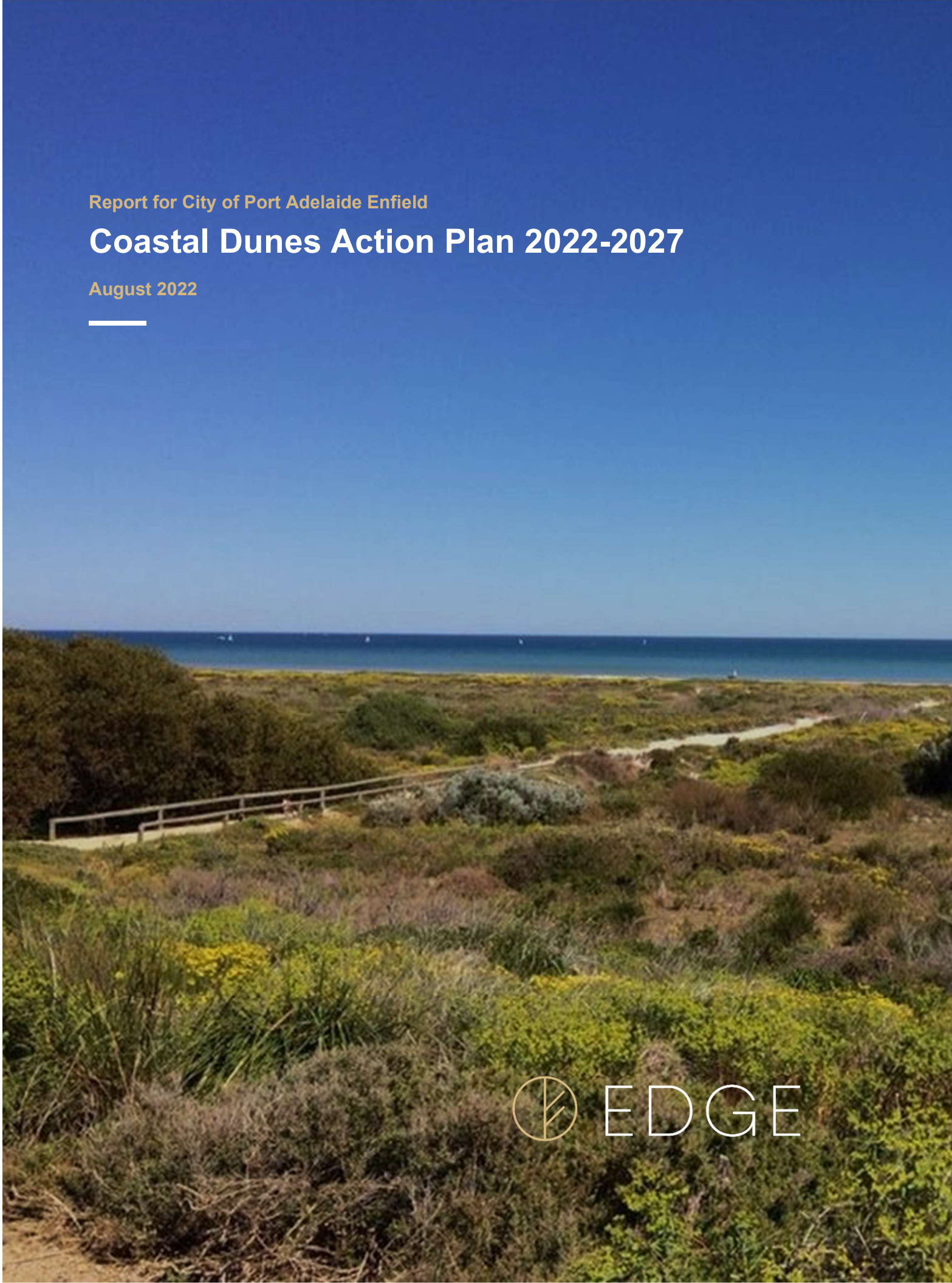
Report for City of Port Adelaide Enfield

Coastal Dunes Action Plan 2022-2027

August 2022



Project Delivered for:

Craig Hughes - Environmental Projects Coordinator

City of Port Adelaide Enfield

163 St Vincent Street, Port Adelaide, SA 5015 AUSTRALIA

craig.hughes@cityofpae.sa.gov.au

Project Delivered by:

Dr Jenni Garden - Senior Consultant - Liveable Cities Lead

Edge Environment

Level 5, 39 East Esplanade, Manly, NSW 2095, AUSTRALIA

jenni.garden@edgeenvironment.com

Ashley Bartlett – Sustainability Consultant

Edge Environment

Level 5, 39 East Esplanade, Manly, NSW 2095, AUSTRALIA

ashley.bartlett@edgeenvironment.com

Revision	Revision Details	Author	Approved by	Date Approved
V1.1	First draft	A. Bartlett, J. Garden	J. Garden	24 June 2022
V1.2	Client edits		J. Garden	1 July 2022
V1.3	Second draft		J. Garden	11 July 2022
V2.0	Final		J. Garden	24 August 2022

Executive Summary

The City of Port Adelaide Enfield (Council) has a strong and practical commitment to enhancing and conserving biodiversity within their Council region, including managing and protecting the remnant dune vegetation communities (coastal dunes system) along its western coastline. For management purposes, the coastal dunes system is divided into the seven segments (from North to South):

- North Haven;
- Osborne;
- Taperoo;
- Largs Bay North;
- Largs Bay;
- Semaphore; and
- Semaphore South.

These management segments vary in their size, shape, disturbance levels, knowledge of species diversity, and management effort. This means that, whilst recognised as a significant asset of high ecological value and despite significant volunteer and council time being spent managing different segments, the coastal dunes system as a whole are inconsistently understood and managed.

To help better manage the coastal dunes system, Council engaged Edge Environment (Edge) to develop this Coastal Dunes Action Plan (CDAP). The aim of this CDAP is to provide a practical resource document for the community and Council land managers to assist in achieving on-ground works that enhance current native vegetation and biodiversity assets, together with community engagement opportunities.

The CDAP has been developed through a co-design process through inviting input from Council as well as the community volunteer dune care groups, and Green Adelaide. Based on input received from these stakeholders, together with desktop reviews, analysis of the Urban Ecological Value score for the site, and specialist urban ecology expertise provided by Edge, 46 priority actions have been identified for implementation over the next five years. These 46 actions have been categorised into the following six Focal Areas:

1. Build Knowledge and Understanding;
2. Manage Pest and Weed Species;
3. Encourage Native Species Diversity;
4. Manage Infrastructure;
5. Communication Networks; and
6. Monitoring and Evaluation.

Actions have also been allocated a relative prioritisation based on a multi-criteria analysis. Based on this analysis, one action is considered of low priority, eight of medium priority, 24 of high priority, and 13 of very high priority. The 13 very high priority actions span five Focal Areas as follows:

- Focal Area 1
    - Action 1.2: Undertake detailed flora and fauna surveys across the whole coastal dunes system to determine current species diversity, abundance, and distribution within the dunes, and generate a comprehensive baseline database of flora and fauna species in the coastal dunes system.

      It is especially important that the Osborne segment is included as it is the area of the dunes system currently with the least knowledge of species diversity. Also, weeds are poorly mapped within the Taperoo segment.
    - Action 1.5: Undertake an investigation for implementation of a detailed fox monitoring program.

- Action 1.6: Investigate the opportunity to undertake a feral species scan project which will record feral species activity within the dunes system via a series of remote-located wildlife cameras.
- Action 1.7: Liaise with Green Adelaide and other Coastal Council practitioners regarding current successful method of sea-wheat grass control.

- Focal Area 2
  - Action 2.4: Develop a priority “weeds” list for management, including woody weeds, for each dune segment.
  - Action 2.5: Implement an annual “weed blitz” to remove any weeds before they are able to take hold. The location of weeds should be informed by the outcomes of Action 1.4
- Focal Area 3
  - Action 3.2: Plant new species not currently represented in the coastal dunes system, including threatened species, where possible. See Action 1.5.
  - Action 3.3: Reduce the spread of *Acacia longifolia* var. *sophorae* by thinning out dense patches to encourage a more structurally biodiverse system (focus areas of control at Semaphore segments).
  - Action 3.4: Manage/protect existing native plant species, with a focus on encouraging threatened species (e.g. planting bitterbush to encourage bitterbush blue butterfly).
  - Action 3.6: Ensure dune management provides adequate bare ground space (~50% in selected areas) to encourage population growth of the Painted Dragon.

    This is particularly important in the Taperoo and Osborne segments where the species is known to currently occur.
- Focal Area 4
  - Action 4.1: Clear all paths of obstructions, including woody weed species.
  - Action 4.5: Review and update all signage as required in accordance with Council’s 2021 Signage Strategy.
- Focal Area 5
  - Action 5.5: Investigate opportunities to increase support of community groups (e.g. create additional community grant focussed on supporting community group administrative tasks).

Contents

Executive Summary i
Contents iii
1 Introduction 1
1.1 Objectives of the CDAP 2
2 Strategic Context 4
3 Developing the Action Plan 5
3.1 Foundation workshops 6
3.2 Desktop Reviews 6
3.3 UEV scoring process 7
3.4 Action development and prioritisation 8
4 Current Status and Management 9
4.1 What are the key successes to date? 9
4.2 What are key conservation priorities? 10
4.3 What are the key challenges? 11
4.4 What are the opportunities? 11
5 Urban Ecological Value Score 13
5.2 Site dimensions and landscape context 16
5.3 Biodiversity Resources 16
5.4 Target UEV Score 17
6 Actions Schedule 18
Focal Area 1: Build Knowledge and Understanding. 19
Focal Area 2: Manage Pest and Weed Species 22
Focal Area 3: Encourage Native Species Diversity 24
Focal Area 4: Manage Infrastructure 26
Focal Area 5: Communication Networks 28
Focal Area 6: Monitoring and Evaluation. 30
7 Monitoring and Evaluation Schedule 31
8 Annexes 33
Annex A. Coastal Dunes Management Segments Showing Stormwater Outlet Locations 34
Annex B. Strategic Context Documents 41
Annex C. Foundation Workshop Outputs 42
Annex D. Weed Mapping Within the Lefevre Coastal Dunes System 54
Annex E. Known Fox Den Locations 65
Annex F. Which Plant Where Dunes Planting Guide - Example Structure 66
Annex G. Urban Ecological Value Scoring Process 67
Species Score 67

Site Score 68
Annex H. Species List 70
Annex I. Multi-criteria Prioritisation Assessment 81

1 Introduction

The City of Port Adelaide Enfield (hereafter, 'Council') covers an area of approximately 97km^2 ranging from North Haven in the west to Gilles Plains in the east. This area encompasses numerous significant ecosystems including near marine and coastal dunes, inter-tidal mangrove forests, the River Torrens riparian corridor, and lowland native woodlands. Across the area, Council manages over 100 reserves that provide important resources for local biodiversity and also add value to the local community.

Council has a long-established strong and practical approach to enhancing and conserving biodiversity within their region, with this being reflected by undertaking regular, repeated biodiversity monitoring at a selection of locations across the region, and further supported by:

- a commitment in the City Plan 2030 to: "Protect, restore, and promote the city's natural environment, biodiversity, and ecological services…"; and
- a commitment to the development of a City-wide Biodiversity Strategic Management Plan that will focus on strategies around protecting and enhancing the City's biodiversity across coastal, marine, freshwater and terrestrial landscapes and help provide direction in delivering biodiversity outcomes on the ground.

The largest coastal reserve managed by Council is the Lefevre coastal dunes system, an 8.5km stretch of coastal dunes that spans from North Haven in the north to Semaphore in the south (Figure 1). For management purposes, the coastal dunes area is divided into the following seven segments (from North to South) (Annex A):

- North Haven
- Osborne
- Taperoo
- Largs Bay North
- Largs Bay
- Semaphore
- Semaphore South

The Lefevre coastal dunes forms the transition zone between highly urbanised development to the east and the coastal foreshore to the west. The system is highly disturbed, due in large part to the adjacent urban land uses together with the multiple public access paths that traverse the system and stormwater runoff entering the system (see Section 4). Despite this high disturbance, the Le Fevre dunes system represent some of the last remaining examples of remnant coastal dunes communities within the metropolitan Adelaide region.

The management of native vegetation within Adelaide's metropolitan area remains a conservation priority, particularly given that much of the region has been heavily modified. As urban development expands, there is increasing pressure on landscapes to provide multiple uses, including public recreation and open space and biodiversity conservation. An important example involving the most northern section of the dunes system is the Lefevre Peninsula Biolink[1]. This 89ha program transformed previously undeveloped land stretching across the top of the peninsula into an open space network including conservation areas, recreation facilities, pedestrian and cycling trails, and playgrounds. The "green" nature of the Biolink and the dune segments has been mandated as 'Metropolitan Open Space' system by the previous City of Port Adelaide Enfield Development Plan and carried over into the South Australian Planning and Design Code.

To guide ongoing management of the coastal dunes system, Council engaged Edge Environment (Edge) to develop the Coastal Dunes Action Plan (CDAP). The information contained and updated as part of this plan, will assist land managers in making key decisions towards the long-term conservation and management of biodiversity values within the area. However, this Plan is also intended to provide a practical resource document for land managers and community groups, alike, to assist in

[1] https://renewalsa.sa.gov.au/projects/northern-lefevre-open-space/

implementing and monitoring on-ground works that will enhance the ecological value of the site and create opportunities for positive community engagement and education.

1.1 Objectives of the CDAP

The main objectives of the Plan are:

- Contextualise the Plan within existing Council management policies, and identify key entities, and responsible parties;
- Identify and describe the coastal dune area, including any specific conservation priorities within each of the seven coastal dune area segments;
- Measure the current ecological value of the site;
- Identify actions to enhance and protect the ecological value of the coastal dune areas; and
- Provide monitoring and evaluation requirements for the coastal dune areas.

The Plan is intended to be a readily accessible, practical document able to support strategic planning and practical actions by Council officers and community volunteer groups, alike. The intended audience is intended to be, but not limited to, Council officers, Volunteer Community Environment Groups, Universities, researchers, and the local community.

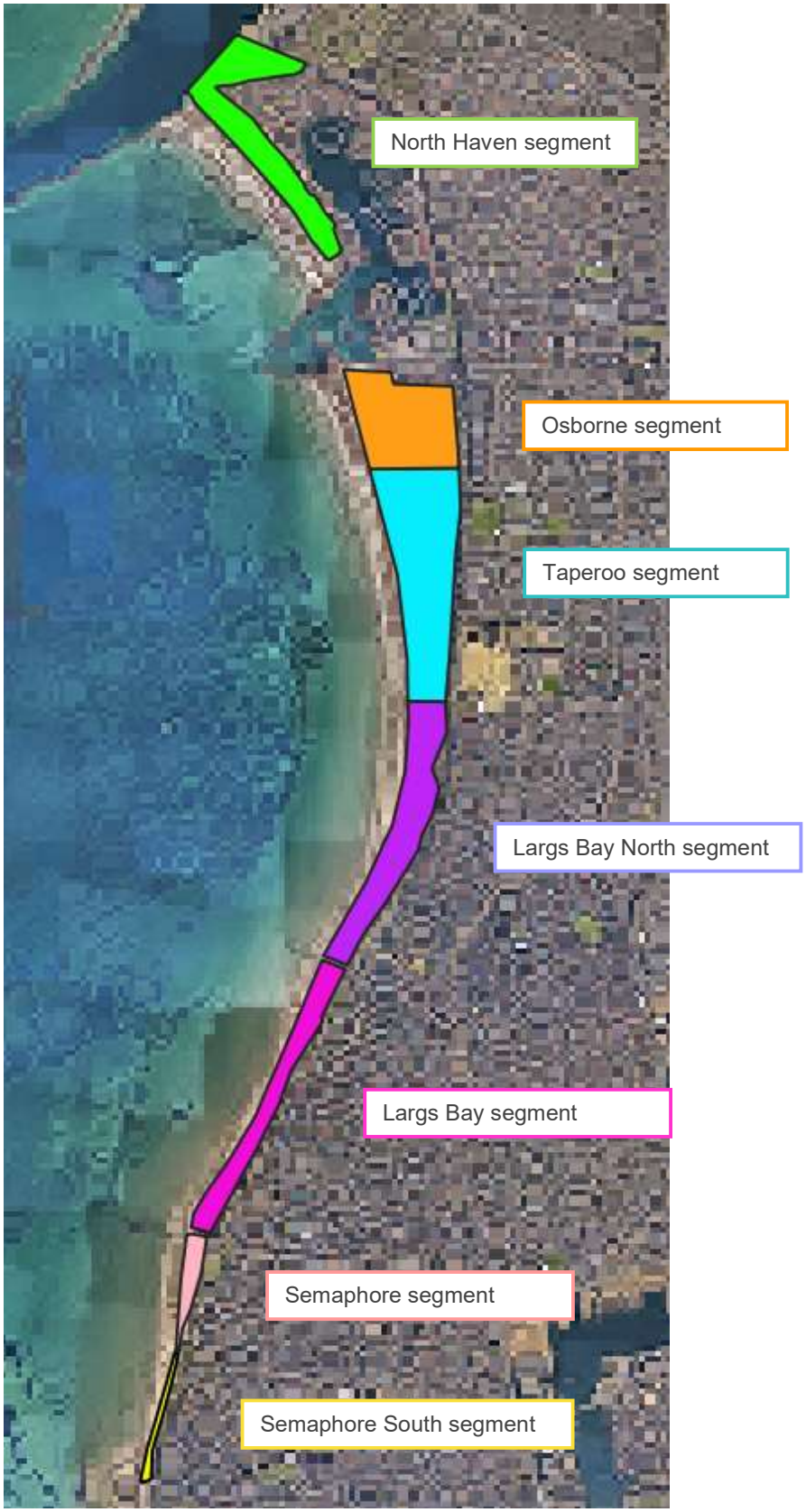


Figure 1. The Le Fevre coastal dunes system, showing separate management segments (see Annex A).

2 Strategic Context

As a practical, on-ground implementation plan, the CDAP sits below, and responds to, a hierarchy of State and local Strategies and Plans (Figure 2, Annex B). It should be noted though, at the time of writing this Plan, both the State Government's Metropolitan Adelaide Northern Coastal Action Plan (MANCAP; 2008, 2022 review forthcoming) and Council's Biodiversity Strategic Plan 2022-2027 were also under development. Consultation with Council and the State government formed a part of developing this Plan to ensure that key connection points between all documents were established. This plan supersedes the existing Coastal Management Plan 2017-2022 (EBS 2016).

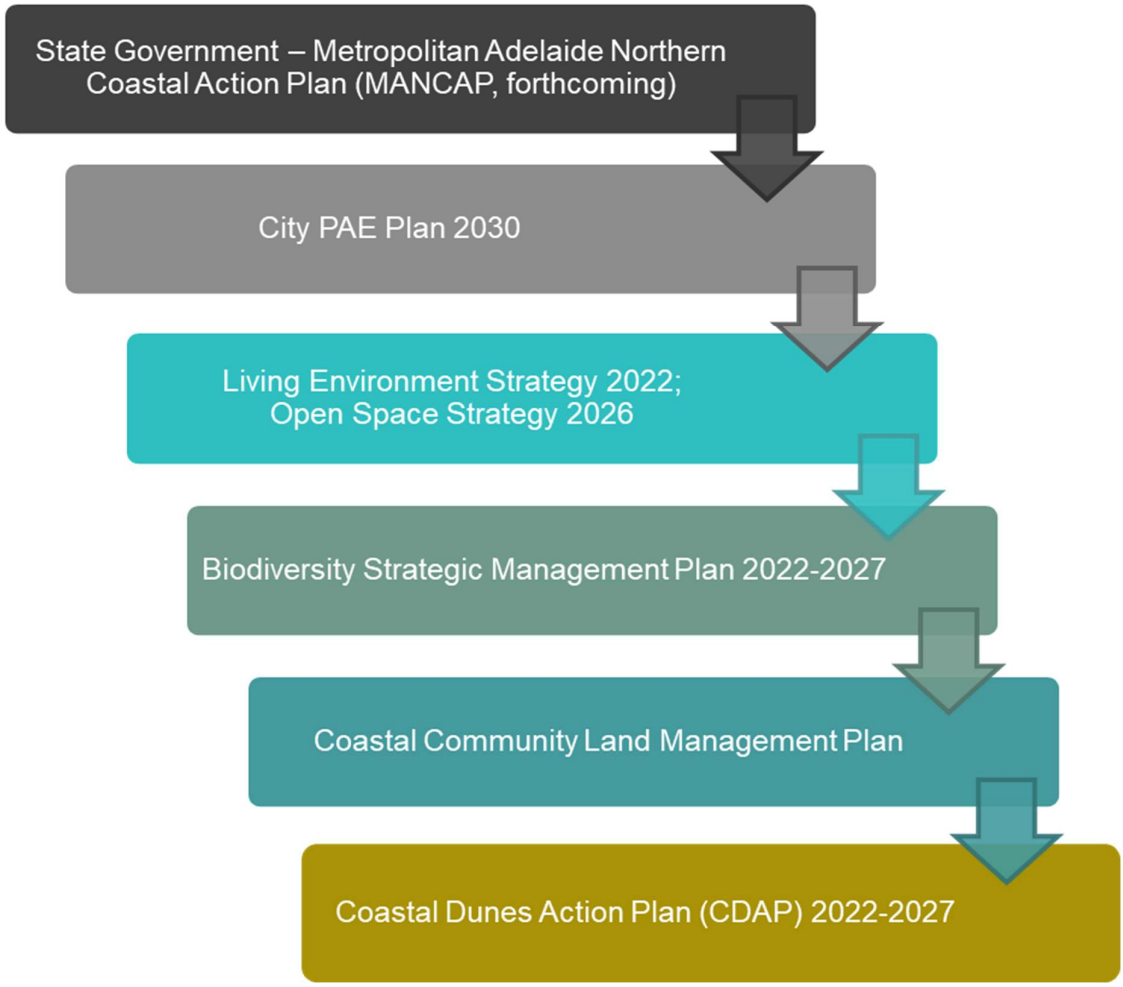


Figure 2. Coastal Dunes Action Plan strategic context.

3 Developing the Action Plan

The development of the CDAP included a multi-staged approach comprising four distinct stages of work (Figure 3).

1. **Stage 1** of the project included two foundation workshops: one with community stakeholder representatives from the dune care community groups; and the other with Council officers and Green Adelaide staff.
    - The purpose of the foundation workshops was to understand current actions and their relative success occurring within the site, conservation priorities of each group, and desired ongoing actions and targets for the site (see Section 3.1).
2. **Stage 2** of the project involved a desktop review of available documents and species databases relating to the site, review of available spatial datasets of conservation actions and the dune assets, and application of Edge's Urban Ecological Value (UEV) tool to establish a baseline ecological value score for the site (see Section 3.3)
3. **Stage 3** centred on development of the draft CDAP and 2 more workshops with the same stakeholders from Stage 1 to allow for review and feedback on the draft Plan.
4. **Stage 4** constituted completion of the final Plan, collating feedback received in Stage 3.

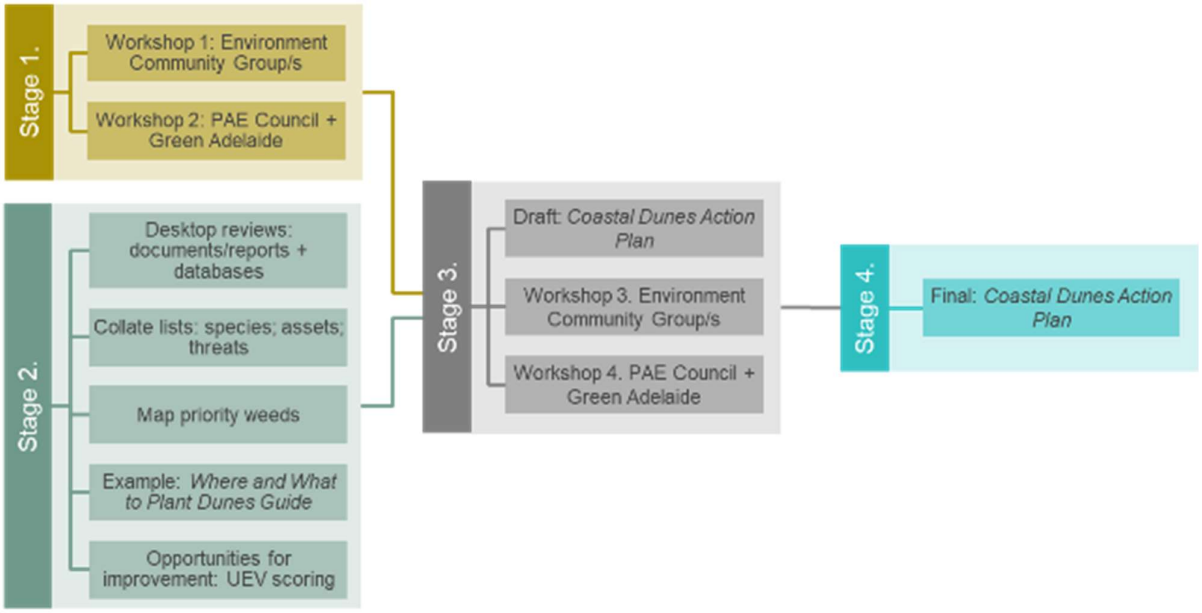


Figure 3. Approach to developing the Coastal Dunes Action Plan.

3.1 Foundation workshops

The foundation workshops provided the framework for developing the CDAP through a co-design process. This approach recognises the important roles that multiple stakeholders play in helping to manage, protect, and champion the site and its legacy. The Foundation workshops invited key representatives of Council, Green Adelaide, and the dune care community groups to provide their input into the Plan development.

The aims of both workshops were to:

- Document the conservation priorities of all parties;
- Understand past and current management of the site, specifically successful and non-successful actions and any key challenges; and
- Document feedback from all parties related to scope and desired outcomes from the revised Action Plan.

To accommodate as many people as possible, the workshops were designed to enable people to participate in-person or remotely online. The MURAL platform was used to guide activities and capture comments and ideas (Annex C). In addition, all stakeholders were invited to provide any additional comments following the workshop, to ensure that the greatest opportunity was provided to all relevant stakeholders to provide input.

3.2 Desktop Reviews

Field surveys were not undertaken as part of developing this Action Plan. Instead, species occurrences at the site were derived from a review of online databases together with available independent consultant reports (Table 1). Whilst this review is considered to have captured many of the species occurring at the site, it should not be considered comprehensive; ongoing flora and fauna monitoring should be undertaken regularly at the site to help build a more comprehensive understanding of species diversity within the site across seasons and years.

The compiled species list was used as input into the UEV tool (see Section 3.3). Only confirmed species records from within the last five years (2017-2022) were included given the highly dynamic nature of urban landscapes. Further, records provided only at taxonomic levels coarser than Genus were also excluded.

In addition to collating a species list for the site, a review of Council's spatial datasets and mapping was undertaken to generate maps and quantify the site's shape, size, and general landscape context for UEV scoring purposes.

Table 1. Desktop review species data sources.

Source	Details
eBird	Global database; bird records only. https://ebird.org/
Atlas of Living Australia (ALA)	National database; flora and fauna records; compiled from a range of sources. https://www.ala.org.au/
FrogID	National database; frog records only. https://australianmuseum.net.au/get-involved/citizen-science/frogid/
FrogWatchSA	State database; frogs records only. https://www.frogwatchsa.com.au/learning-resources/frogs-in-sa
iNaturalist	Global database; flora and fauna records. https://www.inaturalist.org/
NatureMaps	State database; flora and fauna records. https://data.environment.sa.gov.au/NatureMaps/Pages/default.aspx

Source	Details
Coastal Management Plans (2017-2022) Semaphore, Largs Bay, Taperoo, Osborne, and North Haven Dunes[2]	Only known, not 'likely' species included.
Flora Survey of Dunes – Semaphore South to Largs North[3]	Report to Department of Environment and Water
Spatial datasets	Provided by Council

3.3 UEV scoring process

Edge's Urban Ecological Value tool has been designed specifically for application within highly modified urban sites. Other tools that support quantification of biodiversity or habitat value have been developed for use in non-urban landscape, often scoring metrics relative to a remnant state. In urban highly modified and managed urban landscapes though, comparisons with a remnant status are unrealistic as achieving remnant condition in most urban areas is practically impossible. Even within the coastal dunes, an area that represents some of the best remaining remnant dune vegetation within the Council boundaries, the habitat is highly modified and managed and unlikely to ever operate in isolation at the same level as a remnant system.

However, whilst not readily comparable to a remnant condition, urban areas still provide critical habitat and connectivity resources for numerous species. In fact, urban areas are likely to increasing become conservation custodians of climate refugee flora and fauna species. A number of local, patch, and landscape level attributes contribute to the ecological value of a site, and it is these attributes that the UEV focuses on quantifying to develop an overall UEV score. The ecological score of a site is a measure of the site's suitability or potential to support native biodiversity and healthy ecosystem functioning. By understanding the attributes that have contributed to the UEV score (either negatively or positively) it is possible to generate a UEV target score and derive management actions that will help to achieve the target score over time.

Note that the UEV score for a site is intended to provide an improved understanding of elements that drive high functioning biodiverse systems, those that negatively influence system functioning, highlight where management actions may be applied to improve biodiversity within a site, and allow for monitoring of changes in biodiversity within a site. The score is not intended to be directly compared to another site's score as a way of ranking site value. Further, scores are intended to help identify management options and assess change over time within a site – as a way of assessing the impact of landscape change or effectiveness of management actions. Further, the scoring process is based on widely accepted influences on species diversity and should be used as a guide for decision-making and monitoring; it does not proclaim to be exhaustive of all influences on biodiversity or ecological value.

For each site, the scoring is comprised of two compound scores, each of which is a composite of a number of scored input metrics (Annex D):

1. Species score, combines:
    - Species origin score and Species conservation score (e.g. native to Australia or introduced; threatened species, or declared weed/pest);
2. Site score, combines:
    - Species diversity score and Class diversity score (i.e. number of different flora and fauna species, and number of different classes);
    - Structural complexity of vegetation (e.g. ground, shrub, midstorey, canopy, emergent);

[2] (2017) A report prepared by EBS Ecology for Port Adelaide Enfield.

[3] (2020) A report prepared by T&M Ecologists for Department of Environment and Water.

- Occurrence of hollow-bearing trees, stags, logs;
- Presence of water (permanent or ephemeral);
- Site area (small to very large);
- Site compactness (perimeter:area ratio relative to a circle); and
- Visual landscape connectivity (connected, stepping-stone, isolated).

Based on this, a site with a higher ecological score will tend to have:

- more native species present across a range of classes;
- more threatened species and fewer (if any) introduced or declared weed/pest species;
- greater structural complexity;
- more hollow-bearing structures;
- permanent, deep water on site;
- a larger and more circular shape; and
- a more connected landscape context.

Comparatively, a lower ecological score will be driven by: fewer native and threatened species, more introduced and pest/weed species, less diversity in taxonomic classes and structural complexity, a lack of water and hollow-bearing structures, a size and shape that is smaller and more linear, and increased isolation in the landscape.

3.4 Action development and prioritisation

Management actions (see Section 6) were derived from input to the foundation workshops together with learnings from the desktop review, the UEV scoring, and professional knowledge. All actions were assessed through a multi-criteria analysis in which a set of ranked criteria are applied to determine the relative implementation priority for each action. The following criteria were applied herein:

- Completion timeframe;
- Cost of implementation;
- Delivery skills/capacity;
- Feasibility;
- Expected ecological benefit;
- Long-term financial plan impact;
- Monitoring frequency

These criteria generally will mean that highest priority actions are those able to be completed quickly, relatively cheaply, with existing skills/know how, and with the greatest projected ecological benefit. Comparatively, low priority actions are those that will take a long-time to complete, will require specialist skills/know how, be costly to deliver, and will have a relatively low ecological benefit.

Prioritisation of actions are not prescriptive and should be used as a guide only, as there will likely be actions deemed a high implementation priority despite this not being reflected in the prioritisation scoring. This is because the ranking of criteria is not weighted, meaning that an action may be prioritised, for example by Council based on a single criterion alone, regardless of other criteria.

For example, an action may have a high ecological benefit, but it may be difficult to achieve, take a long time to complete, and be very costly. As such, it is likely to have a relatively low relative prioritisation rank. However, the high ecological benefit may compel Council to prioritise this action despite the likely challenges.

4 Current Status and Management

Located on the western coastline, north-west of the Adelaide CBD, the Le Fevre coastal dunes system is a part of an extensive dune system. The Le Fevre coastal dunes system refers only to the portion of the system falling within the Port Adelaide Enfield council (from North Haven to Semaphore South) (Figure 1, Annex A). However, the system functionally extends much further south into other local government areas. Widespread urbanisation has led to native vegetation fragmentation along the coastline, the introduction of invasive and pest plants and animals, and disturbance of the dunes system by human misuse behaviours and activities. Together, these place significant pressure on biodiversity and ecological values within the area.

The Le Fevre coastal dunes system is broken into seven segments for ease of management (Figure 1, Annex A): North Haven, Osborne, Taperoo, Largs Bay North, Largs Bay, Semaphore, and Semaphore South. Council management of these segments is currently greatly facilitated by three community volunteer dune care groups:

- Friends of Taperoo Dunes (https://www.taperoodunes.com);
- Semaphore Largs Dune Group (https://friendsofparkssa.org.au/members/members-directory/semaphore-largs-dunes-group/); and
- Friends of North Haven Dunes Group

However, not all segments have a dedicated community volunteer group attached to it, and so management efforts across the dunes system as a whole is inconsistent. Because of this, development of this Action Plan focusses on the system as a whole, with specific comments included, where relevant, for certain segments. A key output of the Action Plan must be to improve consistency of management across the Le Fevre coastal dunes system.

Numerous points of input were received from community groups, Council and Green Adelaide during the foundation workshops (Annex C), either relating to the dunes system as a whole, or for specific management segments. The key common messages received are summarised below within the framework of:

- actions that are currently working well and should be continued (successes);
- priority considerations within the site (conservation priorities).
- actions that are not working well or are difficult to implement and may need to be ceased or altered (challenges); and
- potential new actions or directions that are considered beneficial (opportunities)

The input provided has been used to inform development of the priority actions for the next 5 years (see Section 6).

4.1 What are the key successes to date?

- Volunteer community groups – these groups provide significant management support, providing numerous hours to activities including: pest and weed management, rubbish removal, data collection, revegetation, seed collection, and community engagement and education;
- Weed management and eradication – significant effort has been dedicated to managing weeds, with local eradications in some segments;
- Vegetation management practices – management approaches of native vegetation (e.g. clearing around natives) are facilitating increased self-sowing and regeneration;
- Community engagement – schools have been involved through the “Adopt A Dune” program; online social media presence for some groups has been successful in recruiting new volunteers; and outdoor events have increased exposure of management of the dunes to the broader public;

- Grass roots grants – community groups have been successful in receiving a number of grants to support management activities and prior to this significant support was provided through Green Adelaide's Coastal Conservation Officer;
- Weed mapping – has been undertaken across most of the coastal dunes system, though currently lacking from Osborne and Taperoo segments (Annex D);
- Collaboration – a positive working relationship is fostered between Council, Green Adelaide, the community groups, contractors, and the Port Environment Centre; provision of plants to community groups and collection of removed weeds each week by Council (in Semaphore and Largs); and
- Infrastructure works – Council infrastructure works to help support management of the dunes system (e.g. installation and maintenance of coastal path retainer walls).

4.2 What are key conservation priorities?

- Better weed control – with a specific focus on sea wheat-grass (*Thinopyrum junceiforme*), false caper (*Euphorbia terracina*), dune onionweed (*Trachyandra divaricata*), bridal creeper (*Asparagus asparagoides*), and coastal galenia (*Galenia pubescens*);
- Better pest control – particularly of European foxes (*Vulpes vulpes*) (Annex E) and European starling (*Sturnus vulgaris*), noting that predation by European fox is recognised as a key threatening process under the *Environment Protection and Biodiversity Conservation Act 1999*
- Improved knowledge – there is a need to undertake detailed flora and fauna surveys consistently across the whole coastal dunes system to help guide targeted habitat management actions. In particular, reptile occurrence, distribution and abundance throughout the dunes system is poorly understood. Surveys should be repeated regularly (approximately every 3 years) in order to maintain knowledge of species diversity within the system;
- Species diversity and resilience – review current planting lists with regard to climate resilience[4] and additional suitable species that could be planted;
- Support threatened species – proactively manage the dunes system to promote habitat resources and connectivity for threatened species. For example, increase plantings of bitterbush (*Adriana quadripartita*) for threatened bitterbush blue butterflies (*Theclinesthes albocincta*), and create suitable protected havens for threatened hooded plovers (*Thinornis rubricollis*); and
- Support dune resilience to climate change – this may involve increasing species diversity within the dunes systems, selectively planting species (e.g. *Spinifex* sp.) in the foredunes that help to stabilise dunes during storm surge events, and applying measures to minimise impacts of storm surges and erosion; and
- Improve community education and engagement – it is important that local residents and recreational beach users act to help protect the dunes system. This may involve: improved signage, targeted community events, education around non-invasive garden plantings for coastal properties, incentivised volunteer recruitment, and ongoing adoption of dunes by schools;
- Enforced domestic dog and cat control – whilst a significant challenge, controlling domestic dog and cat access to the dunes system will help to improve the management and value of the dunes. This may include installing material barriers along all public access paths to limit access, domestic cat curfews, and continuing to enforce domestic dog and cat control activities in line with Council's by-laws; and

[4] Apply the Which Plant Where tool to identify climate suitability and resilience. https://www.whichplantwhere.com.au/

- Enhanced infrastructure – this may take varying forms with varying impact. For example, new tap installations or retrofitting existing showers to allow for ready water access for planting activities, improved signage, upgraded boardwalk and fencing, consistent application of material barriers along the lengths of access paths, and installation of filters/socks on stormwater outlets (Annex F).

4.3 What are the key challenges?

- Climate change impacts from storm surges and sea level rise[5], together with decreased rainfall and increased heat;
- Weed and pest incursions and infestations, particularly in relation to;
    - Stormwater outlet pipes that discharge directly into the dunes;
    - Stormwater runoff from adjacent sealed road and footpath surfaces;
    - Garden escapees from adjacent residential properties; and
    - Domestic pets (dogs and cats) and foxes trampling and toileting within the dunes.
- Sea-wheat grass (*Thinopyrum junceiforme*), whilst not a legislatively declared weed, poses a significant threat to the dunes system. This species occupies vast areas of the dunes system and in many areas appears to reduce the establishment of native flora (e.g. north of the Largs Bay Jetty);
- Human misuse of dunes system, including trampling off dedicated paths, allowing dogs and cats to roam free, littering, and rough sleeper camps – particularly an issue around Semaphore and Semaphore South, and less of an issue further north around North Haven;
- Water access for plantings is currently limited in some areas, especially the Taperoo segment;
- Sand management activities, particularly sand scraping[6], that destabilise the foredunes and together with natural events (e.g. storm surges and high tides) are multiplicative in impact;
- Administrative and volunteer recruitment support to community groups to allow them to focus on on-ground activities; and
- Community awareness and support is essential for supporting the management actions within the dunes systems.

4.4 What are the opportunities?

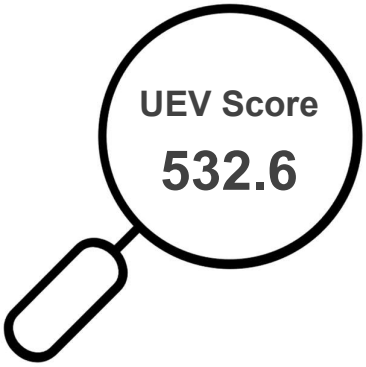
- Detailed flora and fauna surveys applied consistently across the dunes system to develop a baseline biodiversity database;
- Expand the “Adopt A Dune” program to schools further away from the coast;
- Develop a “Which Plant Where Dunes Planting Guide” to provide detailed guidelines and information for native plantings within the dunes system (Annex G);
- Implement rapid, high impact community events to support regular ongoing management actions, such as bio-blitz events, “muddy hands” or “one-in-all-in” working bees;
- Install a series of photo monitoring points (at least one in each management segment) to build a temporal photographic record of the dune system vegetation and structure; such photo points should encourage a citizen science approach to data collection;

[5] Which exacerbate natural high tide impacts

[6] Note that sand scraping/carting is the responsibility of the State government’s Department for Environment and Water and will therefore likely continue in some form.

- Development of community dunes groups for Osborne, and Semaphore South (currently no work being undertaken south of Hart Street);
- Build on the current collaboration between volunteer groups and community nurseries (e.g. Val Wales community nursery) by fostering opportunities for volunteers to become involved in propagation;
- Build on existing citizen science programs through the Biocollect platform;
- Explore opportunities for support and sponsorship by local businesses and corporations;
- Hard waste audit undertaken to identify priorities for Council action;
- Improve monitoring of misuse of the coastal dunes system and actions to address misuse, noting that the type of action will vary depending on the type of misuse. For example:
    - For rough sleepers: Council's new Homelessness Connections Officer will personally refer people experiencing homelessness to recommended accommodation and wellbeing support as the need arises, on request.
    - For public safety related issues such as littering: Council Safety Inspectors will follow-up on requests in relation to public safety concerns, litter issues and administer any penalties as required in-line with Council's by-laws;
- Develop a user-friendly, online interactive portal for reporting of implemented and requested management activities. A portal should facilitate real-time updates and communication between Council and community groups, and provide a culture of inspiration, camaraderie and cooperation between community groups;
- Improved planting success through combination of informed review of planting lists for long-term climate suitability and infrastructure improvements to facilitate water access;
- Engage and promote further use of Fox Scan to record fox and den sighting. Use this to target den fumigation where appropriate;
- Investigate the use of ultrasonic Fox Watch devices to be deployed in sensitive areas of the dune such as Red-capped Plover nesting sites; and
- Monitor changes in foredune shape and depth to inform adaptive management practices.

5 Urban Ecological Value Score



	FAUNA DIVERSITY		
	Total: 101	**Native:** 87	**Introduced:** 14
	FLORA DIVERSITY		
	Total: 103	**Native:** 47	**Introduced:** 56
	CLASS DIVERSITY		
	Total: 13	**Fauna:** 8	**Flora:** 5
	STRUCTURAL COMPLEXITY		
	Total: 8	Moss, groundcover, shrub, midstory, canopy, emergent, and aquatic, vine	

The calculated UEV score for the coastal dunes system is 532.6 (Annex H). This score includes an evaluation of the site's: flora and fauna diversity, patch dimensions and habitat complexity, and landscape context. The following sections provide further insights into key points of interest and influences on the score.

5.1 Species Diversity

A total of 204 species were identified through a desktop review during the project, comprising 101 fauna species and 103 flora species (Annex I). Of these 13.9% of fauna and 54.4% of flora species were introduced. It is important to note that the species records are not considered a comprehensive list of occurrences, and so without any additional management actions, the UEV is likely to be higher given species occurrences that are currently unrecorded. Detailed and repeated surveys of the site will help to generate a more comprehensive list UEV score.

5.1.1 Threatened species

Of the species recorded, a total of 15 fauna and 3 flora species were identified as threatened at the regional, State, national or international level (Table 2). An additional five bird species, 1 reptile species, and nine plant species are considered near threatened within the Adelaide Mount Lofty Ranges (AMLR) region, with one plant species also listed as near threatened at the international level under the IUCN Red List (Table 3). Encouraging threatened species into the site through plantings or provision of wildlife habitat resources (e.g. micro-bat boxes, plant resources) will improve the ecological value at the site and help to achieve a UEV stretch target score (see Section 5.4).

Table 2. Threatened Species identified within the coastal dunes system and their conservation status at regional (AMLR), State, National (Nat'l) and international (Int'l) levels.

Scientific Name	Common Name	AMLR	State	Nat'l	Int'l
Fauna					
Anas superciliosa	Pacific black duck	**VU**	LC	LC	LC
Calidris ferruginea	Curlew sandpiper	LC	**EN**	**CR**	LC
Cereopsis novaehollandiae	Cape Barren goose	LC	**RA**	LC	LC
Ctenophorus pictus	Painted dragon	**EN**	LC	LC	LC
Egretta garzetta	Little egret	LC	**RA**	LC	LC

Scientific Name	Common Name	AMLR	State	Nat'l	Int'l
Falco peregrinus	Peregrine falcon	**RA**	**RA**	LC	LC
Haematopus fuliginosus	Sooty oystercatcher	**NT**	**RA**	LC	LC
Haematopus longirostris	Australian pied oystercatcher	LC	**RA**	LC	LC
Neophema petrophila	Rock parrot	LC	**RA**	LC	LC
Numenius phaeopus	Whimbrel	LC	**RA**	LC	LC
Nycticorax caledonicus	Nankeen night-heron	**VU**	LC	LC	LC
Pelecanus conspicillatus	Australian pelican	**RA**	LC	LC	LC
Phalacrocorax carbo	Great cormorant	**RA**	LC	LC	LC
Sternula nereis	Fairy tern	LC	**VU**	**VU**	LC
Thinornis cucullatus	Hooded plover	**EN**	**VU**	**VU**	LC
Flora					
Acacia ligulata	Umbrella bush	**RA**	LC	LC	LC
Adriana quadripartita	Coast bitter bush	**RA**	LC	LC	LC
Araucaria heterophylla	Norfolk Island pine	LC	LC	LC	**VU**
Atriplex paludosa ssp. *cordata*	Marsh saltbush	**RA**	LC	LC	LC
Kunzea pomifera	Muntries	**RA**	LC	LC	LC
Melaleuca halmaturorum	KI paper-bark	**EN**	LC	LC	LC
Melaleuca lanceolata	Dryland tea-tree	**RA**	LC	LC	LC
Nitraria billardierei	Nire bush	**RA**	LC	LC	LC
Pelargonium australe	Australian pelargonium	**RA**	LC	LC	LC
Scaevola crassifolia	Cushion fanflower	**VU**	LC	LC	LC

Note: RA = Rare, VU = vulnerable, EN = Endangered, LC = Least Concern

Table 3. Species classified only as Near Threatened within the AMLR region.

Scientific Name	Common Name
Fauna	
Calidris ruficollis	Red-necked stint
Glossopsitta porphyrocephala	Purple-crowned lorikeet
Menetia greyii	Dwarf skink
Petrochelidon nigricans	Tree martin
Poliocephalus poliocephalus	Hoary-headed grebe
Rhipidura leucophrys	Willie wagtail
Flora	
Dianella brevicaulis	Coast flax-lily
Eucalyptus camaldulensis *	River red gum
Lepidosperma gladiatum	Coast sword-sedge
Leucophyta brownii	Cushion bush
Myoporum insulare	Common boobialla
Olearia axillaris	Coast daisy-bush
Pimelea serpyllifolia ssp. *serpylliffolia*	Thyme riceflower
Senecio pinnatifolius var. *pinnatifloius*	Variable groundsel
Threlkeldia diffusa	Coast bonefruit

* Note *E. camaldulensis* is also listed as near threatened under the IUCN Red List.

5.1.2 Declared pest and weed species

Of the 204 recorded species, four fauna and 11 flora species were identified as declared species (pests/weeds) at the State or national level (Table 4, Annex I). Management of State declared weed and pest species must be undertaken in accordance with the relevant Class, Category and Provisions as listed within the *Landscape South Australia Act 2019* (LSA)[7] (Table 4). Management advice for nationally listed pests and weeds can be found online via:

- https://www.awe.gov.au/biosecurity-trade/invasive-species/feral-animals-australia,
- https://www.feralscan.org.au/, and
- https://weeds.org.au/weeds-profiles/.

An additional six plant species are listed regionally as environmental weeds or alert weeds (Annex I). Controlling weed and pest incursions are considered the most critical management action for the site, but also the most challenging (see Section 4.2). Eradication of declared pest and weed species from the site will enhance ecological value at the site and achieve the UEV target score proposed below (see Section 5.4).

Table 4. Declared pests and weeds recorded within the coastal dunes system.

		Conservation Status				
Scientific Name	**Common Name**	**AMLR**	**State**	**Nat'l**	**Int'l**	**LSA Provisions[4]**
Fauna						
Felis catus	Cat	**DP**	**DP**	LC	LC	Class 4, Category 3 Provisions: 189, 191(1)
Rattus sp.	Black/brown rat	LC	**DP**	LC	LC	
Sturnus vulgaris	European starling	LC	**DP**	**DP**	LC	
Vulpes vulpes	European fox	**DP**	**DP**	**DP**	LC	Class 5, Category 2 Provisions: 186(1)(3), 87(1), 188, 189, 192(2)
Flora						
Asparagus asparagoides	Bridal creeper	**EW**	**DW**	**DW**	LC	Class 19, Category 2 Provisions: 186(2), 88(1)(2), 192(2), 194
Casuarina glauca	Swamp sheoak	**EW**	**DW**	LC	LC	Class 37, Category 3 Provisions: 186(1)(2), 88(1)
Chondrilla juncea	Skeleton weed	LC	**DW**	LC	LC	Class 19, Category 2 Provisions: 186(2), 88(1)(2), 192(2), 194
Euphorbia terracina	False caper	LC	**DW**	LC	LC	Class 46, Category 3 Provisions: 186(2), 188(1)(2)
Gazania sp.	Gazania	**EW**	**DW**	LC	LC	Class 61, Category 3 Provisions: 186(1)(2), 188(1)(2)
Hyparrhenia hirta	Cooltai grass	**AW**	**DW**	LC	LC	Class 12, Category 2 Provisions: 186(2), 88(1)(2), 190(1)(2)(3), 192(2), 194
Leptospermum laevigatum[8]	Coast tea-tree	**EW**	**DW**	LC	LC	Class 53, Category 3 Provisions: 186(2), 88(1)(2)

[7] Further information relating to requirements of relevant provisions of the LSA can be found at: https://www.legislation.sa.gov.au/__legislation/lz/c/a/landscape%20south%20australia%20act%202019/current/2019.33.auth.pdf

[8] NB. Excludes the cultivars 'Fore Shore' and 'Shore Tuff'

		Conservation Status				
Scientific Name	**Common Name**	**AMLR**	**State**	**Nat'l**	**Int'l**	**LSA Provisions[4]**
Lycium ferocissimum	African boxthorn	**AW**	**DW**	**DW**	LC	Class 19, Category 2 Provisions: 186(2), 88(1)(2), 192(2), 194
Olea europaea[9]	European olive	**EW**	**DW**	LC	LC	Class 27, Category 2 Provisions: 192(2)(3), 194
Rhamnus alaternus	Italian buckthorn	**EW**	**DW**	**LC**	LC	Class 63, Category 3 Provisions: 188(1)(2)
Silybum marianum	Milk thistle	LC	**DW**	LC	LC	Class 53, Category 3 Provisions: 186(2), 88(1)(2)
Trachyandra divaricata	Dune onionweed	EW	**DW**	LC	LC	Class 33, Category 3 Provisions: 186(2), 88(1)(2) 192(1), 194
Tribulus terrestris	Caltrop	LC	**DW**	LC	LC	Class 19, Category 2 Provisions: 186(2), 88(1)(2), 192(2), 194

Note: DP = Declared pest, DW = Declared weed, EW = Environmental weed, AW = Alert weed, LC = Least concern; LSA = *Landscape South Australia Act 2019*

5.2 Site dimensions and landscape context

The coastal dunes system is considered part of a larger connected network of coastal dunes that begin in Port Adelaide Enfield and extend south through different local council areas. Whilst being well connected and relatively large in total area, the dunes system is very narrow, with a perimeter:area ratio (PAR) of 19.4[10]. This is important as narrow sites, and those that are less compact in shape are highly susceptible to edge effects throughout the site. This means that species that are disturbance-sensitive will be unlikely to occur in the site. Further, the location of the coastal dunes system separating the highly urbanised residential areas and roads to the east from the marine foreshore to the west means that there is little to no scope to expand the depth of the dunes to help minimise edge effects. In addition, the numerous public access paths that traverse the dunes effectively increase the total edges. Improving the ecological value at the site will therefore necessarily rely on actions targeting within patch structure and diversity aspects, rather than fixed patch or landscape scale aspects.

5.3 Biodiversity Resources

The coastal dunes system as a whole provides a relatively limited range of biodiversity resources, with the most substantial of these including:

- relatively high vegetation structural complexity; and
- a variety of flowering, seeding, and fruiting plants.

Whilst this is relatively low resource offerings compared to some other habitats, it is entirely fitting with the characteristics of this sort of coastal dunes habitat. As well as providing habitat and resources for many coastal species, including migratory birds, the dunes also play an important ecological role in protecting and buffering the marine foreshore habitat. Management actions within the site should focus on maintaining the diverse vegetation structural complexity within the site and mitigating impacts from weed and pest incursions.

[9] Excludes planted, used and maintained for domestic, public amenity or commercial purposes

[10] Relative to a PAR of 0 for a perfect circle.

5.4 Target UEV Score

The target UEV score for the coastal dunes system is 577.6, an increase of 45 points. This score is achievable if State and nationally declared pest and weed species are successfully eradicated from the site. The target UEV score is recommended as the minimum effort score as management actions required align with legislative directives.

Achieving a more ambitious UEV score, the so called “stretch target”, will require additional management actions that are not legislatively required. This may include, for example, increasing the site size, establishing new plant species not currently represented within the site, and attracting new wildlife species to the site through plantings or provision of additional resources (e.g. nest boxes). Encouraging threatened plant and animal species into the site will further enhance ecological value and the UEV stretch target score. A stretch target, if desired, should be calculated based on a commitment to specific actions as determined through consultation between Council and community stakeholder groups.

6 Actions Schedule

In light of the actions and conservation priorities identified during the foundation workshops a series of priority actions for the next five years have been identified to help protect and enhance the ecological value of the coastal dunes site. These actions have specifically been developed within the SMART framework (Figure 4).

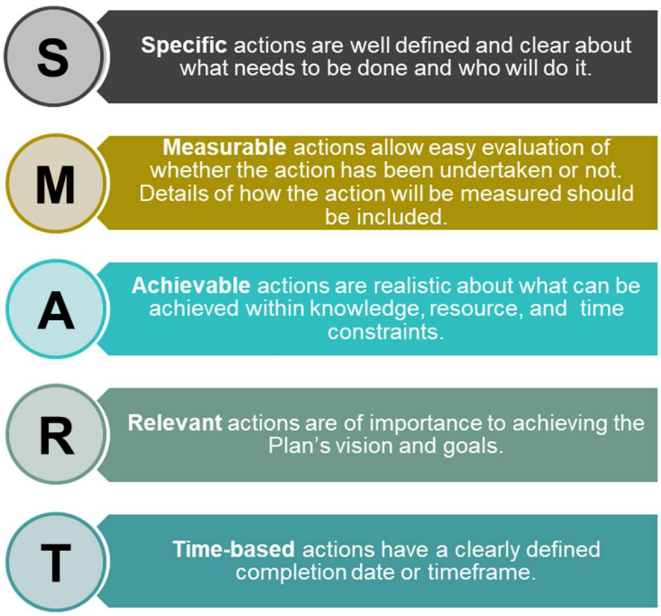


Figure 4. The SMART framework for developing actions.

For ease of reference, the actions have been grouped into six key focal areas, each with a defined objective.

- Focal area 1: Build knowledge and understanding
- Focal area 2: Manage pest and weed species
- Focal area 3: Encourage native species diversity
- Focal area 4: Manage infrastructure
- Focal area 5: Communication networks
- Focal area 6: Monitoring and evaluation

For each Focal Area, the actions are shown together with: the party responsible for leading implementation of the action (lead party), the measure of success, and the proposed time required to complete the action. Further, actions have been prioritised using a 6-point multi-criteria assessment (see Section 3.4, Annex J).

Undertaking these actions over the next five years will help to improve the ecological value of the site (see Section 5) and also build support and awareness about management of the site and its significance in the landscape.

Focal Area 1: Build Knowledge and Understanding.

The objective of this focal area is to build a comprehensive knowledge base about the flora and fauna within the coastal dunes system and be able to proactively respond as needed to protect and enhance ecological value.

#	Action Item	Responsible Party	Measure of Success	Timeframes		
				Commencement	Delivery	Repeatability
1.1	Establish a protocol for undertaking flora and fauna surveys within the dunes system. This should include: a detailed flora and fauna assessment across the whole dunes system every 3 years, supplemented by annual rapid assessments within each segment. *Note: detailed assessments should be undertaken over 3-5 days and include diurnal and nocturnal surveys, as well as trapping and recording methods as appropriate. Comparatively, rapid assessments undertaken in a single day will focus on rapid diurnal techniques.*	PAE	Protocol for detailed and rapid surveys is established and endorsed.	Immediately (by end 2023)	Short (<1year)	Once-off
1.2	Undertake detailed flora and fauna surveys across the whole coastal dunes system to determine current species diversity, abundance, and distribution within the dunes, and generate a comprehensive baseline database of flora and fauna species in the coastal dunes system. It is especially important that the Osborne segment is included as it is the area of the dunes system currently with the least knowledge of species diversity. Also, weeds are poorly mapped within the Taperoo segment. Outputs of this action should feed into Action 1.4	PAE	Flora & fauna surveys completed, and baseline database established by end of 2024	Immediately (by end 2023)	Short (<1 year)	Once-off

#	Action Item	Responsible Party	Measure of Success	Timeframes		
				Commencement	Delivery	Repeatability
1.3	Develop a detailed spatial database of species occurrences, with a focus on threatened species and declared pests and weeds. This should allow for detailed spatial maps to be generated to facilitate management actions.	PAE / Community Groups	Detailed spatial dataset is established and maintained.	Soon (by end 2024)	Short (<1 year)	Once-off
1.4	Review existing planting lists for the coastal dunes segments to identify opportunities for improving species diversity and climate change resilience within the coastal dunes system. Noting that climate resilience should be informed using the Which Plant Where[11] tool.	PAE	Review of planting lists completed by 2024	Immediately (by end 2023)	Short (<1 year)	Once-off
1.5	Undertake an investigation for implementation of a detailed fox monitoring program. Outputs should feed into Action 1.4 and Action 2.2	PAE / Community Groups	Map of active fox dens and understand fox activity within the coastal dunes.	Immediately (by end 2023)	Short (<1 year)	Once-off
1.6	Investigate the opportunity to undertake a feral species scan project which will record feral species activity within the dunes system via a series of remote-located wildlife cameras.	DEW / PAE / Community Groups	Feasibility of, and support for, a feral species scan project is understood.	Immediately (by end 2023)	Short (<1 year)	Once-off
1.7	Liaise with Green Adelaide and other Coastal Council practitioners regarding current successful method of sea-wheat grass control. See Action 2.4.	PAE	Successful methods for controlling sea wheat-grass is understood.	Immediately (by end 2023)	Short (<1 year)	Once-off

[11] https://www.whichplantwhere.com.au/

#	Action Item	Responsible Party	Measure of Success	Timeframes		
				Commencement	Delivery	Repeatability
1.8	Build on existing Biocollect platform to capture species occurrence records consistently across the dunes system (e.g. include FeralScan as recommended citizen science app). See also Action 5.8	PAE	Complementary citizen science app/s are identified to support Biocollect platform.	Immediately (by end 2023)	Short (<1 year)	Annually repeated / ongoing
1.9	Partner with BirdLIfe Australia's Beach-nesting Birds program to run training sessions for community group volunteers and interested community members.	PAE / BirdLife Australia	Minimum one training session is run per year.	Immediately (by end 2023)	Short (<1 year)	Repeat year 3
1.10	Review historical flora species occurrences within the dunes system as a way of identifying species that may be suitable for reintroduction to the system. Information and training should be provided to volunteer groups.	PAE	List of historical flora species that may be considered for reintroduction to the system.	Soon (by end of 2024)	Short (<1 year)	Once-off
1.11	Investigate development of a fine-scale Digital Elevation Model (DEW) of the dunes system to identify sections vulnerable to the effects of sea level rise. Medium/long term. Led by DEW in partnership with PAE	DEW / PAE	DEM of the dunes system identifies sections vulnerable to sea level rise impacts.	Soon (by end of 2024)	Medium (2-3 years)	Once-off

Note: Cells highlighted: **red** = very high priority action; **orange** = high priority action; yellow = medium priority actions; green = low priority action. Responsible party acronyms are: DEW: Department for Environment and Water (includes Green Adelaide); PAE = City of Port Adelaide Enfield.

Focal Area 2: Manage Pest and Weed Species

The objective of this focal area is to manage or eradicate pest and weeds species from within the coastal dunes system to provide enhanced ecological value within the site.

#	Action Item	Responsible Party	Measure of Success	Timeframes		
				Commencement	Delivery	Repeatability
2.1	Ensure weed management actions are consistently applied across the entire coastal dunes area to help mitigate infestations and spread of weeds across segments.	PAE	A weed collection process is developed and implemented	Soon (by end of 2024)	Short (<1 year)	Once-off
2.2	Implement a Fox Watch program to investigate success of this approach to deterring fox use of the dunes system. Key locations for application should be informed by the outputs of Action 1.6.	PAE	Fox Watch program is trialled throughout the dunes system, with a focus on den sites.	Immediately (by end 2023)	Short (< 1 year)	Once-off
2.3	Establish and implement a cat impact research project to quantify the impact of cats on biodiversity within the dunes system. This will help to inform appropriate cat management actions.	PAE	Cat impact research project is established and implemented.	Soon (by end of 2024)	Short (< 1 year)	Once-off
2.4	Develop a priority “weeds” list for management, including woody weeds, for each dune segment. Should be informed by Action 1.4.	PAE / Community Groups / DEW	Priority weeds list generated for each dunes segment.	Immediately (by end 2023)	Short (< 1 year)	Once-off
2.5	Implement an annual “weed blitz” to remove any weeds before they are able to take hold. Location of weeds should be informed by outcomes of Action 1.4	Community Groups	Annual weed and monitoring and removals area undertaken as minimum.	Soon (by end of 2024)	Short (<1 year)	Annually repeated / ongoing

#	Action Item	Responsible Party	Measure of Success	Timeframes		
				Commencement	Delivery	Repeatability
2.6	Develop and implement sea wheat-grass eradication strategy with a view to restore suitable nesting habitat for beach-nesting birds. Action 1.6 must be completed first.	DEW / PAE	A sea wheat-grass eradication strategy is developed and implemented.	Soon (by end of 2024)	Short (<1 year)	Once-off
2.7	Council Safety Inspector Team to monitor, inform and issue penalties relating to public safety concerns, litter, and any other misuse of the Coastal Dunes as required in-line with Council's By Laws, Local nuisance and Litter Control Act. Actions should vary depending on the type of misuse as noted in Section 4.4.	PAE	Dunes system is regularly monitored and inappropriate activities have decreased.	Soon (by end of 2024)	Short (<1 year)	Annually repeated / ongoing

Note: Cells highlighted: **red** = very high priority action; **orange** = high priority action; yellow = medium priority actions; green = low priority action. Responsible party acronyms are: DEW: Department for Environment and Water (includes Green Adelaide); PAE = City of Port Adelaide Enfield.

Focal Area 3: Encourage Native Species Diversity

The objective of this focal area is to encourage native plants and animals to naturally populate the coastal dunes system and to ensure a strong foundation is established for the long-term protection of the vegetation community and its fauna species.

#	Action Item	Responsible Party	Measure of Success	Timeframe		
				Commencement	Delivery	Repeatability
3.1	Develop the "Which Plant Where Guide" for the coastal dunes system. This Guide should include specific actions for each dune segment and be developed specifically for use by community groups. Further, the Guide should balance management efforts relating to vegetation restoration relative to impacts of sand movement (natural or otherwise).	PAE	Which Plant Where Guide is developed and used by community groups.	Immediately (by end 2023)	Short (<1 year)	Once-off
3.2	Plant new species not currently represented in the coastal dunes system, including threatened species, where possible. See Action 1.5.	PAE / Community Groups	Suitable species, not already within the coastal dunes are planted.	Later (by end 2025)	Medium (2-3 years)	Annually repeated / ongoing
3.3	Reduce the spread of *Acacia longifolia* var. *sophorae* by thinning out dense patches to encourage a more structurally biodiverse system (focus areas of control at Semaphore segments).	PAE / Community Groups	*A. longifolia* var. *sophorae* is thinned and native species structural complexity is improved.	Soon (by end 2024)	Short (<1 year)	Annually repeated / ongoing
3.4	Manage/protect existing native plant species, with a focus on encouraging threatened species (e.g. planting bitterbush to encourage bitterbush blue butterfly)	Community Groups	Threatened species are identified and protected to ensure their survival.	Immediately (by end 2023)	Long (>3 years)	Annually repeated / ongoing
3.5	Investigate the installation of bat boxes, hollow logs, and bird perching poles to encourage increased use of the site by native fauna species.	PAE	The feasibility of potential artificial roosts and perches is understood	Soon (by end 2024)	Short (<1 year)	Once-off

#	Action Item	Responsible Party	Measure of Success	Timeframe		
				Commencement	Delivery	Repeatability
3.6	Ensure dune management provides adequate bare ground space (~50% in selected areas) to encourage population growth of the Painted Dragon. This is particularly important in the Taperoo and Osborne segments where the species is known to currently occur.	Community Groups	Areas managed for painted dragon populations maintain at least 50% open ground.	Immediately (by end 2023)	Short (<1 year)	Annually repeated / ongoing

Note: Cells highlighted: **red** = very high priority action; **orange** = high priority action; yellow = medium priority actions; green = low priority action. Responsible party acronyms are: DEW: Department for Environment and Water (includes Green Adelaide); PAE = City of Port Adelaide Enfield.

Focal Area 4: Manage Infrastructure

The objective of this focal area is to ensure infrastructure within the coastal dunes system is maintained in good condition and acts to support protection and management of the system.

#	Action Item	Responsible Party	Measure of Success	Timeframe		
				Commencement	Delivery	Repeatability
4.1	Clear all paths of obstructions, including woody weed species	PAE	Paths are unobstructed and maintained in this manner.	Immediately (by end 2023)	Short (<1 year)	Repeat year 3
4.2	Retrofit taps to allow community groups to readily access water for dunes plantings.	PAE	Taps are retro-fitted to allow community group access to water	Soon (by end 2024)	Short (<1 year)	Once-off
4.3	Investigate and install options to minimise the incursion of weeds via stormwater drain outlets (e.g. pipe filter socks)	PAE	Stormwater outlet pipes within the dines are retrofitted with appropriate filter devises	Soon (by end 2024)	Short (<1 year)	Once-off
4.4	Upgrade all access paths and fences to minimise trampling of the dunes by people/pets	PAE	All access paths and fences are barricaded to minimise ease of access into the dunes system	Soon (by end 2024)	Medium (2-3 years)	Once-off
4.5	Review and update all signage as required in accordance with Council's 2021 Signage Strategy.	PAE	All signs are maintained and updated as needed	Immediately (by end 2023)	Short (<1 year)	Once-off
4.6	Develop a watering plan for across the whole dunes system and ensure ready access to water is available	PAE	A watering plan is developed, and access limitations identified.	Soon (by end 2024)	Short (<1 year)	Once-off

#	Action Item	Responsible Party	Measure of Success	Timeframe		
				Commencement	Delivery	Repeatability
4.7	Implement the watering plan (Action 4.6)	Community Groups	The watering plan is implemented, and plantings have a higher survival rate	Later (by end 2025)	Short (<1 year)	Once-off
4.8	Trial broader application of natural weed suppression mats as used in Taperoo Segment.	Community Groups	Trials are undertaken in each management section of the dunes system.	Soon (by end 2024)	Medium (2-3 years)	Once-off

Note: Cells highlighted: **red** = very high priority action; **orange** = high priority action; yellow = medium priority actions; green = low priority action. Responsible party acronyms are: DEW: Department for Environment and Water (includes Green Adelaide); PAE = City of Port Adelaide Enfield.

Focal Area 5: Communication Networks

The objective of this focal area is to build awareness and support within the broader community about coastal dunes system, and also to facilitate communication lines between community groups and Council.

#	Action Item	Responsible Party	Measure of Success	Timeframe		
				Commencement	Delivery	Repeatability
5.1	Develop and undertake biannual community events to inform and inspire community action. Examples of events include: • Community Bioblitz; • Biodiversity guided walks • Community working bees (e.g. “Muddy Hands” or “One-in-all-in” events)	PAE / Community Groups	At least two community biodiversity education events are held each year.	Soon (by end 2024)	Short (<1 year)	Annually repeated / ongoing
5.2	Support the community in actively engaging with the environment, through assisting in the establishment/growth of volunteer groups to work collaboratively within Council to enhance and protect biodiversity within the coastal dunes area, particularly in segments currently without volunteer group action.	PAE	By 2024, the number of community environment groups active across the coastal dunes area has increased from the current number	Soon (by end 2024)	Short (<1 year)	Repeat year 3
5.3	Develop signage to promote storytelling along the coastal dunes, including links of cultural significance, and the importance of the dune system	PAE	Signage is developed and installed along the length of the coastal dunes area.	Soon (by end 2024)	Medium (2-3 years)	Once-off
5.4	Host an annual volunteer recognition event, such as a BBQ, to recognise the efforts of volunteers in contributing to the conservation of the coastal dunes.	PAE	An annual volunteer recognition event is hosted each year by PAE.	Immediately (by end 2023)	Short (<1 year)	Annually repeated / ongoing
5.5	Investigate opportunities to increase support of community groups (e.g. create additional community grant focussed on supporting community group administrative tasks)	PAE	Community Groups have increased support/capacity to undertake management actions.	Immediately (by end 2023)	Short (<1 year)	Once-off

#	Action Item	Responsible Party	Measure of Success	Timeframe		
				Commencement	Delivery	Repeatability
5.6	Extend the Adopt-A-Dune program more broadly across the different management sections.	PAE	The Adopt-A-Dune program is extended	Soon (by end 2024)	Short (<1 year)	Once-off
5.7	Develop a “Friendly Coastal Gardens” information brochure to educate local residents of suitable garden plantings that will support coastal dune habitats (e.g. identifying threatened species for planting and invasive species to be avoided)	DEW / PAE	“Friendly Coastal Gardens” brochure developed and distributed	Immediately (by end 2023)	Short (<1 year)	Once-off
5.8	Undertake a marketing campaign about selected citizen science app/s to encourage community involvement and raise awareness	PAE	Volunteer numbers within community groups increases following marketing campaign,	Soon (by end 2024)	Short (<1 year)	Once-off
5.9	Invite local business/corporations to sponsor management actions, community events, or community groups.	Community Groups	Increased business support of community group actions.	Immediately (by end 2023)	Short (<1 year)	Annually repeated / ongoing

Note: Cells highlighted: **red** = very high priority action; **orange** = high priority action; yellow = medium priority actions; green = low priority action. Responsible party acronyms are: DEW: Department for Environment and Water (includes Green Adelaide); PAE = City of Port Adelaide Enfield.

Focal Area 6: Monitoring and Evaluation.

The objective of this focal area is to ensure ongoing knowledge building about the coastal dunes system and enable actions to be adaptive and proactive.

#	Action Item	Responsible Party	Measure of Success	Timeframe		
				Commencement	Delivery	Repeatability
6.1	Develop a Monitoring and Evaluation Schedule (MES; Refer Section 7).	PAE	A MES is prepared and implemented.	Immediately (by end 2023)	Short (<1 year)	Once-off
6.2	Implement bi-annual pests surveys dedicated to identifying pest species incursions.	PAE	Weeds and pests are assessed quarterly, and removal actions implemented as needed.	Soon (by end 2024)	Short (<1 year)	Annually repeated / ongoing
6.3	Install photo monitoring points throughout the dunes system to capture changes in vegetation and also dune structure over time. This will also require creating a website to capture and store all photo records submitted, as well as providing another avenue for community education and engagement.	PAE	Photo monitoring points, together with instructional signage, are installed at multiple locations within the dunes system (at least one point in each management section)	Soon (by end 2024)	Medium (2-3 years)	Once-off
6.4	Undertake focussed weed removals around stormwater outlets twice per year to help prevent incursions before they are able to take hold.	PAE / Community Groups	Weed incursions around storm water outlets are managed.	Soon (by end 2024)	Short (<1 year)	Annually repeated / ongoing
6.5	Monitor the shape and depth of foredunes annually to inform adaptive management practices outlined in the MES that aim to protect the dunes system and reduce public safety risks from steep escarpments. See Action 6.1.	PAE / Community Groups	Changes in foredune characteristics are captured and management practices adopted accordingly to help protect dunes system and public safety.	Immediately (by end 2023)	Short (<1 year)	Annually repeated / ongoing

Note: Cells highlighted: **red** = very high priority action; **orange** = high priority action; yellow = medium priority actions; green = low priority action. Responsible party acronyms are: DEW: Department for Environment and Water (includes Green Adelaide); PAE = City of Port Adelaide Enfield.

7 Monitoring and Evaluation Schedule

7.1 Overview

Monitoring of biodiversity is not the same as measuring biodiversity. Measuring biodiversity provides a snapshot in time, whereas monitoring is a long-term, on-going process which identifies temporal trends and allows decisions to be made regarding whether actions are achieving desired biodiversity targets. Accordingly, biodiversity measurements taken over time contribute to biodiversity monitoring.

A Monitoring and Evaluation Schedule (MES) is a strategic mechanism for assessing whether the CDAP is meeting its goals and targets through the outlined actions. Specifically, a MES is a detailed program of works which defines what monitoring activities will take place, when and by whom, and how that information will feed back into actions and management decisions. In this way, the MES assumes the CDAP is adaptive in nature to allow, if necessary, changes to targets and actions to ensure greater on-going success of the CDAP goals.

7.2 MES Considerations

The MES framework presented here has considered State, National, and international best practice for developing environmental guidelines and monitoring and evaluation frameworks. Principally, the MES should be developed to be:

- Fit for purpose
- Credible
- Transparent
- Cost effective

Further, in developing the MES, the following should also be considered:

- Temporal scale
- Spatial scale
- Socio-economics and stakeholder participation

7.3 MES Framework

This section provides the framework for developing a MES for the CDAP. Whilst this framework should not be considered in the initial implementation stages of the CDAP, there is not yet sufficient data available to prepare a detailed MES, as is often the case wat the commencement of biodiversity projects. Nonetheless, it is important that the MES outline is developed in the initial CDAP implementation stages, with further development and refinement undertaken during implementation of the CDAP, by drawing on a combination of the data, observations, and learnings of the actions. In many cases, actions will set a benchmark on which success (achievement of plan targets) and re-evaluation of the direction of the CDAP in 2027 will be made.

7.4 Key Elements of an MES Framework

The MES framework contains the following nine elements:

- Target
- Baseline
- Action
- Indicator
- Data collection method
- Data source
- Frequency
- Reporting

Table 5 presents an example of an MES template with a hypothetical example.

Table 5. MES Template with a Hypothetical Example.

Target *What is trying to be achieved?*	**Baseline Value** *What is the current value?*	**Action** *How will the target be achieved?*	**Indicator** *How will actions be assessed?*	**Data Collection Method** *e.g., online, focus group?*	**Data Source** *What sources can data be derived from?*	**Frequency** *How often will data collection occur?*	**Responsible** *Who will collect the data?*	**Reporting** *Where will data be reported?*
At least two community biodiversity education events are held each year.	*0*	*Run bi-annual biodiversity events*	*Number of biodiversity events run each year*	*Tracking spreadsheet*	*Events database*	*Bi-annually*	*Community engagement department*	*CDAP Annual Action Plan Report*

8 Annexes

Annex A. Coastal Dunes Management Segments Showing Stormwater Outlet Locations

Stormwater outlet locations within each management segment is shown by blue dots.

North Haven segment

Osborne segment

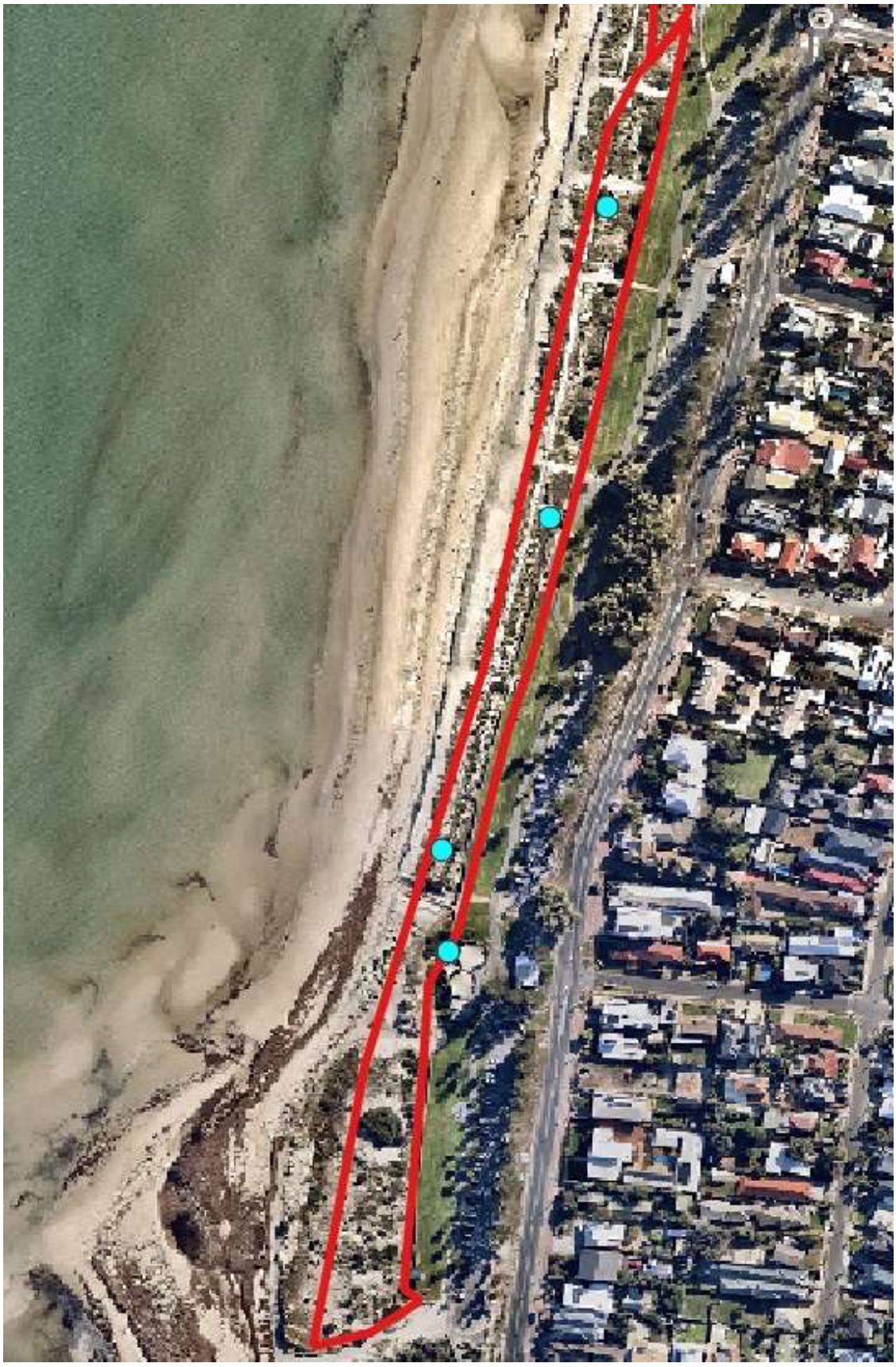
Taperoo segment

Largs Bay North segment

Largs Bay segment

Semaphore segment

Semaphore South segment



Annex B. Strategic Context Documents

State Government – Metropolitan Adelaide Northern Coastal Action Plan (MANCAP; Forthcoming)

- Currently under development
- Previous Plan: https://data.environment.sa.gov.au/Content/Publications/MetroAdelaideAndNorthern_CoastalActionPlan_Vol1_and_2.pdf

Port Adelaide Enfield City Plan

- Further information: https://www.cityofpae.sa.gov.au/council/corporate-documents/city-plan
- City Plan 2030: https://www.cityofpae.sa.gov.au/__data/assets/pdf_file/0013/410404/PAE-City-Plan-2030.pdf

Port Adelaide Enfield Living Environment Strategy

- Further information: https://www.cityofpae.sa.gov.au/live/environment/living-environmental-strategy
- Living Environment Strategy 2017-2022: https://www.cityofpae.sa.gov.au/__data/assets/pdf_file/0034/409696/Environment-Strategy.pdf

Port Adelaide Enfield Biodiversity Strategic Management Plan 2022-2027

- New plan (2022-2027) currently under development
- Further information: https://www.cityofpae.sa.gov.au/live/environment/biodiversity-management
- [Old] Biodiversity Management Plan (2016-2020): https://www.cityofpae.sa.gov.au/__data/assets/pdf_file/0018/410760/Biodiversity-Management-Plan.pdf

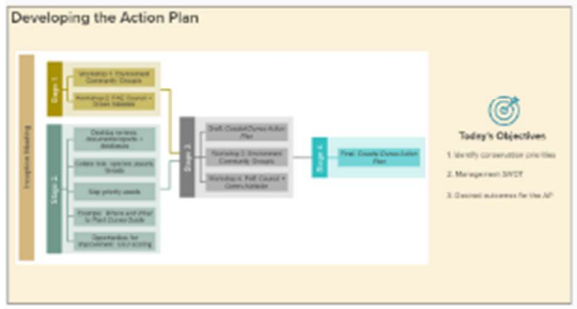
Port Adelaide Enfield Coastal Community Land Management Plans

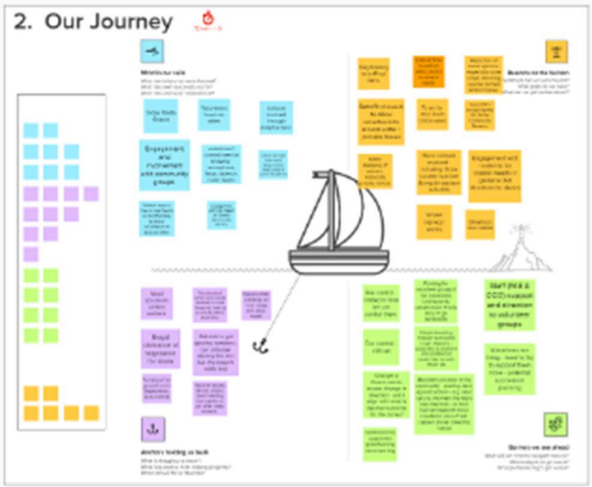
- Further information: https://www.cityofpae.sa.gov.au/council/corporate-documents/plans
- Coastal Reserves Land Management Plan: https://www.cityofpae.sa.gov.au/__data/assets/pdf_file/0036/781659/CLMP-Coastal-Reserves-adopted-13-Oct-2020.pdf

Annex C. Foundation Workshop Outputs

MURAL board screenshots from (a) community workshop and (b) Council and Green Adelaide workshop. A summary of these comments (verbatim) and additional comments provided after the workshops is provided in Table 6.

(A)

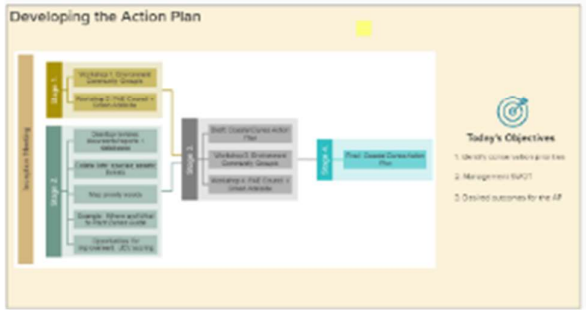




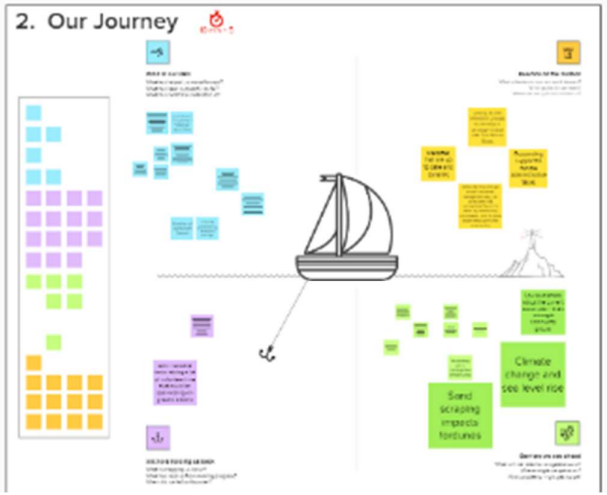
(B)

Coastal Dunes Action Plan
Community Workshop 1
Facilitator
Workshop date
Acknowledgement of Country
Agenda

MURAL Tips
Practice Area


Developing the Action Plan
Today's Objectives

1. Conservation Priorities


2. Our Journey
Climate change and sea level rise
Sand scraping impacts fortunes

3. Desired AP Outcomes

Table 6. Verbatim comments provided during the foundation workshops.

Activity 1. Conservation Priorities. *What are the main priorities for promote biodiversity conservation within the dunes system and/or segments of the dunes system?*
Coastal Dunes System
Semaphore South to Largs Bay – substantial dune erosion due to storms and king high tides. DEW need to develop an Action Plan (current government has put on hold for 12 months), or at least a stop-gap plan. PAE lobbying.
Sea wheat grass control and spinifex restoration
Reptile and invertebrate diversity assessment and habitat improvement recommendations
To assist volunteers in Euphorbia control, council could go through and spray new seedlings to reduce their workload.
Continue Bitterbush plantings to interconnect plantings using both male and female plants. This species can go throughout the whole PAE area.
Engagement with Coastal community groups including the Port Environment Centre.
Add additional species to revegetation to increase biodiversity that connects with the southern coastline.
Continue dune onion weed control. This should be a yearly action by Council.
Be ready for Hooded Plovers arriving along the coastline as they are moving up the coast.
Increase diversity in planting managed through community groups.
Signage being redone across the city – commencing FY22/23.
Feral species control is patchy throughout dunes system. Fox numbers are not receding, cats are also a major issue.
Sea wheat grass is prolific in most of the northern section. The Biodiversity Management Plan is considering the best approach to this at the moment.
An action to review elements of the Community Land Management Plan to include "environment" as a stronger priority of focus for land management, rather than for recreation purposes.
We need to investigate the ecology of the Sea Wheat Grass and its impact on the coastal dune system.
The foreshore dunes are critical for management to build the dune system resilience for preparation of future storm surges, sea level, rise, erosion impacts, sand carting, etc.
Sides of coastal path have Galenia sp., some weeds are too large for volunteers and as such, need spraying.

Trachyandra and Bridal Creeper are appearing. Volunteers are tagging and letting Council know of its whereabouts.
Impact on dunes of campsites
North Haven segment
Trials in Onkaparinga looking at changing from sea-wheat grass to spinifex. Spinifex hold foredunes together better in storm events.
Dunes in the north are growing, so access is getting more difficult.
Trachyandra appearing
A lot of people think the link to the Biolink at the top of the peninsula is important
Volunteers operate mostly around the Surf Club and are working their way north
Osborne segment
No volunteer work being conducted here
Trachyandra control by Council
Perennial weedy ground covers need to be controlled by Council
Taperoo segment
Boardwalk replacement, update, or removal? It is starting to get rundown.
No volunteer work being conducted here
Plenty of work has been carried out in this segment since the Friends of Taperoo Dunes were established in 2016.
Very active group of dedicated volunteers. Longest standing Friends of Group along Port Adelaide Coastal dunes
There sand dune rehabilitation work over the years have focused on priorities such as; weed control, revegetation, rubbish removal, and community/school education via signage initiative and Taperoo website.
Galenia, False Caper and other weed control
One of the priorities of the group has been to enhance the revegetation linear area along carpark footpath and entry to dunes. The group has trialled different natural weed depressive mat methods to avoid use of herbicides with some impressive outcomes. It would be good to see this work continue.
Planting of Sea Berry saltbush maybe a priority north of carpark along footpath (on barren parts of soil)?

Largs Bay North segment
Renewing fencing between Semaphore and Largs
Potential to reduce the number of access paths
Galenia control is a priority
Possible opportunities for Biodiverse plantings
Other invasive weeds – euphorbia, ice plant, bridal creeper
Access to water
Largs Bay segment
Semaphore Largs Bay Dunes Group undertakes weeding in this area
Alberton Primary School – Adopt a Dune Project (planting and weeding activities)
Galenia weed control in area is a challenge
Other invasive species – euphorbia, ice plant, bridal creeper, couch
Tents and camp sites in and on the dunes and under the jetty
Scarps formed from sand scraping and the impact of high tides and storm events (becoming more common)
Semaphore segment
Semaphore Largs Bay Dunes Group undertakes weeding and planting in this area
Dominican School – Adopt a Dune Project (planting and weeding activities)
Stormwater drainage channels – create weed infestation issues grassy weeds, Acacia longifolia (subspecies sophorae) spreading wild throughout this area.
Fox den locations
Impact of camp sites
Scarps formed from sand scraping and the impact of high tides, storm events (becoming more common).
Semaphore South segment

No volunteer work is being conducted here, from Hart St southwards.
Large foredune erosion/stability issues
Red-capped plovers nested here until five years ago (2018) when large amount of sand movement (done to mitigate storm impacts) displaced the birds. 100m3 sand removed, rather than 50m3. Work can be done to re-establish habitat.
Sea-wheat grass from Semaphore to North Haven is the biggest threat to red-capped plover nesting. It limits visibility, and creates more sever dune slope that prevents chicks moving around to feed (spinifex would be better)
Stormwater discharge issues. Drains straight onto dune/beach.
Activity 2. Our Journey (SWOT) ***What are the Strengths, Weaknesses, Opportunities, and Threats for managing the reserve?***
Strengths (What are we doing well? What actions have been successful?)
Grass Roots Grants
Volunteer hours on sites
Schools involved through the 'Adopt a Dune' program
Engagement and involvement with community groups
Volunteers! Commitment is amazing – especially in Semaphore, Largs, Taperoo, and North Haven.
Snake signage could be a deterrent to keep people out of the dunes
Added taps to the showerheads at Holdfast Bay to allow volunteers to access water
Engagement with Volunteers at Coastal Community Nursery
Weeding is showing improvement in some areas - less infestations.
Working well together - cooperation between dune care groups. Partly to do with the grant, and also the environment centre (facilitates cooperation)
School Adopt a Dune program is working well. It has been running for roughly 12 months.
Facebook presence has been good in attracting attention and new volunteers.
More self-sown and regeneration - bush care techniques are working (clearing around natives).

More outdoor events (linked to Covid-19 requiring outdoor activities) has given good exposure and education/awareness programs "disguised as recreation"
Interaction with Councils and contractors regarding watering has been great. Under the grant, funding for watering provided over summer.
Taperoo group has a great website with education information but cost prohibitive for some groups.
Provision of plants from Council
Collecting weeds each week by Council - Semaphore and Largs.
state of the dunes is much improved since the volunteer groups commenced (barring the damage caused by sand carting
infrastructure work conducted by council has been great especially the stepping stones placed at the southern section of the Semaphore jetty which makes it much easier to walk up onto the pavement, the clearing of the dead trees in front of the railway garage and replacement of sections of the old sea wall in front of the amusement centre
Friends of Groups
Propagation workshops fortnightly at the Val Wales Community Nursery
Taperoo segment
Plenty of work has been carried out in this segment since the Friends of Taperoo Dunes were established in 2016.
Very active group of dedicated volunteers. Longest standing Friends of Group along Port Adelaide Coastal dunes
There sand dune rehabilitation work over the years have focused on priorities such as; weed control, revegetation, rubbish removal, and community education via signage initiative and Taperoo website.
Annually the group achieves over; 100’s volunteer hours, 100’s seedlings planted, over ha weeding, and 10’s kgs rubbish removed.
Semaphore Largs Dunes Group
Plenty of work has been carried out in this segment since the SLDG were established in 2017/18.
Their sand dune rehabilitation work over the years have focused on priorities such as; weed control, revegetation, rubbish removal, community education, seeking funding and Adopt a Dune Project with local schools. Active fb and web presence.
School Adopt a Dune program is working well. It has been running for roughly 12 months.
Annually the group achieves; 100’s volunteer hours, 100’s seedlings planted, over 10 ha of weeding, and 10’s kgs rubbish removed.
Friends of North Haven

Plenty of work has been carried out in this segment since the Friends of North Haven were established in 2018.
There sand dune rehabilitation work over the years have focused on priorities such as; weed control, revegetation, and rubbish removal.
Annually the group achieves; 100's volunteer hours, 100's seedlings planted, over 10 ha of weeding, and 10's kgs rubbish removed.
Green Adelaide Grassroots Funded Projects (linking in Biodiversity Park).
Working well together - cooperation between dune care groups. Partly to do with the grant, and also the environment centre (facilitates cooperation)
Facebook presence has been good in attracting attention and new volunteers.
More self-sown and regeneration - bush care techniques are working (clearing around natives).
More outdoor events (linked to Covid-19 requiring outdoor activities) has given good exposure and education/awareness programs "disguised as recreation" (Would prefer this to read 'walking tours with information provided by dunes volunteers'
Interaction with Councils and contractors regarding watering has been great. Under the grant, funding for watering provided over summer.
Taperoo has a great website with education information but cost prohibitive for some groups.
Provision of plants from Council
Collecting weeds each week by Council – Semaphore, Largs.
Weaknesses (What aren't we doing well? What actions haven't worked?)
Weed species are more prolific in some sections, compared to others
Illegal clearance of vegetation for views
Funding of on group works (Restoration, Pest Control)
Weed control action plan needs review. Some tweaking relating to priority weeds, especially.
Not able to get gassing canisters, can collapse/destroy the den, but this doesn't really help for fox eradication
Need for dog by-laws to protect beach besting bird species as per other metro councils
Inappropriate plantings on road verge and black mulch
Weed collection is not consistent across the segments - especially Taperoo
Administrative tasks take a lot of volunteer time that could be spent on doing on-ground actions.

Some of the current signs are worn out and hard to read and there aren't many of them in public places.
Planting advice (what to plant, where?)
Maintenance of fences, signs etc)
Getting diverse plants into the dunes
Ongoing weed control
Could be better system for communicating what work has been done in the dunes by council and contractors and by volunteers
Opportunities (What would you like to be doing/see happen?)
Linking in with interstate groups to develop a strategy to deal with Sea Wheat Grass
Websites that are up to date and dynamic
Resourcing support to handle administrative tasks
Dog training to sniff out fox dens
Retrofit showers to allow volunteers to access water / provision of hoses
Better mapping of weeds, especially priority weeds.
Look at how to work in with Council to source seeds
Aim to achieve zero Dune Onion Weed
More school involvement, including those further from the dunes in the eastern suburbs
Snake signage works
Reduction of weed species, especially dune shape altering species (i.e., Sea Wheat Grass)
Volunteers accessing the Val Wales Community Nursery
Engagement with residents for coastal weeds in gardens that threaten the dunes
Bitterbush blue habitat
Action for Council-led annual volunteer recognition date - to celebrate and appreciate the work done by community volunteers, and to raise awareness within the community.

Better system for staying in touch/ informed about work carried out
More engagement by local businesses/ corporations – maybe to sponsor the website costs or provide corporate volunteers, plants.
continued support for information and visuals on regular intervals along the dunes, telling the story of the plants, birds etc that live along the coast and what people can look out for
There are slabs of old cement along the wall in front of where the amusement centre was located which are unsightly and prevent native plants from growing. This area still seems to struggle even though a number of plants are doing well. As this will be at the front of the foreshore redevelopment area it still needs concerted action and perhaps selected plantings to enhance its aesthetic. There are also areas closer to the Palais where many of the plantings have not survived and no plants are regenerating. Perhaps we could do some selective plantings in partnerships with council in these areas
Could council do an audit and identify areas along the PAEC dunes system where hard rubbish such as cement needs to be removed and gradually do this
The areas around the drainage systems need attention – weed control, more frequent rubbish removal, new plantings
The area where the dead trees were removed in front of the railway garage needs some plantings based on expert advice
There are still sections where the trees are dominating the dune system preventing other species from growing. Is there still a plan in place to gradually remove these
Many of the new plantings are going well and plants are becoming well established however we have also lost a lot of plants and it seems timely for us to get a bit smarter about what we plant and where and how this can support biodiversity
Threats (What may prevent you from undertaking actions/achieving outcomes for the reserve?)
Fox control – limited in how we can control them
Change in Government means change in direction. Will it align with what the desired outcome is for the dunes?
Administration support for grant funding and reporting.
Funding for volunteer groups if the Grassroots funding ends, conservation efforts likely to go backwards.
People trampling through dunes (and rough sleeps), especially at southern end (Semaphore south) less in North Haven.
Staff (PAE & CCO) support and direction to volunteer groups
Volunteers are getting tired – need to try and support them more, potential succession planning.
Climate change and sea level rise.
Sand scraping impacts for dunes

Low awareness about the current action plan, even amongst community groups
No strategy yet to management Sea Wheat Grass
Climate and rainfall
Cost for maintaining websites
New development at Fort Largs - allowing stormwater to runoff into the dunes system
Access to taps north of Largs jetty is a barrier to watering
Watering is patchy
Water access is a huge issue in Taperoo. It requires buckets and manual filling. Trucks can't reach further into dunes.
Activity 3. Desired Action Plan Outcomes ***What would you like to see included as part of the Action Plan?***
Link between the (forthcoming, PAE) Coastal Dunes Action Plan (CDAP) and the State Government Metro Adelaide and Northern Coastal Action Plan (MANCAP) à there has not been a lot of community consultation around the MANCAP review. There is an opportunity for PAE to allow for community feedback into the CDAP which will link to MANCAP.
Appropriate recommendations around planting and mulching
Promote ongoing maintenance on previous plantings
Focus on how to support the groups with limited members
How does this plan link with the sand replenishment project to ensure dune stability and volunteer efforts?
Need the CDAP to be functional for the community groups – use-friendly with a table of properties and clear responsibilities
Clear and prioritised actions for each section of the coast to asset with planning of works and aligned priorities
Will be good if the CDAP can be used to help justify grand funding
How will this plan link in with the other areas within council (e.g., Port River, Bird Island, etc.)?
Consistency with this plan and the operational delivery of council maintenance areas, and volunteer activities
Highlight biodiversity conservation priorities and how they align with recreation/access priorities

Need to protect foredunes which are very important though often less diverse and protect the rest of the dunes.
Action Plan needs to recognise impacts to dunes expected due to climate change and sea level rise, and sand erosion. Dunes have an important role to play.
Action Plan to provide support/justification/advocate for implementation of infrastructure to protect dunes.
Awareness raising in the community around the Action Plan.
Define who's responsible for dealing with stormwater drains and weed incursions, need a separate program to deal with this.
Timelines and funding for actions, SMART actions, especially for feral species control and large weed control
The Action Plan needs to outline how to report on annual progress
Identify how Council relates and connects with Coastal Protection board, community groups, Green Adelaide, other plans, etc.

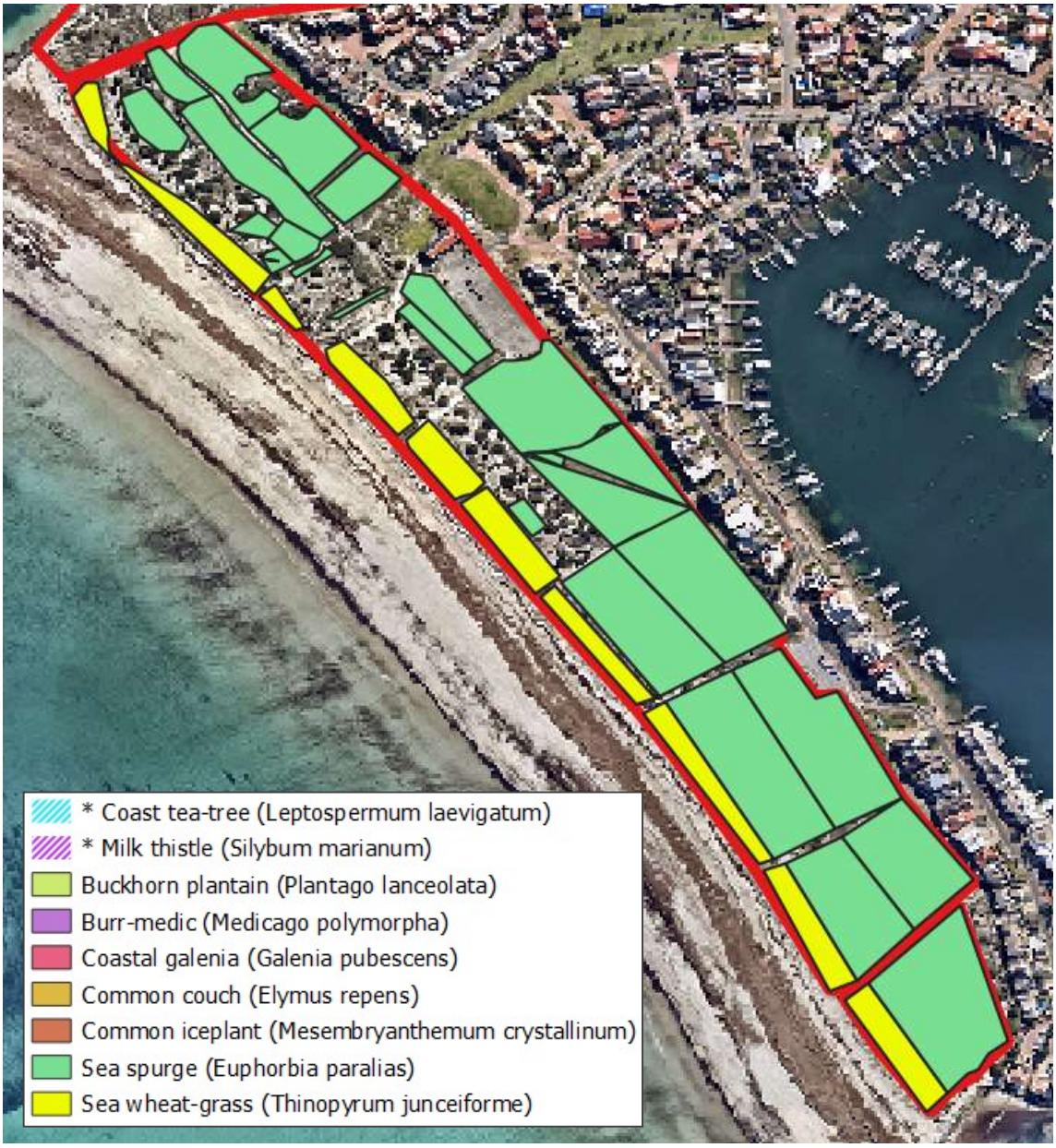
Annex D. Weed Mapping Within the Lefevre Coastal Dunes System

Overview map of coastal dune system showing: (left) points that represent individual weeds and (right) polygons representing large stands/infestations of weeds. Each Segment is shown more clearly in the subsequent images.

North Haven segment – weed points

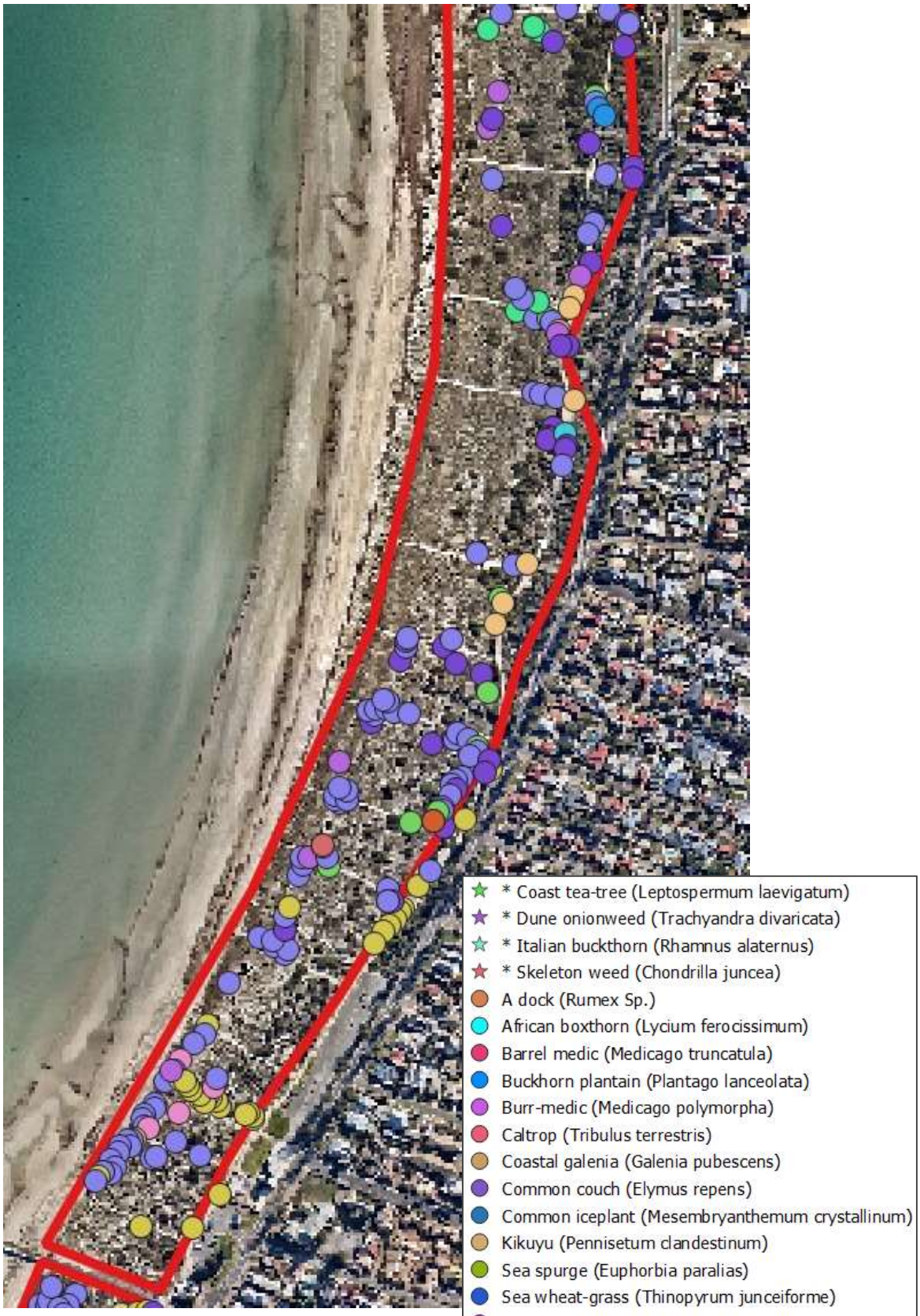
* indicates a declared weed see Section 5.

North Haven segment – weed polygons



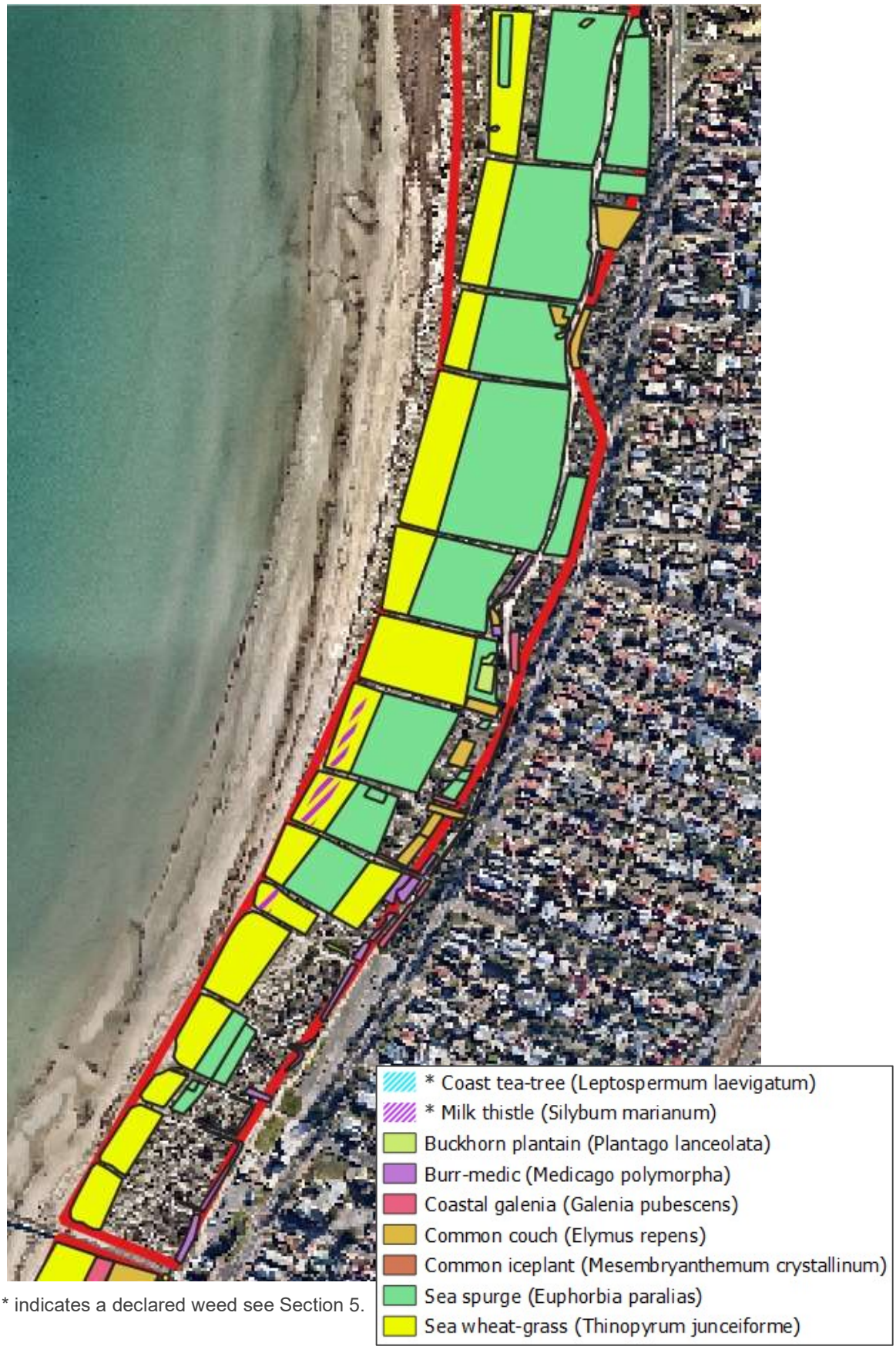
* indicates a declared weed see Section 5.

Largs Bay North segment – weed points



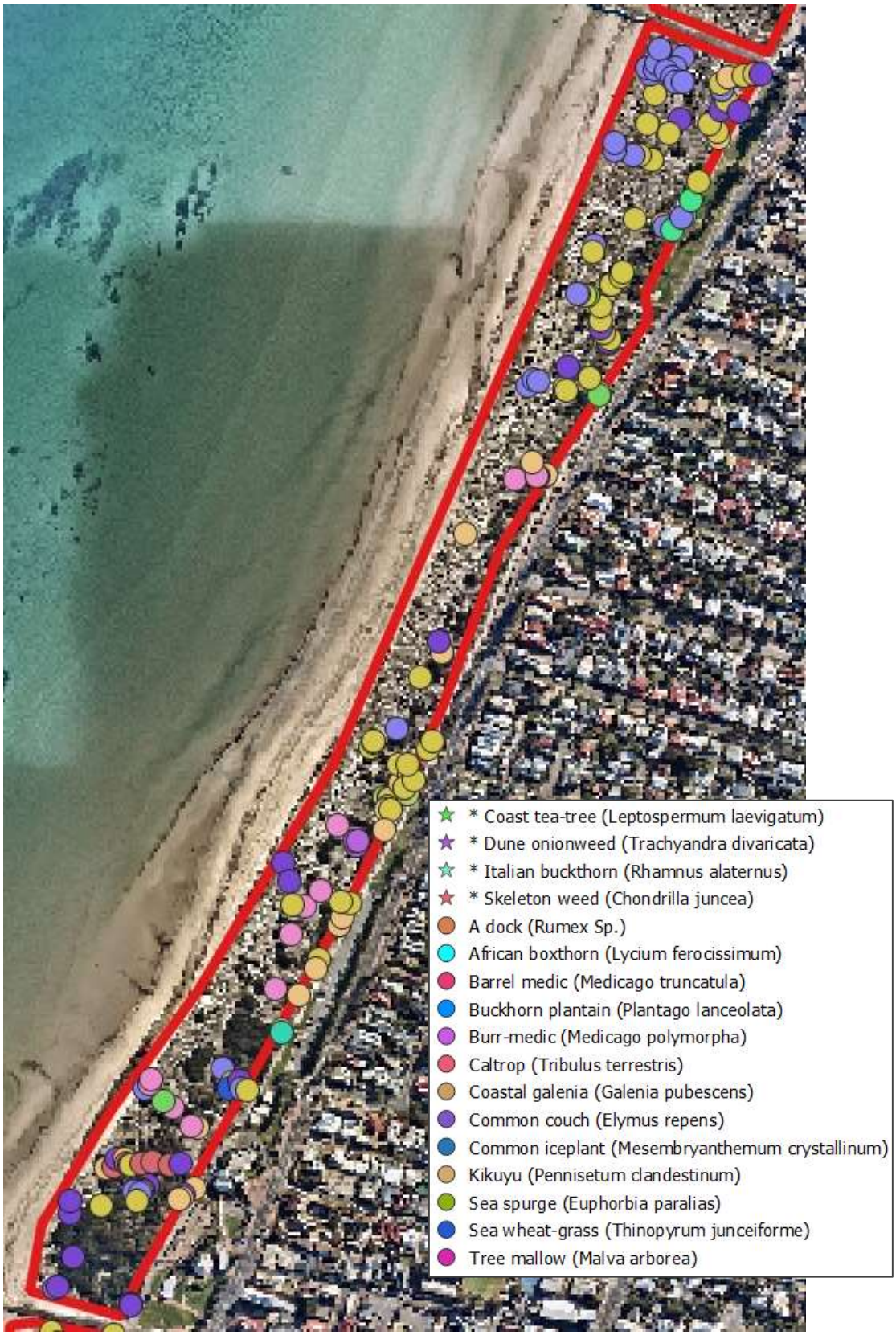
* indicates a declared weed see Section 5.

Largs Bay North segment – weed polygons



* indicates a declared weed see Section 5.

Largs Bay segment – weed points



* indicates a declared weed see Section 5.

Largs Bay segment – weed polygons

* indicates a declared weed see Section 5.

Semaphore segment – weed points

* indicates a declared weed see Section 5.

Semaphore segment – weed polygons

* indicates a declared weed see Section 5.

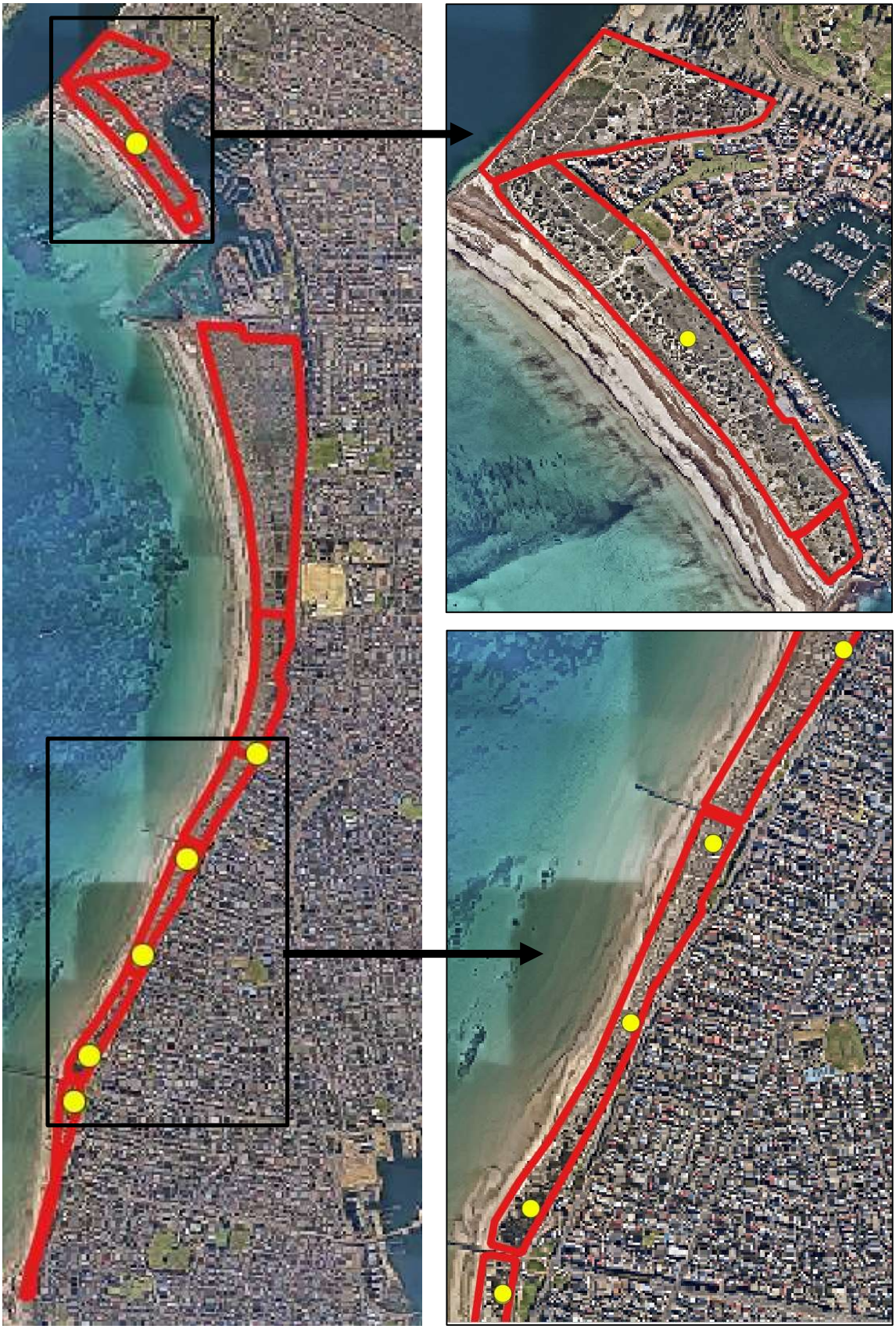
Semaphore South segment – weed points

* indicates a declared weed see Section 5.

Semaphore South segment – weed polygons

* indicates a declared weed see Section 5.

Annex E. Known Fox Den Locations



Annex F. Which Plant Where Dunes Planting Guide - Example Structure

The following provides a high-level structural outline and inclusions for development of a *Which Plant Where Dunes Planting Guide*. The aim of the Guide will be to provide information on native species plantings suitable for the dunes system. The Guide is not intended to focus on weed management or other management actions. This structure has been based on a review of other similar guides available globally, with a particular focus on the City of Auckland's Dune Planting Guide and Coastal Planting Guide[12]. The Guide should be developed to be easy to use by community groups and include clear species lists, maps, diagrams, and photos as necessary to illustrate key points.

Introduction

- Explain coastal dunes system as a whole and the seven management segments;
- Include detailed maps of each segment including paths, access points, and watering points;
- Identify goal/objectives of the Guide;
- Identify intended audiences/users of the Guide;

Planning to Plant

- Outlines the steps to take before planting, including:
    - preparing the site;
    - identifying obstacles/requirements for successful planting (e.g. appropriate fencing/water access);
    - selecting and sourcing suitable plant species; and
    - location and spacing of plantings to maximise benefits and success (reference schematics may be used to illustrate examples of good planting mixes and spacings for different situations;

Species Selection

- Provide a list of suitable species for each management segment, with suitability based on local conditions, biodiversity benefits, and resilience to climate change;
    - The Which Plant Where tool[13] should be used to assess climatic suitability of species;
    - A pictorial reference of species would be desirable;
- For each species, identify: scientific and common names, family, lifeform type, height and spread dimensions, relative planting abundance, and any other noteworthy comments.
    - Planting abundance should be based on prior knowledge of existing abundance of species within each management segment and should aim to ensure a minimum level of genetic diversity is maintained to help ensure resilience to changing conditions. Santamour's 10-20-30 rule could be used as a high-level guide[14].

Monitoring and Management Plan

- Provide an indication of type and frequency of monitoring and management actions required during the establishment phase to help improve planting successes.

---

[12] Dune guide: https://www.aucklandcouncil.govt.nz/environment/plants-animals/plant-for-your-ecosystem/docscoastalplantingguides/dune-planting-guide.pdf; Coastal Guide: https://www.aucklandcouncil.govt.nz/environment/plants-animals/plant-for-your-ecosystem/docscoastalplantingguides/coastal-planting-guide-overview.pdf

[13] https://www.whichplantwhere.com.au/

[14] http://new.www.tree-care.info/mhattachments/pdficol0kyRZI.pdf

Annex G. Urban Ecological Value Scoring Process

For each site, the UEV scoring is comprised of two compound scores: species score and site score; each of which is a composite of a number of scored input metrics as described in further detail below.

Species Score

The **Species Score** is developed for each species identified occurring at the site. It is the sum of the species' **origin score** and the species' **conservation status score** (Figure xx). The **species score** is used as input into the **site score** (Figure 7).

The **origin score** is allocated based on a native or introduced species.

The **conservation status score** is the sum of values allocated for regional, State, national, and international conservation status of the species.

Conservation status for each species at regional to international levels are in accordance with the following documents:

Regional (AMLR)

- threatened species = Adelaide and Mount Lofty Ranges Regional Species Conservation Assessment Project (Gillam & Urban, 2014);
- environmental/declared weeds = Environmental Weeds of Adelaide and the Mount Lofty Ranges (NRAMLR, 2015);

State

- threatened species: National Parks and Wildlife Act 1972 (Government of South Australia, 1972);
- declared weeds/pests: Landscape South Australia Act 2019 (Government of South Australia, 2019);

National

- threatened species: Environment Protection and Biodiversity Conservation Act 1999 (Department of Agriculture, Water and the Environment, 1999);
- weeds: Weeds of National Significance (Australian Government, 2012);
- pests: FeralScan (https://www.feralscan.org.au/)

International

- Protected migratory species = bilateral agreements with China (CAMBA), Republic of South Korea (ROKAMBA), and Japan (JAMBA), Bonn Convention, RAMSAR convention, ACAP
- Threatened species = IUCN Red List.

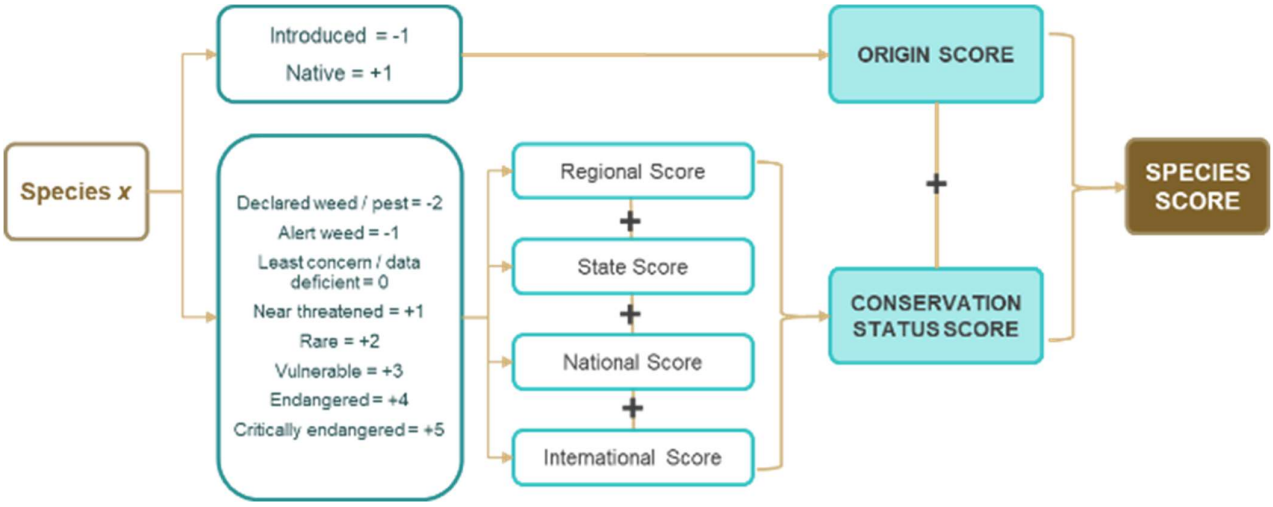


Figure 6. UEV process for generating Species Score for each species.

Site Score

The **Site Score** is developed for each site assessed. It is the sum of:

> *= summed species scores + context score + area score + PAR + water score + HB score + species count + fauna class diversity + flora class diversity + structural score.*

Where:

- **summed species scores** are the sum of the species scores (Figure 4) for all species identified occurring at the site.
- **context score** is a categorised indication of how visually connected the site is in the broader landscape (connected, stepping stone, isolated). It is not an indication of functional connectivity for different species.
- **area score** is the area of the site in ha and then classified as small (<4.4ha), medium (4.4-27ha), large (27-50ha), and very large (>50ha).
- **PAR** is the perimeter:area ratio relative to a circle. The PAR indicates how compact a site is, with rounder more compact sites tending to have a greater proportion of core habitat area (important for disturbance sensitive species) then longer, narrower sites. The PAR value is a negative number, with a value of 0 indicating a perfect circle.
- **Water score** is a categorised score based on the occurrence of permanent, ephemeral, or no water bodies within the site.
- **HB score** is a categorised score indicating the presence and abundance of hollow-bearing structures (e.g. logs, stags, trees).
- **Species diversity** is a measure of species diversity and is the total number of different species recorded within the site.
- **Fauna class diversity** is the total number of different fauna classes represented by species within the site.
- **Flora class diversity** is the total number of different flora classes represented by species within the site.
- **Structural score** is a categorised score based on the number of structural vegetation layers (out of 7) represented by flora species within the site.

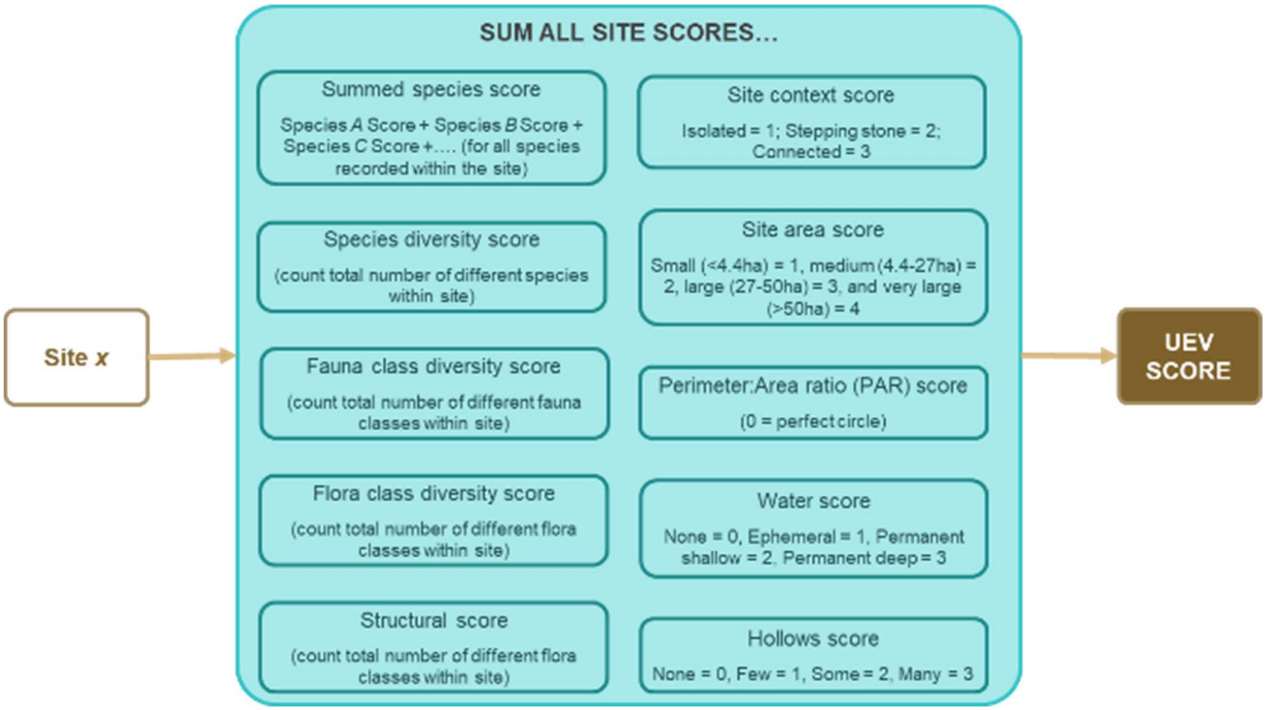


Figure 7. UEV process for generating UEV Score for a site.

Annex H. Species List

Total species recorded within the coastal dunes system over the last 5 years (2017-2022). Introduced species are denoted by a ^ next to the Class name. Conservation status at the regional Adelaide Mount Lofty Ranges (AMLR), State, national and international levels are: LC = least concern, NT = near threatened, RA = rare, VU = vulnerable, EN = endangered, CE = critically endangered, AW = alert weed, EW = environmental weed, DW = declared weed, DP = declared pest.

	Class	Scientific Name	Common Name	Conservation Status				UEV Species Score
				AMLR	State	National	International	
FAUNA								
	Aves	*Accipiter fasciatus*	Brown goshawk	LC	LC	LC	LC	2
	Insecta	*Amegilla sp.*	A blue-banded bee	LC	LC	LC	LC	2
	Insecta	*Anabarhynchus maritimus*	Stiletto-fly	LC	LC	LC	LC	2
	Aves	*Anas gracilis*	Grey teal	LC	LC	LC	LC	2
	Aves	*Anas superciliosa*	Pacific black duck	VU	LC	LC	LC	4
	Insecta	*Anaxilaus oliva*	An insect	LC	LC	LC	LC	2
	Aves	*Anthochaera carunculata*	Red wattlebird	LC	LC	LC	LC	2
	Aves	*Anthochaera chrysoptera*	Little wattlebird	LC	LC	LC	LC	2
^	Insecta	*Apis mellifera*	European honey bee	LC	LC	LC	LC	1
	Insecta	*Archimantis sobrina*	Mallee grass mantis	LC	LC	LC	LC	2
	Gastropoda	*Bembicium vittatum*	A marine snail	LC	LC	LC	LC	2
	Aves	*Cacatua galerita*	Sulphur-crested cockatoo	LC	LC	LC	LC	2
	Aves	*Cacatua sanguinea*	Little corella	LC	LC	LC	LC	2

	Class	Scientific Name	Common Name	Conservation Status				UEV Species Score
				AMLR	State	National	International	
	Gastropoda	*Cacozeliana granarium*	A marine snail	LC	LC	LC	LC	2
	Aves	*Calidris acuminata*	Sharp-tailed sandpiper	LC	LC	LC	LC	2
	Aves	*Calidris ferruginea*	Curlew sandpiper	LC	EN	CR	LC	9
	Aves	*Calidris ruficollis*	Red-necked stint	NT	LC	LC	LC	2
	Aves	*Cereopsis novaehollandiae*	Cape Barren goose	LC	RA	LC	LC	3
^	Gastropoda	*Cernuella virgata*	A land snail	LC	LC	LC	LC	1
	Aves	*Charadrius bicinctus*	Double-banded plover	LC	LC	LC	LC	2
	Aves	*Charadrius ruficapillus*	Red-capped plover	LC	LC	LC	LC	2
	Insecta	*Chauliognathus tricolor*	Tricolor soldier beetle	LC	LC	LC	LC	2
	Aves	*Chenonetta jubata*	Australian wood duck	LC	LC	LC	LC	2
	Aves	*Chlidonias hybrida*	Whiskered tern	LC	LC	LC	LC	2
	Aves	*Chroicocephalus novaehollandiae*	Silver gull	LC	LC	LC	LC	2
	Aves	*Colluricincla harmonica*	Grey shrikethrush	LC	LC	LC	LC	2
^	Aves	*Columba livia*	Rock dove; Feral pigeon	LC	LC	LC	LC	1
	Aves	*Coracina novaehollandiae*	Black-faced cuckoo-shrike	LC	LC	LC	LC	2
	Aves	*Corvus mellori*	Little raven	LC	LC	LC	LC	2
	Reptilia	*Ctenophorus pictus*	Painted dragon	EN	LC	LC	LC	5
	Aves	*Cygnus atratus*	Black Swan	LC	LC	LC	LC	2
	Aves	*Egretta garzetta*	Little egret	LC	RA	LC	LC	3
	Aves	*Egretta novaehollandiae*	White-faced heron	LC	LC	LC	LC	2

	Class	Scientific Name	Common Name	Conservation Status				UEV Species Score
				AMLR	State	National	International	
	Aves	*Elanus axillaris*	Black-shouldered kite	LC	LC	LC	LC	2
	Aves	*Eolophus roseicapilla*	Galah	LC	LC	LC	LC	2
	Aves	*Epthianura albifrons*	White-fronted chat	LC	LC	LC	LC	2
	Polychaeta	*Eunicida sp.*	A polychaete worm	LC	LC	LC	LC	2
	Aves	*Falco cenchroides*	Nankeen kestrel	LC	LC	LC	LC	2
	Aves	*Falco longipennis*	Australian hobby	LC	LC	LC	LC	2
	Aves	*Falco peregrinus*	Peregrine falcon	RA	RA	LC	LC	4
^	Mammalia	*Felis catus*	Domestic cat	DP	DP	LC	LC	-1
	Aves	*Fulica atra*	Eurasian coot	LC	LC	LC	LC	2
	Bivalvia	*Fulvia tenuicostata*	Common southern cockle	LC	LC	LC	LC	2
	Aves	*Gavicalis virescens*	Singing honeyeater	LC	LC	LC	LC	2
	Gastropoda	*Gazameda iredalei*	A marine snail	LC	LC	LC	LC	2
	Aves	*Gelochelidon nilotica*	Gull-billed tern	LC	LC	LC	LC	2
	Aves	*Glossopsitta concinna*	Musk lorikeet	LC	LC	LC	LC	2
	Aves	*Glossopsitta porphyrocephala*	Purple-crowned lorikeet	NT	LC	LC	LC	2
	Aves	*Grallina cyanoleuca*	Magpie-lark	LC	LC	LC	LC	2
	Aves	*Gymnorhina tibicen*	Australian magpie	LC	LC	LC	LC	2
	Aves	*Haematopus fuliginosus*	Sooty oystercatcher	NT	RA	LC	LC	3
	Aves	*Haematopus longirostris*	Australian pied oystercatcher	LC	RA	LC	LC	3
	Aves	*Haliaeetus leucogaster*	White-bellied sea-eagle	LC	LC	LC	LC	2

	Class	Scientific Name	Common Name	Conservation Status				UEV Species Score
				AMLR	State	National	International	
	Bivalvia	*Hiatula biradiata*	Double-rayed sunset clam	LC	LC	LC	LC	2
	Aves	*Hirundo neoxena*	Welcome swallow	LC	LC	LC	LC	2
	Aves	*Hydroprogne caspia*	Caspian tern	LC	LC	LC	LC	2
	Arachnida	*Lampona sp.*	White-tailed spider	LC	LC	LC	LC	2
	Aves	*Larus pacificus*	Pacifc gull	LC	LC	LC	LC	2
^	Bivalvia	*Magallana gigas*	Pacific oyster	LC	LC	LC	LC	1
	Aves	*Manorina melanocephala*	Noisy miner	LC	LC	LC	LC	2
	Reptilia	*Menetia greyii*	Dwarf skink	NT	LC	LC	LC	2
	Aves	*Microcarbo melanoleucos*	Little pied cormorant	LC	LC	LC	LC	2
	Aves	*Milvus migrans*	Black kite	LC	LC	LC	LC	2
	Aves	*Morus serrator*	Australasian gannet	LC	LC	LC	LC	2
	Aves	*Neophema petrophila*	Rock parrot	LC	RA	LC	LC	3
	Aves	*Numenius phaeopus*	Whimbrel	LC	RA	LC	LC	3
	Aves	*Nycticorax caledonicus*	Nankeen night-heron	VU	LC	LC	LC	4
	Aves	*Ocyphaps lophotes*	Crested pigeon	LC	LC	LC	LC	2
^	Aves	*Passer domesticus*	House sparrow	LC	LC	LC	LC	1
	Aves	*Pelecanus conspicillatus*	Australian pelican	RA	LC	LC	LC	3
	Aves	*Petrochelidon nigricans*	Tree martin	NT	LC	LC	LC	2
	Aves	*Phalacrocorax carbo*	Great cormorant	RA	LC	LC	LC	3
	Aves	*Phalacrocorax fuscescens*	Black-faced cormorant	LC	LC	LC	LC	2

	Class	Scientific Name	Common Name	Conservation Status				UEV Species Score
				AMLR	State	National	International	
	Aves	*Phalacrocorax sulcirostris*	Little black cormorant	LC	LC	LC	LC	2
	Aves	*Phalacrocorax varius*	Australian pied cormorant	LC	LC	LC	LC	2
	Aves	*Phylidonyris novaehollandiae*	New Holland honeyeater	LC	LC	LC	LC	2
^	Insecta	*Pieris rapae*	Cabbage white	LC	LC	LC	LC	1
^	Bivalvia	*Pinna bicolor*	Bicolor pen shell	LC	LC	LC	LC	1
	Aves	*Platycercus elegans*	Crimson rosella	LC	LC	LC	LC	2
	Aves	*Platycercus eximius*	Eastern rosella	LC	LC	LC	LC	2
	Insecta	*Podomyrma adelaidae*	Common ant	LC	LC	LC	LC	2
	Reptilia	*Pogona barbata*	Eastern bearded dragon	LC	LC	LC	LC	2
	Aves	*Poliocephalus poliocephalus*	Hoary-headed grebe	NT	LC	LC	LC	2
	Aves	*Ptilotula penicillata*	White-plumed honeyeater	LC	LC	LC	LC	2
	Insecta	*Radumeris tasmaniensis*	Yellow flower wasp	LC	LC	LC	LC	2
^	Mammalia	*Rattus sp.*	Black or brown rat	LC	DP	LC	LC	-1
	Aves	*Rhipidura leucophrys*	Willie wagtail	NT	LC	LC	LC	2
	Aves	*Sternula nereis*	Fairy tern	LC	VU	VU	LC	6
^	Aves	*Streptopelia chinensis*	Spotted dove	LC	LC	LC	LC	1
^	Aves	*Sturnus vulagris*	European starling	LC	DP	DP	LC	-3
	Aves	*Tachybaptus novaehollandiae*	Australasian grebe	LC	LC	LC	LC	2
	Aves	*Thalasseus bergii*	Crested tern	LC	LC	LC	LC	2
^	Gastropoda	*Theba pisana*	White garden snail	LC	LC	LC	LC	1

	Class	Scientific Name	Common Name	Conservation Status				UEV Species Score
				AMLR	State	National	International	
	Aves	*Thinornis cucullatus*	Hooded plover	EN	VU	VU	LC	9
	Aves	*Threskiornis molucca*	Australian white ibis	LC	LC	LC	LC	2
	Insecta	*Thyreus caeruleopunctatus*	Chequered cuckoo bee	LC	LC	LC	LC	2
	Reptilia	*Tiliqua rugosa*	Shingleback lizard	LC	LC	LC	LC	2
	Aves	*Trichoglossus moluccanus*	Rainbow lorikeet	LC	LC	LC	LC	2
^	Aves	*Turdus merula*	Common blackbird	LC	LC	LC	LC	1
	Aves	*Vanellus miles*	Masked lapwing	LC	LC	LC	LC	2
^	Mammalia	*Vulpes vulpes*	Red fox	DP	DP	DP	LC	-3
FLORA								
	Eudicot	*Acacia calamifolia*	Wallowa	LC	LC	LC	LC	2
	Eudicot	*Acacia cyclops*	Western coastal wattle	EW	LC	LC	LC	0
	Eudicot	*Acacia ligulata*	Umbrella bush	RA	LC	LC	LC	3
	Eudicot	*Acacia longifolia ssp. sophorae*	Coastal wattle	LC	LC	LC	LC	2
	Eudicot	*Acacia pycnantha*	Golden wattle	LC	LC	LC	LC	2
	Eudicot	*Acacia saligna*	Golden wreath wattle	EW	LC	LC	LC	0
	Eudicot	*Adriana quadripartita*	Coast bitter-bush	RA	LC	LC	LC	3
^	Eudicot	*Aeonium sp.*	Succulent garden escapee	EW	LC	LC	LC	-1
^	Eudicot	*Agonis flexuosa*	Willow myrtle	LC	LC	LC	LC	1
	Eudicot	*Allocasuarina verticillata*	Drooping sheoak	LC	LC	LC	LC	2
	Pinopsida	*Araucaria heterophylla*	Norfolk Island pine	LC	LC	LC	VU	5

	Class	Scientific Name	Common Name	Conservation Status				UEV Species Score
				AMLR	State	National	International	
^	Eudicot	*Arctotis stoechadifolia*	Arctotis	LC	LC	LC	LC	1
^	Eudicot	*Argyranthemum frutescens*	Marguerite daisy	LC	LC	LC	LC	1
^	Monocot	*Asparagus asparagoides*	Bridal creeper	EW	DW	DW	LC	-5
^	Eudicot	*Asterales sp.*	A flower	LC	LC	LC	LC	1
	Eudicot	*Atriplex cinerea*	Grey saltbush	LC	LC	LC	LC	2
	Eudicot	*Atriplex paludosa ssp. cordata*	Marsh saltbush	RA	LC	LC	LC	3
^	Eudicot	*Atropa belladonna*	Deadly nightshade	LC	LC	LC	LC	1
	Monocot	*Austrostipa flavescens*	Coast spear-grass	LC	LC	LC	LC	2
^	Monocot	*Avena barbata*	Bearded oat	LC	LC	LC	LC	1
^	Eudicot	*Brassica tournefortii*	Mediterranean turnip	LC	LC	LC	LC	1
^	Monocot	*Bromus diandrus*	Brome grass	LC	LC	LC	LC	1
^	Eudicot	*Cakile maritima*	European searocket	LC	LC	LC	LC	1
	Eudicot	*Callistemon sp.*	Bottlebrush	LC	LC	LC	LC	2
^	Eudicot	*Carpobrotus edulis*	Hottentot-fig	LC	LC	LC	LC	1
	Eudicot	*Carpobrotus rossii*	Native pigface	LC	LC	LC	LC	2
	Eudicot	*Casuarina glauca*	Swamp sheoak	EW	DP	LC	LC	-2
^	Monocot	*Cenchrus clandestinus*	Kikuyu	EW	LC	LC	LC	-1
^	Eudicot	*Centaurea calcitrapa*	Star thistle	LC	LC	LC	LC	1
^	Eudicot	*Chondrilla juncea*	Skeleton weed	LC	DW	LC	LC	-1
^	Eudicot	*Conyza bonariensis*	Flax-leaf fleabane	LC	LC	LC	LC	1

	Class	Scientific Name	Common Name	Conservation Status				UEV Species Score
				AMLR	State	National	International	
	Eudicot	*Crassula colligata*	Crassula	LC	LC	LC	LC	2
^	Monocot	*Cynodon dactylon*	Couch	LC	LC	LC	LC	1
	Monocot	*Dianella brevicaulis*	Coast flax-lily	NT	LC	LC	LC	2
	Monocot	*Dianella revoluta*	Black-anther flax-lily	LC	LC	LC	LC	2
^	Eudicot	*Dimorphotheca fruticosa*	Trailing African daisy	LC	LC	LC	LC	1
^	Eudicot	*Dimorphotheca pluvialis*	White African daisy	LC	LC	LC	LC	1
	Eudicot	*Disphyma crassifolium ssp. clavellatum*	Round-leaf pigface	LC	LC	LC	LC	2
	Eudicot	*Dodonaea viscosa ssp. spatulata*	Sticky hop-bush	LC	LC	LC	LC	2
^	Monocot	*Ehrharta longifolia*	Annual veldt grass	LC	LC	LC	LC	1
^	Monocot	*Elymus repens*	Common couch	LC	LC	LC	LC	1
	Eudicot	*Enchylaena tomentosa var. tomentosa*	Ruby saltbush	LC	LC	LC	LC	2
	Eudicot	*Eucalyptus camaldulensis*	River red gum	NT	LC	LC	NT	3
^	Eudicot	*Euphorbia paralias*	Sea spurge	LC	LC	LC	LC	1
^	Eudicot	*Euphorbia terracina*	False caper	LC	DW	LC	LC	-1
	Eudicot	*Ficinia nodosa*	Knobby club-rush	LC	LC	LC	LC	2
^	Angiosperm	*Galenia pubescens*	Coastal galenia	LC	LC	LC	LC	1
^	Eudicot	*Gazania sp.*	Gazania	EW	DW	LC	LC	-3
^	Monocot	*Hordeum marinum*	Sea barley-grass	LC	LC	LC	LC	1
^	Monocot	*Hyparrhenia hirta*	Cooltai grass	AW	DW	LC	LC	-2

	Class	Scientific Name	Common Name	Conservation Status				UEV Species Score
				AMLR	State	National	International	
	Eudicot	*Kunzea pomifera*	Muntries	RA	LC	LC	LC	3
^	Eudicot	*Lactuca serriola f. serriola*	Prickly lettuce	LC	LC	LC	LC	1
^	Monocot	*Lagurus ovatus*	Hare's tail grass	LC	LC	LC	LC	1
	Monocot	*Lepidosperma gladiatum*	Coast sword-sedge	NT	LC	LC	LC	2
^	Eudicot	*Leptospermum laevigatum*	Coast tea-tree	EW	DW	LC	LC	-3
	Eudicot	*Leucophyta brownii*	Cushion bush	NT	LC	LC	LC	2
^	Monocot	*Lolium sp.*	Ryegrass	LC	LC	LC	LC	1
^	Eudicot	*Lycium ferocissimum*	African boxthorn	AW	DW	DW	LC	-4
	Eudicot	*Maireana brevifolia*	Short-leaf bluebush	LC	LC	LC	LC	2
^	Eudicot	*Malva arborea*	Tree mallow	LC	LC	LC	LC	1
^	Eudicot	*Medicago polymorpha*	Burr-medic	LC	LC	LC	LC	1
^	Eudicot	*Medicago truncatula*	Barrel medic	LC	LC	LC	LC	1
	Eudicot	*Melaleuca halmaturorum*	KI paper-bark	EN	LC	LC	LC	5
	Eudicot	*Melaleuca lanceolata*	Dryland tea-tree	RA	LC	LC	LC	3
	Eudicot	*Melaleuca nesophila*	Showy honey-myrtle	LC	LC	LC	LC	2
^	Eudicot	*Melilotus indicus*	King Island melilot	LC	LC	LC	LC	1
^	Eudicot	*Mesembryanthemum crystallinum*	Common iceplant	LC	LC	LC	LC	1
	Eudicot	*Muehlenbeckia gunnii*	Coastal climbing lignum	LC	LC	LC	LC	2
	Eudicot	*Myoporum insulare*	Common boobialla	NT	LC	LC	LC	2
	Eudicot	*Nitraria billardierei*	Nire bush	RA	LC	LC	LC	3

	Class	Scientific Name	Common Name	Conservation Status				UEV Species Score
				AMLR	State	National	International	
^	Eudicot	*Oenothera stricta ssp. stricta*	Evening primrose	LC	LC	LC	LC	1
^	Eudicot	*Olea europaea*	European olive	EW	DW	LC	LC	-3
	Eudicot	*Olearia axillaris*	Coast daisy-bush	NT	LC	LC	LC	2
^	Eudicot	*Oxalis pes-caprae*	African wood-sorrel	AW	LC	LC	LC	0
	Eudicot	*Pelargonium australe*	Australian pelargonium	RA	LC	LC	LC	3
^	Monocot	*Phoenix canariensis*	Canary Island palm	LC	LC	LC	LC	1
^	Monocot	*Phoenix dacylifera*	Data palm	LC	LC	LC	LC	1
	Monocot	*Phragmites australis*	Common reed	LC	LC	LC	LC	2
	Eudicot	*Pimelea serpyllifolia ssp. serpyllifolia*	Thyme riceflower	NT	LC	LC	LC	2
	Pinopsida	*Pinales sp.*	A conifer	LC	LC	LC	LC	2
^	Eudicot	*Plantago coronopus*	Buck's-horn plantain	LC	LC	LC	LC	1
^	Eudicot	*Plantago lanceolata*	Buckhorn plantain	LC	LC	LC	LC	1
	Monocot	*Poa poiformis car. Poiformis*	Coast tussock-grass	LC	LC	LC	LC	2
^	Eudicot	*Reichardia tingitana*	False sow thistle	LC	LC	LC	LC	1
	Eudicot	*Rhagodia candolleana ssp. candolleana*	Sea-berry saltbush	LC	LC	LC	LC	2
^	Eudicot	*Rhamnus alaternus*	Italian buckthorn	EW	DP	LC	LC	-3
^	Eudicot	*Rumex sp.*	Dock	LC	LC	LC	LC	1
	Fucistia	*Scaberia sp.*	A marine algae	LC	LC	LC	LC	2
	Eudicot	*Scaevola crassifolia*	Cushion fanflower	VU	LC	LC	LC	4
^	Eudicot	*Schinus molle*	California peppertree	LC	LC	LC	LC	1

	Class	Scientific Name	Common Name	Conservation Status				UEV Species Score
				AMLR	State	National	International	
	Eudicot	*Senecio pinnatifolius var. pinnatifolius*	Variable groundsel	NT	LC	LC	LC	2
^	Eudicot	*Silybum marianum*	Milk thistle	LC	DW	LC	LC	-1
^	Eudicot	*Sinapis arvensis*	Wild mustard	LC	LC	LC	LC	1
^	Eudicot	*Sonchus oleraceus*	Common sowthistle	LC	LC	LC	LC	1
	Monocot	*Spinifex hirstus*	Satin-leaved spinifex	LC	LC	LC	LC	2
^	Monocot	*Stenotaphrum secundatum*	Buffalo grass	LC	LC	LC	LC	1
	Bryopsida	*Syntrichia sp.*	Moss	LC	LC	LC	LC	2
	Eudicot	*Tetragonia implexicoma*	Bower spinach	LC	LC	LC	LC	2
^	Monocot	*Thinopyrum junceiforme*	Sea wheat-grass	LC	LC	LC	LC	1
	Eudicot	*Threlkeldia diffusa*	Coast bonefruit	NT	LC	LC	LC	2
^	Monocot	*Trachyandra divaricata*	Dune onionweed	EW	DP	LC	LC	-3
^	Eudicot	*Tribulus terrestris*	Caltrop	EW	DW	LC	LC	-3
^	Eudicot	*Urtica sp.*	A nettle	LC	LC	LC	LC	1

Annex I. Multi-criteria Prioritisation Assessment

Actions were prioritised by applying a multi-criteria assessment. Each action was scored against the following eight criteria, each of which contained three categories allocated a score of 1-3 (Table 7). All criteria are relative to the Action Plan's lifetime of 5 years (2022 – 2027)

1. **Commencement timeframe:** refers to the timeframe in which the action should be started and highlights that not all actions need to be started at the same time. A higher score is allocated to more immediate commencement timeframe.
2. **Delivery timeframe:** refers to the expected time needed to complete the action once commenced. A higher score is allocated to a shorter completion time.
3. **Repeatability timeframe:** refers to how often, if at all, the action should be repeated. A higher score is allocated to actions that don't need to be repeated.
4. **Skills/capacity:** refers to whether the action can be undertaken "in-house" (e.g. by existing CoA staff or TFL) or if an external consultant/specialist will need to be contracted. A higher score is allocated for completion by "in-house" skills.
5. **Feasibility:** refers to how easily implemented the action is likely to be. Feasibility of an action includes the mechanics of implementation as well as the likely level of support from community. A higher score is allocated for easier implementation.
6. **Ecological benefit:** refers to the anticipated impact on the biodiversity and ecological value of the site. Impact on ecological value directly relates to the ecological value score (see Section 5). A higher score is allocated to a greater positive impact.
7. **Cost:** refers to the estimated financial resources required to complete the action. Where an action refers to undertake a survey of assets or investigating options, the cost does not include implementation of any outcomes/recommendations from the surveys or investigations. A higher score is allocated to lower cost requirements.
8. **Budget plan:** refers to whether the cost required to complete the action is available in existing budgets or if it is as yet, unaccounted for. A higher score is allocated to actions that are already included in existing budgets.

For each action, the sum of scores for the eight criteria produced the multi-criteria assessment score for the action. The highest possible score (and therefore the highest priority actions) is 21, which would be achieved if an action is considered to be:

- Once-off, able to commence immediately, completed within one year, business as usual, readily implemented with high support, contributing to achieving a UEV stretch target score, delivered for a cost less than $50,000, and already included in existing budget plans.

Comparatively, the lowest possible score (and therefore the lowest priority action) is 15, which would be achieved if an action is considered to be:

- Repeated each year or delivered in an ongoing manner, able to be delayed until 2025, completed over 3 years or more once commenced, requiring an external expert/specialist to implement, difficult/complex to implement, not contributing directly to improving the UEV score, delivered for a cost greater than $100,000, and currently unaccounted for in existing and future budget plans.

For the actions scored in this Plan, the highest score achieved was 21, and the lowest was 15. Therefore, action priorities are categorised as follows:

- low priority = score 15;
- medium priority = score 16-17;
- high priority = score 18-19; or
- very high priority = score 20-21

Table 7. Categories and scores allocated for each of six criteria.

Score	Timeframes		Repeatability	Skills / Capacity Need	Feasibility	Ecological benefit	Budget	Budget Plan
	Commencement	Delivery						
1	Immediately - by the end of 2023.	> 3 years	Annually repeated or ongoing	Require external expert / specialist to undertake action.	Action is difficult to achieve either due to implementation complexity and/or lack of support from community.	Business as usual – the action has does not improve the UEV score.	>$100,000	Cost to implement action is not included in current or future budget bids.
2	Soon – by the end of 2024	2-3 years	Repeat year 3	Capacity provided by Council staff or TFL members with appropriate training/up-skilling.	Action is implemented with some challenges, related to either practical implementation or level of support.	Contributes to achieving the UEV target score.	$50,000 - $100,000	Cost to implement action is partially included in existing budgets or earmarked for future budget bid.
3	Later – by the end of 2025	Up to 1 year	Once-off	Business as usual (skills provided by existing Council staff or TFL members).	Action is readily implemented, with wide support from community.	Contributes to achieving a UEV stretch target score.	< $50,000	Cost to implement action is entirely included in existing budgets.