

city of
Victor Harbor



BIODIVERSITY AND NATURAL ASSETS MANAGEMENT PLAN

2023 TO 2028



ACKNOWLEDGEMENT OF COUNTRY

The City of Victor Harbor acknowledges the Ramindjeri and Ngarrindjeri people, the Traditional Custodians of the land and surrounding waters where we live and work. We acknowledge their deep connection to country and pay our respects to Elders past, present and emerging. This respect is extended to Aboriginal and Torres Strait Islander people across Australia.

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The City of Victor Harbor adopted the Biodiversity and Natural Assets Plan on [DATE]



Cover photo: Bassian Thrush by Darcy Whittaker

MESSAGE FROM THE CEO AND MAYOR



People are drawn to Victor Harbor from across Australia to experience our stunning natural assets. Some will return to our coastal city from time to time as a place to reconnect and retreat, while others are fortunate enough to call the City of Victor Harbor and our spectacular landscape home.

Recognising the importance of our environment, the Council has been protecting and conserving our magnificent surroundings for some time.

In fact, a large number of local and regional strategies and plans point towards the importance of nurturing our fauna and flora. Many of our staff and volunteers are actively involved in enhancing our natural environment on a day-to-day basis.

Our Environmental Management Plan is the guiding document that sets Council's environmental responsibilities and encourages a 'whole of Council' approach for environmental action.

The Biodiversity and Natural Assets Management Plan builds upon the directions outlined in the Environmental Management Plan, with a key focus on prioritising rehabilitation, revegetation and management of unique areas and species. It also explores how we can connect with Ramindjeri and Ngarrindjeri people to enhance our environment in a culturally sensitive way.

The Plan has been developed with the support and contributions of City of Victor Harbor staff, Council Members, volunteers, our community and a wide range of environmental groups and organisations.

It is also backed by significant research into the condition and value of our ecological sites and communities.

We look forward to implementing this Plan and protecting many of the things that make Victor Harbor so extraordinary – from our ocean and dunes to our rivers and hills.

With the impacts of climate change continuing to threaten our bionetwork, there is no better time to be bold, innovative and proactive in our approach to environmental management. Victor Harbor is an incredibly special place. We must protect it.

Victoria MacKirdy

City of Victor Harbor Chief Executive Officer

Dr Moira Jenkins

City of Victor Harbor Mayor

CONSULTATION

In early 2023, key stakeholders were consulted to assist with the development of the Biodiversity and Natural Assets Management Plan. Information and input was gathered from industry and subject matter experts, including Landscapes Hills and Fleurieu, Green Adelaide, Department for Environment and Water, Ngarrindjeri Aboriginal Corporation, Butterfly Conservation SA, Birdlife Australia, Nature Conservation Society SA and key City of Victor Harbor staff.

Local environmental community groups also contributed to a workshop facilitated by the Council, which focused on questions such as:

- what aspects we think are special in our local natural environment,
- what are, and will be, the challenges to looking after these special natural assets,
- if we think there are certain plant or animal species, or ecological communities, that need particular management, and
- what you think we can realistically do to protect and improve our natural assets.

During the workshop, the aspects of our local natural environment that were discussed as most special or important were:

- Remnant vegetation,
- Natural coastlines and islands,
- Rivers and estuaries,
- Threatened species, and
- Clean water and air.

The biggest challenges were thought to be:

- Funding/resourcing,
- Habitat loss/development,
- Lack of education/awareness/engagement of community,
- Pest plant and animal control, and
- Climate change

The most important things that Council could realistically do in the management of biodiversity and natural assets were:

- Weed control,
- Community native plant nursery,
- Increased resourcing/funding,
- Pest animal control/dog and cat management,
- Restoration/revegetation,
- Monitoring and adaptive management for best practice, and
- Linkages/corridors for wildlife.

While some themes that emerged during the workshop were out of scope, many of the topics discussed were used to inform the development of the Biodiversity and Natural Assets Management Plan.

Broader community consultation was then undertaken on a draft Biodiversity and Natural Assets Management Plan in May/ June 2023. Community consultation showed overwhelming agreement that protecting and restoring Victor Harbor's natural elements should be a priority of Council.

Some of the common themes to emerge through the consultation include:

- Appreciation for Council in developing this strategic document
- The need for a specific endemic plant list, and the use of endemic plants in Council projects
- Support for creating a community biodiversity nursery
- The importance of biodiversity in our region and desire for Victor Harbor to be a leader in conservation initiatives.

EXECUTIVE SUMMARY

ACKNOWLEDGEMENTS

The City of Victor Harbor would like to extend sincere appreciation to everyone who contributed to the development of this Plan including community groups, individuals, government and non-government agencies, industry professionals and Council staff.

Special thanks to the Native Vegetation Council (NVC) for allowing the use of the Bushland Assessment methodology. It is acknowledged that this method was developed over many years and their approval for Council to utilise the assessment method for quantifying biodiversity values is greatly appreciated. Local ecologist, Ron Taylor, has provided data on plants in reserves and roadsides over many years. We would like to acknowledge his time compiling plant lists.

INTRODUCTION

The City of Victor Harbor is situated in the Mt Lofty Ranges (MLR), one of 15 biodiversity hotspots in Australia. It sits within the Hills and Fleurieu Landscape region, which encompasses approximately half of South Australia's native plant species and three quarters of its native bird species. The City of Victor Harbor region is home to a wide range of ecological communities including coastal dunes and headlands, river systems, woodlands, grasslands, and Fleurieu Peninsula Swamps. The natural beauty and biodiversity of the area is highly valued by the community and attracts global visitors.

According to the International Union for Conservation of Nature (IUCN) the definition of biodiversity is the variability among living organisms from all sources including terrestrial, marine and other aquatic ecosystems and the ecological complexes of

which they are a part; this includes diversity within species, between species and of ecosystems.

Although the region is home to a considerable diversity of habitats, native plants and animals, there have been significant losses to biodiversity over the last two centuries. Our natural assets face increasing threats from climate change, pests, disease, pollutants, illegal land clearance and wildfire. The number of species and ecological communities listed as threatened continues to rise. Without investment in conservation management, we will see further species extinctions and biodiversity loss. As biodiversity declines, natural ecosystems become less resilient and less able to recover from events such as wildfire, storms and flooding, all of which are projected to increase with climate change.

Natural assets provide our region with immeasurable benefits and include the biodiversity within these sites, and the non-living attributes such as geology, soils and hydrology.

The City of Victor Harbor is responsible for the management of a large number of reserves and roadsides, many of which contain native flora and fauna. This plan focuses on the management of vegetation and habitats within Council owned and managed land, though it is acknowledged that these actions can have broader implications, such as improving water quality or habitat for fauna in the region.

Council is committed to protecting and enhancing its biodiversity and natural assets for the community and future generations, and this Plan will guide Council's management actions over the next five years.



Local environmental volunteers at work

STRATEGIC CONTEXT

The development of a Biodiversity and Natural Assets Management Plan aligns with several Council and regional aspirations and plans.

COMMUNITY PLAN 2030

Aspiration 4 - We protect our environment:

- **Strategy** - Adapt to the impacts of climate change
- **Strategy** - Enhance the health and biodiversity of our natural environment
- **Strategy** - Educate the community to enhance awareness of environmental issues
- **Priority** - Plant more trees to green City of Victor Harbor urban areas
- **Priority** - Implement actions from the Victor Harbor Environmental Management Plan
- **Priority** - Implement conservation strategies that look to increase the population and species of native fauna
- **Priority** - Protect and rehabilitate our beaches, waterways and conservation reserves
- Undertake environmental education projects in partnership with the Hills and Fleurieu Regional Landscape Board, Fleurieu Regional Waste Authority, South Australian Whale Centre and other environmental groups.

ENVIRONMENTAL MANAGEMENT PLAN 2019 - 2024

Action 3.1.1 undertake field reviews to categorise the conservation significance of Council reserves. Determine priorities for rehabilitation, revegetation and bushfire management with the development of a Biodiversity and Natural Assets Plan.

URBAN GROWTH MANAGEMENT STRATEGY 2013 - 2030

Strategies: Environment

- Protect ecological values and biodiversity
- Identify and protect heritage, landscape and townscape values
- Protect and enhance the coastal environment and marine parks
- Plan for appropriately designed and located, mixed density housing which caters to the needs of the community

- Adapt to impacts of climate change
- Encourage development controls which reflect principles of Ecologically Sustainable Development.

OTHER PLANS

- Sports, Recreation and Open Spaces Strategy 2023 – 2028 (in progress)
- The Bluff Master Plan
- Coastal Adaptation Study and Strategy 2021
- Tree Management Strategy 2019
- Dog and Cat Management Plan 2019 – 2024
- Southern Fleurieu Vegetation Management Plan 2011

REGIONAL PLANS

- Hills and Fleurieu Landscape Plan 2021 – 2026
- Climate Adaptation Plan for the Adelaide Hills, Fleurieu Peninsula and Kangaroo Island Region
- Southern Fleurieu Coastal Action Plan
- Five Southern Fleurieu Islands Biodiversity Action Plan
- Action Plan for Mount Compass Oak bush (*Allocasuarina robusta*)
- Action Plan for Mount Compass Swamp Gum (*Eucalyptus paludicola*)
- Recovery Plan for Twelve Threatened Orchids in the Lofty Block of South Australia

LEGISLATION

- Aboriginal Heritage Act 1988
- Development Act 1993
- Environmental Protection and Biodiversity Conservation Act 1999
- Heritage Act 1993
- Landscapes SA Act 2019
- Local Government Act 1999
- National Parks and Wildlife Act 1972
- Native Title Act 1994
- Native Vegetation Act 1991



“The natural world is not separate from the human world – it is the source of our food, water, air and raw materials. Our culture and wellbeing are interwoven with the places where we live and walk. Ongoing environmental decline also has negative economic impacts on industries, businesses, regions and individuals. In a rapidly changing climate, with declining biodiversity, the general outlook for our environment is deteriorating. The impacts of this will affect us all.”

Creswell, Janke and Johnston (2021) Australia State of the Environment 2021



ENVIRONMENTAL VOLUNTEERING

Victor Harbor has an increasing interest from the community in volunteering in the natural environment.

The City of Victor Harbor has been lucky enough to partner with long-standing community groups such as Victor Harbor Coastcare, Victor Harbor and Encounter Bay Rotary Clubs, Friends of the Hooded Plover, the Inman River Catchment and Landcare Group, Bush for Life and, more recently, groups like the Friends of Hindmarsh River Estuary, Friends of Inman Valley Cemetery Scrub and Friends of Inman River.

These groups provide a welcoming environment for community members. Participants report a great sense of achievement and wellbeing by being part of conservation activities. The work that these groups do is an asset to the community and achieves positive environmental outcomes that would not otherwise be achieved.

We extend our sincere thanks to all those who have been involved over the years.



WHAT ARE BIODIVERSITY AND NATURAL ASSETS?

Biodiversity and natural assets make up the complex web of biological, chemical and physical processes which provide us with ecosystem services and goods, and support life on earth. Biodiversity describes the diversity of biological organisms, from micro-organisms and fungi to plants and fauna, their genes, and the ecological communities they live in.

Natural assets also incorporate non-biological features, such as soils, geology, air and hydrology. This plan focuses on managing biological features, actions for the protection and enhancement of biodiversity must also consider the effects from, and on, natural assets.

In the context of this report, biodiversity and natural assets describe the biological resources situated within City of Victor Harbor owned and managed land, including the living organisms and ecosystems encompassed within.

WHY ARE BIODIVERSITY AND NATURAL ASSETS IMPORTANT?

Nature provides us with significant social, economic and recreational benefits. Natural assets can offer protection from flooding and climate extremes, coastal hazards and other processes which threaten built assets.

Ecological services support our basic needs as a global community, providing cleaner water for us to drink, filtering the air that we breathe, pollinating the crops that we eat and improving the soil that our food grows in and on.

In the face of climate change, biodiversity assets sequester carbon and help to regulate the climate. Organic waste decomposition and soil stabilisation are among other reasons why biodiversity is important to our community and the broader region.

The connection between nature and better mental and physical health is well documented. Nature can help to connect people. Victor Harbor's natural environment provides the community and visitors with areas to use and enjoy and recreate within, and opportunities for local businesses and communities to benefit from.

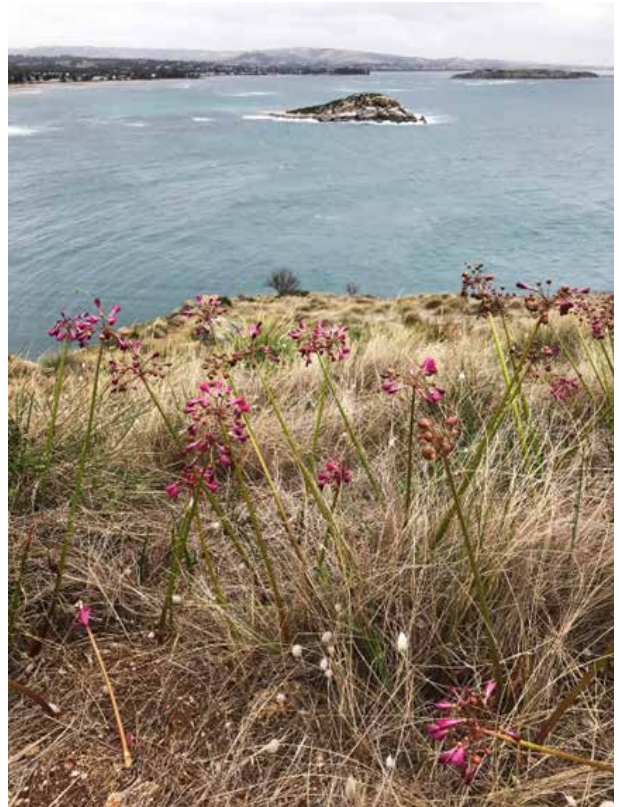
WHY DO WE NEED A PLAN?

Australia encompasses many unique flora and fauna species. Unfortunately, in just over two centuries, Australia has lost more mammal species than any other continent in the world. The Australia State of the Environment report (Creswell, Janke and Johnston 2021) acknowledges that biodiversity continues to decline, both globally and locally.

By working alongside stakeholders in the local community, and the wider region, local governments are well placed to play a key role in protecting and restoring natural ecosystems in their area. With limited resources, actions must be prioritised and strategically planned to gain the greatest outcomes.

A healthy biological ecosystem is more resilient to environmental pressures, and more able to recover from catastrophic events, such as wildfire or flooding. The more complex and biodiverse an ecosystem, the more able it is to tolerate disruption. It is therefore important to maintain and restore diversity within our ecosystems, wherever possible.

The City of Victor Harbor owns and manages many reserves and roadsides which contain natural assets. The Biodiversity and Natural Assets Management Plan (the Plan) provides Council with a snapshot in time to track changes, measure investment, identify site-specific threats, and provide logical planning to guide and prioritise on-ground works. These actions aim to **protect, restore and connect** biodiversity and natural values, and engage with, **educate, inspire and learn** from the community. These aims are interconnected with learnings and restoration building on each other.



BIODIVERSITY SURVEYS

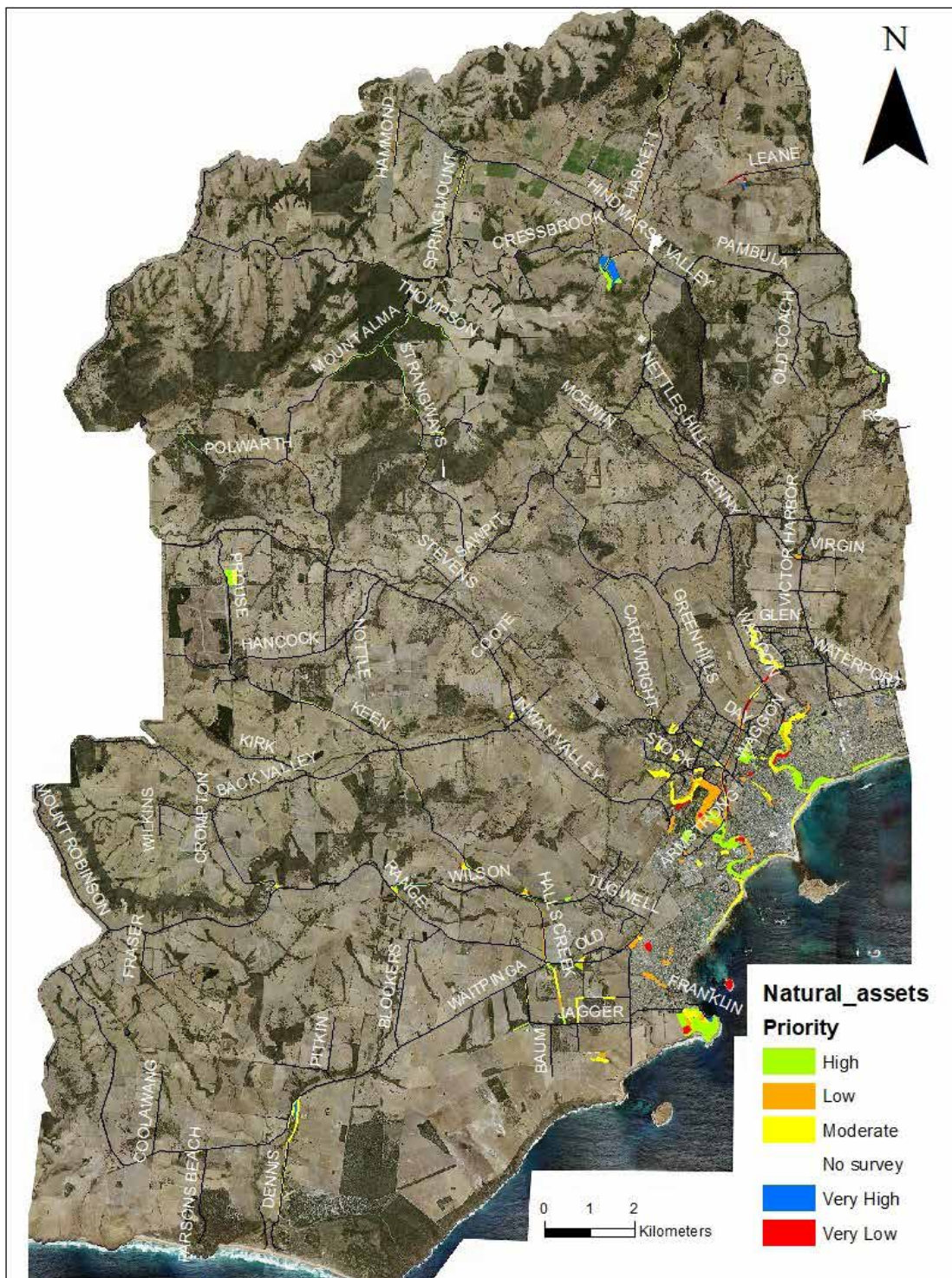
To enable the development of this plan, the City of Victor Harbor firstly needed to identify biodiversity assets, threats/pressures and missing components within local areas. Field surveys were undertaken between 2020 and 2023 within City of Victor Harbor reserves and roadsides to gain a snapshot of Council's biodiversity and natural asset values. From this baseline data, changes can be tracked over time. This will allow a better understanding of the impact of management in natural areas and demonstrate the value of investment in these areas.

SURVEY SCOPE

Surveys included areas that have a Native Vegetation Council (NVC) Significant Environmental Benefit/Set Aside (SEB) agreement, roadsides that are included in Council's Roadside Vegetation Marker (RVM) scheme and some unmade road reserves that were previously identified in surveys during 2010. Some reserves are primarily native vegetation, while others also contained recreational values. The City of Victor Harbor manages other reserves and roadsides that may contain biodiversity values but are not within the scope of these surveys.

More than 250 assessments were undertaken across 70 reserves and 66 Roadside Vegetation Marker (RVM) sites. Some reserves contained different vegetation communities (dominant plant species and life forms). For the purposes of the assessments, each vegetation community was determined to be a 'site' and an assessment was carried out for each 'site' within a reserve. Some reserves or roadsides had more than one survey 'site' because of the diversity of ecosystems within that reserve, while others had only one.





Map of City of Victor Harbor reserves and roadsides surveyed between 2020-2023



Tugwell Water Reserve 664 – this reserve encompassed three distinct vegetation communities; TWR01 Pink Gum/Blue Gum woodland with Grass Trees underneath and a degraded ground layer, TWR02 Tall Silky Tea-tree and Common Reed (probably once a Fleurieu Peninsula Swamp) and TWR03 Pink Gum/Blue Gum woodland with a tall Wattle and Sweet Bursaria shrubland and a wide diversity of ground layer plants.

BIODIVERSITY SURVEYS

METHOD

All sites included in this report have been assessed using the Bushland Assessment method (2020) developed by the Native Vegetation Council (NVC).

This provides a rapid survey method that calculates a relative score for attributes such as:

- landscape context (the value within the broader surrounding landscape),
- size of the site (area as hectares),
- plant species and life form diversity (how many different plant species and types of plants, eg: grasses, sedges, groundcovers, shrubs, trees, ferns, grass-trees, etc),
- presence of threatened plant species (listed as threatened under the EPBC or NPW Acts),
- presence of a threatened ecological community (listed as threatened under the EPBC Act or Provisional List of Threatened Ecosystems of SA),
- threatened fauna recorded within a 5 km radius since 1995 (unless presence is highly unlikely),
- regeneration (how many plant species are recruiting naturally),
- tree health (amount of dieback), and
- number and threat of weed species (how many and how much of exotic species).

Calculations of these attributes provided a 'Unit Biodiversity Score' (UBS) and a 'Total Biodiversity Score' (TBS) for each site and indicated how each attribute contributed to the UBS. These relative scores (UBS and TBS) have been used to develop priorities for conservation management and provide a baseline score for future comparisons.

The surveys recorded habitat values, and identified over 300 weed species and over 500 native plant species within the sites, including twelve nationally threatened plant species (listed under the EPBC Act), 170 species listed as threatened under the NPW Act and many more regionally significant plant species.

Fauna data was collected from desktop analyses using NatureMaps (DEW 2023) and incorporated into the UBS and TBS. More than 20 nationally threatened fauna species were identified for the City of Victor Harbor region through desktop analyses, as well as over 70 state-listed fauna species.



Eucalyptus paludicola, the Mt Compass Marsh Gum, listed as endangered under the EPBC Act and NPW Act.

BIODIVERSITY SURVEYS

SIGNIFICANT ECOLOGICAL COMMUNITIES

Two nationally threatened ecological communities were identified within City of Victor Harbor reserves (Fleurieu Peninsula Swamps and Temperate Coastal Saltmarsh). One site contained a relatively intact Fleurieu Peninsula Swamp, a threatened ecological habitat listed as 'Critically Endangered' under the EPBC Act. Two sites on Tugwell Road, Victor Harbor would likely have historically encompassed Fleurieu Peninsula Swamp, but the degradation of these sites has resulted in deterioration of biodiversity values and a reduction in key plant species, and therefore need restoration to be regarded as such.

Temperate Coastal Saltmarsh, listed as Vulnerable under the EPBC Act, was recorded in a very small area within the Hindmarsh River Estuary.

Two vegetation communities that are listed in the Provisional List of Threatened Ecosystems of SA (*Eucalyptus fasciculosa* +/- *E. leucoxyton* Heathy Woodland on sandy loams of flats and slopes and *E. ovata* +/- *E. viminalis* ssp. *cygnetensis* Woodland in valleys and drainage lines) were identified in some reserves and roadsides.



Fleurieu Peninsula Swamp with dense shrubs and sedges.



A small area of Temperate Coastal Saltmarsh around the lagoon at Hindmarsh River Estuary.

REGISTER OF THE NATIONAL ESTATE (CLASS: NATURAL)

Although the Register of the National Estate was closed in 2007 and is no longer a statutory list, the following archival information provides a relevant indication of importance for several natural areas.

Other reserves and roadsides fell within (Natural) National Estate registered areas, such as:

- Encounter Bay Region
- Inman Hill/Strangways Hill/Ducknest Creek area
- Mt Billy area
- Newland Head area
- Spring Gully/Gum Tree Gully area.

RESERVE	STATEMENT OF SIGNIFICANCE
[Granite Island,] Wright Island [and Seal Island]	Granite, Wright and Seal Islands in Encounter Bay are scenically spectacular, provide sanctuary for wildlife and form a protective barrier against the Southern Ocean swell.
Hindmarsh River Estuary	The area is a useful island-refuge and corridor for birds. The Estuary with its associated estuarine vegetation is uncommon in SA. The strip of near natural vegetation in a built up area is significant, including valuable swamp paperbark woodland and Temperate Coastal Saltmarsh.
Inman River Estuary	The area supports remnant vegetation once widespread along estuaries in the region. Few estuaries in South Australia still support natural vegetation. It is one of two remaining localities of swamp paperbark communities on the Fleurieu Peninsula; swamp paperbark communities are considered rare in South Australia. The area is an important habitat for wading and other bird species and is an important corridor for bird movement from the coast to wooded inland areas. Bird species known from the Estuary, which are uncommon, rare or vulnerable in South Australia, include the royal spoonbill, hooded plover, yellow thornbill and black-chinned honeyeater. The Estuary, with its near natural vegetation and location within a built-up urban area, is also of high aesthetic significance.
Rosetta Head (The Bluff)	Particularly significant geological sites. An exposure of the contact between the intrusive granite and Kanmantoo group metasedimentary rocks occurs at Rosetta Head. Two amphibolite dykes intrude into the porphyritic granite on the seaward side of Rosetta Head. Important geological features including occurrences of metamorphic minerals, preserved sedimentary structures, contact metamorphic aureole, deformation evidence. From the summit of Rosetta Head, spectacular views of Encounter Bay and part of south coast.

Table data sourced from National Estate Register

BIODIVERSITY SURVEYS

RESERVES AND UNMADE ROAD RESERVES

High-scoring (and therefore high priority) reserves include Leane Road unmade road reserve (containing Fleurieu Peninsula Swamp), Hindmarsh Falls Reserve, Bluff Reserve, Dennis Road Reserve, Wilson Hill Memorial Reserve, Day Road Reserve, McNamara Reserve, Greenhills Reserve, Depledge to Range Roads Heysen Trail, Inman Valley Cemetery, and the Hindmarsh and Inman River Estuaries (Appendix 1).

Most sites are in the range of a 30 – 70 UBS, with an average of approximately 47, which is considered moderate condition. A score of less than 40 is considered low or very low condition and these areas are a low priority for restoration, unless they contain other significant natural assets such as threatened species or are part of a greater natural area.

Some ‘clusters’ of reserves were identified, where they exist as corridors or adjacent to each other to form larger natural areas. The total biodiversity scores (TBS) were added together to analyse the value of these reserve ‘clusters’ (Appendix 3). Both the Hindmarsh and Inman Rivers form significant biodiversity corridors, with the river estuaries linking to coastal reserves. Each river and coastal reserve ‘cluster’ returned substantial TBS.

This demonstrates the importance of these larger natural areas and suggests the potential environmental benefits for reserves such as Morgan Reserve and Pages Reserve to be restored. It also points to the benefits of linking reserves such as Morgan Reserve and Scott McKenzie Reserve, or Pages Reserve and Summerlea Reserve.

These outcomes could be delivered by partnering with private landholders through Landscapes Hills and Fleurieu or through future development.

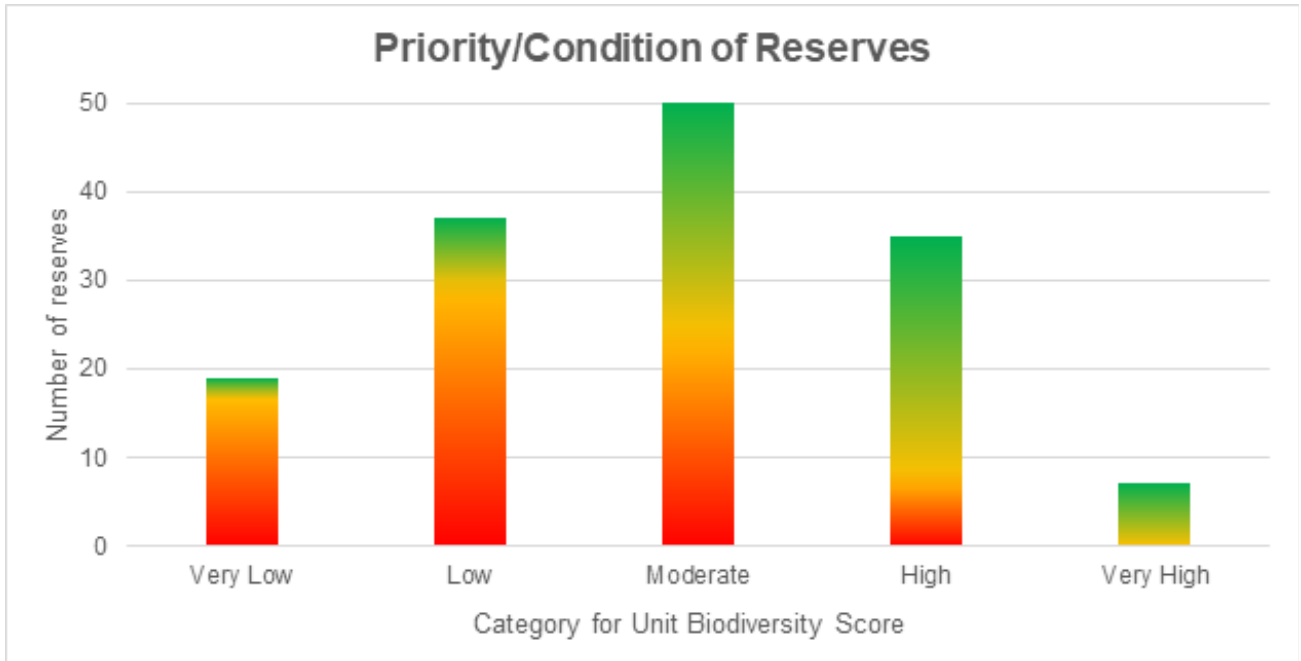
Other discrete reserves such as The Bluff Reserve, Hindmarsh Falls Reserves, Day Road Reserve and Inman Valley Cemetery also showed large total biodiversity scores (>400) when all ‘sites’ within the reserves were tallied. Dennis Road Reserve, Bacchus Reserve and Stone Reserve Tugwell returned a TBS of over 200 (Appendix 1), though most reserves or reserve clusters had a TBS of less than 100.



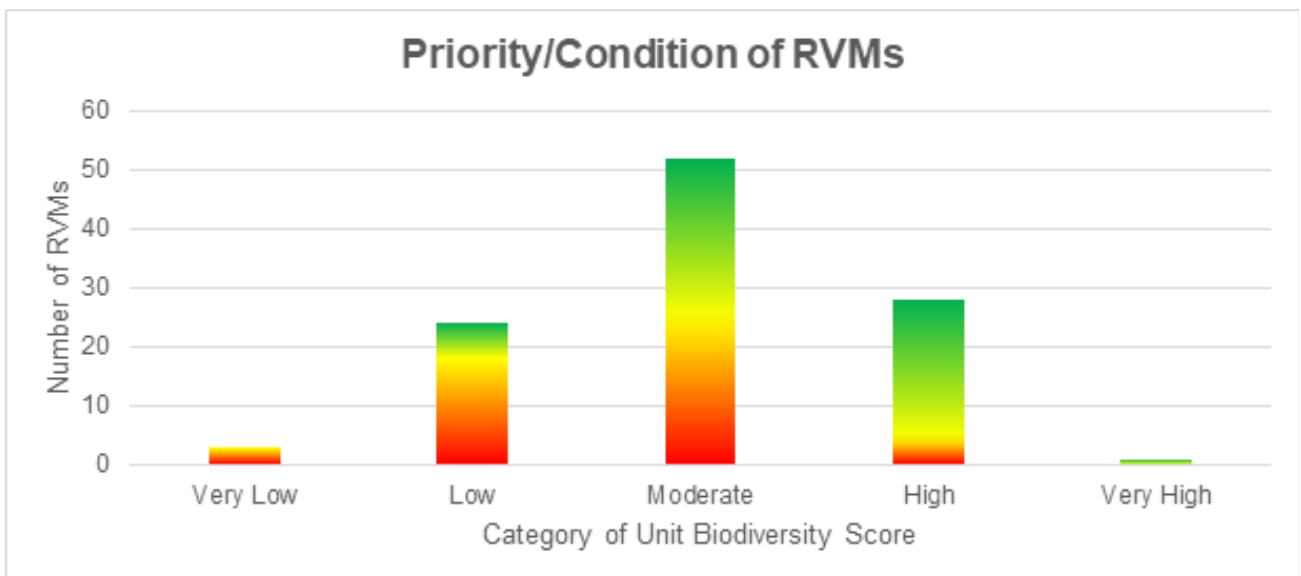
A ‘good’ site (high priority): Site HIF01 at Hindmarsh Falls - USB: 90.97 and TBS: 514.10 – this site encompasses mostly native vegetation and has a diversity of trees, shrubs, groundcovers, grasses and herbaceous plants with very few weeds.



A degraded site (low priority): Site SEC03 at Section 696 – USB: 16.03 and TBS: 22.97 – this site is dominated by exotic grasses, with some sedges and a few remnant Eucalyptus trees.



Number of reserves in each condition category, based on the unit biodiversity scores from 2020 – 2023 assessments. Very Low = <20, Low = 20 – 40, Moderate = 40 – 60, High = 60 – 80, Very High = >80.



Number of RVMs in each category, based on the unit biodiversity scores from 2020 – 2023 assessments. Very Low = <20, Low = 20 – 40, Moderate = 40 – 60, High = 60 – 80, Very High = >80.

BIODIVERSITY SURVEYS

ROADSIDE VEGETATION MARKER SITES

The City of Victor Harbor contains approximately 265km of road networks, with a mix of sealed and unsealed roads. The region is fortunate to retain a considerable amount of native vegetation on the roadsides, providing corridors for wildlife and preserving remnant vegetation and threatened plant species.

Council manages roadsides with high biodiversity values under its Roadside Vegetation Marker (RVM) scheme. While RVMs cover many patches of good quality vegetation and threatened plant species on roadsides, it does not cover all remnant vegetation. Conversely, some roadsides under the scheme are of low quality. These poor condition RVMs may have deteriorated since inclusion in the scheme, may have lacked significant values in the first place, or they may contain threatened species. Mount Compass Oak-bush (*Allocasuarina robusta*), listed as endangered under that EPBC Act, is present in several such sites but should remain in the RVM scheme to ensure protection from threats such as roadside maintenance and weed spraying. Other sites such as Fuller Road East may have potential for revegetation with vulnerable plants such as the Butterfly Spyridium (*Spyridium coactilifolium*) and other suitable threatened species. Assessments will allow the Council to determine if there is a need to remove low quality sites from the RVM scheme.

Over the 66 RVMs currently included in the City of Victor Harbor scheme, 108 assessments were undertaken. Similar to the UBS scores for City of Victor Harbor reserves, RVMs were predominantly in the 'Moderate' category. RVM120 and RVM121 had previously been removed from the scheme.

While the only assessment categorised as 'Very High' was on Leane Road (containing Fleurieu Peninsula Swamp vegetation) two other assessments on this same road were of 'Very Low' condition (Appendix 2).

RVM sites that are a high priority for protection and restoration (based on UBS) included Leane Road (containing Fleurieu Peninsula Swamp ecological community), Polwarth Drive, Strangways Road, Mt Alma Road, Thompson Road, Braeburn Road, Hindmarsh Falls Road, Prouse Road, Tugwell Road, Wilson Hill Road and Crompton Road. The highest priority RVMs are those that had very few weeds and would require little work to maintain or improve their biodiversity values (RVM131 and 132, RVM111, RVM154 and 155 and RVM116 and 117 adjacent to native vegetation).

Department for Infrastructure and Transport RVMs were not assessed but those that fall within the jurisdiction of City of Victor Harbor should be surveyed over the next five years to ascertain their biodiversity values. Several are known sites of threatened plant species such as *Allocasuarina robusta*.



The Butterfly Spyridium (*Spyridium coactilifolium*) is listed as vulnerable under the EPBC Act and NPW Act. A few Council reserves contain significant populations of this species, though in some reserves they have disappeared.



Roadside Vegetation Marker site with identifying sign

BIODIVERSITY SURVEYS

FLORA

Seven nationally listed threatened plant species and an additional 31 species listed as threatened under the NPW Act were identified during the 2020 – 2023 surveys (Table 1). Approximately half of the plant species recorded had regional conservation significance (Gillam and Urban 2014), many of which were only represented in one or two reserves or roadsides.

The Bluff Reserve, Hindmarsh Falls Reserve and Leane Road unmade reserve recorded many species not noted in any other City of Victor Harbor reserve or roadside, indicating their important biodiversity values. Other reserves containing plants not recorded elsewhere during the surveys included Hindmarsh River Reserve and Hindmarsh River Estuary, Day Road Reserve, McNamara Reserve, Greenhills Reserve and Inman Valley Cemetery.



Correa alba var. *pannosa* at The Bluff Reserve



Correa calycina var. *calycina* from Hindmarsh Falls Reserve

Scientific Name	Common Name	EPBC	NPW	AMLR	# of Reserves	# of RVMs
<i>Pterostylis bryophila</i>	Hindmarsh Greenhood	CR	E	EN	1	0
<i>Allocasuarina robusta</i>	Mount Compass Oak-bush	EN	E	VU	1	17
<i>Eucalyptus paludicola</i>	Mount Compass Marsh Gum	EN	E	VU	0	5
<i>Olearia pannosa</i> ssp. <i>pannosa</i>	Silver Daisy-bush	VU	V	EN	3	2
<i>Correa calycina</i> var. <i>calycina</i>	Hindmarsh Correa	VU	V	VU	1	1
<i>Spyridium coactilifolium</i>	Butterfly Spyridium	VU	V	VU	6	5
<i>Glycine latrobeana</i>	Clover Glycine	VU	V	RA	1	2
<i>Scaevola calendulaea</i>	Dune Fanflower		V	CR	6	0
<i>Veronica gracilis</i>	Slender Speedwell		V	EN	1	0
<i>Caladenia valida</i>	Robust Spider-orchid		E	EN	1	0
<i>Atriplex australasicum</i>	Native Orache		R	EN	2	0
<i>Gastrodia sesamoides</i>	Potato Orchid		R	EN	1	0
<i>Pteris tremula</i>	Tender Brake		R	EN	1	0
<i>Rumex dumosus</i>	Wiry Dock		R	EN	1	0
<i>Amphibromus macrorhinus</i>	Long-nosed Swamp Wallaby-grass		R	VU	1	0
<i>Baumea gunnii</i>	Slender Twig-rush		R	VU	1	0
<i>Cardamine paucijuga</i>	Annual Bittercress		R	VU	1	0
<i>Correa aemula</i>	Hairy Correa		R	VU	1	2
<i>Correa alba</i> ssp. <i>pannosa</i>	White Correa		R	VU	1	0
<i>Dianella longifolia</i> var. <i>grandis</i>	Pale Flax-lily		R	VU	3	0
<i>Drosera binata</i>	Forked Sundew		R	VU	1	0
<i>Eucalyptus phenax</i> ssp. <i>compressa</i>	Kangaroo Island Mallee		R	VU	0	2
<i>Gonocarpus micranthus</i> ssp. <i>micranthus</i>	Creeping Raspwort		R	VU	1	0
<i>Hypericum japonicum</i>	Matted St John's Wort		R	VU	1	0
<i>Hypolepis rugusola</i>	Ruddy Ground-fern		R	VU	1	1
<i>Myriophyllum amphibium</i>	Broad Milfoil		R	VU	1	0
<i>Scutellaria humilis</i>	Dwarf Skullcap		R	VU	1	4
<i>Viminaria juncea</i>	Native Broom		R	VU	1	0
<i>Acacia dodonaeifolia</i>	Hop-bush Wattle		R	RA	27	5
<i>Amphibromus archeri</i>	Pointed Swamp Wallaby-grass		R	RA	?	0
<i>Cladium procerum</i>	Leafy Twig-rush		R	RA	1	0
<i>Gleichenia microphylla</i>	Coral Fern		R	RA	0	2
<i>Melaleuca squamea</i>	Swamp Honey-myrtle		R	RA	1	0
<i>Prostanthera chlorantha</i>	Green Mintbush		R	RA	2	0
<i>Pseudanthus micranthus</i>	Fringed Pseudanthus		R	RA	0	0
<i>Xanthorrhoea semiplana</i> ssp. <i>tateana</i>	Tate's Grass-tree		R	RA	4	22
<i>Xanthosia tasmanica</i>	Southern Xanthosia		R	RA	0	3
<i>Eucalyptus fasciculosa</i>	Pink Gum		R	NT	35	54

Table 1: List of threatened (AMLR) plant species in City of Victor Harbor reserves and roadsides, listed under the EPBC Act and NPW Act. Regional status is also shown. (Gillam and Urban 2014)

BIODIVERSITY SURVEYS

FLORA

A few species were not observed during these surveys but have been observed or recorded in the past. Several others were under-represented in reserves and roadsides. These should be included in revegetation programs in suitable sites. Table 2 provides some of these species and suggested sites where they could be planted.

FAUNA

Victor Harbor's position within the landscape lends itself to a wide range of habitats, from higher altitude and rainfall zones to riparian zones, coastal dunes, estuaries and headlands, grasslands, woodlands and heath all providing different habitats for a range of native fauna. Some animals, such as the Chestnut-rumped Heathwren, Southern Emu-wren or Southern Brown Bandicoot prefer low dense vegetation while other species, like some reptiles and insect-eating birds, require open areas.

Since colonisation, the Adelaide Hills and Fleurieu Peninsula region has lost almost one third of its mammal species. Woodland birds in the Mount Lofty Ranges have suffered a significant decline in the last 10 to 20 years, particularly small insectivorous birds. Data on insects and other invertebrates is generally deficient, though the decline in insectivorous birds may be an indicator that the region is experiencing biodiversity loss of this vital group of organisms.

Biodiversity loss has not been limited to terrestrial ecosystems. Marine environments are also experiencing significant biodiversity declines (Edgar et al. 2023). Table 3 provides a list of threatened native fauna in the Victor Harbor region.

Rosenberg's Goanna, Cunningham's Skink and threatened birds such as Scarlet Robin have been recorded at Hindmarsh Falls and it is probable that Southern Brown Bandicoots utilise the dense vegetation as well. The lower Hindmarsh and Inman Rivers support one of the most stable populations of Black-chinned Honeyeaters in the Mount Lofty Ranges, a bird species that is experiencing considerable declines elsewhere in the region.

Habitat loss and invasive species are key threats to native fauna, and climate change will amplify these impacts. Reserves with good quality natural assets and roadsides adjacent to native vegetation should be preserved and improved to support the region's remaining native fauna. When planting, species that either currently exist or previously occurred naturally should be used, and a wide variety of micro-habitats should be retained to allow for varying fauna requirements.

Insect host plants should be incorporated into revegetation wherever appropriate, with some insects needing one particular species to survive and reproduce. Appendix 4 provides planting suggestions for particular butterfly species, such as the Yellowish Sedge-skipper, Chequered Copper and the Bitterbush Blue.



Mt Lofty Ranges Southern Emu-wren. Photo by Martin Stokes.

Species	Site code/RVM #
<i>Acacia spinescens</i>	CAR01, HRR03, RIN02
<i>Aristida behrii</i>	BLU01, BLU05, PAR03, HRR02
<i>Atriplex suberecta</i>	PAR03
<i>Austrostipa oligostachya</i>	DEURR01
<i>Austrostipa setacea</i>	ADR01, ADR02, BLU01, BLU05, PAR03
<i>Baumea tetragona</i>	RVM138a, RVM138c, RVM138d, RVM139c
<i>Callitris gracilis</i>	BAR01, HRR02
<i>Centella asiatica</i>	PAR01, SEC01, SEC02, MOR01
<i>Chrysocephalum semipapposum</i>	TWR01, TWR03
<i>Cladium procerum</i>	DER01, HIF04, HIF05
<i>Correa calycina</i> var. <i>calycina</i>	HRR06, RVM116c, RVM117b
<i>Correa pulchella</i>	BLU04
<i>Cullen australasicum</i>	BLU01, BLU05
<i>Cymbonotus preissianus</i>	HIF06, IVC01, IVC02, RVM150
<i>Daviesia arenaria</i>	CAR01, HRR03, RIN02
<i>Dianella longifolia</i> var. <i>grandis</i>	BLU01, BLU05, ETR01, PAR03, PHR01
<i>Enneapogon nigricans</i>	BLU01, BLU05, PAR03
<i>Frankenia pauciflora</i>	RVM137
<i>Gahnia trifida</i>	COO01, SUM01, RVM142b, RVM143b, TWR02
<i>Glyceria australis</i>	LEURR02, LEURR03, RVM138a, RVM138c, RVM138d, RVM139c, TWR02
<i>Glycine latrobeana</i>	HIF06, RVM165, RVM166
<i>Glycine rubiginosa</i>	BLU01, BLU05, ETR01, HUR01, PAR03, RBR01, RRS01
<i>Indigofera australis</i>	WRS01, WRS02, WSR03, HIF06
<i>Juncus planifolius</i>	TWR02, RVM138a, RVM138c, RVM139c
<i>Juncus caespiticus</i>	HRR02, PAR01, SEC01, SEC02, MOR01, TWR02
<i>Lomandra leucocephala</i> ssp. <i>robusta</i>	BAR01, CAR01, HRR03
<i>Lotus australis</i>	BPR01, BTR01, CAD01, FPN01, GSR01, GSR02, KER01, KER02, OLR01, PRD01, SMR01
<i>Maireana brevifolia</i>	BLU06
<i>Melaleuca squamea</i>	RVM138c, RVM138d, RVM139c
<i>Olearia pannosa</i> ssp. <i>pannosa</i>	CAR01, DEN02, RIN02, RVM106a, RVM107a
<i>Patersoina occidentalis</i>	RVM116c, RVM117b
<i>Picris squarrosus</i>	BPR01, BTR01, CAD01, FPN01, GSR01, GSR02, KER01, KER02, OLR01, PRD01, SMR01
<i>Pittosporum angustifolium</i>	RVM125
<i>Phyllota pleurandroides</i>	HRR03, MCN01, RIN02, RURR01, RVM140, RVM141, SCR01, TWS01
<i>Prostanthera chlorantha</i>	HRR03, RIN02
<i>Santalum acuminatum</i>	BLU01, BLU05, BLU13, PAR02, PAR03, TWR03
<i>Santalum murrayanum</i>	GHR01, RVM122, RVM123,
<i>Senecio squarrosus</i>	HIF06, IVC01, IVC02, RVM150
<i>Spyridium coactilifolium</i>	DAY01, DHT01, RIN02, RVM110
<i>Velleia paradoxa</i>	BLU01, BLU05, ETR01, HUR01, PAR03, RBR01, RRS01
<i>Viminaria juncea</i>	LEURR02, LEURR03, RVM138c, RVM138d, RVM139c, TWR02
<i>Vittadinia cuneata</i>	ETR01, HUR01, PAR03, PHR01
<i>Wilsonia backhousei</i>	RVM137

Table 2: Threatened or locally under-represented plant species that could be incorporated into revegetation programs.

BIODIVERSITY SURVEYS

Dead wood (standing and fallen) and tree hollows are incredibly important for fauna habitat and should be retained within natural environments and other locations wherever practicable. Pollinators such as native bees and wasps create or use holes in dead timber. Many insects will utilise crevices and flaking bark of dead and dying timber, and leaf litter is important for nutrient cycling and soil health. Dead tree branches are utilised as perches for birds, including Yellow-tailed Black Cockatoos.

Many Australian fauna species, like the Western Pygmy Possum, are dependent on hollows for shelter or nesting. Nesting boxes are generally poor substitutes for natural hollows and crevices and need regular monitoring and maintenance if installed. They can be infested by European honey bees and often tend to be beneficial for more adaptable and common native species. For these reasons, the City of Victor Harbor is reluctant to install nesting boxes.



Southern Brown Bandicoot. Photo by Rosemary Goland.



Western Pygmy Possum. Photo by Peter Watton.

Scientific Name	Common Name	EPBC	NPW	AMLR
<i>Cinclosoma punctatum anachoreta</i>	Spotted Quailthrush (MLR)	CR	E	CR
<i>Stagonopleura bella samueli</i>	Beautiful Firetail (MLR, KI)	EN	R	CR
<i>Botaurus poiciloptilus</i>	Australasian Bittern	EN	E	CR
<i>Hylacola pyrrhopygia parkeri</i>	Chestnut-rumped Heathwren (MLR)	EN	E	EN
<i>Stipiturus malachurus intermedius</i>	Southern Emuwren (MLR)	EN	E	CR
<i>Isodon obesulus obesulus</i>	Southern Brown Bandicoot	EN	V	EN
<i>Zoothera lunulata halmaturina</i>	South Australian Bassian Thrush	EN	R	EN
<i>Nannoperca australis</i>	Southern Pygmy Perch	VU	E	EN
<i>Thinornis cucullatus cucullatus</i>	Hooded Plover	VU	V	EN
<i>Haliaeetus leucogaster</i>	White-bellied Sea Eagle		E	EN
<i>Egernia cunninghami</i>	Cunningham's Skink		E	VU

<i>Pandion haliaetus cristatus</i>	Eastern Osprey		E	VU
<i>Petroica phoenicea</i>	Flame Robin		V	CR
<i>Varanus rosenbergi</i>	Heath Goanna		V	CR
<i>Melithreptus gularis</i>	Black-chinned Honeyeater		V	CR
<i>Microeca fascinans</i>	Jacky Winter		R	CR
<i>Stagonopleura guttata</i>	Diamond Firetail		V	EN
<i>Hieraaetus morphnoides</i>	Little Eagle		V	EN
<i>Lewin pectoralis pectoralis</i>	Lewin's Rail		V	EN
<i>Neophema chrysostoma</i>	Blue-winged Parrot		V	VU
<i>Stictonetta naevosa</i>	Freckled Duck		V	VU
<i>Zanda funerea whiteae</i>	Yellow-tailed Black Cockatoo		V	VU
<i>Antechinus flavipes</i>	Yellow-footed Antechinus		V	RA
<i>Eulamprus heatwolei</i>	Yellow-bellied Water Skink		V	RA
<i>Egretta sacra sacra</i>	Pacific Reef Heron		R	CR
<i>Melanodryas cucullata cucullata</i>	Hooded Robin		R	CR
<i>Myiagra inquieta</i>	Restless Flycatcher		R	CR
<i>Actitis hypoleucos</i>	Common Sandpiper		R	EN
<i>Falcunculus frontatus frontatus</i>	Eastern Shriketit		R	EN
<i>Gallinago hardwickii</i>	Latham's Snipe		R	EN
<i>Haematopus fuliginosus fuliginosus</i>	Sooty Oystercatcher		R	EN
<i>Neophema petrophila zietzi</i>	Rock Parrot		R	EN
<i>Zapornia tabuensis</i>	Spotless Crake		R	EN
<i>Anhinga novaehollandiae novaehollandiae</i>	Australasian Darter		R	VU
<i>Biziura lobata menziesi</i>	Musk Duck		R	VU
<i>Bubulcus ibis coromandus</i>	Eastern Cattle Egret		R	VU
<i>Neophema elegans elegans</i>	Elegant Parrot		R	VU
<i>Oxyura australis</i>	Blue-billed Duck		R	VU
<i>Petroica boodang boodang</i>	Scarlet Robin		R	VU
<i>Pseudophryne bibronii</i>	Brown Toadlet		R	VU
<i>Turnix varius varius</i>	Painted Buttonquail		R	VU
<i>Cereopsis novaehollandiae novaehollandiae</i>	Cape Barren Goose		R	RA
<i>Falco peregrinus macropus</i>	Peregrine Falcon		R	RA
<i>Falco subniger</i>	Black Falcon		R	RA
<i>Oriolus sagittatus sagittatus</i>	Olive-backed Oriole		R	RA
<i>Plegadis falcinellus</i>	Glossy Ibis		R	RA
<i>Rattus lutreolus</i>	Swamp Rat		R	RA
<i>Spatula rhynchotis</i>	Australasian Shoveler		R	RA
<i>Trichosurus vulpecula</i>	Common Brushtail Possum		R	RA

Table 3: Threatened Fauna in the City of Victor Harbor region, listed under the EPBC Act and NPW Act. Regional (AMLR) status is also shown. (Gillam and Urban 2014) Data sourced from NatureMaps 2023.

THREATS

Biodiversity is susceptible to threats including changes in land use, vegetation clearance, fragmentation of natural areas, climate change, invasive species and catastrophic events. The loss of species within an ecosystem can result in the loss of other dependent or co-dependent species or processes which in turn reduces resilience to other pressures and can break down the sustainable functioning within those natural systems.

In most cases, natural assets are subjected to multiple pressures and the cumulative effect exacerbates these issues. Some impacts may appear small, but the ongoing accumulation of many small impacts have a much larger long-term impact. Although the natural environment can display a level of resilience, the effect of these pressures may not be seen for some time following a damaging event or ongoing pressure. This is observed in extinction debt, where there is a time delay between damage to the environment and the loss of species.

The natural range of both plant and animal species is retracting, and the number of threatened species is increasing. The integrity of the natural environment can be decayed incrementally, eventually resulting in significant biodiversity loss and even total ecosystem collapse.

CLIMATE CHANGE AND CATASTROPHIC EVENTS

All living organisms have a range of conditions in which they thrive, and conditions that they can tolerate. The disruption of normal climatic ranges due to climate change will put increasing pressure on ecosystems and the organisms within them.

Climate change is threatening a vast array of plant and animal species, adding to other pressures not only in terrestrial systems, but in marine systems as well.

Recent studies revealed an alarming decline in shallow reef marine species, particularly in cool and temperate waters, due to increases in water temperature (Edgar et al 2023). Under a medium emissions scenario, in Victor Harbor, sea surface temperature is projected to rise by 0.5°C by 2039 and 1.2°C by 2090. Sea level is projected to rise by 0.12 m under a medium emissions scenario by 2039 and 0.45 m by 2090 (Department for Environment and Water 2022). When this is added to the projected increase in storm events, the sustainability of coastal-dependent species such as the Hooded Plover is seriously compromised.

With the increase in average temperature and decrease in average annual rainfall, the probability of catastrophic events, such as wildfire and flooding, will increase. While fire has been a fundamental process in the Australian landscape over thousands of years, changes in the environment and climate are likely to increase the frequency and intensity of wildfire.



Hooded Plover eggs are vulnerable to storm surge, which will be exacerbated with increasing climate change impacts.

Under a medium emissions scenario, the average number of days over 40°C per year is projected to increase by 6 to 10 days between 2020 and 2039, an increase of average daily maximum temperature of 1.1°C, and a decrease in average annual rainfall by 9% (Department for Environment and Water 2022). The ability of natural ecosystems to recover following catastrophic events is also affected by other environmental pressures such as development overgrazing, lack of rainfall or extreme temperatures, or even the recurrence of the same type of catastrophe.

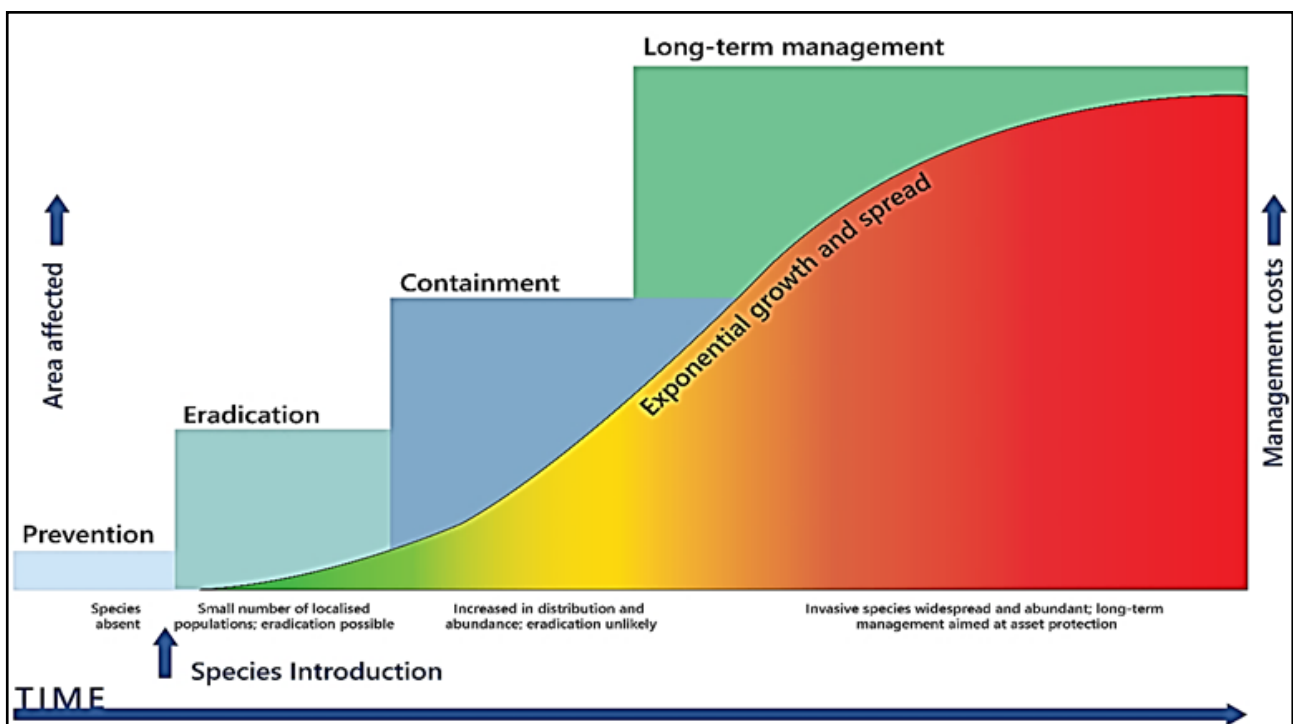
Action to mitigate the severity of climate change is needed to provide biodiversity with relative stability.

Although we may continue to find innovative ways to adapt to climate change, natural systems and the species that live within them are less able to adjust.

The more our climate changes, the greater the risk of extinctions and ecosystem collapse and, subsequently, the greater the risk of impacts to us from biodiversity loss.

INVASIVE AND OVERABUNDANT SPECIES

Invasive species are a key threat for biodiversity in Australia. Investment needs are lowest if pests are eradicated when they first emerge in a region.



The invasion curve presents efficiencies of eradicating or containing invasive species before they become difficult to control. Image source from Invasive Species Council



Inman Floodplain

THREATS

PEST PLANTS

City of Victor Harbor reserves and roadsides contain several pest plants that are likely to be eradicated (or contained to very small infestations) with ongoing management. A few pest plant species have been controlled in the past and appear to be eradicated due to a quick response to their initial identification in the region. Weeds under the 'Eradication' management strategy should be monitored annually and immediate action undertaken if they are present. Locations of previous and current outbreaks can be found in Appendix 6.

While these principles should set the framework for on-ground work schedules over the next five years, other opportunities may arise that allow for the management of particular species or areas that may not otherwise be tackled. For example, City of Victor Harbor currently partners with Monarto Safari Park to remove Sallow Wattle (*Acacia longifolia* ssp. *longifolia*) and Western Coastal Wattle (*Acacia cyclops*) from roadsides and reserves for animal fodder at the zoo. This is of benefit to Monarto Safari Park, while providing considerable efficiencies for the City of Victor Harbor and reducing a widespread woody weed. Monarto has also worked with Victor Harbor Coastcare and the Friends of Hindmarsh River Estuary to remove weedy wattles from river and coastal reserves.

The City of Victor Harbor balances the need to control high priority weeds like African Weeping Lovegrass with the protection of sites with high-value biodiversity and natural assets.

PEST ANIMALS

Pest animal strategies are addressed in a similar manner as pest plants, with the eradication of species as they emerge in a region being the most cost-efficient approach. Both pigs and goats (possibly purposely released into the environment) have emerged in the City of Victor Harbor region in the past. These pest animals have the capacity to degrade biodiversity and natural assets and should be of the highest priority for control if they re-emerge. The presence of feral pigs or goats in the City of Victor Harbor region should be reported to LHF immediately.

Current efforts are centred around an integrated management approach to rabbits. The City of Victor Harbor will continue to work with LHF, Green Adelaide, BirdLife Australia and DEW as opportunities arise to target foxes, particularly in the vicinity of Hooded Plover nests and other high value fauna habitat areas. The use of conservation dogs to assist in this program is a new and exciting opportunity in our region.

DOGS AND CATS

Both feral and domestic cats are a key threat to native fauna. The City of Victor Harbor Cat By-law 2016 and the City of Victor Harbor Dog and Cat Management Plan are currently under review and due for renewal in 2024. This may present an opportunity to reduce the impact of cats on native fauna.

THREATS

Domestic dogs and cats can have a significant impact on native fauna if not managed appropriately. During monitoring undertaken by BirdLife Australia, off-leash dogs were identified as the greatest threat to Hooded Plovers during the nesting season. Friends of the Hooded Plover, BirdLife Australia and the City of Victor Harbor have been working to reduce this impact through educating dog owners about Hooded Plovers. Every effort should be made to minimise the impact to this threatened bird species and others.

OVER-ABUNDANT NATIVE ANIMALS

With the disruption of natural ecosystems over the last two hundred years some native species, such as kangaroos, have become over-abundant and have had a detrimental effect on the natural environment, less adaptable native fauna species and palatable plant species. The recovery of natural systems after fire and the success of revegetation can be seriously inhibited by the overabundance of kangaroos.

Competitive native species such as Noisy Miners have been identified as a key threat to declining woodland bird species; including Black-chinned Honeyeaters which are listed as vulnerable under the NPW Act. Noisy Miners thrive in open spaces with large trees and with nectar-rich garden plants and compete with less aggressive bird species. Although Noisy Miners have been recorded in the City of Victor Harbor region, their small numbers are likely to assist in the sustainability of local native bird populations like the Black-chinned Honeyeater. Consideration should be given to reducing preferential habitat and food resources for Noisy Miners, to reduce the likelihood of increasing their population size in Victor Harbor.

PHYTOPHTHORA CINNAMOMI

Phytophthora cinnamomi (Pc) is a soil-borne plant pathogen which has the potential to kill a wide range of native plants including keystone species such as *Xanthorrhoea semiplana*. It is listed as a key threatening process under the EPBC Act, and its impacts have been seen in several locations across the Fleurieu Peninsula, particularly in higher rainfall zones (Appendix 7).



Probable *Phytophthora cinnamomi* impact on *Xanthorrhoea semiplana*.

HABITAT LOSS AND FRAGMENTATION

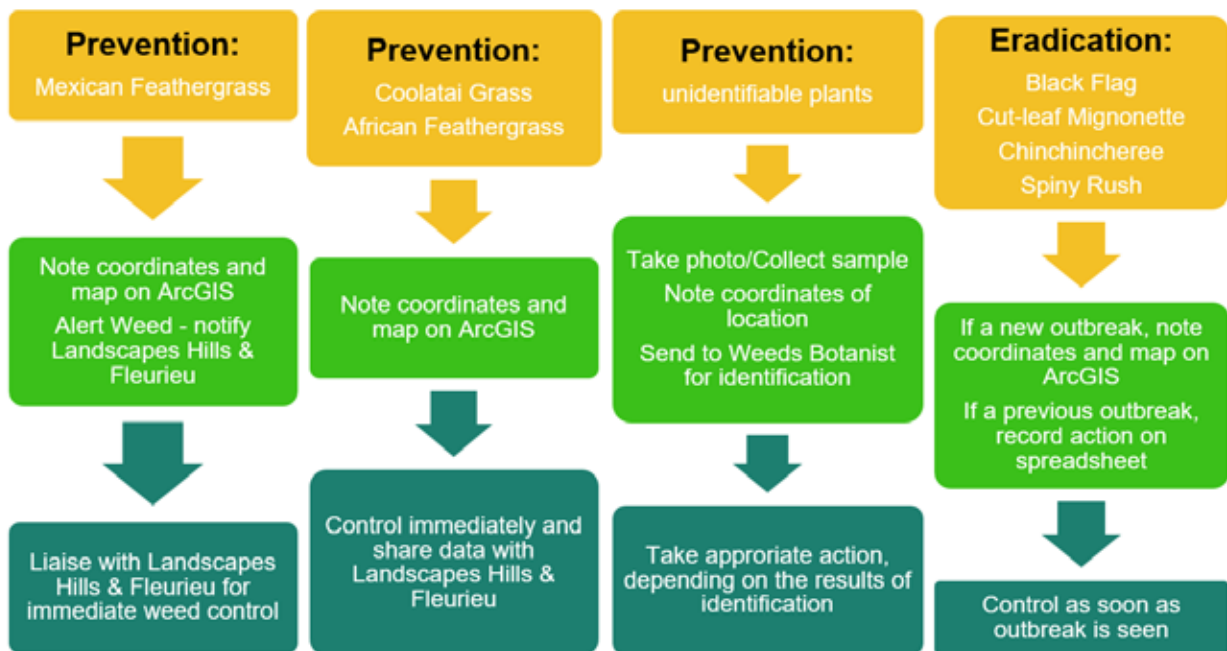
Habitat loss has occurred for many different reasons including clearance of vegetation for food production, housing and infrastructure. It is estimated that less than 18% of our original native vegetation remains in the City of Victor Harbor region (Modystach, Stephens and Bignall 2019), though much of this is in a degraded state. Habitat quality has been reduced through processes such as grazing, invasive species, overabundant native animals, firewood collection, changes in hydrology, inappropriate fire regimes, erosion, recreational activities, the loss of pollinators and climate change.

Although large-scale clearing in South Australia has mostly ceased, historic native vegetation clearance has left a legacy of fragmented patches of native vegetation. The disconnection of habitat and fauna populations can result in the loss of genetic diversity, leaving species more susceptible to disease and inbreeding. This may be particularly true for species like the Mount Lofty Ranges Southern Emu-wren, which requires dense vegetation. Fragmentation has left species like this vulnerable to serious decline and local extinctions. Extinction lag describes the delayed effect of environmental pressures, with species 'hanging on' for some time after the impacts occur. Similarly, it takes time for the positive effects of ecological restoration to be fully realised. Applying these principles, the need to protect and restore the natural environment is urgent.

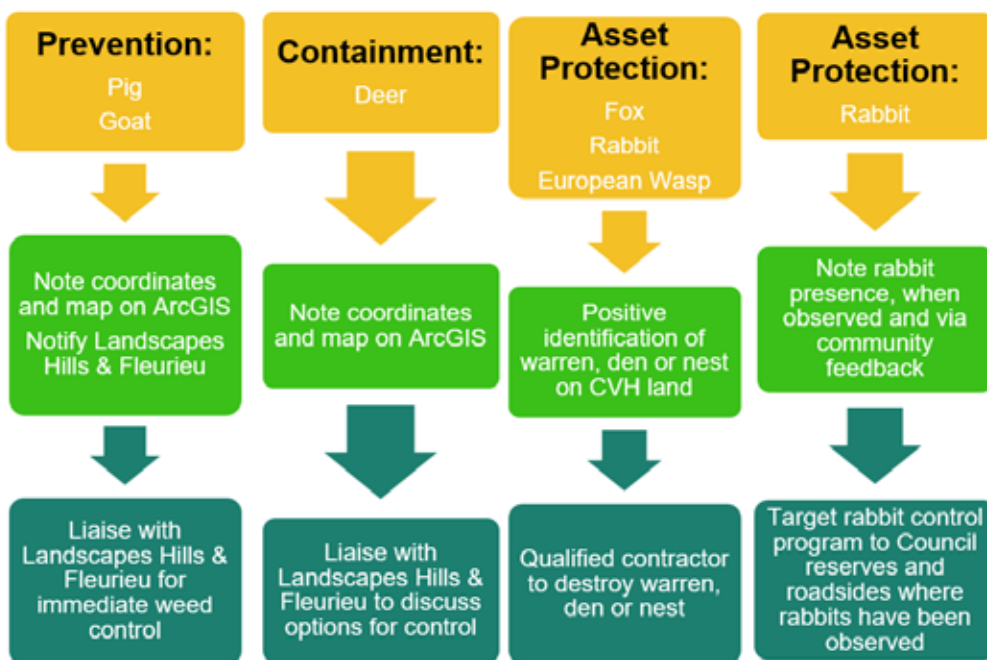
The cumulation of smaller clearances of native vegetation and other pressures continue to impact on biodiversity. For Council, small clearances involve incremental impacts like road maintenance, illegal clearances, pest animals, road upgrades, development of reserves and balancing the needs of the community. Engaging and educating the community and City of Victor Harbor staff at all levels is an important step to mitigating the risk of small clearances in City of Victor Harbor reserves and roadsides. More broadly, providing credible information and training about issues such as environmental values, best practice, fire hazard, climate change and pest plant and animals aims to improve understanding and procedures.



Hooded Plover with chicks. Photo by Kerri Bartley, BirdLife Australia.



Pest plants require different strategies depending on the level of infestation.



Pest animals require different strategies depending on the level of infestation.



Bitterbush Blue. Photo by Matthew Endacott.

IMPROVING BIODIVERSITY SCORES

It is envisaged that, over the next five years, thoughtful planning and strategic actions will protect and enhance biodiversity in City of Victor Harbor managed reserves and roadsides. Changes (improvements or decline) will be reflected in assessments undertaken five years after each site was assessed for baseline data and will be reflected in photos (coordinates and description of photo points are logged in the site spreadsheets) and in the subsequent Total Biodiversity Score (TBS) and average Unit Biodiversity Score (UBS).

The average UBS can be increased by observing or facilitating:

- an increase in the number of native plant species,
- an increase in the number of threatened plant species,
- an increase in the number of native plants species regenerating,
- an increase in the cover and diversity of plant life forms (eg. tree, shrub, grass),
- a decrease in the number of weed species, particularly those with a high threat rating,
- an increase in the native:exotic plant biomass ratio,
- an increase in tree hollows,
- an increase in tree canopy cover and health (unless a naturally treeless plant community), and
- an increase in the amount of leaf litter and fallen timber (unless a naturally treeless plant community).

Council can increase its TBS by:

- increasing the UBS of individual sites, and/or
- increasing the area of biodiversity and natural assets as identified in this report.

Although it is acknowledged that the worth of biodiversity does not lie merely with a 'score', the method used for this plan provides Council with a simple technique to monitor and evaluate changes in biodiversity assets over time and measure the success or failure of management actions. It is our responsibility to leave nature healthy for future generations.

Together we can make a difference.



Threatened plants such as the Butterfly Spyridium (Spyridium coactilifolium) incorporated into revegetation help to improve the Unit Biodiversity Score.

REVIEWING, REPORTING, MONITORING AND EVALUATION

This five-year Biodiversity and Natural Assets Management Plan builds on directions from the City of Victor Harbor's overarching Environmental Management Plan. The Biodiversity and Natural Assets Management Plan will be complemented by an annual workplan, guided by the action tables (pages 39 to 52) and in accordance with annual budgets. This will be reviewed towards the end of each financial year to enable staff to report on the Plan's achievements, and identify gaps and the need for improvement where warranted.

The natural environment is often unpredictable, therefore an adaptive management approach is needed to ensure the most appropriate actions are being taken to conserve biodiversity in the region. For this reason it is critical for the City of Victor Harbor to monitor and assess the conditions and changes in biodiversity and natural assets within Council reserves and roadsides.

Data from the 2020 – 2023 surveys will be used as a baseline for subsequent monitoring, which is recommended for 2025-26 in reserves and 2026-27 on roadsides.

These five-yearly surveys will allow Council staff to track changes, evaluate the effectiveness of investment and assess the need to adapt management in specific reserves and roadsides.

While the NVC Bushland Assessment Method is considered to be a relatively rapid survey technique, it provides enough data to be able to inspect different elements within a site and compare these to the previous surveys.

Analyses of the 2025-27 surveys will allow for informed decisions around what we do and why we do it, in the next Biodiversity and Natural Assets Plan.



Friends of Hindmarsh River Estuary members, Mark, Ann and Di, contribute to the improvement of Victor Harbor's natural environment.

ACTIONS

OBJECTIVES

The City of Victor Harbor has thirteen key objectives that underpin the Biodiversity and Natural Assets Management Plan, and inform a wide range of actions.

The objectives include:

1. Develop staff knowledge and capacity
2. Raise environmental awareness
3. Showcase the value of local biodiversity
4. Connect with First Nations people/ organisations
5. Build key partnerships and share knowledge
6. Collect and manage data on City of Victor Harbor natural assets
7. Strengthen the resilience of threatened flora and increase locally uncommon plant species
8. Improve fauna resilience
9. Protect beach-nesting birds
10. Protect and restore natural ecosystems
11. Incorporate biodiversity into the urban environment
12. Reduce pest animals and plants
13. Reduce pollutants in the environment.

THEMES

The objectives and actions have been split into two key themes:

- **Engage, Learn, Inspire**
- **Protect, Restore, Connect**

The themes of **Engage, Learn, Inspire** and **Protect, Restore, Connect** are intrinsically linked and therefore some of the actions might fit into both themes.

The themes have been informed by aforementioned biodiversity surveys, in addition to significant consultation with a range of key stakeholders including volunteer environmental groups, organisations and expert bodies.



**ENGAGE,
LEARN,
INSPIRE**

**PROTECT,
RESTORE,
CONNECT**

ENGAGE, LEARN, INSPIRE

OBJECTIVE	ACTION	DELIVERY
1.0 Develop staff knowledge and capacity	1.1 Continue to update training on Native Vegetation legislation when offered through NVC	Ongoing
	1.2 Actively participate in industry network groups including the Coastal Officers network, Local Government Biodiversity Network, the Adaptation Practitioners Network, Environmental Sustainability Network, Coastal Alliance	Ongoing
	1.3 Explore new research and methods for continued best practice methods and procedures	2023-ongoing
	1.4 Engage relevant CVH staff in a workshop and information session on the Biodiversity and Natural Assets Management Plan	2023-25
	1.5 Investigate opportunity for a Conservation and Land Management Trainee within Open Spaces team	2023-24
	1.6 Recommend human resource expansion in the Environmental Sustainability team	2024-25
	1.7 Raise awareness of environmental weeds with Open Spaces staff	2023-ongoing
	1.8 Raise awareness of native vegetation values and legislation for Operations and Capital Projects staff	2024-25 and 2026-27



Victor Harbor Coastcare planting local coastal plants at Kings Beach lookout. Photo by Victor Harbor Coastcare.

ENGAGE, LEARN, INSPIRE

OBJECTIVE	ACTION	DELIVERY
2.0 Raise environmental awareness	2.1 Provide environmental 'news' to the community, CVH staff and Council Members through newsletters and social media	Ongoing
	2.2 Provide community workshops, events and presentations	Ongoing
	2.3 Partner with LHF, Green Adelaide and other agencies to deliver educational programs such as Coastal Gardens workshops, Gazania-free Gardens and Waterbug BioBlitz	2023-ongoing
	2.4 Advocate for LHF region to host Climate Ready Schools Program, Coastal Ambassadors Program and other metropo-based community programs	2023-ongoing
	2.5 Connect with local youth on environmental issues through Southern Environmental Action (SEA)	2023-ongoing
	2.6 Install interpretive signage about biodiversity in high value biodiversity reserves that are utilised by the community and visitors	2023- ongoing
	2.7 Share RHC 'Balancing Bushfires and Biodiversity' project report on Council website and utilise where other opportunities arise to raise awareness	2023-24
	2.8 Develop a concept plan for walking trails along the Inman River to showcase the natural environment	2024-25
	2.9 Implement walking trails and ecological restoration works, as per Inman River concept plan	2025-28
	2.10 Enhance environmental information and messaging on Council website	2024-25

OBJECTIVE	ACTION	DELIVERY
3.0 Showcase the value of local biodiversity	3.1 Share positive news stories through our website and social media, newsletters and broader communications media	Ongoing
	3.2 Establish a garden to showcase local native plants for urban gardens	2025-26
	3.3 Maintain the local native showcase garden (3.2)	2026-ongoing
	3.4 Run a nature photography competition	2027-28
	3.5 Develop a digital herbarium for the public to access online	2027-28

PROTECT, RESTORE, CONNECT

OBJECTIVE	ACTION	DELIVERY
4.0 Connect with First Nations peoples/ organisations	4.1 Listen to, respect, acknowledge, value, and learn from Ngarrindjeri, Ramindjeri and other First Nations peoples	2023-ongoing
	4.2 Co-develop guidelines and a framework of when to formally engage with NAC or other appropriate First Nations organisations during the implementation of this plan	2023-25
	4.3 Recognise cultural heritage obligations under the Aboriginal Heritage Act and co-develop guidelines and a framework for the mitigation of risks to cultural heritage during on-ground works, including how this is implemented	2023-ongoing
	4.4 During the development of site-specific Vegetation Management Plans, collaborate with NAC to identify culturally significant flora species that will provide the habitats of key Ngartis (totem animals or plants)	2023-28

OBJECTIVE	ACTION	DELIVERY
5.0 Build key partnerships and share knowledge	5.1 Provide support, technical advice and direction for community volunteers and groups working to enhance and protect the local natural environment	Ongoing
	5.2 Provide information about grant opportunities for environmental community groups	Ongoing
	5.3 Continue partnership with RHC to identify and undertake projects that improve biodiversity resilience	Ongoing
	5.4 Provide support to the Bush for Life program	Ongoing
	5.5 Support LHF, DEW and other external agencies to connect and restore sites with biodiversity values	2023-ongoing
	5.6 Engage with landholders adjacent to priority sites to raise awareness of biodiversity values and environmental issues specific to their area	2023-ongoing
	5.7 Consider support for the establishment of a community-led native nursery	2025-26

PROTECT, RESTORE, CONNECT

OBJECTIVE	ACTION	DELIVERY
6.0 Collect and manage data on CVH natural assets	6.1 Create a register of CVH reserves suitable as SEB sites based on 2020-22 assessments, for use as CVH clearance offsets if needed	2024-25
	6.2 Identify (through desktop analysis and collaboration with fauna experts and LHF) EPBC/NPW Act listed threatened fauna within CVH owned and managed reserves and roadsides	2024-25
	6.3 Undertake biodiversity assessments in CVH owned and managed reserves to compare with or set baseline data	2025-26
	6.4 Undertake biodiversity assessments in CVH's RVM sites to compare with or set baseline data	2026-27
	6.5 Undertake biodiversity assessments in the Department for Infrastructure and Transport's RVM sites	2026-27
	6.6 Assess high biodiversity value unmade road reserves using the NVC Bushland Assessment Method including those that were surveyed in 2010	2027-28
	6.7 Analyse 2025-27 biodiversity assessments to determine successes and failures, and inform future planning and works scheduling accordingly	2027-28
	6.8 Investigate ways to track total RVM sites to monitor expansion overtime	2023-25

OBJECTIVE	ACTION	DELIVERY
7.0 Strengthen the resilience of threatened flora and increase locally uncommon plant species	7.1 Identify areas within new land developments that could act as biodiversity corridors, and provide technical assistance to developers to establish corridors where practicable	2023-ongoing
	7.2 Identify sites and opportunities to introduce new populations of EPBC and NPW listed threatened flora within CVH owned and managed reserves and roadsides	2023-25
	7.3 Incorporate threatened or regionally under-represented flora species into orders for revegetation programs where possible	2024-ongoing
	7.4 Partner with SA Seed Conservation Centre and other external agencies to gain insight into propagation and/or supply of threatened plant species	2024-ongoing
	7.5 Ensure known EPBC-listed plant species are identified, recorded and protected under the RVM scheme	2025-ongoing
	7.6 Identify Council owned or managed land that has the potential to link areas of native vegetation	2026-27

PROTECT, RESTORE, CONNECT

OBJECTIVE	ACTION	DELIVERY
8.0 Improve fauna resilience	8.1 Liaise with LHF and other fauna experts to better understand the requirements for local threatened fauna	Ongoing
	8.2 Retain large dead wood (standing or fallen) in conservation areas to provide fauna habitat	Ongoing
	8.3 Seek opportunities to collaborate with LHF, Green Adelaide and other agencies to monitor for threatened fauna	2023-ongoing
	8.4 Gradually remove blackberry thickets in Hindmarsh Falls Reserve and replace/ encourage vegetation structure for threatened fauna species such as Southern Brown Bandicoot	2023-ongoing
	8.5 Design revegetation projects to establish varied habitats and support a wide range of fauna including mammals, birds, reptiles, invertebrates and frogs	2023-ongoing
	8.6 Identify opportunities to restore habitat for uncommon invertebrate species such as the Bitterbush Blue, Chequered Copper and Sedge-skippers butterflies	2024-25

OBJECTIVE	ACTION	DELIVERY
9.0 Protect beach-nesting birds	9.1 Engage with dog owners around Hooded Plover nesting zones to educate and enforce compliance if necessary	Ongoing
	9.2 In collaboration with BirdLife, Friends of the Hooded Plover and LHF, provide on-ground support to assist with fencing and signage when necessary during the Hooded Plover nesting season	Ongoing
	9.3 Relevant staff to attend presentation from BirdLife Australia on their annual report of the Hooded Plover program	Ongoing
	9.4 Recognise and raise awareness about significant sites and habitat for beach-nesting birds such as Hooded Plovers, Crested Terns and Sooty Oystercatchers	2023-ongoing
	9.5 Control Sea Wheat-grass and replace with Rolling Spinifex in key locations to sustain habitat for Hooded Plovers	2023-ongoing
	9.6 Change CVH by-law to specify a 50 metre dogs on-leash zone around active Hooded Plover nests and incorporate into updated Dog and Cat Management Plan 2024-2029, subject to relevant by-law review	2023-24
	9.7 Investigate the potential for Wright Island to change ownership to DEW	2023-25
	9.8 Create a dog on-leash or exclusion zone around the Hindmarsh River mouth and incorporate into updated Dog and Cat Management Plan 2024-2029, subject to relevant by-law review	2023-24

PROTECT, RESTORE, CONNECT

OBJECTIVE	ACTION	DELIVERY
10.0 Protect and restore natural ecosystems	10.1 Seek grant opportunities that improve biodiversity resilience	Ongoing
	10.2 Continue to collaborate with the State Herbarium Weeds Botanist to identify and document unidentified plants	Ongoing
	10.3 Identify suitable ecological restoration sites to include in future annual revegetation programs	Ongoing
	10.4 Partner with DEW, LHF, Birdlife Australia, SA Seed Conservation Centre and other external agencies to deliver ongoing biodiversity projects	Ongoing
	10.5 Maintain signage on RVM sites	Ongoing
	10.6 Provide technical support to CVH staff regarding native vegetation clearances	Ongoing
	10.7 Install protection barriers for high conservation value sites that are deteriorating due to vehicle, bike, firewood collection, human or stock access	2023-ongoing
	10.8 Seek opportunities to partner in, and support, the 'Seeds for Snapper' program	2023-ongoing
	10.9 Stabilise coastal dune systems where practicable using revegetation	2023-ongoing
	10.10 Manage foot traffic through dunes using revegetation and fencing where necessary	2023-ongoing
	10.11 Identify and categorise reserves with significant natural assets as E Reserves (as assessed in reserve categories)	2023-25
	10.12 Assess and establish the location of beach accesses to mitigate the risk of damage from informal paths and trampling	2023-25
	10.13 Develop a plan for Inman Valley Cemetery to prevent the further clearance or degradation of native vegetation	2023-25
	10.14 Develop a template for site-specific Vegetation Management Plans	2023-25
	10.15 Develop site-specific Vegetation Management Plans for high priority CVH managed and owned reserves	2023-28
	10.16 Establish and fund an Environmental Grants Program for community groups or individuals in the CVH region	2024-ongoing
	10.17 Update the Environmental Management Plan 2019-2024	2024-25
	10.18 Establish a Heritage Agreement at Hindmarsh Falls Reserve to protect the high value vegetation and habitat values	2025-26
	10.19 Update the River Reserves Biodiversity Works Schedule 2022-2025	2024-25
	10.20 Explore the feasibility of supplying the community with local native plants through a community nursery	2027-28

OBJECTIVE	ACTION	DELIVERY
11.0 Incorporate biodiversity into the urban environment	11.1 Incorporate BSUD and WSUD into new and existing garden beds where appropriate	Ongoing
	11.2 Develop policy to plant suitable local species in natural reserves/roadsides as listed in Appendix 1 and 2 and mapped as 'Natural Assets' in ArcGIS	2023-25
	11.3 Identify reserves with unused lawn areas and replace with local native gardens where practicable	2024-ongoing
	11.4 Explore options to create a booklet on urban biodiversity and using local native plants species into gardens/verges	2026-27
	11.5 Investigate methods of encouraging the community to incorporate local native plant species into gardens/verges	2027-28
	11.6 Continue to provide information to community, volunteers, businesses and developers on best practices in conservation, biodiversity and ecosystems	2023-ongoing

OBJECTIVE	ACTION	DELIVERY
12.0 Reduce pest animals and plants	12.1 Continue annual program to control rabbits using an integrated approach	Ongoing
	12.2 Partner with LHF and PIRSA, and undertake on-ground works to eradicate emerging and high threat weeds	Ongoing
	12.3 Collaborate with the agribusiness Working Group to identify priority agricultural weeds	Ongoing
	12.4 Undertake weed control on roadsides as outlined by the AgriWeeds program	Ongoing
	12.5 Reduce fire hazard by removing woody weeds in reserves, and replacing perennial weedy grasses with native grasses and/or low fire hazard native plants	2023-ongoing
	12.6 Notify LHF of any Alert Weeds or high priority weeds as they are identified in reserves or roadsides	2023-ongoing
	12.7 Develop (and adapt as needed) a weed management schedule, outlining priorities, locations and timing	2023-ongoing
	12.8 Control 'very high and high priority' weeds (as identified in the weed management schedule) across all sites in CVH owned and managed reserves	2023-ongoing
	12.9 Support LHF, Green Adelaide and DEW to undertake fox den searches using a conservation dog	2023-ongoing
	12.10 Investigate options for managing feral cats in CVH reserves and incorporate into the updated Dog and Cat Management Plan 2024-2029, subject to relevant Council by-laws	2023-24
	12.11 Establish a 'dob in a den' program and register, where community can report the location of fox dens on Council owned and managed land	2025-26

PROTECT, RESTORE, CONNECT

OBJECTIVE	ACTION	DELIVERY
13.0 Reduce pollutants in the environment	13.1 Continue to remove litter along coastal dunes on a weekly basis	Ongoing
	13.2 Incorporate gross pollutant traps and water retention/detention wherever practicable, to reduce pollutants in river and marine environments	Ongoing



Photo by Kerri Bartley, BirdLife Australia



Rosenberg's Goanna. Photo by Anthony Abley.

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ACRONYMS

BSUD	Biodiversity Sensitive Urban Design
CVH	City of Victor Harbor
DEW	Department for Environment and Water
EPBC	Environment Protection and Biodiversity Conservation
LHF	Landscapes Hills and Fleurieu
MLR	Mount Lofty Ranges
NAC	Ngarrindjeri Aboriginal Corporation
NPW	National Parks and Wildlife
NVC	Native Vegetation Council
RHC	Resilient Hills and Coasts
RVM	Roadside Vegetation Marker
SEB	Significant Environmental Benefit
TBS	Total Biodiversity Score
UBS	Unit Biodiversity Score
WSUD	Water Sensitive Urban Design



Hardenbergia violacea



APPENDIX 1

**BIODIVERSITY SCORES AND
PRIORITY CATEGORIES IN
COUNCIL RESERVES**

RESERVE	SITE CODE	UBS CATEGORY	UNIT BIODIVERSITY SCORE (UBS)	TOTAL BIODIVERSITY SCORE (TBS)
Leane Road unmade road reserve	LEURR03	Very High	100.36	20.77
Hindmarsh Falls Reserve	HIF06	Very High	97.97	435.78
Hindmarsh Falls Reserve	HIF01	Very High	90.97	514.1
Inman Valley Cemetery	IVC01	Very High	86.35	382.35
Hindmarsh Falls Reserve	HIF02	Very High	81.94	154.05
Bluff Reserve	BLU07	Very High	81.85	93.81
Dennis Road Reserve	DER02	Very High	80.06	193.42
Hindmarsh River Estuary Reserve	HIE01	High	79.68	184.69
Hindmarsh Falls Reserve	HIF05	High	79.26	63.25
Bluff Reserve	BLU08	High	78.98	220.52
Bluff Reserve	BLU09	High	78.86	663.85
Section 696	SEC06	High	77.2	115.42
Hindmarsh River Estuary Reserve	HIE02	High	77.1	259.46
Inman River Estuary	IER01	High	76.57	85.07
Hindmarsh River Reserve	HRR01	High	76.53	781.19
Bacchus Reserve	BAR01	High	75.44	240.29
Bluff Reserve	BLU04	High	74.48	334.25
Depledge-Range Rd Heysen Trail unmade road reserve	DHT04	High	73.27	34.14
Day Road Reserve	DAY01	High	72.45	419.86
Jagger Road unmade road reserve	JURR01	High	69.18	25.61
Inman River Estuary	IER03	High	69.01	59.28
Tom Stephens Memorial Reserve	TSM01	High	68.55	192.69
Cut Hill Reserve	CHR01	High	67.42	91.01
McNamara Reserve	MCN02	High	67.26	45.34
Cut Hill Reserve	CHR02	High	66.92	74.28
Hindmarsh River Estuary Reserve	HIE03	High	66.82	30.34
Bluff Reserve	BLU05	High	66.81	106.01
Depledge-Range Rd Heysen Trail unmade road reserve	DHT01	High	66.65	25.33
Tugwell Water Reserve 665	TUW01	High	65.53	26.61
Hindmarsh River Reserve	HRR03	High	64.99	132.06
Bluff Reserve	BLU12	High	64.71	123.01
Hindmarsh Falls Reserve	HIF03	High	64.66	58.71
Wilson Hill Lookout	WHL01	High	63.83	51.32
Bluff Reserve	BLU02	High	63.77	251.01
Stock Reserve	STR01	High	63.46	52.16
G.S.Read Reserve	GSR01	High	63.2	38.74

Inman River Reserve	IRR02	High	62.84	594.37
Hindmarsh Falls Reserve	HIF04	High	61.93	207.03
Waitpinga Stone Reserve	WSR02	High	61.87	52.71
Olivers Parade Reserve	OLR01	High	61.47	168.89
Section 696	SEC01	High	60.52	132.17
Inman River Estuary	IER02	High	60.51	231.82
Greenhills Reserve	GHR01	Moderate	59.79	64.81
Depledge-Range Rd Heysen Trail unmade road reserve	DHT02	Moderate	59.51	80.27
McNamara Reserve	MCN03	Moderate	59.2	55.29
Ring Road SEB area	RIN02	Moderate	58.79	35.57
Stone Reserve Tugwell	SRT02	Moderate	57.8	60.92
Causeway dune	CAD01	Moderate	57.74	6.93
Bridge Terrace Reserve Dune	BTR01	Moderate	57.54	48.56
Waitpinga Stone Reserve	WSR01	Moderate	57.42	51.1
Leane Road unmade road reserve	LEURR02	Moderate	55.55	2.67
Tugwell Water Reserve 664	TWR03	Moderate	54.55	13.42
Victor Harbor Cemetery	VHC01	Moderate	54.15	51.77
Donkey Patch	DOP01	Moderate	54.13	123.46
Water Reserve Road Reserve	WRR01	Moderate	53.75	35.26
Bridge Point Dune	BPR01	Moderate	53.09	15.18
Kent Reseve	KER02	Moderate	52.75	67.26
Franklin Parade North	FPN01	Moderate	52.61	88.65
Cootamundra Reserve	COO01	Moderate	52.26	338.15
Dennis Road Reserve	DER01	Moderate	51.84	88.23
Soldiers Memorial Reserve dune	SMR01	Moderate	51.8	23.26
Promenade Dune	PRD01	Moderate	51.32	21.04
Hindmarsh River Reserve	HRR02	Moderate	51.2	84.59
Inman River Reserve	IRR01	Moderate	48.71	39.31
Bluff Reserve	BLU13	Moderate	48.67	53.88
Robinson Reserve	ROR01	Moderate	48.43	24.7
Inman Valley Cemetery	IVC02	Moderate	48.19	108.23
Bluff Reserve	BLU03	Moderate	48.14	33.91
Stevenson Reserve	STV01	Moderate	48.13	38.69
Brooke Rd Reserve	BRR02	Moderate	48.11	61.2
Bluff Reserve	BLU01	Moderate	47.33	232.5
Mayfield Wetland	MAW01	Moderate	47.32	41.26
Back Valley Recreation Grounds	BVR01	Moderate	46.92	18.3
Reid Road unmade road reserve	RURR01	Moderate	46.42	23.95
Cantebury Reserve	CAR01	Moderate	46.35	8.25
Ring Road SEB area	RIN06	Moderate	46.2	30.26

Kent Reseve dune	KER01	Moderate	46.16	20.4
G.S.Read Reserve	GSRO2	Moderate	46.01	46.06
Morgan Reserve	MOR01	Moderate	45.23	417.54
Stock Reserve	STR04	Moderate	44.98	21.86
Pages Reserve	PAR01	Moderate	44.85	301.26
Tugwell Water Reserve 664	TWR01	Moderate	44.78	13.61
Landfill Depot (South)	LFS01	Moderate	44.43	72.59
Victor Harbor Cemetery	VHC02	Moderate	43.86	27.59
Summerlea Reserve	SUM01	Moderate	43.37	173.03
Solly Reserve	SOL01	Moderate	42.9	42.9
Cudmore Reserve	CUD01	Moderate	42.75	75.23
Ring Road SEB area	RIN09	Moderate	42.12	24.6
Crompton Rd unmade road re-serve	CRR01	Moderate	41.26	13.16
Section 696	SEC04	Moderate	40.58	253.28
Jagger Road unmade road reserve	JURR02	Moderate	40.12	42.81
Depledge-Range Rd Heysen Trail unmade road reserve	DHT03	Low	39.86	23.08
Ring Road SEB area	RIN04	Low	39.45	65.94
Freebairn Reserve	FRE01	Low	39.24	15.78
Ring Road SEB area	RIN01	Low	38.86	28.87
Bacchus Rd SEB (roadside)	BASEB01	Low	38.31	4.37
Geoff Walker Reserve	GWR01	Low	38.13	58.79
Lorne Mayfield Reserve	LMR01	Low	37.67	13.1
Brooke Rd Reserve	BRR01	Low	37.53	8.75
Water Reserve Road Reserve	WRR03	Low	37.41	23.31
Landfill Depot (North)	LFN01	Low	37.26	28.21
Cudmore Reserve	CUD02	Low	36.94	37.9
Section 696	SEC07	Low	36.89	20.29
Section 696	SEC02	Low	36.43	619.58
Swains Crossing Reserve	SCR01	Low	36.19	20.31
Ring Road SEB area	RIN03	Low	36.14	26.78
Bluff Reserve	BLU06	Low	34.36	46.25
Porters Hill Reserve	PHR01	Low	34.24	83.35
Joy Beer Reserve	JBR01	Low	33.75	6.99
Scott McKenzie Reserve	SMC01	Low	33.67	19.56
CWA Reserve	CWA01	Low	32.64	32.64
Ring Road SEB area	RIN11	Low	30.26	39.45
Robert Barry roadside	RRS01	Low	29.41	32.32
Tugwell Water Reserve 664	TWR02	Low	28.95	24.29
Hurrell Reserve	HUR01	Low	28.15	10.76

Stock Reserve	STR03	Low	27.85	12.89
Stone Reserve Tugwell	SRT01	Low	27.4	15.95
Bacchus Rd SEB (drain)	BASEB02	Low	27.32	13.22
Ring Road SEB area	RIN14	Low	26.93	12.93
Waitpinga Stone Reserve	WSR03	Low	26.89	6.43
Oval Road Reserve	OVR01	Low	26.11	44.06
Robert Barry Reserve	RBR01	Low	25.93	32.44
Bluff Reserve	BLU11	Low	24.34	20.47
Ring Road SEB area	RIN12	Low	24.31	5.74
McNamara Reserve	MCN01	Low	24.24	4.36
Water Reserve Road Reserve	WRR02	Low	22.85	4.34
Ephriam Tripp Reserve	ETR01	Low	22.05	8.97
Pages Reserve	PAR02	Low	21.98	33.91
Section 696	SEC05	Very Low	20.01	22.56
Wright Island	WIR02	Very Low	19.82	10.5
Graham Shipway Reserve	GRR01	Very Low	19.31	5.16
Bluff Reserve	BLU10	Very Low	18.68	40.99
Bruce Reserve	BRU01	Very Low	18.22	14.7
Adams Reserve	ADR02	Very Low	17.62	19.13
Wright Island	WIR01	Very Low	16.89	27.87
Section 696	SEC03	Very Low	16.03	22.97
Wattle Reserve	WAT01	Very Low	15.94	33.45
Adams Reserve	ADR01	Very Low	15.87	7.35
Pages Reserve	PAR03	Very Low	15.12	18.15
Stock Reserve	STR02	Very Low	14.27	7.93
Hindmarsh River Reserve	HRR04	Very Low	11.94	4.73
Leane Road unmade road reserve	LEURR01	Very Low	10.34	2.38
Ring Road SEB area	RIN10	Very Low	8.41	4.92
Ring Road SEB area	RIN13	Very Low	6.64	4.21
Ring Road SEB area	RIN08	Very Low	3.08	0.45
Ring Road SEB area	RIN07	Very Low	0.95	0.19
Ring Road SEB area	RIN05	Very Low	0.92	0.24



Western Pygmy Possum. Photo by Anthony Abley.

An aerial photograph of a coastal landscape. The foreground shows a rocky coastline with waves crashing against the shore. The middle ground features rolling green hills and a winding road. In the background, there are more hills and a clear blue sky. The overall scene is bright and scenic.

APPENDIX 2

**BIODIVERSITY SCORES AND
PRIORITY CATEGORIES IN
COUNCIL RVMS**

ROADSIDE	RVM#	UBS CATERGORY	UNIT BIODIVERSITY SCORE	TOTAL BIODIVERSITY SCORE
Leane Rd	RVM138a	Very High	82.94	17.58
Thompson Rd	RVM111	High	77.91	77.44
Prouse Rd	RVM150	High	75	9.38
Leane Rd	RVM139a	High	74.38	9.89
Polwarth Drive	RVM132	High	72.95	35.45
Mt Alma Rd	RVM112d	High	72.68	15.7
Hindmarsh Falls Rd	RVM117a	High	70.54	23.21
Mt Alma Rd	RVM112b	High	70.2	48.09
Thompson Rd	RVM136	High	69.85	36.74
Mt Alma Rd	RVM113b	High	69.08	77.51
Polwarth Drive	RVM131	High	68.96	24.69
Strangways Rd	RVM154b	High	68.58	61.72
Strangways Rd	RVM154a	High	68.47	43.82
Strangways Rd	RVM155b	High	67.57	53.17
Tugwell Rd	RVM145	High	66.03	7.26
Waggon Rd	RVM118	High	65.58	2.24
Hindmarsh Falls Rd	RVM116b	High	65.3	15.67
Braeburn Rd	RVM165	High	65.18	23.79
Mt Alma Rd	RVM112c	High	65.07	12.23
Crompton Rd	RVM149	High	64.85	25.29
Hindmarsh Falls Rd	RVM116a	High	64.5	6.45
Springmount Rd	RVM114	High	64.49	34.05
Tugwell Rd	RVM146	High	64.12	19.62
Wilson Hill Rd	RVM147	High	64.12	15.32
Wilson Hill Rd	RVM103a	High	62.79	58.27
Ocean Rd	RVM137	High	62.79	1.63
Mt Alma Rd	RVM112a	High	61.23	29.45
Crompton Rd	RVM167a	High	60.83	11.8
Tugwell Rd	RVM144	High	60.29	31.71
Day Road	RVM126	Moderate	58.79	13.17
Strangways Rd	RVM153a	Moderate	58.42	7.01
Dennis Rd	RVM107b	Moderate	57.98	12.06
Old Range Rd	RVM102	Moderate	57.71	10.5
Cartwright Rd	RVM142b	Moderate	57.54	3.68
Strangways Rd	RVM155a	Moderate	57.44	16.08
Braeburn Rd	RVM166	Moderate	56.07	32.91
Depledge Rd	RVM109	Moderate	55.99	24.8

Halls Creek Rd	RVM128d	Moderate	54.97	13.19
Strangways Rd	RVM153b	Moderate	54.64	8.74
Halls Creek Rd	RVM129d	Moderate	54.59	13.54
Cartwright Rd	RVM143b	Moderate	54.58	3.87
Waggon Rd	RVM127a	Moderate	54.31	1.85
Mt Alma Rd	RVM113c	Moderate	54.06	16.59
Range Rd	RVM110	Moderate	53.07	17.88
Cressbrook Rd	RVM161	Moderate	53	7.58
Mt Alma Rd	RVM113a	Moderate	52.76	44.9
Waitpinga Rd	RVM108	Moderate	52.31	61.31
Nettle Hill Rd	RVM119a	Moderate	52.26	11.55
Halls Creek Rd	RVM128b	Moderate	50.72	5.27
Wislon Hill Rd	RVM103b	Moderate	50.49	12.02
Waitpinga Rd	RVM105	Moderate	50.03	12.96
Dennis Rd	RVM107a	Moderate	49.88	39.5
Dennis Rd	RVM106c	Moderate	49.44	18
Dennis Rd	RVM106a	Moderate	49	25.73
Hammond Rd	RVM157b	Moderate	48.32	16.11
Crompton Rd	RVM168	Moderate	48.28	6.42
Hindmarsh Falls Rd	RVM117b	Moderate	48.25	21.42
Keen Rd	RVM134	Moderate	47.84	41.48
Haskett Rd	RVM115c	Moderate	47.8	49.66
Glenvale Rd	RVM141	Moderate	47.78	9.17
Range Rd	RVM101c	Moderate	47.41	8.63
Range Rd	RVM101a	Moderate	47.37	4.69
Haskett Rd	RVM115a	Moderate	46.82	41.06
Dennis Rd	RVM106b	Moderate	46.27	9.16
Dennis Rd	RVM107c	Moderate	46.07	25.99
Crompton Rd	RVM167b	Moderate	45.65	4.34
Fraser Rd	RVM104	Moderate	45.13	7.76
Finnis Rd	RVM122	Moderate	44.23	27.23
Haskett Rd	RVM164a	Moderate	43.86	30.69
Halls Creek Rd	RVM128a	Moderate	43.41	7.38
Greenhills Rd	RVM124a	Moderate	43.3	11.04
Fraser Rd	RVM135	Moderate	43.22	5.53
Keen Rd	RVM133	Moderate	43.14	31.28
Cartwright Rd	RVM142a	Moderate	43.12	20.96
Glenvale Rd	RVM140	Moderate	42.98	5.2
Greenhills Rd	RVM123	Moderate	42.55	7.06
Springmount Rd	RVM159	Moderate	41.94	15.81

Cartwright Rd	RVM143a	Moderate	40.52	23.7
Tugwell Rd	RVM130	Moderate	40.47	16.15
Greenhills Rd	RVM124b	Moderate	40.13	8.79
Springmount Rd	RVM158	Moderate	40.13	13.36
Halls Creek Rd	RVM129b	Low	39.03	23.07
Leane Rd	RVM138b	Low	38.42	8.41
Halls Creek Rd	RVM129c	Low	38.25	6.62
Halls Creek Rd	RVM129a	Low	38.21	23.77
Cressbrook Rd	RVM160	Low	37.29	15.03
Leane Rd	RVM139b	Low	36.64	8.5
Hammond Rd	RVM156	Low	36.39	16.12
Tugwell Rd	RVM100	Low	35.93	20.95
Attrill Rd	RVM162	Low	35.32	9.75
Wilkins Rd	RVM148	Low	35.19	8.41
Haskett Rd	RVM164b	Low	34.71	3.16
Fuller Rd East	RVM125	Low	34.55	15.96
Waggon Rd	RVM127b	Low	34.51	2.24
Hindmarsh Falls Rd	RVM116c	Low	33.36	14.41
Leane Rd	RVM138d	Low	33.11	8.11
Haskett Rd	RVM115b	Low	32.78	35.86
Leane Rd	RVM139d	Low	32.73	19.7
Halls Creek Rd	RVM128c	Low	30.4	6.72
Nettle Hill Rd	RVM119b	Low	30.38	7.84
Range Rd	RVM101b	Low	30.13	6.78
Mt Alma Rd	RVM152	Low	29.62	4.85
Attrill Rd	RVM163	Low	27.87	8.25
Leane Rd	RVM139c	Low	22.15	4.96
Hammond Rd	RVM157a	Low	21.4	3.45
Leane Rd	RVM138c	Very Low	16.94	3.66
Leane Rd	RVM138e	Very Low	11.43	2.73
Mt Alma Rd	RVM151	Very Low	3.79	0.96

An aerial photograph of a coastal reserve. In the foreground, a wooden boardwalk with railings leads down to a lagoon. The lagoon is surrounded by dense green vegetation. In the background, a residential area with houses is visible on a hillside. The sky is clear and blue.

APPENDIX 3

**TOTAL BIODIVERSITY
SCORES PER RESERVE /
RESERVE 'CLUSTER'**

TOTAL TBS	RESERVE OR RESERVE CLUSTER
3038	Swains Crossing Reserve, Victor Harbor Cemetery, Pages Reserve, Section 696, Inman River Reserve, Oval Road Reserve, Bruce Reserve, Stevenson Reserve, Causeway dune, Soldiers Memorial Reserve dune, G.S. Read Reserve, Inman River Estuary, Franklin Parade North, Kent Reserve dune
2394	Promenade Dune, Bridge Terrace Reserve Dune, Bridge Point Dune, Hindmarsh River Estuary, Olivers Parade Reserve, Hindmarsh River Reserve, Tom Stephens Memorial Reserve, Cootamundra Reserve, Cudmore Reserve, Scott McKenzie Reserve
2220	Bluff Reserve
1433	Hindmarsh Falls Reserve
698	Ring Road SEB area, Morgan Reserve
491	Inman Valley Cemetery
420	Day Road Reserve
282	Dennis Road Reserve
258	Bacchus Reserve, Bacchus Rd SEB (roadside), Bacchus Rd SEB (drain)
250	Stone Reserve Tugwell
202	Waitpinga Stone Reserve, Jagger Rd unmade road reserve, Reid Rd unmade road reserve
165	Cut Hill Reserve
163	Depledge-Range Rd Heysen Trail unmade road reserve
138	Solly Reserve, Stock Reserve
123	Donkey Patch
105	McNamara Reserve
101	Landfill Depot (South), Landfill Depot (North)
89	Robert Barry Reserve, Robert Barry roadside, Robinson Reserve
83	Porters Hill Reserve
70	Brooke Rd Reserve
65	Greenhills Reserve
63	Water Reserve Road Reserve
59	Geoff Walker Reserve
51	Tugwell Water Reserve 664
51	Wilson Hill Lookout
41	Mayfield Wetland
38	Wright Island
33	Wattle Reserve
33	CWA Reserve
27	Tugwell Water Reserve 665
26	Adams Rsv
26	Leane Road unmade road reserve
18	Back Valley Recreation Grounds
16	Ephriam Tripp Reserve, Joy Beer Reserve
16	Freebairn Reserve
13	Crompton Rd unmade road reserve
13	Lorne Mayfield Reserve
11	Hurrell Reserve
8	Cantebury Reserve
5	Graham Shipway Reserve

APPENDIX 4

BUTTERFLIES AND HOST PLANTS

DATA SOURCE: BUTTERFLY CONSERVATION SA INC



PLANT HOST	BUTTERFLY
<i>Acacia longifolia</i> spp. <i>sophorae</i> <i>Acacia pycnantha</i>	Double-spotted Lineblue Icilus blue Wattle-blue
<i>Adriana quadripartita</i>	Bitterbush Blue
<i>Amyema miquelii</i> <i>Amyema pendula</i> ssp. <i>pendula</i>	Broad-margined Azure Satin Azure Southern Purple Azure Wood White
<i>Atriplex australasicum</i> <i>Atriplex cinerea</i> <i>Atriplex semibaccata</i> <i>Atriplex suberecta</i> <i>Einadia nutans</i> <i>Rhagodia candolleana</i>	Saltbush Blue
<i>Cassytha glabella</i> f. <i>dispar</i> <i>Cassytha pubescens</i>	Blotched Dusky-blue
<i>Chrysocephalum apiculatum</i> <i>Chrysocephalum semipapposum</i>	Australian Painted Lady
<i>Cullen australasicum</i>	Chequered Swallowtail Grass-blue
<i>Dillwynia sericea</i>	Fringed Heath-blue
<i>Gahnia trifida</i>	Flame Sedge-skipper Golden-haired Sedge-skipper Varied Sedge-skipper
<i>Gahnia filum</i>	Golden-haired Sedge-skipper Yellowish Sedge-skipper
<i>Convolvulus remotus</i> <i>Goodenia geniculate</i> <i>Goodenia ovata</i> <i>Scaevola albida</i>	Meadow Argus
<i>Hardenbergia violacea</i>	Grass-blue
<i>Coronidium scorpioides</i>	Australian Painted Lady
<i>Imperata cylindrica</i>	Common Brown Southern Dart White-banded Grass Dart
<i>Kennedia prostrata</i> <i>Lotus australis</i>	Grass-blue Long-tailed Pea-blue
<i>Oxalis perennans</i>	Chequered Copper
<i>Lepidosperma carphoides</i> <i>Lepidosperma viscidum</i>	Large Brown Skipper
<i>Microlaena stipoides</i>	Common Brown Ringed Xenica Southern Dart White-banded Grass Dart
<i>Parietaria debilis</i>	Australian Admiral
<i>Poa</i> spp. <i>Themeda triandra</i>	Common Xenica Ringed Xenica
<i>Pultenaea largiflorens</i> <i>Pultenaea acerosa</i>	Fringed Heath-blue Grass-blue Long-tailed Pea-blue
<i>Santalum acuminatum</i>	Wood White

An aerial photograph of a residential area, likely a council reserve or roadsides, with a large body of water in the background. The houses are densely packed, and the water is a deep blue. The sky is a pale, hazy blue. The overall tone is muted and slightly desaturated.

APPENDIX 5

**DECLARED WEEDS IN
COUNCIL RESERVES AND
ROADSIDES**

COMMON NAME	SCIENTIFIC NAME	ALERT WEED	MANAGEMENT STRATEGY
Coolatai Grass	<i>Hyparrhenia hirta</i>		Prevention
Mexican Feathergrass	<i>Nassella tenuissima</i>	Y	Prevention
African Feathergrass	<i>Cenchrus macrorourus</i>		Prevention
Cutleaf Mignonette	<i>Reseda lutea</i>		Eradication
Spiny Rush	<i>Juncus acutus</i>		Eradication
African Weeping Lo-vegrass	<i>Eragrostis curvula</i>		Containment
Asparagus Fern	<i>Asparagus scandens</i>		Containment
Bathurst Burr	<i>Xanthium spinosum</i>		Containment
Berry Heath	<i>Erica baccans</i>		Containment
Bluebell Creeper	<i>Billardiera heterophylla</i>		Containment
Caltrop	<i>Tribulus terrestris</i>		Containment
Cape Tulip	<i>Moraea flaccida</i>		Containment
English Broom	<i>Cytisus scoparius</i>		Containment
Flax-leaf Broom	<i>Genista linifolius</i>		Containment
Fountain Grass	<i>Cenchrus setaceus</i>		Containment
Horehound	<i>Marrubium vulgare</i>		Containment
Three Corner Jack	<i>Emex australis</i>		Containment
Tree Heath	<i>Erica arborea</i>		Containment
White Weeping Broom	<i>Retama monosperma/raetam</i>		Containment
African Boxthorn	<i>Lycium ferocissimum</i>		Asset protection
Aleppo Pine	<i>Pinus halepensis</i>		Asset protection
Apple of Sodom	<i>Solanum linnaeanum</i>		Asset protection
Arum Lily	<i>Zantedeschia aethiopica</i>		Asset protection
Athel Pine	<i>Tamarix aphylla</i>		Asset protection
Blackberry	<i>Rubus fruticosus</i>		Asset protection
Boneseed	<i>Chrysanthemoides monilifera</i>		Asset protection
Bridal Creeper	<i>Asparagus asparagoides</i>		Asset protection
Bridal Veil	<i>Asparagus declinatus</i>		Asset protection
Bulbil Watsonia	<i>Watsonia meriana var. bulbil-lifera</i>		Asset protection
Cape Broom	<i>Genista monspessulana</i>		Asset protection
Coastal Tea-tree	<i>Leptospermum laevigatum</i>		Asset protection
Desert Ash	<i>Fraxinus angustifolia</i>		Asset protection
Dog Rose	<i>Rosa canina</i>		Asset protection
Dolichos Pea	<i>Dipogon lignosus</i>		Asset protection
False Caper	<i>Euphorbia terracina</i>		Asset protection
Field Garlic	<i>Allium vineale</i>		Asset protection

Gazania	<i>Gazania spp.</i>		Asset protection
Giant Reed	<i>Arundo donax</i>		Asset protection
Gorse	<i>Ulex europaeus</i>		Asset protection
Ground Asparagus	<i>Asparagus aetheopicus</i>		Asset protection
Italian Buckthorn	<i>Rhamnus alaternus</i>		Asset protection
Lincoln Weed	<i>Diplotaxis tenuifolia</i>		Asset protection
Mirror Bush	<i>Coprosma repens</i>		Asset protection
Olive	<i>Olea europaea</i>		Asset protection
Ornamental Asparagus	<i>Asparagus africanus</i>		Asset protection
Pampas Grasses	<i>Cortaderia spp.</i>		Asset protection
Polygala	<i>Polygala myrtifolia</i>		Asset protection
Salvation Jane	<i>Echium plantagineum</i>		Asset protection
Skeleton Weed	<i>Chondrilla juncea</i>		Asset protection
Swamp Oak	<i>Casuarina glauca/obesa</i>		Asset protection
Sweet Briar	<i>Rosa rubiginosa</i>		Asset protection
Sweet Pittosporum	<i>Pittosporum undulatum</i>		Asset protection
Three Corner Garlic	<i>Allium triquetrum</i>		Asset protection
Willow	<i>Salix spp.</i>		Asset protection



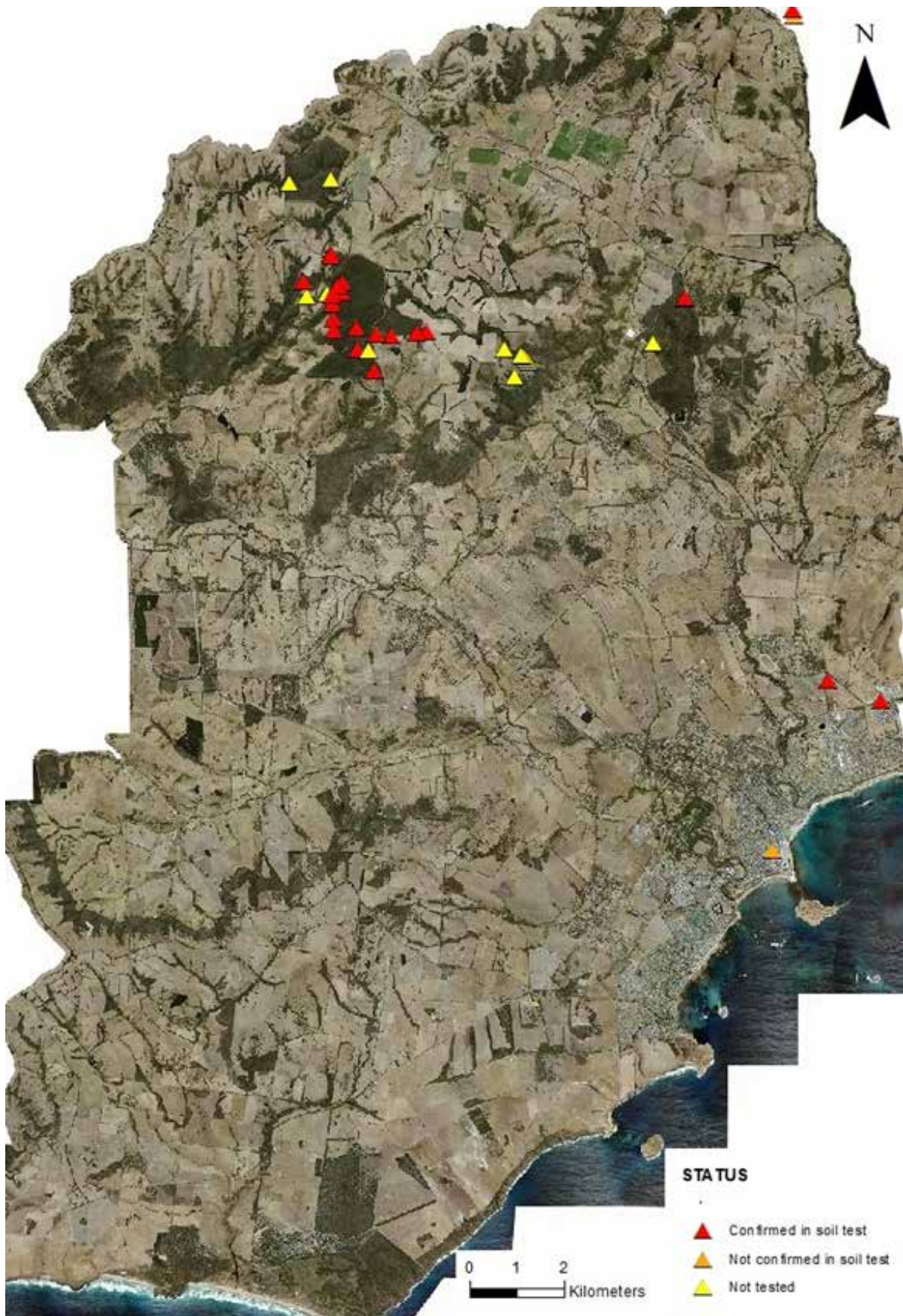
A photograph of two individuals, likely workers or researchers, in a field. They are wearing bright orange high-visibility shirts and dark pants. One person is holding a pair of red-handled shears, and they appear to be examining or working on a plant. The background consists of tall grasses and trees, with a blue sky visible. The entire image has a blue color overlay.

APPENDIX 6

**LOCATIONS FOR WEEDS
TO BE MONITORED AND
ERADICATED**

APPENDIX 7

**PHYTOPHTHORA
CINNAMOMI LOCATIONS**



city of
Victor Harbor



STAY IN TOUCH

PO Box 11
Victor Harbor SA 5211

Ph. (08) 8551 0500
Fax. (08) 8551 0501

email: localgov@victor.sa.gov.au
www.victor.sa.gov.au



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