum insulare*) +/- Coast Daisy-bush (*Olearia axillaris*) Open shrubland

Unit 17 – Revegetation areas east of the Coast park pathway at Largs North

Mature revegetation occurs in this unit and can be described as Dryland tea-tree (*Melaleuca lanceolata*), *Acacia cupularis/Acacia ligulata*, Coast Daisy-bush (*Olearia axillaris*) +/- Common Boobialla (*Myoporum insulare*) Tall closed shrubland. The understorey is dominated by weedy grasses (particularly Wild Oats, Couch, Brome grass) and native:exotic understorey biomass was estimated to be 20-40%.

Unit 17: Dryland tea-tree (*Melaleuca lanceolata*), *Acacia cupularis/Acacia ligulata*, Coast Daisy-bush (*Olearia axillaris*) +/- Common Boobialla (*Myoporum insulare*) Tall closed shrubland

Unit 18 Low relief/modified dune areas north of Magarey Street at Largs North

This is a highly modified area comprised of a Nitre Bush (*Nitraria billardierei*) Open shrubland with scattered emergent coastal shrubs. Weeds such as Sea Wheat-grass (**Thinopyrum junceiforme*), Two-horned Sea Rocket (**Cakile maritima*), Coastal Galenia (**Galenia pubescens*), Iceplant (**Mesembryanthemum crystallinum*) and Great Brome (**Bromus diandrus*) are prominent. Native:exotic understorey biomass was estimated to be 5-10%.

Unit 18: Nitre Bush (*Nitraria billardierei*) Open shrubland with scattered emergent coastal shrubs

Unit 19 Low relief/modified dune areas north of the Largs Bay jetty

This unit is similar to Unit 18, however it is even more highly degraded and native:exotic understorey biomass was estimated to be <5%. The cover of Sea Wheat-grass (**Thinopyrum junceiforme*) is estimated at approximately 51-75%.

Unit 19: Sea Wheat-grass (**Thinopyrum junceiforme*) Introduced grassland with widely scattered emergent coastal shrubs

Unit 20 Rear dune areas Largs North

The vegetation within these low-lying dune areas, which occur between Afric Street and Cheapside Street, is in better condition and is dominated by Rolling Spinifex (*Spinifex hirsutus*) and Knobby Club-rush (*Ficinia nodosa*).

Unit 20: Rolling Spinifex (*Spinifex hirstus*) Tussock grassland/Knobby Club-rush (*Ficinia nodosa*) Sedgeland with emergent shrubs

Figure 3.1: Coastal vegetation – Pt Malcom Reserve to Bower Road, Semaphore South

Figure 3.2: Coastal vegetation –Bower Road to Hart Street, Semaphore South

Figure 3.3: Coastal vegetation –Hart Street to Semaphore Jetty

Figure 3.4: Coastal vegetation –Semaphore Jetty to Union Street, Semaphore

Figure 3.5 Coastal vegetation –Union Street to Alexander Street, Largs Bay

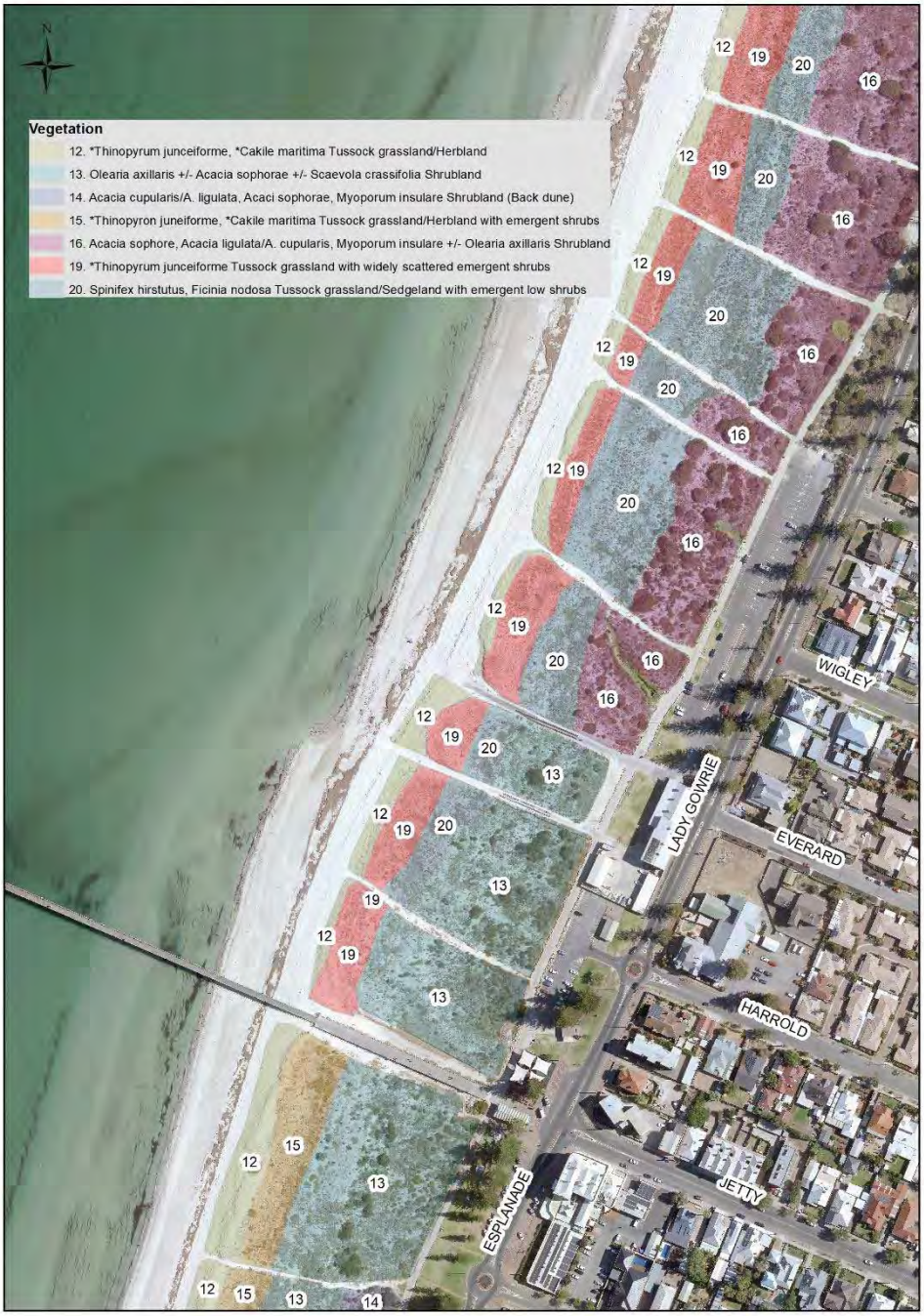

Figure 3.6 Coastal vegetation –Alexander Street to Roslyn Street, Largs North

Figure 3.7 Coastal vegetation –Alexander Street to Strathfield Terrace, Largs North

4. Flora species

4.1 Native flora species

A total of 36 native flora species was recorded within the project area[4]. Several of these species are likely to have been planted as part of revegetation programs which have been under way since 2004, or possibly earlier. Native plant species lists per unit/section are provided in Table 1, along with the estimated % cover for each species.

Table 1: Native plant species recorded within each vegetation community/section.

Scientific Name	Common Name	*Region	Unit/% cover																		
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Acacia ligulata/Acacia cupularis	Umbrella Bush/Cup Wattle	RA		10		6		N<1		<1					N<1	20		6	6			
Acacia longifolia ssp. sophorae	Coastal Wattle	LC		<1	N<1	2	N<1			6/R	N<1				3	3	N<1	6	4	N<1		N <1
Acacia pycnantha	Golden Wattle	LC																N<1				
Adriana quadripartita	Coast Bitter-bush	RA													N<1							
Allocasuarina verticillata	Drooping Sheoak	LC				15				N<1						N<1			N<1			
Atriplex cinerea	Coast Saltbush	LC	N<1	2	5	N<1		N<1		N<1	N<1	N<1	N<1		N<1		N<1			N<1	N<1	N <1
Atriplex paludosa ssp. cordata	Marsh Saltbush	RA								N<1			N<1		N<1			N<1			N<1	<1
Austrostipa flavescens	Coast Spear-grass	LC		<1						N<1					N<1							
Carpobrotus rossii	Native Pigface	LC		2	<1	2	3	2		3	<1	<1	6		3	1	3	<1	<1	4	4	2
Crassula colligata	Crassula	LC																				
Dianella brevicaulis	Coast Flax-lily	NT		3		N<1	N<1	N<1		<1			<1		1	<1	<1/ R	2	2	<1	<1	<1
Disphyma crassifolium ssp. clavellatum	Round-leaf Pigface	LC			N<1																	
Dodonaea viscosa ssp. spatulata	Sticky Hop-bush	LC						N<1		N<1					N<1	N<1		N<1				

[4] It should be noted that the seasonal nature of flora species means that not all plant species that occur within the project area would have been observed during this once-off field survey. Some plant species have short growth patterns and are typically only conspicuous at certain times of the year. Consequently some species may not have been readily 'detectable' at the time of field assessment.

Scientific Name	Common Name	*Region	Unit/% cover																		
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Enchylaena tomentosa var. tomentosa	Ruby Saltbush	LC		<1 /R		<1	N<1	N<1					N<1		N<1				N<1	N<1		
Ficinia nodosa	Knobby Club-sedge	LC	N<1	3	<1		N<1	1		3	<1	<1	3		4	<1	<1	7	<1		<1	2
Kunzea pomifera	Muntries	RA		N <1		<1				N<1					N<1							
Lepidosperma gladiatum	Coast Sword-sedge	NT		N <1						N<1					N<1	N<1	N<1	N<1	<1		N<1	N <1
Leucophyta brownii	Cushion Bush	NT	N<1		N<1										N<1			N<1				
Maireana brevifolia	Short-leaf Bluebush	LC		N <1																N<1		
Melaleuca halmaturorum	Swamp Paperbark	EN																	2			
Melaleuca lanceolata	Dryland Tea-tree	RA		N <1			10											N<1	2			
Muehlenbeckia gunnii	Coastal Climbing Lignum	LC		1			N<1	N<1		N<1								N<1	N<1	<1		
Myoporum insulare	Common Boobialla	NT		1/ R			2	N<1		2/R	N<1		N<1		<1	4	N<1 /R	8	7		N<1	N <1
Nitraria billardierei	Nire Bush	RA		N <1			N<1	N<1	N <1	N<1					N<1	N<1	N<1	N<1	N<1	4	N<1	
Olearia axillaris	Coast Daisy-bush	NT	N<1 /R	20	20	2	N<1	N<1		2	2/R	N<1	N<1 /R		<1/ R	N<1	3/R	3	8	N<1	<1/ R	<1
Pelargonium australe	Australian Pelargonium	RA		N <1						N<1			<1		<1	<1	<1	1	<1	2	2	2
Phragmites australis	Common Reed	LC																N<1				
Pimelea serpyllifolia ssp. serpyllifolia	Thyme Riceflower	NT			N<1																	
Poa poiformis var. poiformis	Coast Tussock-grass	LC		<1			N<1			<1						N<1			<1			
Rhagodia candolleana ssp. candolleana	Sea-berry Saltbush	LC		1	N<1		<1/ R			3/R	<1		1		1/R	<1	N<1	<1	<1	<1	<1	N <1
Scaevola crassifolia	Cushion Fanflower	VU		N <1	N<1	2				6	1	N<1			<1	2	N<1	7	10			
Senecio pinnatifolius var. pinnatifolius		NT		2			N<1			N<1			<1		<1	<1	<1	<1	<1	2	4	<1

Scientific Name	Common Name	*Region	Unit/% cover																	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Spinifex hirsutus	Coast Spinifex	LC	1	2	5	<1	N<1	6	< 1	7	4	20	25	7	13	3	3	4	1	<1	<1	8
Tetragonia implexicoma	Bower Spinach	LC								N<1	N<1									N<1		
Threlkeldia diffusa	Coast Bonefruit	NT		3	N<1	N<1		N<1		N<1	N<1		N<1		<1			<1	N<1	3	<1	<1
Bare Sand				25	50		15	50	75	35	55	50	35	55	40	15	45	20	10	15	35	

***Regional Ratings** (as per 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.)

RE - Regionally Extinct: There is no reasonable doubt that the last individual potentially capable of reproduction within the region has died or disappeared from the region, or, in the case of a former visiting taxon, individuals no longer visit the region.

CR - Critically Endangered/ EN – Endangered: Considered to be facing an extremely high risk of extinction in the wild.

VU - Vulnerable: Considered to be facing a high risk of extinction in the wild.

RA - Rare: Taxa that are considered to be dependent on ongoing conservation programs to prevent them moving into the Critically Endangered, Endangered or Vulnerable categories.

NT - Near Threatened: This category is applied to taxa where populations are 'uncommon', i.e. if it occurs in relatively low numbers, and does not meet the criteria for Rare.

LC - Least Concern: Widespread and abundant species

(R = Species that is naturally regenerating)

N<1 = Not many, cover is less than 1%

<1 = Plentiful, cover is less than 1%

4.2 Flora of conservation significance

The following table lists the plant species of conservation significance which were recorded within the assessment area. Note that no species with a National or State conservation rating were recorded. It should be noted that several of these species are considered to be planted and may not have originally occurred within the project area. As noted previously, some species may not have been readily 'detectable' at the time of field assessment, and so it is possible there are other species present, particularly annual species.

Table 2: Flora species of conservation significance, recorded January – February 2019

Name	Common Name	Conservation Status	Comments
		Region[5]	
Acacia cupularis/A. ligulata	Cup Wattle/Umbrella Bush	Rare	Likely to have been planted – these species have been part of Council's revegetation projects over the years
Adriana quadripartita	Coast Bitter-bush	Rare	Planted
Atriplex paludosa ssp. paludosa	Marsh Saltbush	Rare	Likely to have been planted – this species has been part of Council's revegetation projects over the years
Kunzea pomifera	Muntries	Rare	Remnant/Planted?
Melaleuca halmaturorum	Swamp Paper-bark	Endangered	Planted
Melaleuca lanceolata	Dryland Tea-tree	Rare	Likely to have been planted
Nitraria billardierei	Nitre-bush	Rare	Remnant
Pelargonium australe	Austral Stork's-bill	Rare	Most considered to be planted, but some remnant individuals may also occur
Scaevola crassifolia	Cushion Fanflower	Vulnerable	Most considered to be planted, but some remnant individuals may also occur

4.3 Weed species

A total of 42 weed species was recorded within the project area. As noted previously, some species may not have been readily 'detectable' at the time of field assessment, and so it is possible there are other species present, particularly annual species. Several species which are regulated (Declared) under the *Landscapes South Australia Act 2019* were recorded, including:

- Skeleton Weed (**Chondrilla juncea*) – scattered individuals, most notable north of the Largs Bay jetty
- False Caper (**Euphorbia terracina*) – scattered throughout, although there is evidence in some places of control via hand-pulling and spot-spraying
- African Boxthorn (**Lycium ferocissimum*) – several individuals noted in Unit 2 and Unit 18
- Olive (**Olea europaea*) – one small individual only noted in Unit 2

[5] Ratings for Adelaide and Mount Lofty Ranges region from 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.

Other weeds which are of concern due to their highly invasive nature and/or widespread cover within the project area include:

- Brome Grass *(*Bromus diandrus*) – throughout many sections, however particularly high covers occur to the north of the Largs Bay jetty.
- Couch (**Cynodon dactylon*) – particularly dense in areas around drainage infrastructure and other more disturbed areas such as adjacent to the sealed Coast Park pathway.
- Gazania (**Gazania* sp.) – probably a garden escape. Only 1 individual recorded in Unit 2, perhaps indicating that this highly invasive species has been actively controlled.
- Sea Wheat-grass (**Thinopyrum junceiforme*) - a weed that is developing into a cosmopolitan, it has a number of positive attributes (i.e. as a sand binder), although it could be altering habitat for shoreline birds such as the Red-capped Plover (*Charadrius ruficapillus*) which regularly frequents this coastline and also the Nationally and State Vulnerable Hooded Plover (*Thinornis rubricollis rubricollis)*.
- Dune Onion Weed (**Trachyandra divaricata*) – has been actively controlled and only widely scattered individuals were noted.

Weed species lists per community/section are provided in Table 3, as well as the cover ratings.

Table 3: Weed species recorded within each vegetation community/section and cover
*(*Cover ratings: 1= not many, cover <1%; 1a = plentiful, cover <1%; 2 = covering 1 - 5%; 3 = covering 5 – 25%; 4 = covering 26 –50%; 5 = covering 51 – 75%; 6 = covering > 75%)*

Species Name	Common Name	Weed threat ratings			Unit/*Cover																			
		Declared[1]	MANCAP[2]	BCM[3]	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Acacia calamifolia (planted)	Wallowa		-	-		1						1												
Aeonium sp.	Succulent garden escape		2	2																	1			
Agonis flexuosa	Willow Myrtle		-	-								1												
Arctotis stoechadifolia	Arctotis		5	3																	1			
Argyranthemum frutescens	Marguerite Daisy		4	3				1a									1							
Avena barbata	Bearded Oat		2	2		1a			1a	1a		1a					1	2		1a	2	2		
Brassica tournefortii	Mediterranean Turnip		1	1		1			1a			1						1a		1				
Bromus diandrus	Great Brome		1	1		2			2	1a		1a			1a			2	1a	2	2	3	3	
Cakile maritima ssp. maritima	Two-horned Sea Rocket		1	1	1	1a	1a			2	3	1	1a	1	1a	2	1a		2	1	1	2	2	
Callistemon sp. (planted)	Bottlebrush		-	-													1							
Cenchrus clandestinus	Kikuyu		5	3																1				
Centaurea calcitrapa	Star Thistle		-	-																	1			
Chondrilla juncea	Skeleton Weed	Yes	2	2		1						1								1a				
Conyza bonariensis	Flax-leaf Fleabane		1	2													1			1a		1		
Cynodon dactylon var. dactylon	Couch		3	2		1a		1a	3			2						2		1a	3			
Dimorphotheca fruticosa	Trailing African Daisy		2	-		1a				1a		2	1a		1a		1a	2	3	2		1a		1a
Ehrharta longiflora	Annual Veldt Grass		-	2		1						1												
Euphorbia paralias	Sea Spurge		5	3						1a		1a	1a	1a			1		1				1a	
Euphorbia terracina	False Caper	Yes	5	3	1	1			1								1		2	1a	1a			1a
Galenia pubescens var. pubescens	Coastal Galenia		5	2		1a		1	1	2	1	1a			1a		1a	1a	2	1a	2	2	2	

Species Name	Common Name	Weed threat ratings			Unit/*Cover																			
		Declared[1]	MANCAP[2]	BCM[3]	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Gazania sp.	Gazania		6	3		1																		
Hordeum marinum	Sea Barley-grass		1	1		1a	1a																	
Lactuca serriola f. serriola	Prickly Lettuce		1	2								1								1				
Lagurus ovatus	Hare's Tail Grass		2	2		2		1a	1a	1a		1			1					1a	2	1a		
Leptospermum laevigatum	Coast Tea-tree		6	3						3											1			
Lolium sp.	Ryegrass		1	1		1						1								1	1a	1a		
Liliaceae sp.			-	-								1											1	
Lycium ferocissimum	African Boxthorn	Yes	6	3		1																		
Medicago polymorpha var. polymorpha	Toothed Medic		1	2					1a			1a												
Melilotus indicus	King Island Melilot		1	2		1						1									1			
Mesembryanthemum crystallinum	Iceplant		4	2		1			1						1					1		3		
Oenothera stricta ssp. stricta	Evening Primrose		1	1																1		1		
Olea europaea	Olive	Yes	4	4		1																		
Phoenix dacylifera	Date Palm		-	-																	1			
Plantago coronopus	Buck's-horn Plantain		3	2								1								1			1	
Reichardia tingitana	Reichardia		3	2	1	3	1a	1a	2	2		1a		1a	1	1a	1a	1a	1a	1a	1a	1a	2	1a
Sonchus oleraceus	Milk Thistle		1	1		1		1	1											1				
Sonchus sp.			1	1								1												
Stenotaphrum secundatum	Buffalo Grass		2	2																1a				
Thinopyrum junceiforme	Sea Wheat-grass		3	2	4		1a	1		2	2	1	2			3	1a		3	2		3	5	1a
Trachyandra divaricata	Dune Onion Weed		7	4								1a					1a			1		1a		

Species Name	Common Name	Weed threat ratings			Unit/*Cover																	
		Declared[1]	MANCAP[2]	BCM[3]	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Vulpia sp.		3	2			3			2								1a	2		2			1a	

[1] Weeds which are **Declared** under the *Landscape South Australia Act 2019*

[2] Metropolitan Adelaide and Northern Coastal Action Plan (**MANCAP**) threat categories; [3] Bushland Condition Monitoring (**BCM**) Methodology weed threat ratings:

Value	BCM weed threat category	BCM weed threat category description	Distribution
9 8	5	Highly invasive in either disturbed or intact remnant bushland, spreads rapidly producing dense stands and a blanket cover. Potential to eliminate almost all understorey species. Very difficult to control without outside help.	• Widespread OR • Currently limited with numerous vectors
7	4	Highly invasive in either disturbed or intact bushland, with the potential to spread rapidly and produce very dense stands given favourable habitat and/or vectors. High potential to reduce native species diversity and abundance. Can be controlled with sustained effort	• Widespread OR • Currently limited with numerous vectors
6			• Limited distribution with few vectors
5	3	Invasive in intact bushland with moderate potential to reduce native species diversity. Rate of spread is slower than Category 4 and 5 weeds but once present will persist and threaten biodiversity. May produce dense stands over a wide area but can be controlled with sustained effort.	• Widespread OR • Currently limited with numerous vectors
4			• Limited distribution with few vectors
3	2	Generally only invade disturbed bushland, but may spread rapidly. However, generally only a slight potential to reduce native species diversity, unless present in high densities.	• Widespread OR • Currently limited with numerous vectors
2			• Limited distribution with few vectors
1	1	Generally only invade disturbed bushland. Often widespread and abundant but not considered a significant threat to biodiversity, unless present at very high densities.	N/A

5. Opportunistic fauna sightings

Whilst this project principally focussed on flora, there were some opportunistic observations made of fauna. These are summarised below:

5.1 Birds

A total of 12 native bird species and 4 introduced bird species was recorded during the March 2020 survey (Table 4). These birds are all widespread species that adapt well to urban and peri-urban areas.

Table 4: Bird species opportunistically recorded in the project area during the flora assessment, March 2020.

Species	Common Name	Conservation Status - Adelaide Region
Native		
Accipiter fasciatus	Brown Goshawk	Least Concern
Chroicocephalus novaehollandiae	Silver Gull	Least Concern
Eolophus roseicapilla	Galah	Least Concern
Falco cenchroides	Nankeen Kestrel	Least Concern
Gavicalis virescens	Singing Honeyeater	Least Concern
Grallina cyanoleuca	Magpielark	Least Concern
Gymnorhina tibicen	Australian Magpie	Least Concern
Hirundo neoxena	Welcome Swallow	Least Concern
Ocyphaps lophotes	Crested Pigeon	Least Concern
Manorina melanocephala	Noisy Miner	Least Concern
Phylidonyris novaehollandiae	New Holland Honeyeater	Least Concern
Rhipidura leucophrys	Willie Wagtail	Near Threatened
Introduced		
**Sturnus vulgaris*	Common Starling	-
**Passer domesticus*	House Sparrow	-
**Spilopelia chinensis*	Spotted Turtle-dove	-
**Turdus merula*	Blackbird	-

5.2 Reptiles

An opportunistic reptile survey was also undertaken in March 2020. There was little reptile activity noted during field survey. The dune habitats present are still in recovery in better sections, and in poorer quality sections are dominated by non-native shrubs and introduced herbs and grasses. Table 5 lists the species which were opportunistically sighted in March 2020. It was pleasing to note the presence of the Painted Dragon (*Ctenophorus pictus*) in the dune area, as this species is considered to be regionally Endangered. It is considered likely that several other reptile species would be present in the dune areas, including small skinks (eg *Lerista dorsalis*), large skinks (*Tiliqua rugosa*), geckoes (*Christinus marmoratus*), and snakes (*Pseudonaja textilis*).

Table 5: Reptiles opportunistically recorded in the project area during the flora assessment, March 2020.

Scientific Name	Common Name	*Conservation status			Comments[6]
		AUS	SA	AD	
Ctenophorus pictus	Painted Dragon			E	This species is found in dunes along the Adelaide coastline and was sighted in Unit 13 beneath a *Scaevola crassifolia* shrub (269835E/ 6142969N).
Menetia greyii	Dwarf Skink			NT	A small, active diurnal skink which is widespread across Australia. This species was sighted in Unit 8 on a beach access track near the Semaphore jetty.
Pogona barbata	Eastern Bearded Dragon			LC	A semi-arboreal species which was sighted in Unit 6.

***Conservation Status:** AUS = *Environment Protection and Biodiversity Conservation Act 1999*; SA= Schedules of the *National Parks and Wildlife Act 1972;* AD = Adelaide Region (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.
RE: Regionally Extinct; CE = Critically Endangered; E = Endangered; V = Vulnerable; R = Rare; NT = Near Threatened; LC = Least Concern

6. Overview of coastal dune vegetation

6.1 Pre-European

Prior to development of the adjacent land for housing, the dune system at Semaphore and Largs Bay would have comprised three or four well-defined parallel ridges of calcareous sand, rarely more than 15m high, and usually much lower[7].

The foredune (first dune facing the coast) is exposed to constant and severe environmental stresses of high winds, waves, tides, storms and seasonal change[8]. Its stability depends on highly specialised dune plants, with adaptations such as salt tolerance, rapid colonisation, and fibrous root systems. Species richness is generally low, with the most common plants including Rolling Spinifex (*Spinifex hirsutus*), Knobby Club-Rush (*Ficinia nodosa*), and Coast Cushion Bush (*Leucophyta brownii*), along with dwarfed and windswept versions of shrubs more typical of the swale and hind-dune communities. Remnant foredunes along the Adelaide coastline also commonly contain the introduced species Sea Wheat Grass (**Thinopyrum junceiforme*), Sea Spurge (**Euphorbia paralias*), and Two-horned Sea Rocket (**Cakile maritima*)[9].

Once past the foredune, a shrubland community, (generally 1-3m high) generally forms in the swale and hind dunes. The following description is based upon information contained within Croft, Pedler and Milne (2006)[10], supplemented by the author's personal experience of coastal communities.

Dominant overstorey species include Coast Daisy Bush (*Olearia axillaris*), Coastal

[6] Dr Tim Milne, Herpetologist.
[7] Specht, R.L. (1972). *The Vegetation of South Australia*. 2nd Edition. Government Printer, Adelaide.
[8] Coast Protection Division and Llewyn-Davies Kinhill Pty Ltd (1978). *Fleurieu Coast Protection District Management Plan.* South Australian Coast Protection Board, Adelaide.
[9] Croft, S.J., Pedler, J.A. and Milne, T.I. (2006). *Coastal Vegetation Communities of the Southern Mount Lofty Ranges.* Nature Conservation Society of SA Inc., Adelaide.
[10] Croft, S.J., Pedler, J.A. and Milne, T.I. (2006). *Coastal Vegetation Communities of the Southern Mount Lofty Ranges.* Nature Conservation Society of SA Inc., Adelaide.

Wattle (*Acacia longifolia var. sophorae*), Coast Beard-heath (*Leucopogon parviflorus*), Common Boobialla (*Myoporum insulare*) and, in parts, Coast Saltbush (*Atriplex cinerea*). In more sheltered swale areas other less salt-tolerant shrubs, such as Cushion Fanflower (*Scaevola crassifolia*), Sea Box (*Alyxia buxifolia*), Coast Bitterbush (*Adriana quadripartita*) and Cup Wattle (*Acacia cupularis*) can occur. The density of this overstorey shrub layer is generally 30-50%.

The understorey in the swale areas contains a much higher diversity of species and lifeforms, including:

- low and medium shrubs (<1m) of 5-25% cover, including Sea-berry Saltbush (*Rhagodia candolleana ssp. candolleana*), Thyme Riceflower (*Pimelea serpyllifolia ssp*.), Coast Bonefruit (*Threlkeldia diffusa*) and Ruby Saltbush (*Enchylaena tomentosa*)
- herbs, generally <5% cover overall, including Australian Pelargonium (*Pelargonium australe*), Variable Groundsel (*Senecio pinnatifolius*), Austral Trefoil (*Lotus australis*),
- sedges and lilies of 5-10% cover, including Short-stem Flax-lily (*Dianella brevicaulis*), Coast Sword-sedge (*Lepidosperma gladiatum*), and Knobby Club-Rush (*Ficinia nodosa*)
- mat plants of around 5% cover, including Karkalla (*Carpobrotus rossii*), Round-leaf Pigface (*Disphyma crassifolium*), Muntries (*Kunzea pomifera*) and Scarlet Runner (*Kennedia prostrata*)
- native grasses and tussocks, with Rolling Spinifex (*Spinifex hirsutus*), Coast Spear Grass (*Austrostipa flavescens*) and Coast Tussock-grass (*Poa poiformis*) the most commonly encountered species
- vines and scramblers, generally around 1-5% cover, with Coastal Climbing Lignum (*Muehlenbeckia gunnii*) the most common species, but Old Man's Beard (*Clematis microphylla*) and Bower Spinach (*Tetragonia implexicoma*) also common

Further to the above information, comment was sought from Tim Croft[11] as follows:

"My understanding of the area originally, from working on this a bit with Ron Sandercock[12], was it was typical sand dunes. This part of the coast is still reasonably high energy, compared to further north along the gulf coast where it becomes more shallow a long way out, and there is more a shell grit mound rather than a definite sand dune. There is a different shrub structure close to the shore line and *Atriplex* and Nitre bush line the area adjacent the beach.

But for Semaphore, it is sand dunes. The real fore dune which would have always been unstable due to storm activity, *Spinifex sericeus, Ficinia nodosa, Leucophyta brownii* would have been dominant. Moving back to the hind dune, it would have

[11] Tim Croft is one of South Australia's pre-eminent botanists and natural historians, and, has undertaken the pre-European vegetation mapping for the bulk of the state's agricultural regions.
[12] Caton B., Fotheringham D., Krahnert E., Pearson J., Royal M. and Sandercock R. 2009. *Metropolitan Adelaide and Northern Coastal Action Plan*. Prepared for the Adelaide and Mount Lofty Ranges NRM Board and Department for Environment and Heritage

been a shrubland of *Olearia axillaris*, and to a lesser extent *Myoporum insulare* and *Acacia longifolia sophorae*.

Further back behind the hind dune, where loam soil is present in the profile rather than pure sand, even if the loam is 30cm down, *Allocasuarina verticillata* and *Melaleuca lanceolata* and shrubs such as *Rhagodia* would have come in more."

In summary, the ultimate aim of this project is to develop a dune system similar to that described in this section, with specific planting densities and species developed with reference to historical records and remnant dunes in the area.

6.2 Current condition of dune vegetation

Today, the condition of the coastal dune vegetation between Point Malcolm Reserve at Semaphore South and Strathfield Terrace, Largs North varies from moderately good to very poor. Vegetation condition within various sections is discussed below.

Point Malcolm Reserve – Bower Road (Semaphore South)

The coastal dune shrublands in this section are in moderately good condition with medium to high native plant species diversity and a good range of native plant life forms. Although the fore-dune is dominated by the introduced Sea Wheat-grass (**Thinopyron junceiforme*), it is nevertheless assisting to stabilise the sand in this area. Whilst there are still some native species that may have been lost in the hind dune and swale areas due to past disturbance (see Section 6.2), the core native shrub overstorey species are present at what is considered to be an appropriate density.

Bower Road – Hart Street (Semaphore South)

The dune system in this section is much reduced due to erosion and consequent regular replenishment. As a result, native plant species diversity and the number of native plant life forms is reduced, with a corresponding increase in weed covers. Condition has therefore been classified as 'poor'.

Hart Street – Semaphore jetty (Semaphore)

The dune system in this section widens out considerably and is characterised by a tall and often dense coastal shrubland in the back-dunes and lower coastal shrublands towards the fore-dune which is dominated by Rolling Spinifex (*Spinifex hirsutus*). The density and height of Coastal Wattle (*Acacia longifolia sophorae*) and to a lesser extent Common Boobialla (*Myoporum insulare*) at the eastern extent of the dune area is considered to be greater than would have occurred in a natural dune system, perhaps due to water and nutrients from runoff. This high density and height of these species lends itself to ongoing management issues, including harbouring feral animals and illegal camping/habitation. The overall vegetation condition in this section is considered to be moderate.

Semaphore jetty to Largs Bay jetty (Semaphore)

The fore-dune in this section is dominated by the introduced Sea Wheat-grass (**Thinopyron junceiforme*) and Two-horned Sea Rocket (**Cakile maritima*). The condition of the back-dunes is moderate to good with medium – high native plant species diversity, a good range of native plant life forms and >80% of understorey biomass estimated to be native. There are some patches where the density and height of Coastal Wattle (*Acacia longifolia sophorae*) and to a lesser extent Common Boobialla (*Myoporum insulare*) at the eastern extent of the dune area is considered to be greater than would have occurred in a natural dune system, and causes management issues as discussed

above. Invasive weeds such as Galenia, Iceplant, Dune Onion Weed and False Caper occur in small amounts only due to ongoing control efforts.

Largs Bay jetty to Strathfield Terrace (Largs Bay and Largs North)

The dune system to the north of the Largs Bay jetty includes some patches of coastal vegetation in moderately good condition, but also significant areas dominated by introduced species. The overall profile of the dune appears to be highly modified, with only very low relief (up to 2 metres), and a relatively flat swale area. Some revegetation has occurred in these swale areas, however weed covers are relatively high, including Sea Wheat-grass (**Thinopyron junceiforme*), Iceplant (**Mesembryanthemum crystallinum*), Two-horned Sea Rocket (**Cakile maritima*), Great Brome Grass (**Bromus diandrus*) and the occasional occurrence of Dune Onion Weed (**Trachyandra divaricata*). From Afric Street to Strathfield Terrace, there is an area of shrub and tree revegetation on the slope up to Lady Gowrie Drive with weedy grasses dominant in the understorey.

The fore-dune is also very low-lying and is dominated by Sea Wheat-grass (**Thinopyron junceiforme*) and Two-horned Sea Rocket (**Cakile maritima*),

6.3 Plant species diversity

Indigenous plant species present within the project area are generally those which readily re-colonise and regenerate in South Australian coastal dune systems. Some of these species are also resilient due to their ability to cope with, and recover from, disturbance. It is likely that some of the native species have been planted, including *Allocasuarina verticillata, Melaleuca lanceolata, Melaleuca halmaturorum, Acacia cupularis, Acacia ligulata, Atriplex paludosa, Dodonaea viscosa ssp., Lepidosperma gladiatum, Pelargonium australe* and *Adriana quadripartita*.

When compared to the nearby Tennyson Dunes Conservation Reserve, however, it is apparent that certain species and plant life forms are absent or occur in very low numbers only along this particular section of the coastline. These include:

Species	Life form	Comments
Austrostipa flavescens	Tall tussock grass	Widely scattered individuals only were noted during field survey
Austrostipa scabra ssp. falcata	Tussock grass	Not recorded
Baumea juncea	Sedge	Not recorded
Clematis microphylla	Climber	Not recorded
Kennedia prostrata	Mat plant	Not recorded
Kunzea pomifera	Mat plant	Some planted individuals are scattered throughout the survey area
Leucopogon parviflorus	Medium to tall shrub	Not recorded
Alyxia buxifolia	Medium to tall shrub	Not recorded
Adriana quadripitarta	Medium shrub	One individual only was noted during survey in Unit 13
Pimelea serpyllifolia	Small to medium shrub	One individual only was noted during survey in Unit 2
Lotus australis	Small shrub	Not recorded

Leucophyta brownii	Small shrub	Widely scattered individuals only were noted during field survey
Geranium potentilloides	Small shrub/herb	Not recorded
Helichrysum leucopsidium	Herb	Not recorded
Rytidosperma caespitosum	Tussock grass	Not recorded

There are therefore opportunities for revegetation with these species to improve species richness in the dunes. In addition, the fore-dune has accreted over the past few years and would benefit from significant plantings to assist with sand stabilization in order to alleviate the impacts of storm surges.

7. Revegetation at Semaphore South

It is proposed to undertake a detailed revegetation program within a portion of the project area at Semaphore South (see Figure 2 for location), in order to restore the diversity of the dune shrubland to its pre-European condition (or close to it). Revegetation will also be undertaken on the fore-dune to assist with sand stabilisation and mitigate wind-blown sand and dune-drift and to improve the area's biodiversity. A detailed planting plan will be produced for this section of coastline in May 2020.

The following excerpt is from the *Bushland Condition Monitoring Manual: Coastal Vegetation Communities of the Southern Mount Lofty Ranges* (Nature Conservation Society of South Australia) and it describes coastal dune shrublands in good condition. This will be the target or 'benchmark' community to be re-instated within the revegetation area.

> "In coastal dune shrublands, the density of the overstorey shrubs varies naturally from 10 to 60% cover, but most commonly is over 30%. Tall shrubs may sometimes be the dominant layer with up to 30-70% cover. The medium shrub layer is often the dominant layer, characterised by a relatively dense and diverse number of shrubs, with a combined canopy cover of up to 50%. It sometimes forms an impenetrable layer. This natural variation partly reflects the position of the community on the dunes (i.e. on second or third dune, on crest, slope or swale or lower cliff slopes), and possibly also the height of the dunes/depth of sand on cliffs. Several small tree species may be present at low levels and/or more frequently as tall shrubs in this environment.
>
> The understorey is usually characterised by abundant low shrubs with 5-25% cover. The density of this layer often relates to the degree of exposure of the site. Many of the shrubs listed in the taller categories may also be in this low shrub category on exposed sites. Herbs are common, with a diverse number of species, but generally of low cover (<5%), including several annuals while tussocks are common contributing 5-25% cover. Twiners, climbers and scramblers are prominent and often form extensive layers among tall shrubs.
>
> Coast Sword-sedge can become locally dominant on the dunes where soaks may be present. The swales afford greater protection from wind and salt spray, and more water accumulates there than on the dune slopes. This allows dense stands of *Lepidosperma gladiatum* (Coast Sword-sedge), often with *Ficinia nodosa* (Knobby Club-rush) and/or *Kunzea pomifera*

(Muntries) to develop. *Olearia axillaris* (Coast Daisy-bush) and/or *Leucopogon parviflorus* (Coast Beard-heath) are often present as emergent, or scattered, shrubs."