Conservation Action Plan:

Wilsons Promontory

Parks and reserves managed by Parks Victoria

Iteration 2

July 2025

Parks VICTORIA

VICTORIA State Government

Acknowledgement of Country

Victoria's network of parks and reserves form the core of Aboriginal cultural landscapes, which have been modified over many thousands of years of occupation. They are reflections of how Aboriginal people engaged with their world and experienced their surroundings and are the product of thousands of generations of economic activity, material culture and settlement patterns. The landscapes we see today are influenced by the skills, knowledge and activities of Aboriginal land managers. Parks Victoria acknowledges the Traditional Owners of these cultural landscapes, recognising their continuing connection to Victoria's parks and reserves and their ongoing role in caring for Country.

Authorised and published by Parks Victoria
Level 10, 535 Bourke St, Melbourne

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Foreword

I recognise the diversity of cultures, deep connections, rights and responsibilities that Traditional Owners have over the lands and waters covered by the Wilsons Promontory Conservation Action Plan.

Parks Victoria manages more than 4 million hectares of parks and reserves, enabling people to experience and recreate in Victoria's most spectacular and pristine natural environments. Central to our role is the protection and enhancement of these areas, and the natural and cultural values that make them so special.

Wilsons Promontory is one on the most visited parts of Parks Victoria's estate – it is also one of the most important for biodiversity. This Wilsons Promontory Conservation Action Plan is guided by Protecting Victoria's Environment – Biodiversity 2037, Victoria's plan to stop the decline of our native plants and animals.

The plan outlines our understanding of the major threats to nature and wildlife, the impact of a changing climate, and the actions that we can take together, with Traditional Owners, park visitors and other partners, in caring for and improving the health of this unique part of Victoria.

The Wilsons Promontory Conservation Action Plan builds on recent investments to uplift and restore natural values in this landscape, including the Wilsons Promontory Sanctuary project. The sanctuary will help make Wilsons Promontory National Park a world-class climate change refuge and a safe haven for Victoria's wildlife, taking full advantage of the unique and strategic advantages this landscape provides to prevent new incursions of invasive species.

By establishing the sanctuary, and through the actions in this Wilsons Promontory Conservation Action Plan, we aim to protect and restore natural and cultural values at Wilsons Promontory for current and future generations. We will only be successful in achieving this through dedicated effort and strong partnerships with Traditional Owners, scientists, community groups and businesses.

By working together to implement this plan, I look forward to tangible benefits for our environment, for parks visitors and for local communities.

Lee Miezis
Chief Executive Officer

Managing Country Together

Traditional Owners are the custodians of a living cultural heritage. The forests, rivers, coastal areas, plants and animals are all part of Country and the cultural identity of Traditional Owners. Protecting, managing and enjoying the land are important parts of this connection and Traditional Owner knowledge and perspectives are critical in best practice land and natural resource management to bring benefits to both the parks and the whole community.

The Wilsons Promontory Parks Landscape is part of an Aboriginal cultural landscape and contains physical and intangible heritage. The Boonwurrung, Bunurong and Gunaikurnai Traditional Owner groups identify Wilsons Promontory as their traditional land. As Traditional Owners, the Boonwurrung, Bunurong and Gunaikurnai have been part of this landscape for tens of thousands of years and maintain a deep and continuing connection to these lands, water and places.

The Wilsons Promontory Parks Landscape is rich in Aboriginal cultural heritage, both tangible sites and intangible heritage, closely linked to traditional stories and embedded in customary access to, and use of, Country. Careful modification of the environment using fire was an important land management tool, used to regenerate vegetation attracting game species such as kangaroo and wallaby. It was also used to clear shrubs and tussocks allowing food plant species to thrive. Supporting the inclusion of traditional ecological knowledge in land management practices can assist in healing Country and achieving conservation outcomes, including through better understanding of environmental drivers such as cultural water flows and rekindling cultural burning practices.

This Conservation Action Plan identifies and describes management actions and outcomes focusing on ecological or natural values. These may intersect with, but are not the same as, Aboriginal cultural values including biocultural values.

This Conservation Action Plan is a Parks Victoria-led plan focused on prioritising and directing internal conservation effort at the Wilsons Promontory Parks Landscape over the next fifteen years and provides a western scientific perspective to conservation management. This Plan is one of several inputs to the overarching Landscape Management Plan for this landscape, which will represent cultural values, western scientific values and visitor experience.

Opportunities to apply traditional ecological knowledge and work in partnership with Traditional Owners will be sought during the implementation of this plan. This will be guided by the *Traditional Owners Governance and Engagement Framework at Wilsons Promontory National Park (September 2022)* that was developed with representatives of the Bunurong Land Council Aboriginal Corporation, Gunaikurnai Land and Waters Aboriginal Corporation and the Boonwurrung Land and Sea Council. This framework will help to embed Managing Country Together principles in delivery of conservation management at Wilsons Promontory, and how we may work together to recognise Traditional Owner connection and care for Country.

Summary

The Wilsons Promontory Park Landscape includes mountains, forests and fern gullies fringed by granite headlands, sandy beaches and sheltered coves backed by coastal dunes, heathlands and swamps. Its topography and unique position also creates a zone of diverse marine habitats. The area covered by this plan forms part of an Aboriginal cultural landscape that contains values and places that are significant to Traditional Owners.

This Conservation Action Plan is the second iteration for the Wilsons Promontory Parks Landscape, and features updated threats, strategies and outcomes following a review of the first iteration of the plan and additional work undertaken through the Wilsons Promontory Sanctuary Project. It defines and prioritises conservation strategies for this Parks Landscape for the period to 2039, and broadly describes the expected outcomes of these strategies. The plan outlines what can be realistically achieved to tackle the threats that pose the most risk to conservation assets. The Conservation Action Plan continues to direct the achievement of the conservation vision:

The resilience of natural assets in the Wilsons Promontory Parks Landscape is increased and ecosystem services are maintained in the face of climate change and other stressors

Parks Victoria is responsible for managing over four million hectares of Victoria's most intact natural habitats and recognises the critical importance of working with Australia's First Peoples to manage parks and reserves in a culturally sensitive and ecologically sympathetic way. Parks Victoria appreciates the importance of long-term, respectful and meaningful partnerships with Traditional Owners, the opportunity to understand, share and celebrate Aboriginal cultural values, and the need for greater accountability and responsibility for managing risks to Aboriginal cultural heritage. Parks Victoria's Managing Country Together Framework outlines a robust agency-wide approach that provides a strong foundation for partnerships to grow and evolve and become integrated into the way the organisation works.

The development, implementation and review of the plan follows Parks Victoria's cyclical 10-step conservation action planning and adaptive management process. The plan revision updates the first seven steps in this process, which includes scoping, identifying conservation assets and their condition, assessing threats to asset condition, developing strategies and actions to mitigate them, and articulating performance measures.

Six terrestrial and four marine conservation assets have been identified in the Wilsons Promontory Parks Landscape. Within each of these assets a range of nested assets, such as threatened species and important ecological assemblages, have also been identified. The plan also identifies a range of key ecological attributes (components that are believed to best reflect the health of the asset). The plan describes their current condition (very good, good, fair, poor) and the trend in condition (improving, stable, declining), and sets the anticipated future condition of each key ecological attribute. These measures then allow the overall condition of each asset to be assessed.

Terrestrial conservation assets

- Coastal (including islands) is in very good condition
- Mixed Dry Forest and Woodland, and Riparian and Wetland are mostly in good condition
- Heathland is in fair condition
- Coastal Grassy Woodland is in poor condition
- Wet Forest and Rainforest is in largely unknown condition, with some good and very good components

Marine conservation assets

- Seagrass, Subtidal Reef, Unvegetated Soft Sediment, and Water Column are all in very good condition

The trends in condition are mostly stable, with some notable exceptions. Coastal Grassy Woodland, though in poor condition, has seen recent improvement in some areas and is improving. The Heathland and Subtidal Reefs assets have some stable and some declining attributes, and the Coastal asset has some attributes that are stable, some improving and some declining. While the Wet Forest and Rainforest asset is generally demonstrating a stable condition, the trends for many attributes are unknown. The desired future status of the majority of assets is good to very good, with the exception of the Coastal Grassy Woodland asset, which is desired to improve to fair condition. Achieving these desired future statuses is dependent on the implementation of all the listed strategies.

Eleven threatening processes to the conservation assets in the Parks Landscape are identified in the plan. In assessing risks, the compounding effects of climate change have been considered. Seven of these threats are considered to pose extreme or high risk and are therefore the priority threats considered in this plan. They are:

- Inappropriate fire regimes
- Weed and pathogen invasion
- Total grazing and browsing pressure
- Predation by foxes and cats
- Marine invasive or overabundant species
- Human disturbance (visitor impacts and natural resource use)
- Climate change

The ability of species and ecosystems to persist in a changing climate will be determined by their capacity to adapt to those changes. Some conservation assets and the nested assets within them will be more resilient than others and be better able to withstand the impacts of climate change. Conservation strategies have been developed to mitigate threats, including the compounding effect of climate change, to improve the assets' capacity to adapt. Climate change is a large focus of this plan and specific adaptation actions have been designed to, where feasible, maintain ecosystem function with altered composition, facilitate movement of communities and species, or maximise species persistence through managing in-situ or ex-situ refugia.

The following conservation strategies will be undertaken to tackle these threats. They have been selected for their impact, feasibility and cost in achieving the desired conservation goals.

- **Landscape-scale ecological burn program** — a coordinated and well-informed approach to fire management will ensure planned burns are conducted within an appropriate fire regime and protect high value assets and areas from future fire, and that fire management and conservation needs are met before, during and after bushfire.
- **Integrated weed and pathogen control program** — weeds, overabundant native flora species and pathogens are managed to reduce their spread, establishment and impact with a focus on high risk species in high value sites.
- **Herbivore management** — targeted monitoring and control of deer, rabbits and key native species through integrated control methods to achieve very low herbivore population densities and improved vegetation quality.
- **Sustained control of introduced predators** — sustained control of foxes and cats using a range of control methods and consistent monitoring will reduce introduced predators to very low levels, supporting key native species.
- **Managing marine pests and overabundant species** — increasing community awareness of the impacts of marine pests, consistent monitoring and the ability to respond rapidly to detected pest incursions or overabundant species will reduce the likelihood of new populations establishing.

- **Restoration of Coastal grassy Woodland, Heathland and Wet Forests** — assessing condition and supporting adaptive decision-making to restore degraded Coastal Grassy Woodland, Heathland and Wet Forests will increase recruitment of key species and the overall health of conservation assets.
- **Reducing the impacts of human disturbance** — targeted education and compliance reduce the impacts of recreation, illegal activities and resource extraction, encouraging the public to enjoy sustainable nature-based tourism while reducing the impacts of illegal activities.
- **Augmentation, reintroduction and introduction of key native species** — establishing partnerships, eliminating threats to terrestrial conservation assets and assessing the viability of translocation or reintroduction of key native species supports endangered species and the role of Wilsons Promontory as a climate refuge.
- **Collaborative partnerships to address key knowledge gaps** — the development and maintenance of partnerships and collaborations with Traditional Owners, research institutes and agencies and community groups will increase the effectiveness and efficiency of management at Wilsons Promontory and build knowledge to support responses to climate change.
- **Building climate resilience and refugia** — optimising current management, protecting refugia, identifying knowledge gaps, and proactively preparing for extreme climate scenarios will maintain, restore or direct ecosystems and species.

For each strategy, a results chain has been developed to help guide implementation and identify monitoring indicators. These chains test the ability of Parks Victoria management to achieve the conservation outcomes defined for each of the assets.

1 Background

1.1 Adaptive management

Conservation action planning is an important component of Parks Victoria's approach to adaptive management and evidence-based decision making. It uses a collaborative approach to identify conservation priorities and develop strategies to address those priorities. These strategies are designed to achieve defined and measurable conservation outcomes.

Through conservation action planning, Parks Victoria identifies and focusses on strategies that target clearly defined elements of the natural environment (conservation assets) for which threats have been identified and for which the success of strategies can be measured. Understanding how to best use the resources available for conservation to achieve the greatest improvement in the overall health of ecosystems is a complex challenge for land managers.

Conservation experience, scientific understanding, local environmental knowledge, traditional ecological knowledge, and strategic thinking are all key components of successful conservation action planning.

Conservation strategies have been developed and prioritised using the best available knowledge and will enable specific operational activities to be implemented, monitored for success, and further refined. The plan complements existing park management plans and may be used to guide the development of future joint management plans. Conservation strategies detailed in park management plans have been reviewed during the conservation action planning process and updated for inclusion where relevant.

The plan's purpose is to guide the management of conservation values and to articulate Parks Victoria's conservation priorities and strategies to stakeholders, land management partners and the public.

1.2 Parks landscapes

Park landscapes are classified according to a combination of ecological attributes, landforms and administrative boundaries. There are 18 park landscapes across Victoria (Figure 1.1). They form a logical unit for applying conservation action planning and delivering specific operational activities to parks and reserves in these park landscapes.

1.3 Planning method

Parks Victoria is using the conservation action planning methodology developed by The Nature Conservancy. This methodology is based on the Open Standards for the Practice of Conservation developed by Conservation Measures Partnership, an international partnership of conservation organisations.

Parks Victoria's approach to conservation action planning is suitable for planning conservation projects with joint management partners, in partnership with all stakeholders, for land that it manages. It is consistent with the approach used by numerous other agencies that manage conservation lands in Victoria.

The emphasis is on identifying strategies that tackle the high-risk threats to priority conservation assets and their key ecological attributes, and that will contribute most to achieving the best possible conservation outcomes, taking into account the vulnerabilities of conservation assets to climate change. The impacts of climate change on threatening processes, and adaptation measures to mitigate them, are considered in the planning process.

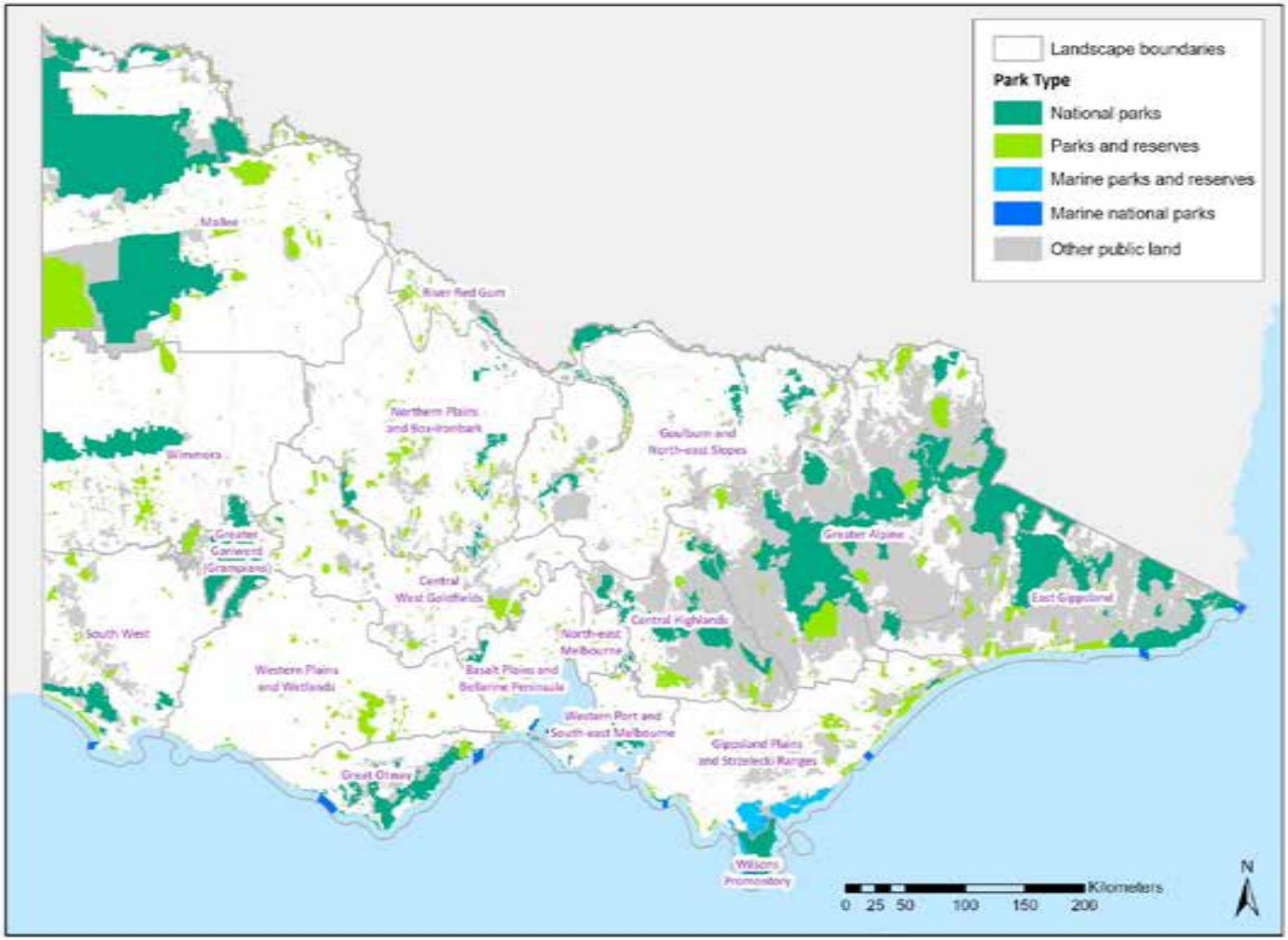


Figure 1.1 *Parks Victoria's Parks Landscapes.*

Parks Victoria's conservation action planning process involves a series of conservation action planning workshops, with participants from Parks Victoria and other organisations, and follows 10 sequential steps (Figure 1.2):

1. Scope planning, people and resources.
2. Identify conservation assets.
3. Identify critical threats.
4. Develop conservation outcomes, objectives and strategies.
5. Develop monitoring and evaluation plan.
6. Develop implementation plan.
7. Resource allocation and project management
8. Implement operational plan.
9. Evaluate results and adapt plan.
10. Share learning.

This Conservation Action Plan is an output of steps 1 to 4 and will provide directions for environmental conservation management for the next 15 years. The implementation of the conservation strategies (steps 8 and 9) is undertaken by regional staff at the operational level.

After 5 years the plan will be reviewed again (step 10), and progress will be evaluated against outcomes identified for the conservation assets, threat mitigation objectives and implementation of identified priority actions, in order to revise the plan.

Figure 1.2 *The 10-step conservation action planning process.*

1.4 The Wilsons Promontory Conservation Action Plan 2017

The first iteration of this Conservation Action Plan was published in January 2017, identifying ten Conservation Assets, five priority threatening processes, seven strategies, and a series of activity, threat and outcomes measures for each strategy.

Five years after the first plan was published, a review was undertaken and a monitoring, evaluation and learning report produced (Parks Victoria 2022). A partial amount of progress has been made in achieving the conservation outcomes set out in the original plan. The greatest progress in achieving conservation outcomes was achieved for marine management, and the least for collaborative partnerships, although progress for these strategies is based on measures that were described in the original plan which have not necessarily captured new elements of management since its publication. Over the past five years, staff delivered the largest planned burn program at Wilsons Promontory within the last 20 years, which has been instrumental for the health of multiple ecosystems. Reviewed condition ratings for each conservation asset were largely stable, with declines observed for Heathland and Coastal (including islands) ecosystems.

Gaps in funding and implementation planning were identified as the main factors that impeded the feasibility of achieving progress in all outcomes laid out for 2031. It was recommended from this review that an implementation plan and new monitoring, evaluation and learning plan should be developed with a costing approach to guide the implementation of actions and monitoring over the next five years. Formal, strategic implementation planning with discrete units of work that can be prioritised and costed will be essential to achieve adequate progress of the conservation outcomes of the revised Conservation Action Plan.

Since the publication of the original plan, several new programs and projects for Wilsons Promontory have been developed and undertaken, providing additional research outputs, data sources, funding opportunities and planning outputs that have been recognised in the new iteration of the Conservation Action Plan. Furthermore, the conservation action planning process has been improved and additional elements have been added, such as goals for key ecological attributes. Therefore, there are notable changes between the first and second iteration of this plan.

Where the review of the original Conservation Action Plan highlighted the need to update and adapt its content, the revision of outcomes and strategies have largely been drawn from the Prom Sanctuary project and climate change scenario planning. Updates to the condition and trend of conservation assets and key ecological attributes are presented in the conservation asset descriptions in Section 4, and renewed conservation outcomes for these assets are described, based on current knowledge of the state of the landscape, threats to conservation outcomes, and a review of the feasibility and priorities of the listed strategies and actions. As part of the adaptive management process, the strategies in Section 6 and their respective results chains have also been updated. The implementation of the Wilsons Promontory Conservation Action Plan will follow the strategies and results chains of this second iteration.

1.5 Climate change

Climate change is an extraordinary challenge that affects every aspect of nature conservation. Predicted warming and changes to precipitation patterns of south-east Australia will increasingly challenge the resilience of many ecosystems across the state and the species that live within them. Further shifts in weather systems are expected to bring hotter conditions, drier conditions and more droughts, reduced stream flows, changes to floodplain inundation regimes, more fires (including increased fire severity and frequency), more floods and storms (including more extreme rainfall events and storm surges), rising sea levels, and warmer and more acidic oceans.

The many and varied impacts of climate change will have intensifying impacts on Victoria's biological systems and species that are unused to such rapid change, potentially causing the depletion or extinction of species, major change in ecosystem structure, major change to landforms, water bodies and coasts, and loss or damage to ecosystem services such as clean air and water, pollination and flood mitigation.

In some cases, climate change will have a profound impact on the functioning of ecosystems to the extent that some ecosystems may be highly transformed, such as coastal ecosystems that are overtaken by sea level rise. Victoria's parks

and reserves are essential for the persistence of the species they support, because they offer cool or moist climate refugia for many species which already have relict distributions. Protected areas also sequester and store carbon. However, their legacy of land degradation and fragmentation hampers many processes available to species to mitigate climate change impacts, such as shifting their distribution to follow movements in suitable climatic ranges. Climate change can also influence the success of project delivery (e.g. where the increased severity of drought or flood provides sub-optimal conditions for pest control) and project outcomes.

Dealing with the impacts of climate change is a formidable and unprecedented challenge in its own right but it also exacerbates other pressures, including impacts of pests, weeds and diseases, and recent high population growth with expanding urban and coastal development.

Decision-making framework

In some cases, the future form of ecosystems may not necessarily end up reflecting the recent or older past; e.g. forests may transition to shrublands or open grassy woodlands. However, these transformations may be able to be managed to ensure that nature is given its best chance to survive, adapt, evolve and thrive.

The Resist-Accept-Direct (RAD) framework for managing ecosystems transforming under climate change encompasses the uncertainty of future climate and broadens management options beyond simply restoring ecosystems to an original or previous state. In addition to the traditional 'resist' approach of protected area management, the RAD framework also considers whether accepting change or directing it along a preferred pathway might be more appropriate, as illustrated in Figure 1.3.

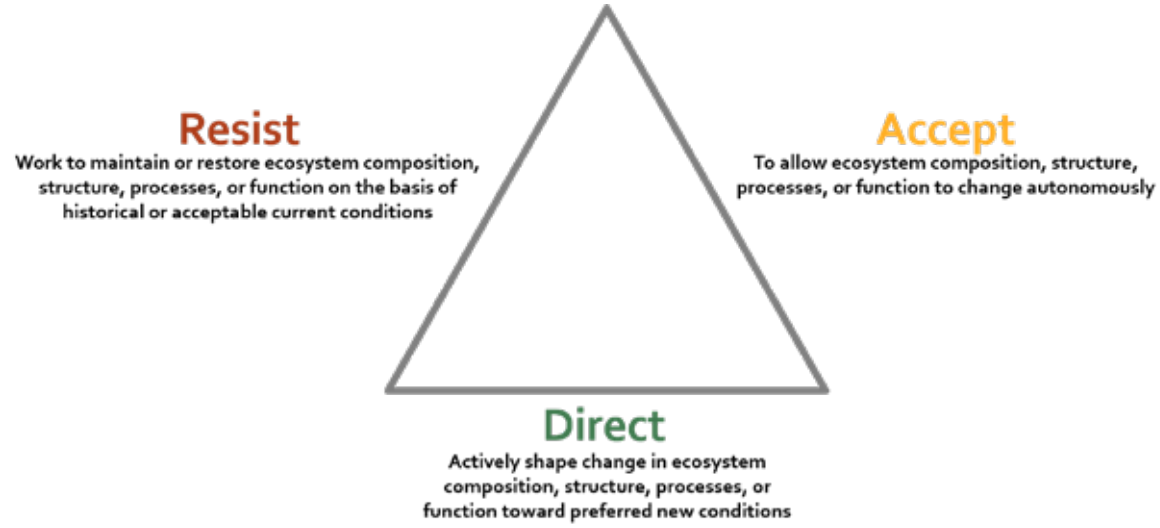


Figure 1.3. *The RAD framework's three approaches for making management decisions for systems undergoing ecosystem transformation (USGS 2021).*

While commitments to increase available habitat and resilience or recover or restore ecosystems that are struggling may be more aligned to the 'resist' pathway, the RAD framework provides additional and potentially more feasible management options.

For example, the 'accept' pathway provides pragmatic actions for ecosystems unlikely to bounce back from drastic change, meaning that effort can be focussed where it will be most effective. 'Accept' options may include a focus on the protection of singular elements within the broader transitioning area, extracting and/or translocating vulnerable species to establish or bolster other populations, creating insurance populations for threatened species, and fostering cross-tenure collaborations to broaden Parks Victoria's influence and management options.

Similarly, the 'direct' pathway provides an avenue to identify ecosystems that cannot or will not recover from transformational change and determine alternate states that will maintain some desired ecosystem functions within the broader landscape. Transformed or novel ecosystems may provide opportunities for the immigration or

translocation of species being displaced from elsewhere, under a broad-scale and potentially cross-tenure approach. To support this pathway, the protection of climate-buffered refuges that may become valuable habitat for vulnerable species across the broader landscape or host translocated species will be important 'resist' actions.

As a decision-making framework, RAD can help to minimise extinctions and compounding threats, maintain habitat complexity and maximise native species diversity when protected area management is viewed holistically and collaboratively. Within Parks Victoria's adaptive management cycle, regular assessment of whether RAD objectives and goals continue to be feasible under revised climate change projections or following extreme weather or climate events, enables a flexible response to identified management triggers.

Planning for uncertainty

Climate adaptation planning represents a significant challenge for conservation planning, due to the long-time horizons, the dramatic and potentially transformative nature of the impacts, and uncertainty associated with the projected changes for many climate drivers. In many cases, planning based on just average climate projections or single climate drivers in isolation will hamper the development of robust strategies that adequately take into account the deep uncertainties and many interacting effects associated with climate change.

To account for uncertainty, this plan uses a 'climate futures' approach, where the future scenarios informing the plan are based on projections from a manageable subset of climate models. Doing so ensures that each scenario considered is a plausible (i.e. internally consistent) and comprehensive, yet divergent, representation of the future climate. Both outcomes and actions can then be generated and assessed for feasibility under different potential climate scenarios and adjusted accordingly.

Climate futures are presented as narrative scenarios that allow stakeholders and community to easily understand the breadth of potential conditions and impacts and understand the planning decisions made. Using this approach increases the longevity of plans and strategies and provides land managers with the opportunity to identify 'no-regret' actions that are unlikely to be wasted effort regardless of the trajectories of future climate.

Where the RAD framework is a useful tool to help land managers make decisions about what approach to take, climate change scenario planning is the process that provides Parks Victoria the information to make those decisions and choose appropriate actions. A full description of the climate change scenario planning process can be found in Appendix G (see also Section 5.7).

1.6 The Wilsons Promontory Sanctuary

Recently, significant Victorian and Australian Government funding was allocated to programs designed to uplift current management and restore the Wilsons Promontory landscape and assets, including the Wilsons Promontory revitalisation program (targeting visitor assets) and the Wilsons Promontory Sanctuary project.

At Victoria's southern-most point, and surrounded by the cooler water of Bass Strait, Wilsons Promontory is regularly cooler than the rest of the mainland. As climate change progresses with increased warming and drying, and rising sea surface temperatures, it is expected that the promontory will continue to experience a lag in the intensity of these impacts, making it a climate change refuge capable of supporting temperature-sensitive species and communities. The important natural features of this landscape may represent the most resilient location for Wilsons Promontory's unique marine and terrestrial biodiversity relative to the rest of Victoria. However, it will only remain a functional climate refuge as long as it is well protected against threats, both anthropogenic and natural.

The Wilsons Promontory Sanctuary project recognises that Wilsons Promontory is a relatively untouched climate change haven in Victoria and is focussed on addressing key ecosystem issues and opportunities for habitat and species restoration. Delivery of an effective sanctuary involves changing the way we design and implement conservation programs, with clear goals of landscape-scale invasive species suppression, supported by a predator exclusion fence, habitat restoration, fire management, native animal risk management and ongoing monitoring and evaluation to support adaptive and evidence-based decision making.

The Sanctuary project is designed to take advantage of the landscape's unique values and characteristics to protect and restore elements of Wilsons Promontory over the next 20 years and informs the conservation vision and strategies of the Conservation Action Plan. The plans of the Sanctuary project comprise:

- Coastal Grassy Woodlands Restoration Implementation Plan (CWGRP)
- Heathlands Restoration Implementation Plan (HRP)
- Wet Forest and Rainforest Restoration Implementation Plan (WFRRP)
- Fire Management Strategy (FMS)
- Native Wildlife Risk Management Plan (NWRMP)
- Wildlife Restoration Plan (WRP)
- Threat Management Strategy (TMS)

As these Sanctuary plans describe a large portion of the current understanding of the Wilsons Promontory ecosystems, processes, threats and strategies, they have been used and referenced throughout the Wilsons Promontory Conservation Action Plan in relevant sections using the acronyms listed above. Actions, activities, outcomes, objectives and indicators from the Sanctuary plans have been used extensively throughout the Conservation Action Plan and referenced according to their acronym code and location. Additional or more detailed information should be sought from the relevant Sanctuary plans referenced herein.

2 Scope

2.1 Geographic scope

The Wilsons Promontory Park Landscape covers the southern-most part of the Australian mainland with continuous coverage of parks and reserves from Yanakie Isthmus to the surrounding islands, totalling over 70 000 hectares of park estate. The Wilsons Promontory Parks Landscape is home to many endangered plant and animal species and protects countless significant cultural heritage places.

This landscape is characterised by mountains, forests and fern gullies fringed by granite headlands, sandy beaches and sheltered coves backed by coastal dunes, heathlands and swamps. The unique position within the adjoining land and seascapes isolates Wilsons Promontory, creating a zone of diverse marine habitats. As the southern-most area of mainland, this landscape experiences a cooler climate, making it a climate refuge for many species and ecosystems.

The Wilsons Promontory Parks Landscape is one of the most well-known and frequented recreational areas in the state, providing hundreds of unique views and tourism experiences for Victorians and visitors.

The parks and reserves of this landscape include:

Park/reserve name	Area (hectares)	IUCN Protected Areas Category
Wilsons Promontory National Park	48 244	2 – National Park
Seal Island Wildlife Reserve	36	Ia – Strict Nature Reserve
Wilsons Promontory Marine National Park	15 604	2 – National Park
Wilsons Promontory Marine Park	5 566	6 – Protected area with sustainable use for natural resources
Wilsons Promontory Marine Reserve	627	6 – Protected area with sustainable use of natural resources

Wilsons Promontory National Park was the first national park to be declared in Victoria. It has outstanding conservation, recreation and wilderness values, and has been designated by UNESCO as a Biosphere Reserve. The National Park is surrounded by a number of other areas with high natural values. These include the Corner Inlet and Shallow Inlet Marine and Coastal Parks, Wilsons Promontory Marine National Park, Wilsons Promontory Marine Park, and Wilsons Promontory Marine Reserve. The adjacent Corner Inlet area, up to the high tide mark, which is also a designated Ramsar site, has been included within the Gippsland Plains and Strzelecki Ranges Parks Landscape because of its catchment connectivity. The seagrass beds, intertidal mudflats and mangroves associated with this area are therefore not included in this plan.

2.2 Significant natural values

The natural values of significance identified in this Parks Landscape are:

- entire promontory of national geological and geomorphological significance, containing a number of sites of State and regional significance
- diverse vegetation communities, including warm temperate and cool temperate rainforest, tall open forests, woodlands, heathlands, and swamp and coastal communities
- the occurrence of 21% of Victoria's known vascular flora species

- several biogeographically significant species, including a number of plant species and communities which have associations with other parts of Australia or are threatened or at the limits of their distribution
- unmodified rivers and streams with no introduced fish species
- unique populations of threatened fauna species, including the Pookila (also known as New Holland Mouse), Long-nosed Potoroo, Ground Parrot, White-bellied Sea-Eagle, Swamp Skink, Eastern Bristlebird, and the damselfly *Hemiphlebia mirabilis*
- half of Victoria's bird species
- intertidal mudflats that are an internationally important habitat for migratory wading birds
- Victoria's southernmost and largest Marine National Park
- the only Marine National Park within the Flinders marine bioregion
- granite habitats, which are unusual in Victorian marine waters, including extensive heavy reefs with smooth surfaces, boulders and rubble, and low profile reefs
- biological communities with distinct biogeographic patterns, including shallow subtidal reefs, deep subtidal reefs, intertidal rocky shores, sandy beaches, seagrass and subtidal soft substrates
- abundant and diverse marine flora and fauna, including hundreds of fish species and invertebrates such as sponges, ascidians, sea whips and bryozoans
- 126 species of marine flora and fauna at, or presumed to be at, their eastern or western distributional limits
- important breeding populations of several seabird species, including Fairy Prions and diving petrels, Australian Fur Seals and New Zealand Fur Seals, including one of the largest Australian Fur Seal breeding populations in the state
- important habitat for several threatened shorebird species, including species listed under international migratory bird agreements
- three Cabbage Fan-palm plants listed as critically endangered in Victoria that were transplanted 1916 as an early attempt at species conservation and are now considered of significant cultural heritage, historic and scientific value
- part of a nationally significant area for the recovery of Great White Shark populations
- outstanding landscapes, seascapes and spectacular underwater scenery
- opportunities for scientific investigation and learning in an area with minimal human disturbance
- More than 2 400 recorded species.

Species that are subject to Recovery Plans made under the EPBC Act or Action Statements under the FFG Act are listed at Appendix B.

Commonly used terms and abbreviations

CMA	Catchment Management Authority.
DEECA	Victorian Department of Energy, Environment and Climate Action.
EPBC	Relating to the *Environment Protection and Biodiversity Conservation Act 1999*, under which threatened species, communities and locations can be listed for protection; administered by the Commonwealth Department of the Agriculture, Water and the Environment.
EVC	Ecological Vegetation Class, a vegetation classification system based on floristic species composition, structural features, and ecological traits of the community.
EVD	Ecological Vegetation Division, a grouping of Ecological Vegetation Classes based on broad similarities.
FFG	Relating to the Victorian *Flora and Fauna Guarantee Act 1988*, under which threatened species and communities can be listed for protection against potentially threatening processes.
Functional group	A group of species which share similar characteristics (e.g. colonial nesting birds, riverine / wetland specialist fish).
IUCN	International Union for Conservation of Nature.

Figure 2.1 *Geographic scope of conservation planning for the Wilsons Promontory Parks Landscape, showing each park and reserve.*

2.3 Cultural significance

Wilsons Promontory National Park has an early history of Aboriginal occupation, dating back at least 6 500 years. The area covered by this plan, including the Marine Protected Areas, is significant to many people in the community, especially Traditional Owners, who are traditionally and culturally associated with the area. The land and waters of the planning area form part of an Aboriginal cultural landscape and contains physical and intangible heritage. Traditional cultural landscapes are both material and symbolic, and include Traditional Owner history, practices, plants, animals, ancestors, song lines, physical structures, trade routes and many other significant cultural connections to Country (FVTOC 2021).

The Boonwurrung, Bunurong and Gunaikurnai Traditional Owner groups identify Wilsons Promontory as their traditional land. As Traditional Owners, the Boonwurrung, Bunurong and Gunaikurnai have been part of this landscape for tens of thousands of years and maintain a deep and continuing connection to these lands, water and places.

The Gunaikurnai Whole of Country Plan describes the Wilsons Promontory complex of marine and terrestrial parks and reserves as a place of natural and cultural significance.

Wilsons Promontory National Park also has a long history of resource use and commerce dating back to the early 19th century, including sealing and whaling, timber harvesting, grazing, and tin and gold mining. Cattle were grazed in parts of the park from the 1850s until 1992.

Wilsons Promontory is one of the earliest national parks in Australia, reserved in 1898 due to early recognition by scientists and naturalists of its outstanding beauty and natural significance.

2.4 Legislative and planning context

The management of land and water resources, cultural heritage, flora and fauna in the Wilsons Promontory Parks Landscape is guided by many pieces of Commonwealth and Victorian legislation, as well as Victorian Government policies and priorities. This domestic legislation also implements a number of Australia's international treaty obligations.

Parks Victoria's planning and management context is broadly illustrated in Figure 2.2.

Parks Victoria's objective is to protect, conserve and enhance Parks Victoria managed land, including its natural and cultural values, for the benefit of the environment and current and future generations. Parks Victoria also contributes to the achievement of State and regional land management outcomes as far as is consistent with the effective protection and management of Parks Victoria managed land[1]. Conservation action planning provides a framework for delivering on these objectives, as well as supporting a variety of community and cultural objectives.

Australia, as a signatory to the Convention on Biological Diversity, is compelled to establish a network of protected areas for the purpose of maintaining biodiversity. This Conservation Action Plan will guide the management of Parks Victoria's protected areas in the Wilsons Promontory Parks Landscape, and thereby contributing to several of Australia's national targets under the *Convention on Biological Diversity* (1992), related to objectives and associated Sustainable Development Goals in Australia's *Strategy for Nature 2019-2030*.

[1] *Parks Victoria Act 2018 (Vic)* pt2 s7 (a) and (f)

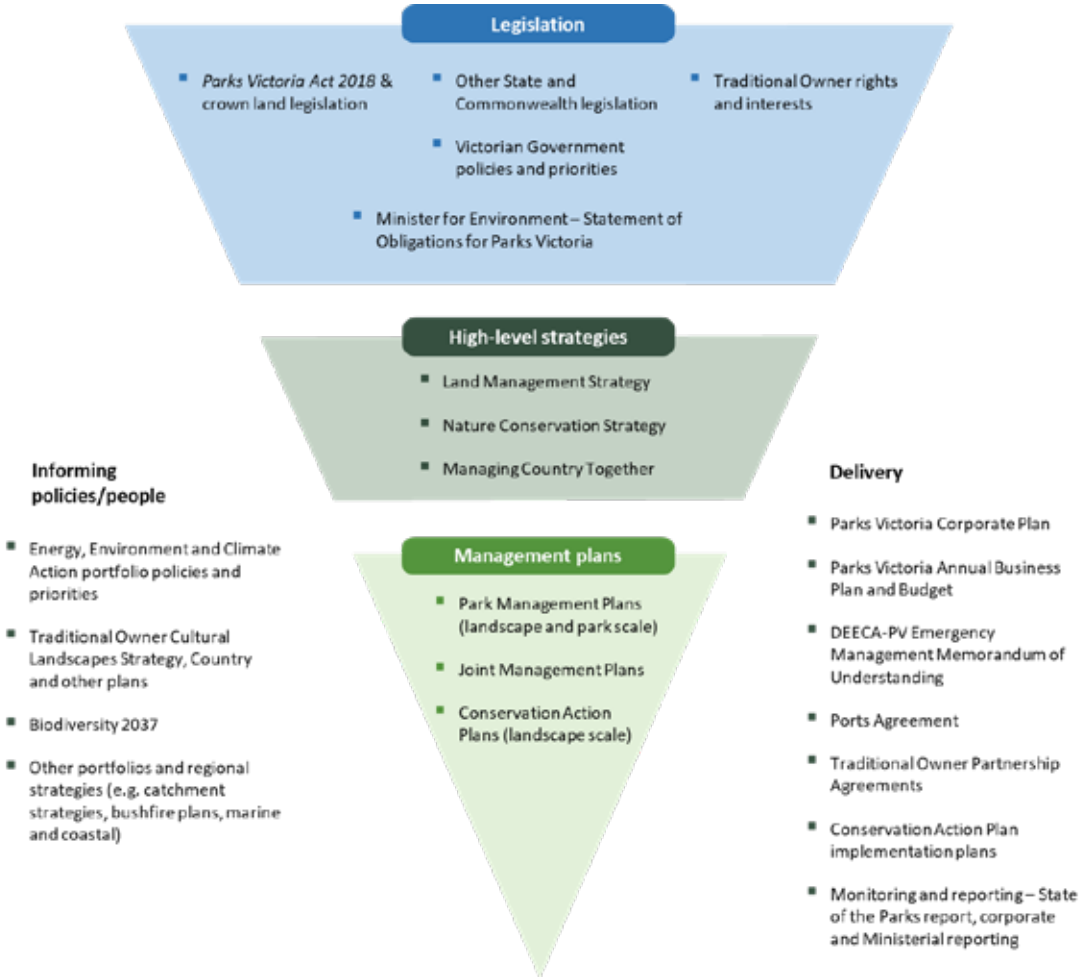


Figure 2.2 *Parks Victoria's planning and management context.*

The planning context for conservation action plans include the statutory basis for reservation of the parks and reserves, as follows:

- Most of the Wilsons Promontory Parks Landscape is reserved and managed under the provisions of the National Parks Act, including 15 604 hectares of marine protected area.
- Nature Conservation Reserve (Seal Island Wildlife Reserve) make up the remaining hectares, managed under the provisions of the Crown Land (Reserves) Act.

The protected area management categories of the International Union for Conservation of Nature (IUCN) classify protected areas according to their management purpose. A description of this classification system is given in Appendix A, along with the reserve type of the parks and reserves in this landscape.

Parks Victoria's planning framework

Parks Victoria's *Nature Conservation Strategy 2021-2031* sets out how Parks Victoria aims to conserve and protect nature on Victoria's parks estate, in the context of the unprecedented challenges posed by climate change. It sets the following goal: "Conserve nature in Victoria's parks in the face of unprecedented threats – through intensified action with partners, new techniques and increased community collaboration", and recognises the conservation action planning (CAP) process as the cornerstone for setting nature conservation directions.

Conservation action plans contribute to park management plans and provide a more detailed review of natural values and their condition. Conservation action plans also provide a more robust framework for evaluating the health of the landscape and include targeted goals based on condition of ecosystems which complement actions in the park management plans. Conservation action planning does not specifically address visitor management or cultural asset

management, and as such, a conservation action plan does not constitute a plan of management in the context of Section 17(2)(d) of the *National Parks Act 1975* or a land management plan under Division 4 of the *Parks Victoria Act 2018*.

2.5 Alignment with other strategies and plans

Wilsons Promontory Sanctuary project

As described in Section 1.4, significant portions of this plan's updated knowledge and priorities for nature conservation at Wilsons Promontory are drawn from the Wilsons Promontory Sanctuary project.

Yiruk Wamoon (Wilsons Promontory) Landscape Management Plan

At the time of preparation of this Conservation Action Plan, a review of the 2002 Wilsons Promontory Management Plan was underway to develop a new Landscape Management Plan for Yiruk Wamoon (Wilsons Promontory). This new Landscape Management Plan outlines how the natural and cultural landscape of the planning area should be protected, visited and celebrated over the fifteen years following its publication. The Landscape Management Plan will also include Corner Inlet Marine National Park, Wilsons Promontory Marine National Park, Wilsons Promontory Marine Park, Wilsons Promontory Marine Reserve and Seal Islands Wildlife Reserve as part of its planning area.

The Wilsons Promontory Conservation Action Plan has been used as a western science input to the Landscape Management Plan, and provides technical advice and priorities about the values, threats and actions required to protect the area over fifteen years. In addition to the Conservation Action Plan, other inputs to the Landscape Management Plan include cultural landscape and cultural value protection developed with Traditional Owners, and visitor experience issues and needs. The Conservation Action Plan is one facet and perspective of the overarching Landscape Management Plan, and additional work undertaken as part of the development of the Landscape Management Plan has also informed priorities and actions expressed in the Conservation Action Plan, such as the Coastal Hazard Adaptation and Resilience Plan (BMT 2023).

Biodiversity 2037

This Plan will contribute to the delivery of Victoria's biodiversity strategy *Protecting Victoria's Environment – Biodiversity 2037 (Biodiversity 2037)*, which establishes a 20-year framework for the protection of biodiversity in Victoria (DELWP 2017). This plan is consistent with a number of the priorities described in Biodiversity 2037 and will contribute to outcome 7: Victoria's biodiversity is protected and managed through strategic and consistent threat management, and restoration of ecosystem functions (DELWP 2019a).

Strategic Management Prospects

Under *Biodiversity 2037*, the Strategic Management Prospects (SMP) tool is a component of the Department of Energy, Environment and Climate Action's *NatureKit* (DELWP 2019b). These spatial databases have been used as a decision support tool, together with field-based evidence, to assist in identifying the relative priority of threats and benefit of actions. SMP outputs are focused on modelled biodiversity outcomes and may need to be balanced with organisational and community priorities when prioritising on ground actions.

Regional Catchment Strategies

This plan addresses a number of priority directions and actions from the West Gippsland Catchment Management Authority (WGCMA) *Regional Catchment Strategy 2021-2027 (RCS)*. WGCMA is working in partnership with Parks Victoria, DEECA, Traditional Owners and other partners to deliver a number of management directions, medium term outcomes (by 2027) and long term outcomes (by 2041) in a number of key themes. These outcomes are aligned with *Biodiversity 2037* and Traditional Owner objectives for Country and Country Plans. The themes and outcomes specific to the Wilsons Promontory local area include:

- Biodiversity (increasing pest plant and animal control)
- Climate Change (incorporating climate change adaptation and mitigation options in plans and strategies)
- Community (maintaining volunteer and community participation in land management)
- Traditional Owners (increasing partnerships and programs with Traditional Owners)
- Water (meeting regional water quality targets)

This plan will support the priority directions for these themes by addressing the following key challenges for Wilsons Promontory identified in the *RCS* through the Conservation Strategies:

- Pest plants
- Pest animals and overabundant wildlife
- Marine pests
- Recreational use and visitation impacts (includes activities and access)
- Coastal erosion and hazards
- Inappropriate fire regimes
- Climate change and related extreme events (e.g. bushfire, flood, storm surge, sea level rise)

Other information sources

Parks Victoria reports and management plans and other documents that directly assisted and informed the preparation of this plan can be found in the reference section at the end of this document. Parks Victoria will work with stakeholders to utilise other relevant plans and information to assist in implementing this and future plans.

2.6 Participation

A series of conservation action planning workshops were held during 2022–2023 to support the planning process for this Conservation Action Plan. Conservation action planning is undertaken collaboratively between corporate and regional staff and partners. The success of the workshops drew from the great depth of knowledge and experience of participants, including Parks Victoria staff and members of the Wilsons Promontory Technical Advisory Group.

3 Conservation vision

Setting conservation outcomes involves defining a conservation vision and conservation outcomes for each asset (as described in Section 4). The conservation vision, based on Parks Victoria's Health of Country goal for conserving its special places, is an aspirational statement that describes the intended outcome of management and the future state of the Wilsons Promontory Parks Landscape:

The resilience of natural assets in the Wilsons Promontory Parks Landscape is increased and ecosystem services are maintained in the face of climate change and other stressors

The Wilsons Promontory Sanctuary further describes an overarching vision for the project:

Building health of Country and a pest-free climate refuge for nature in challenging times

This vision is underpinned by three core objectives (Pest Free Nature, Restore Country, Back from the Brink) which are carried out through the numerous actions outlined by the component Sanctuary plans (see Section 1.4).

In partnership with Traditional Owners and stakeholders and other partners, Parks Victoria will work to improve the health of Country, by actively managing the water, fire, wildlife and biodiversity, in a culturally appropriate way.

The Wilsons Promontory Parks Landscape features a wide range of unique habitats in a single, continuous group of protected areas at the southernmost tip of Victoria. The landscape includes wet forests, dry forests, riparian systems and coastal wetlands, heathlands, beaches and high quality reefs and waters. Its conservation assets are largely in good to very good condition and the implementation of this plan will improve the quality of habitat and its capacity to support fauna and flora populations.

The focus of restoration on ecosystems that are in the poorest condition and most vulnerable to disturbance, including climate change, will prioritise effort in Heathland, Coastal Grassy Woodland and Wet Forest and Rainforest. A suite of threat management strategies, including inappropriate fire, weed and pathogen invasion, introduced predators and herbivores, marine pests and overabundant species, and human disturbance, will support marine and terrestrial ecosystems to persist in the face of climate change. By reducing compounding threats, conservation assets will be better placed to recover from changes to temperature and precipitation and extreme climate events. This, paired with a dedicated climate strategy, will nurture Wilsons Promontory as a climate refuge, creating a safe haven for rare and vulnerable species and communities, and increasing the scope for the reintroduction or translocation of key terrestrial fauna.

4 Conservation assets

The Parks Landscape is divided into 10 *conservation assets* (see Figure 4.1) or habitat types, according to similarities in biodiversity and natural values, and management drivers. The basis for this classification is described in Appendix C, and the component Ecological Vegetation Classes (EVCs) and Ecological Vegetation Divisions (EVDs) that make up each conservation asset are listed in Appendix D.

Conservation Asset	Area (hectares)
Heathland	13 467
Mixed Dry Forest and Woodland	12 459
Wet Forest and Rainforest	9 006
Coastal Grassy Woodland	5 344
Riparian and Wetland	3 680
Coastal (including islands)	4 012
Unvegetated Soft Sediments	13 087
Subtidal Reefs	8 567
Seagrass Beds	-
Water Column (pelagic) †	NA

† Water Column overlaps other marine assets, so an area figure is not provided.

Conservation asset description format

The following pages provide a description of each conservation asset within the Parks Landscape, along with the outcomes sought from management. The descriptions are set out in the following format, and definitions for the terms used for attributes and indicators are provided below.

The method for identifying key ecological attributes and assigning ratings for condition is described at Appendix E, and scientific names and conservation status of species mentioned in the descriptions are listed at Appendix B.

Conservation asset name

The ecosystem or habitat type considered to be the overarching value to be managed, including a description of key components, condition, predominant drivers of condition, and their effect on component nested assets.

Nested assets

Nested assets are a series of values that are present within the asset, or that rely on the asset for their health. These are often iconic components of the asset and may include threatened species, ecological (faunal) assemblages, vegetation communities, or species or communities of cultural importance. Comprehensive lists of species held on national and Victorian databases are used to inform the selection of nested assets. They also include species nominated for potential augmentation, re-introduction and introduction as “Sanctuary WRP species” (consistent with section 6.8).

Key ecological attributes and indicators

Key aspects of an ecosystem’s structure, function or composition that support ecosystem and biodiversity persistence, that are readily measurable using one or more indicators.

Condition

This sets out the key ecological attributes, indicators for those attributes, the current condition and trends in condition of the attribute, and the anticipated goal. The 15-year goals are set on the basis of quantitative condition data where possible and assume the threat mitigation strategies presented in this plan are implemented. Their feasibility has been assessed based on the potential impact of climate change (see Section 5.7 and Appendix G). Finally, the relevant strategy (abbreviated) is listed, for which the full strategy name and performance measures can be found in Table 7.1.

Key ecological attributes	Indicator	Current condition	Current trend	Key ecological attribute goal	Strategy abbrev.
Woodland bird diversity	Species richness	Fair	↘	Over xx% of surveyed sites have a richness of bird species representative of the vegetation age-class and expected bird community.	Predation
Canopy recruitment	Seedling recruitment	Good	→	Overstorey recruitment present at more than xx% of surveyed sites	Fire Herbivores

Conservation outcome

A qualitative outcome statement for the conservation asset aggregating the goals for the key ecological attributes, and the rating for its ecological integrity, over 15 years. An example is shown below.

Riparian	Current rating	Desired trend	Desired rating
By 2035, maintain critical habitat features (e.g. vegetation structure), functions (e.g. hydrology, water quality and quantity) and connectivity of riparian and in-stream ecosystems to provide habitat and refugia.	Good	↗	Very Good

Trends are indicated as follows: Improving ↗ Stable → Declining ↘

The assessment of current condition and desired future status is represented by the following categories. Measures to assess this classification will be documented in the Monitoring, Evaluation and Learning Plan (see Section 7.2).

VERY GOOD (optimal integrity)	The attribute is functioning at an ecologically desirable status and requires little human intervention to maintain or improve health.
GOOD (minimum integrity)	The attribute is functioning within its range of acceptable variation; it may require some human intervention.
FAIR (vulnerable)	The attribute is outside its range of acceptable variation and requires human intervention to recover or be restored. If unchecked, the target will be vulnerable to serious degradation.
POOR (imminent loss)	Allowing the attribute to remain in this condition for an extended period of time will make restoration or preventing extinction practically impossible.

The asset descriptions, and other sections of this document, include references to Sanctuary plans using acronym codes and coloured bars in the left margin of the relevant paragraphs (see section 1.4 for further explanation).

Definition of terms (attributes, indicators)

Indicator	Description
Abundance	Number of individuals present of a particular species or functional group
Assemblage	The range of species that occur together in a particular habitat
Attributes	The characteristics of a habitat that may affect a species such as its condition and structure (see Key Ecological Attributes below)
Composition	The identity and variety of the biota, and includes characteristics of species assemblages such as diversity and abundance/ biomass across taxonomic groups and trophic levels
Connectivity	The degree to which a landscape facilitates or impedes movement between suitable habitat sites for different species
CWR	Critical Wight Range (mammals)
Demography	Identifies the age class of individuals as a surrogate measure of recruitment success over time (e.g. presence of young-of-year fish and turtles through to mature age; identification of eggs or fledgling birds in nesting colonies)
EVC Benchmark	EVC benchmarks relate to an EVC within a bioregion which has been developed to assess the vegetation quality of the EVC at the site scale in comparison to a 'benchmark' condition. These benchmarks have been developed to assess native vegetation and contain a subset of lists of species for each EBC in a bioregion
Extent	Area of cover of a particular species or functional group, attribute or area subjected to particular conditions (e.g. flooding, salinity)
Function	Ecological processes, such as nutrient-cycling, productivity, pollination, seed dispersal, predator–prey interactions, functional connectivity (including species movement, dispersal and metapopulation dynamics, and exchanges between ecosystems), phenology, disturbance regimes (e.g., fire and drought) and hydrological processes
Functional group	A group of species that share similar characteristics (e.g. colonial nesting birds, riverine/wetland specialist fish)
Growth stage	The stages of a vegetation life cycle from seedling through to maturity
Health	Measured for long-lived flora and fauna that require certain conditions to maintain health. This indicator can be used to identify whether those conditions are achieved, and repeat surveys can detect change over time. A key example is riverine tree health, which is maintained through an appropriate flooding and drying regime
Index of wetland condition (IWC) score	Assessment procedure used in Victoria to assess the condition of wetlands to assist in management decisions and prioritisation of sites
Intactness	Indicator of human modification within a habitat. Landscapes with a high level of intactness will have less human interference and greater ecological structure, composition and function
Morphology	Measurement of the form, shape or structure of an organism used as a key ecological indicator
Nutrient levels	Measure of the movement and exchange of organic and inorganic matter within an ecosystem
Percentage cover	Compares the cover of a particular species or functional group to another. Can be used to identify change in dominance of species or functional groups over time. Particularly important in wetlands in which flora composition changes in response to wetland phases (e.g. wet/receding/dry) or changed hydrological conditions
Recruitment	Process by which new individuals establish a population or add to an existing population
Representativeness	Compares the type and/or number of species, or presence of a particular representative indicator species, identified within a defined benchmark such as a functional group or EVC
Site occupancy	Presence of a particular species or functional group within a suitable habitat. Repeated surveys provide greater confidence in data, particularly for mobile fauna, and seasonal flora e.g. waterbird surveys and the emergence of aquatic flora in wetlands during floods

Indicator	Description
Spatial distribution	Presence and cover of species or functional groups across the landscape. Can be used to detect change in distribution of species across habitats, or change in habitat qualities that may favour different, rather than expected, species. A key example here is the progression of terrestrial dominant flora into typically wetter environments, suggesting a change in flooding regime
Species diversity	Measure of the number of different species that are represented in a community and the relative abundance of each species
Species richness	Number of different species are present at a particular location or across a landscape area
Structure	Physical organisation, including structural connectivity, contiguity of natural habitat, vertical and horizontal spatial arrangement of the biota, substrate characteristics, and size- or age-class distributions

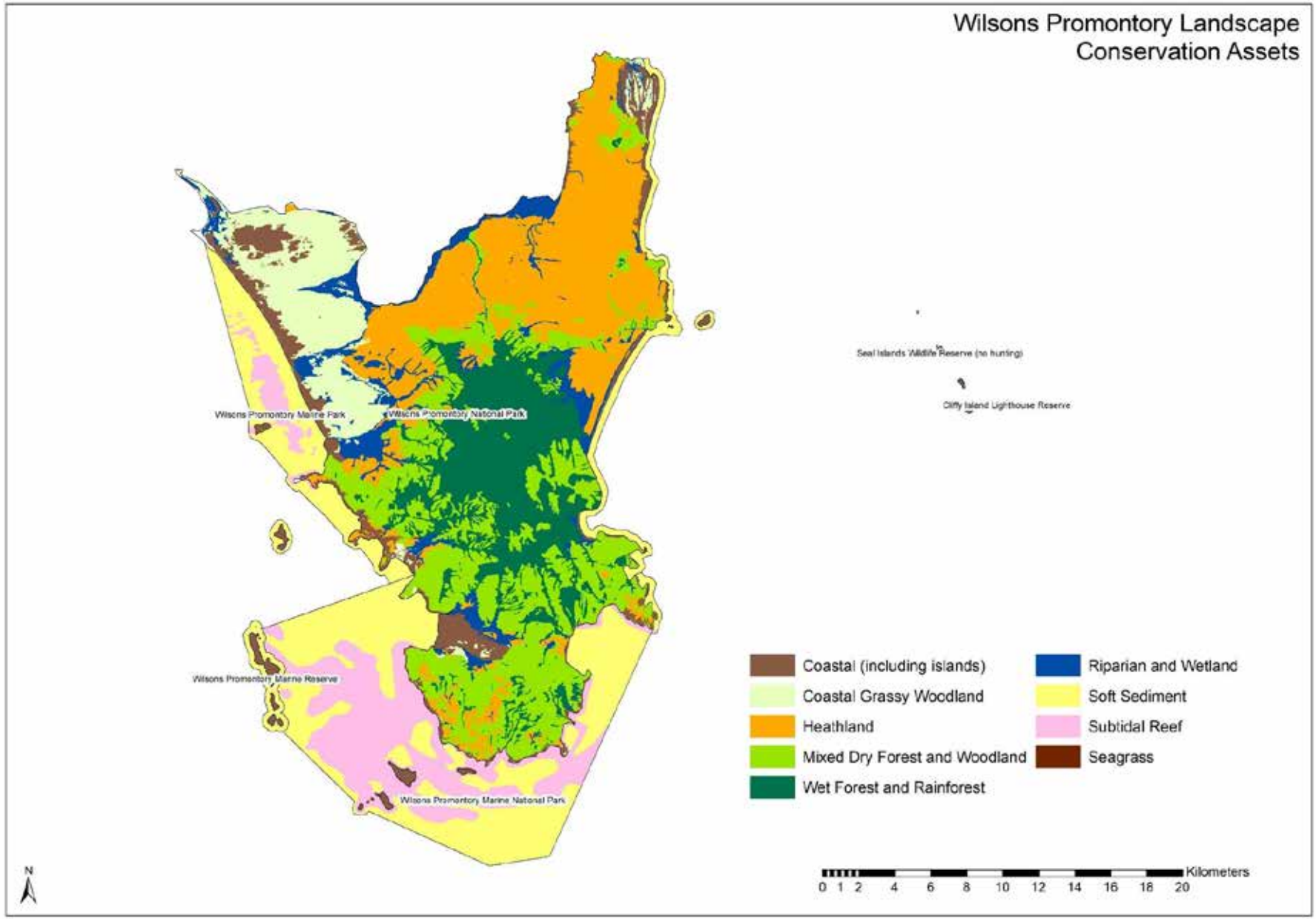


Figure 4.1 *Conservation assets in the Wilsons Promontory Parks Landscape.*

4.1 Heathland

Heathlands make up 13 467 hectares of the Wilsons Promontory Parks Landscape, which is approximately 28% of Wilsons Promontory National Park.

[HRP] This conservation asset is typically found on or near the coastal fringe, but large areas of heathland are found in the interior of Wilsons Promontory. Heathlands generally have a very high plant species richness, which in turn supports a wide range of fauna including a diverse heathland bird assemblage and several significant mammal species.

The main driver of condition within heathland systems is fire, and managing fires' timing, intensity, frequency, scale, and spatial heterogeneity across the landscape is essential to ensure that multiple growth stage structures exist to provide a variety of habitat types. High-quality heathlands are associated with mosaic ecological fire, as opposed to large-scale fires or the long-term absence of fire.

Although there is compositional variation across moisture gradients, heathlands are typically characterised by an understory of hardy, ericoid-leaved shrubs growing over a relatively nutrient-poor substrate, although Austral Bracken may dominate where fires have been frequent. Heathlands may have a sparse and open woodland canopy, generally less than 10m high. Geophytes and annuals are often seasonally abundant, particularly orchids and lilies.

Component Ecological Vegetation Classes and species

Heathland consists of a number of EVCs, including Coastal Sand Heathland, Heathy Woodland, Sand Heathland, Wet Heathland and Damp Heathland.

[HRP] Coastal Sand Heathland and Sand Heathland EVCs occur on deep, infertile, uniformly textured sands and on coastal headlands that experience extreme exposure to wind and salt-spray. They consist of a low, dense heathy shrub layer that includes common heath, prickly tea-tree and heath tea-tree as well as a number of sedges and sedge-like species, with stunted sheoaks, silver banksia and a variety of Hakea spp. Grasses and herbs are notably absent or infrequent. Typically, about 10% of the soil crust is exposed. Wind-striped patterns in the vegetation are typically evident. These EVCs are the priority for protection and restoration works because they are considered the most vulnerable of the Heathland EVCs to the threat of invasion by Coast Tea-tree.

Wet Heathlands occur on lower slopes, flats or depressions that are relatively infertile and subjected to prolonged water logging. This EVC has an understorey dominated by a range of grasses, sedges and shrubs. Sedges are frequently of the *Restionaceae* and *Cyperaceae* families, and shrubs often include ericaceous or myrtaceous species, and Heath

[HRP] Wilsons Promontory Sanctuary: Heathlands Restoration Implementation Plan

Teatree is often dominant. Scrub Sheoak and Dwarf Sheoak are also frequent. Although Wet Heathlands are generally treeless, emergent eucalypts may be present in some cases. Typically, there is no exposed soil crust.

Damp Heathland occurs at the northern boundary of Wilsons Promontory National Park as a mosaic of Damp and Wet Heathlands. Heathy Woodlands are also found on nutrient-poor soils (e.g., deep uniform sands), but this EVC is dominated by Saw Banksia or Eucalyptus spp., especially *E. obliqua*, up to 10m tall, at a density of approximately 15 trees of 50cm diameter at breast height per hectare. The tree canopy cover is typically about 10%. The EVC lacks a secondary tree layer but supports a diverse array of narrow or ericoid-leaved shrubs and graminoids, except where frequent fire has reduced this to a dense cover of bracken. Geophytes and annuals can be quite common. Typically, about 10% of soil crust is exposed. Heathy Woodlands are typically highly flammable in the summer; in the winter, they are often too wet to carry fire under typical heathland burning prescriptions. Heathy Woodlands predominantly occur in the northeast of Wilsons Promontory National Park, north of Five Mile Road and east of Vereker Track.

Threatened flora species such as the Thick-lipped Spider Orchid and the Eastern Spider Orchid are supported by the heathlands ecosystem group. The Heathlands asset also supports ground-dwelling mammals such as the Southern Brown Bandicoot, the Pookila (formerly known by the common name 'New Holland Mouse'), the Long-nosed Potoroo; heathland birds such as the Southern Emu-wren, Eastern Ground Parrot and the recently reintroduced Eastern Bristlebird; and other threatened species such as the Swamp Skink and the Ancient Greenling damselfly. The Heathy Woodlands EVC, and Coast Banksia trees in particular, provide important habitat and resources for the Eastern Pygmy Possum and several nectivorous bird species.

Condition

The condition of the Heathland asset is affected by fire regimes, the invasion of Coast Tea-tree, White Kunzea and Coast Wattle, browsing pressure by overabundant native herbivores, the presence of introduced predators (cats and foxes) and the absence of native predators (such as Dingo and quolls), weed species, and pathogens and diseases such as Phytophthora.

[HRP] Wet Heathland EVCs are generally declining because of the impacts of large-scale bushfires, though some areas are stable or improving due to the application of ecological burning programs. The Sand Heathland EVC is listed as vulnerable and generally regenerates more slowly than the Wet Heathland EVC due to the more stressful (e.g., dry and nutrient-poor) conditions characteristic of its distribution. Due in part to this slower growth rate and the subsequently longer window of opportunity for pest plant germination in bare ground, the Sand Heathlands are also more susceptible to Coast Tea-tree invasion and monoculture establishment.

Climate change impacts

Under a range of potential climate change scenarios, heathland vegetation may experience an increase in proportion under minimum TFI due to increased fire frequency, severity or altered seasonality. This effect is likely to be more extreme under scenarios with greater warming. Vegetation may become more uniform, with younger stands and fewer species, reducing diversity across EVCs. In the case of a warming but high rainfall scenario, fire may occur in different seasons, potentially reducing eucalypt invasion and encouraging a shift to sedgeland. The Sand Heathland EVC is expected to be more heavily impacted under an extreme hot and dry climate change scenario. Wet heathland might experience range contraction and become invaded by eucalypt species. Dieback extent may increase as phytophthora invades stressed vegetation, potentially to the point of losing all susceptible species under an extreme scenario. The invasion of Coast Tea-tree and other shrubs may increase with warming climate.

The occupancy of heathland ground-dwelling mammals and birds is expected to reduce with hotter and drier climate conditions, potentially to the point of reduced species diversity as repeat fire events reduce vegetation cover and density. A wetter climate scenario may increase food availability, but species persistence may depend on resilience to fire and heat stress events, or the alignment of wet periods with faunal life cycle stages.

The condition of this asset varies across the Parks Landscape. Its overall condition is Fair and the trend in the last five years declining.

Nested assets

Nested asset	Examples of components
Heathland bird community	Southern Emu-wren
Threatened fauna*	Southern Brown Bandicoot, Long-nosed Potoroo, Eastern Bristlebird, Southern Toadlet
Threatened flora*	Variable Bossiaea, Orange-tip Finger-orchid, Green Midge-orchid, Fringed Helmet-orchid, Prawn Greenhood, Eastern Spider-orchid, Rush Lily, Thick-lip Spider-orchid, Lax Twig-sedge, Granite Greenhood, Promontory Daisy-bush, Promontory Peppermint, Wiry Bog-sedge, Currant-wood, Crimson Berry, Bog Gum
Sanctuary WRP species	Pookila (New Holland Mouse), Swamp Antechinus*, Broad-toothed Rat*, King Quail, Eastern Ground Parrot Potential to reintroduce: Eastern Bettong, Eastern Quoll, Spot-tailed Quoll

*Listed as a threatened species under the *Fauna and Flora Guarantee Act 1988* or *Environment Protection and Biodiversity Conservation Act 1999*

Condition

Key ecological attributes	Indicator	Current condition	Current trend	KEA Goal	Strategy abbrev.
Ground-dwelling mammals	Species richness, composition and occupancy of suitable habitat	Fair	→	Increase the number of sites where focal ground-dwelling mammal species occur in areas of suitable habitat Maintain species composition	Fire Predation Reintros
Bird assemblages	Species richness, composition and occupancy of suitable habitat of key species (e.g. Ground Parrots, Southern Emu Wren)	Fair	→	Maintain occupancy of sites where focal heathland bird species occur	Fire Predation Reintros
Vegetation age-class and growth stage structure	Proportion within tolerable fire intervals and distribution of growth stages	Good	↗	Increase the proportion of heathland that is within TFI Improve the distribution of growth stages of heathland vegetation	Fire
Floristic diversity, richness and health	Dieback percentage of key species Extent of dieback in landscape Species richness at key sites	Fair	↘	Maintain the area of heathland vegetation where key species are unaffected by dieback. Maintain presence of local heathland vegetation species at key sites	Fire Weeds
Vegetation composition	Extent of invasion by Coast Tea-tree and other shrubs	Fair	↘	Reduce area of heathland vegetation invaded by native woody weeds, particularly the Sand Heathland EVC	Fire Weeds

Conservation outcome

Heathland	Current condition	Desired trend	Desired condition
Over the 15 years to 2031, maintain the health of Heathland and improve the distribution of growth-stages to maintain floristic diversity and richness and provide high-quality habitat for ground-dwelling mammals and heathland birds.	Fair		Good

HRP **Long term objective:** In the next 20 to 50 years, the currently healthy heathlands will be maintained in good condition, and their resilience to disturbances will be increased; the currently degraded heathlands and their ecological processes will be restored. Specifically, Coast Tea-tree and White Kunzea will be limited to their historic ranges; bare ground suitable for invasion will be scarce due to ecological burning regimes' encouragement of high-flammability Heathland species' regeneration.

4.2 Mixed Dry Forest and Woodland

Mixed Dry Forest and Woodland makes up 12 459 hectares of Wilsons Promontory National Park. It grows on a range of soil types and situations throughout the Wilsons Promontory Parks Landscape. This asset is generally characterised by the dominance of a eucalypt forest or woodland canopy. The various understorey components are determined largely by aspect, geology, soils, and management history.

Examples include herb-rich woodlands on granitic substrates that tend to have a woodland canopy over a sparse herb-dominated understorey, with few shrub or mid-layer canopy species.

This contrasts with the shrub-dominated forests that can occur on ridges and drier northerly and westerly slopes, in association with Damp Forest EVC (on sheltered slopes), on moderately fertile soils and various elevations. These dry forests have an overstorey dominated by eucalypt species to 25 m tall with an understorey characterised by a distinctive middle strata dominated by a diversity of narrow-leaved shrubs, and there is a paucity of ferns, graminoids and herbs in the ground stratum. All these examples are linked by their similar management requirements, key ecological attributes and threats.

The Mixed Dry Forest and Woodland asset consists of a number of EVCs, including Granitic Hills Woodland, Shrubby Foothill Forest, Lowland Forest, Rocky Outcrop Shrubland, Rocky Outcrop Herbland, Wet Rocky Outcrop Scrub, Bare Rock. The main driver of condition within this system is fire, and the timing, intensity and frequency of fire are all important factors.

Higher-quality examples of this asset are associated with the absence of large-scale hot fires and the application of lower intensity, more frequent fires. Although a large percentage of this asset is in a good condition, the frequent exposure to fire has resulted in a reduction in canopy height, which has increased the risk of canopy-consuming bushfires. Managing fire to allow canopy height to increase and reduce this risk will increase the health of this system.

Climate change impacts

Across a range of climate change scenarios, the vegetation of this asset is predicted to experience increased dieback with a loss of old growth and thinning undergrowth mostly due to increasing frequency and intensity of fire. This may also reduce the openness of herb forest and woodland understorey by producing high density regrowth and decrease the window of opportunity for planned burning to provide fire management. Heathy woodland may persist, but with reduced species composition. Under a scenario where rainfall shifts in seasonality, fire seasons may also shift or become unpredictable. Lower intensity fires may increase the likelihood of achieving open woodland.

With increased warming and drying scenarios, food resources and habitat for fauna may become scarcer or of lower quality, and heatwaves may cause deaths amongst birds or mammals, particularly diurnal species. Under a scenario of shifted rainfall seasonality, the mistiming of food resources and breeding cycles may impact bird communities or result in changed species composition.

The condition of this asset varies across the Parks Landscape. Its overall condition is Good and the trend in the last five years stable.

Nested assets

Nested asset	Examples of components
Hollow-dependent fauna	Large forest owls, arboreal mammals, reptiles, bat community, forest birds
Threatened fauna*	Lilly Pilly Burrowing Crayfish, Long-nosed Potoroo, Southern Brown Bandicoot
Threatened flora*	Coast Needlewood, Green-striped Greenhood, Southern Blue-gum, Granite Greenhood, Crisped Mitre-moss, Southern Xanthosia, Promontory Peppermint, Bass Guinea-flower, Oval Wedge-fern, Broad-leaf Prickly Moses, Promontory Daisy-bush, Thick-lip Spider-orchid, Bog Gum, Currant-wood, Paper Flower, Crimson Berry
Sanctuary WRP species	Broad-toothed Rat* Potential to reintroduce: Eastern Bettong, Eastern Quoll, Spot-tailed Quoll

*Listed as a threatened species under the *Fauna and Flora Guarantee Act 1988* or *Environment Protection and Biodiversity Conservation Act 1999*

Condition

Key ecological attributes	Indicator	Current condition	Current trend	KEA Goal	Strategy abbrev.
Age-class structure of canopy species	Growth-stage distribution	Fair	↘	Improve the distribution of growth stages of Dry Forest and Woodland vegetation	Fire
Bird assemblages	Species richness and occupancy of suitable habitat	Good	→	Increase or maintain the number of sites where focal forest and woodland bird species occur	Fire Predation
Openness of herb forest and woodland understorey (Granitic Hills EVC)	Proportion of life forms relative to EVC benchmark	Unknown	Unknown	Improve understorey structure to better align with life form composition and cover for EVC benchmarks	Fire Weeds
Ground-dwelling mammals	Species richness and occupancy of suitable habitat Abundance and activity	Good	→	Increase or maintain the abundance and number of sites where focal ground-dwelling mammal species occur	Fire Predation Reintros

Conservation outcome

Mixed Dry Forest and Woodland	Current condition	Desired trend	Desired condition
Over the 15 years to 2031, improve the growth-stage heterogeneity of canopy species, floristic diversity and composition, improve (and where needed restore) the open understorey of Granitic Hills Woodland EVC, and maintain high-quality habitat for mammals and woodland birds.	Good	→	Good

4.3 Wet Forest and Rainforest

Wet Forest and Rainforest makes up 9 006 hectares of the Wilsons Promontory National Park. This asset contains a number of EVCs including Wet Forest, Damp Forest, Cool Temperate Rainforest, Warm Temperate Rainforest and Montane Rocky Shrublands.

Component Ecological Vegetation Classes and species

[WFRRP] Wet Forest is restricted to the foothills, mountain ranges and protected valleys within Wilsons Promontory where rainfall exceeds 800 mm. Soils are generally clay loams with moderate to high levels of organic matter. Within this area, small patches of old-growth forest can be found. Wet Forest develops extensively around the localised areas of Cool Temperate Rainforest. At the dry end of its range, Wet Forest changes to Damp Forest.

In Wilsons Prom, this EVC includes a very wide range of structural variation ranging from tall, old-growth forest beyond 60m in height through to regrowth forest which has the potential to support tall forest. The dominant eucalypt species in this EVC are Mountain Ash and Blue Gum. The understory features a diversity of fern species, many of which are endangered and their distribution at the Prom poorly understood.

Damp Forest grows on a wide range of fertile parent rock types on a variety of aspects, from sea level to sub-montane elevations where average rainfall exceeds 800mm. Damp Forest is widespread and is the dominant EVC on the eastern side of the Vereker Range. The dominant eucalypt is Messmate but due to its wide range and tolerance of varying conditions the EVC can include a range of other eucalypt species depending on the site conditions. At the Prom, these species may include Yellow Stringybark, Narrow-leaf Peppermint, Otway Messmate, Brown Stringybark and Swamp Gum.

The endangered Cool Temperate Rainforest EVC is highly restricted and is found in the most topographically protected sites in the highest rainfall areas surrounded by Wet Forest and Montane Rocky Shrubland. It typically occupies protected south and south-easterly aspects and gullies of sheltered creeks and streams. It forms more extensive stands where it has been undisturbed and protected from fire. Overall, this EVC is not well described at Wilsons Promontory.

The rare Warm Temperate Rainforest EVC occurs in four main areas: Vereker Creek, Sealers Cove, scattered patches south of Chinamans Creek across to Miller's Landing, and Lilly Pilly Gully. The world's southernmost stand of this EVC is found at Little Waterloo Bay. There are also some small, isolated patches of this vegetation type in gullies scattered between Tidal River and Five Mile Road. The Warm Temperate Rainforests within the Park landscape have been

[WFRRP] Wilsons Promontory Sanctuary: Wet Forest and Rainforest Restoration Implementation Plan

severely impacted by bushfire and floods over the past century; the remaining intact stands of this EVC are generally inaccessible to the public.

Several EVC overlaps occur at Wilsons Promontory. The endemic Cool Temperate Rainforest Overlap (where Cool Temperate Rainforest overlaps with Warm Temperate Rainforest, referred to as EVC 96) includes a high diversity of tree-ferns, ground ferns and epiphytic ferns. Stronghold areas are often free of eucalypts but sometimes include Messmate and Blue Gum and tend towards an open structure. Likely endemic to Wilsons Promontory, the Warm Temperate Rainforest Overlap (where Warm Temperate Rainforest overlaps with eucalypt forest, referred to as EVC 159) is restricted to a highly localised and protected area in the Paradise Valley catchment (Vereker Creek Reference Area) inland from Five Mile Beach.

Wet Forest transitions to the rare Wilsons Promontory Montane Rocky Shrubland at the highest altitude areas around Mt LaTrobe. The Montane Rocky Shrubland EVC is treeless or sparsely treed shrubland of the windswept rocky summits of the highest granitic peaks of Wilsons Promontory. When present, trees are often stunted and low-growing and may form part of the dominant shrub layer. This EVC is only recorded from a few highly localised areas on and around the windswept rocky summits of the highest peaks between about 400-700m, such as Mt LaTrobe. The group includes a range of structural forms from rocky shrubland through scrub to forest.

Some rainforest species such as *Nothofagus sp.* persist in Montane Rocky Shrubland in a stunted form. Some large stumps of these species are also present on the top of Mt. LaTrobe, and early descriptions of the area refer to forested peaks, which could suggest that some areas of Montane Rocky Shrubland were once Wet Forest or rainforest prior to excessive burning early in the 1900s.

WFRRP This asset supports FFG and EPBC-listed threatened flora species. Notably, the Wet Forests and Rainforests contain old growth areas of the endangered Southern Blue Gum, and restricted or Rainforest-dependent flora species, Myrtle Beech and Southern Sassafras. Wet Forest and Rainforests also provide critical habitat for a range of FFG and EPBC-listed threatened fauna species, such as for hollow-dependent fauna (e.g., large forest owls, arboreal mammals, bat communities and Wet Forest and Rainforest bird assemblages); as well as habitat for diverse herpetofauna, ground-dwelling mammals and rainforest invertebrates.

Wet Forests and Rainforests provide key ecological functions including carbon storage, water production, erosion control and soil building.

Condition

The main driver of condition within this asset is fire and disturbance from events such as flooding and extreme weather. The increase in fire frequency between the arrival of Europeans in the 1850s and the implementation of fire prevention and suppression policies in 1951 continues to influence the condition of this asset. Only the protected gullies that have escaped burning remain in good condition.

WFRRP Areas of fire-sensitive forest at the Prom have changed in composition to non-forest due to historical short-interval fires re-occurring before the forests could naturally regenerate. These areas lack the characteristic eucalypt overstorey of their former EVCs and typically exhibit unusually dense shrub layers with a species-poor understorey – particularly Acacia spp. and, in wetter areas, Hazel Pomaderris.

The concept of “landscape traps” has been used to describe areas where entire landscapes are shifted into a state in which major functional and ecological attributes are compromised, leading to feedback processes that either maintain an ecosystem in a compromised state or push it into a further regime shift to an entirely new type of vegetation cover (Lindenmayer et al. 2011).

There are now extensive areas of Wet Forest which have undergone this regime shift, many of which have been reclassified as “Unclassified Non-Eucalypt Forest” EVCs to recognise the collapse of these forest areas.

Some areas, despite having been affected by fire and flood, remain largely intact and retain a canopy cover. Much of the minimally impacted areas occur above 400m of elevation. Relatively little is known about the condition, species

composition and threats in these relatively remote areas. The main management focus for the minimally impacted areas is to exclude bushfire and build the knowledge base to understand more about the current condition and future trajectory of the more intact areas.

Other factors that impact this asset include established weeds, invasive fungi, over-browsing by herbivores such as native Swamp Wallabies and potentially deer, predation by foxes and cats, edge effects, disturbance from visitation and soil disturbance.

Climate change impacts

Under a range of climate change scenarios, Wet Forest and Rainforest vegetation may experience drying to various degrees due to heatwaves or fires, and the extent of the impact is likely to rely on longer term patterns of drying as underlying moisture is the key to protecting these ecosystems. With incidences of severe fire, there is expected to be a loss of canopy, with successive fires creating a more vulnerable system. In the worst case of extreme fire, previously unburnt (i.e. refugia) areas may be burnt. In the case of flood events, warm and cool temperate rainforest may experience tree deaths and a buried seed bank.

Under a slight to moderate warming scenario, fire management activities may be sufficient to retain rainforest extent, but extreme fire or extreme flood events may reduce extent or see a shift towards messmate or peppermint gum forest. Declines in rainforest extent or quality will impact threatened species, including flora species vulnerable to phytophthora, migratory birds, and ground-dwelling and arboreal mammals. The effect of heat stress on mammals such as possums is likely to worsen with more extreme heatwaves. In dry conditions, decreases of pooling water may compromise breeding conditions for insects.

The overall condition of this asset is largely unknown or degraded but remains unassessed. In areas unaffected by forest collapse, this asset is considered to be in Good condition, but the trend in the last five years is largely unknown as the current condition of many components of the asset has not been identified.

The attribute 'extent of rainforest,' while encompassing extensive area of collapsed forest, has been described as in Very Good condition, as the Unclassified Non-Eucalypt Forest EVC is still considered part of the asset, and this attribute refers to area, not quality, of rainforest.

Nested assets

Nested asset	Examples of components
Hollow-dependent fauna	Large forest owls, arboreal mammals, bat communities, wet forest bird assemblage
Amphibians	Victorian Smooth Froglet
Restricted or rainforest-dependent flora species	Myrtle Beech, Southern Sassafras
Canopy-forming tall eucalypts	Mountain Ash and Southern Blue Gum
Threatened fauna*	Powerful Owl, South Gippsland Spiny Crayfish, Lilly Pilly Burrowing Crayfish, Southern Brown Bandicoot
Threatened flora*	Forest Hook-sedge, Long Clubmoss, Oval Fork-fern, Slender Tree-fern, Small Fork-fern, Jungle Bristle-fern, Brickmaker's Sedge, Small Shade-nettle, Rock Banksia, Bass Guinea-flower, Currant-wood
Sanctuary WRP species	Potential to reintroduce: Rufous-bellied Pademelon, Eastern Quoll, Spot-tailed Quoll

*Listed as a threatened species under the *Fauna and Flora Guarantee Act 1988* or *Environment Protection and Biodiversity Conservation Act 1999*

Condition

Key ecological attributes	Indicator	Current condition	Current trend	KEA Goal	Strategy abbrev.
Age-class structure of canopy species	Growth-stage distribution Abundance of hollow-bearing trees	Good	→	Maintain the distribution of growth stages of Wet Forest and Rainforest vegetation	Fire
Ground-dwelling mammals	Species richness and occupancy of suitable habitat Abundance and activity	Unknown	Unknown	Maintain abundance and number of sites where focal ground-dwelling mammal species occur	Fire Predation Reintros
Arboreal mammals	Species richness and occupancy of suitable habitat Abundance and activity	Unknown	Unknown	Maintain abundance and number of sites where focal arboreal mammal species occur	Fire Predation
Bird assemblages	Species richness and occupancy of suitable habitat	Unknown	Unknown	Maintain the number of sites where focal Wet Forest and Rainforest bird species occur	Fire Predation
Rainforest extent	Area	Very Good	→	Maintain the extent of Wet Forest and Rainforest	Fire
Rare and threatened plants	Presence / absence and abundance of populations	Unknown	Unknown	Maintain the number of sites where focal rare and threatened Wet Forest and Rainforest flora species occur	Fire Herbivores Visitors

Conservation outcome

Wet Forest and Rainforest	Current condition	Desired trend	Desired condition
Over the 15 years to 2031, maintain Rainforest extent and increase the extent of older growth-stages of Wet Forest and Rainforest canopy species, increase the capacity to provide critical habitat features (such as hollows), and maintain the diversity of flora and fauna that depend on rainforest and wet forest.	Good	→	Good

WFRRP **Long term objective:** The exclusion of bushfire and planned fire from Wet Forests and Rainforest, especially the long-undisturbed areas, along with actions to protect key threatened fauna and flora will ensure this asset can continue to recover and improve its viability over time.

4.4 Coastal Grassy Woodland

CGWRP Coastal Grassy Woodlands comprise 5 344 hectares of the Wilsons Promontory Parks Landscape. This ecosystem group, primarily located on the Yanakie Isthmus but also occurring at Norman Bay (Tidal River), Oberon Bay and Entrance Point, occurs across a landscape of undulating dunes and swales (shallow depressions) generally within five kilometres of the high tide mark.

Coastal Grassy Woodlands are characterised by a variable, complex vegetation structure which includes a diverse mix of understorey grasses and herbs on the low primary dunes, within swales and across the open woodland of the secondary and tertiary dunes; mid-storey of small sub-shrubs on the higher interdune corridors (between swales); sparse canopy trees generally less than 20 metres high occurring on the higher interdune corridors or crests (between swales) and across the open woodland of the secondary and tertiary dunes. There is typically a perennial woody overstorey above the grassy understorey.

Component Ecological Vegetation Classes and species

CGWRP Dominant grasses in the understorey layer include Kangaroo Grass, Spear Grasses, Wallaby Grasses and Blady Grass and dominant rushes include Knobby Club Rush and Spiny Mat-rush. The scattered perennial overstorey features Pomaderris species, White Correa and Coast Ballart (listed as endangered in Victoria). Following initial restoration works such as ecological burning, some pioneer species dominate in the short term, and these include Climbing Lignum, Kangaroo Apple and Coast Daisy Bush.

The sparse canopy of the higher dunes and woodlands is dominated by Coast Banksia and Drooping She-oak, other tall shrubs that also occur in these areas are Coast Beard Heath, Sweet Bursaria and Coast Tea-tree. There are notable stands of eucalypt present across the open woodland areas including Swamp Gum, Bog Gum/Gippsland Mallee Gum, Snow Gum hybrids and Coast Manna Gum. Coast Manna Gums and Swamp Gums in particular provide important habitat for Koalas.

The Coastal Grassy Woodland asset consists of a number of EVCs, including Calcareous Swale Grassland, Coastal Alkaline Scrub, Coast Banksia Woodland and Damp Sands Herb-rich Woodland.

CGWRP Calcareous Swale Grassland represents the vegetation community referred to by staff and land managers as ‘the swales’ and is the focus of restoration at sites on the Yanakie Isthmus such as Varneys Grasslands. This EVC is of particularly high conservation value as 100% of its remaining distribution (556 ha) is found within Wilsons Promontory.

CGWRP Wilsons Promontory Sanctuary: Coastal Grassy Woodlands Restoration Implementation Plan

Coastal Alkaline Scrub represents the vegetation community referred to by staff and land managers as 'the hummocks' (dunes and raised areas which allow swales to be delineated and mapped as units).

Coast Banksia Woodland has shown significant decline over the past century. Coast Banksia, the dominant canopy tree species within the Coast Banksia Woodland EVC, is itself in decline from factors generally not understood. Recent research suggests a variety of pressures contribute to the decline, including competition with Coast Tea-tree for resources. This EVC can be found scattered across the Yanakie Isthmus amongst degraded areas where Coast Tea-tree has become the dominant species.

Damp Sands Herb-rich Woodland is a woody vegetation complex with a grassy understorey found north-east of the Yanakie Airstrip. This EVC is susceptible to herbaceous weed invasion. It has historically been favoured for agricultural clearing due to its diversity and cover of herbs and palatable grasses. It is an obvious attraction for browsing wildlife such as wallabies, kangaroos and wombats. Waterholes are often built in Damp Sands Herb-rich Woodland as a clay subsoil is sometimes present with a deep sandy topsoil. At the Monkey Creek Area some stands of mature Silver Banksia exist in tree-form with connected canopy. This habitat type is considered high value for small nectar feeding animals, such as the Eastern Pygmy Possum.

All four EVCs that make up the Coastal Grassy Woodlands are listed as vulnerable within the Gippsland Plain Bioregion. The ecosystem group supports a diverse assemblage of grasses, herbs, forbs and ground-layer plants including orchids, lilies and sedges. This includes rare and threatened species notably the Leafy Greenhood and Bassian Pomaderris.

Coast Banksia is an important food source for nectivorous birds of the open woodlands and the Eastern Pygmy Possum which is impacted by shortages in nectar as a result of Coast Banksia numbers declining.

The Coastal Grassy Woodlands is thought to support one of the most genetically distinct populations of the Pookila (formerly known by common name 'New Holland Mouse'). The Pookila is listed as Endangered in Victoria and has a restricted range nationally, occurring in disjunct populations.

Other fauna recorded within the Coastal Grassy Woodlands system include the White-footed Dunnart, Southern Brown Bandicoot and Long-Footed Potoroo. The small ground dwelling mammals rely upon specific vegetation structures, age, and floristics to support their populations.

Condition

CGWRP A lack of recent fire, and inappropriate fire regimes, in Coastal Grassy Woodlands has been a key driver in the spread of Coast Tea-tree across this vegetation system. Without fire, Coast Tea-tree continues to form dense monocultures and produces large volumes of leaf litter limiting the amount of light reaching the ground layer. As a result of reduced light grasses and herbs are unable to persist diminishing plant species richness and diversity. The timing and season of burning in Coastal Grassy Woodlands is also a key factor driving the structure and floristic diversity of species across this system. If the fire is not of sufficient intensity, it will not carry through a mature Coast Tea-tree canopy due to a lack of ground-level and understorey fine fuels. Younger stands of Coast Tea-tree may burn more easily if fine fuels remain on the ground and in the understorey. Conversely, if the fire is too intense, it may scorch the soil and kill root stock or seeds of the grassland species, preventing regeneration of the grassland.

The condition of Coastal Grassy Woodlands across Wilsons Promontory is variable. Most sites dominated by Coast Banksia are in poor condition (as assessed by canopy health). In some sites, dense Coast Tea-tree monocultures may be senescing without replacement.

Higher-quality examples of this asset are associated with the presence of controlled mosaic ecological fire, as opposed to large-scale fires or the long-term absence of fire. The reasons for the continuing decline of canopy species (especially Coast Banksia) are unclear, although the absence of soil engineers (soil-modifying plants and animals) may be a factor. This may reduce the availability of appropriate niches for regeneration and also reduce soil health, thereby limiting regeneration of canopy species and their long-term survival and exacerbate the impacts of decreasing rainfall. In the longer term, reintroducing and supplementing existing populations of soil engineers is likely to be required to increase this capacity.

The continuing decline in the condition of these woodlands is also a result of historical and ongoing overgrazing in the absence of fire, with subsequent invasion of Coast Tea-tree and Coast Wattle. This was exacerbated by bushfires in February 2009 that resulted in mass regeneration of Coast Tea-tree. The condition of some examples of these EVCs are stable or improving because of the increasing application of ecological burns, specifically under the Coastal Grassy Woodland Restoration program.

CGWRP The Varneys area has been the focus for Coastal Grassy Woodlands restoration efforts since 2012 (predominantly ecological burning and grazer control). As a result of restoration works, some of the swale areas have shown significant signs of recovery (e.g., recruitment of grasses/herbs/forbs, limited bare ground, reduced coverage of Coast Tea-tree). Perhaps due to these efforts and the availability of more suitable habitat, Pookila have recently been observed in this block for the first time.

Other drivers of condition include total grazing pressure by historic cattle grazing, introduced species such as rabbits and Hog Deer and overabundant native species such as wombats, Swamp Wallabies and Eastern Grey Kangaroos; introduced predators such as foxes and cats; weed invasion; climate change impacts; and the absence of native predators such Dingos, Eastern Quolls and Spot-tailed Quolls.

Climate change impacts

Under a range of future climate change scenarios, Coastal Grassy Woodland vegetation may experience an increase in Banksia dieback, loss of canopy cover, reduced floristic diversity, reduced recruitment, loss of soil crust components and a shift in ground layer structure due to increased drying and warming conditions and fire frequency. The cover of Coast tea-tree, Coast Wattle and other invasive shrubs would be driven largely by the ability to apply fire as a management tool, and the interaction with bushfire incidence, timing and severity. In a warming scenario with shifted rainfall seasonality, the window of opportunity for planned burning may decrease, and groundcover may see a dominance of herbaceous species or change in grass species composition.

Occupancy and abundance of small mammals is likely to decrease under warming and drying climate change scenarios due to declines in food availability and suitable habitat, and heavy rainfall events may create areas of prolonged inundation, affecting burrows and ground layer habitat.

Overall, this asset is considered to be in Poor condition, though in general the trend in the last five years is improving.

Nested assets

Nested asset	Examples of components
Floristically diverse ground layer	Kangaroo Grass, Blady Grass, wallaby-grasses
Small mammals	Eastern Pygmy-possum
Threatened fauna*	White-throated Needletail, Southern Brown Bandicoot, White-footed Dunnart
Threatened flora*	Leafy Greenhood, Small Sickle Greenhood, Coast Bitter-bush, Coast Wirilda, Coast Ballart, Bushy Peppercress
Sanctuary WRP species	Pookila (New Holland Mouse)* Broad-toothed Rat* Potential to reintroduce: Eastern Bettong, Rufous-bellied Pademelon

*Listed as a threatened species under the *Fauna and Flora Guarantee Act 1988* or *Environment Protection and Biodiversity Conservation Act 1999*

Condition

Key ecological attributes	Indicator	Current condition	Current trend	KEA Goal	Strategy abbrev.
Vegetation age-class structure, composition and diversity	Presence of different age classes in each of the dominant tree species (e.g. Casuarina, Banksia) Canopy cover of key species on dunes	Poor	↗	Improve the age-class distribution of focal canopy tree species Increase the area on dunes of focal Coastal Grassy Woodland canopy species	Fire
Diverse floristic ground layer	Cover and composition of key functional floristic groups	Poor	↗	Improve understorey composition to better align with the life form composition for EVC benchmarks.	Fire Weeds
Open habitat structure	Cover of Coast Tea-tree, Coast Wattle and other invasive shrubs	Poor	↗	Increase the area of Coastal Grassy Woodland not dominated by Coast Tea-tree, Coast Wattle and other invasive shrubs	Fire Weeds
Small mammals	Site occupancy and abundance of Pookila (New Holland Mouse) and other key species Abundance of soil engineers	Poor	→	Increase the abundance and occupancy of focal small mammal species	Fire Predation Reintros

Conservation outcome

Coastal Grassy Woodland	Current condition	Desired trend	Desired condition
By 2031, increase the area of open woodland and the age-class diversity of focal canopy species, and develop a diverse ground layer (including connected native grasses) that provides a varied habitat for ground-dwelling mammals.	Poor	↗	Fair

CGWRP **Long term objective:** Create a rich mosaic of herby grasslands and dunes populated by Coast Banksia and Drooping She-oak, and patches of recently burnt, mature and senescent Coast Tea-tree, providing a variety of habitats for woodland birds and ground dwelling mammals and a rich recreational experience for visitors travelling through the Isthmus.

4.5 Riparian and Wetland

This asset makes up 3 680 hectares of the Wilsons Promontory Parks Landscape and includes a range of EVCs that occupy seasonally flooded alluvial flats of major rivers and streams under an annual rainfall regime of 700–1000 mm, as well as saltmarsh, mangrove and estuarine habitats. The soils are fertile, well-watered silty loams often high in organic matter. Saltmarsh and estuarine habitats are important feeding grounds for shorebirds and migratory birds, and mangrove and estuarine habitats are important habitats for many fish species. Coastal wetlands have several important ecosystem functions, including nutrient and carbon cycling and storage and habitat for invertebrates, shorebirds and mammals (Saintilan et al. 2019). Estuaries and coastal wetlands at Wilsons Promontory are an important component of the gradient between coastal and inland habitats, representing a transition point influenced both by rainfall and inundation.

The Riparian and Wetland asset can be divided into those EVCs driven by tidal (or saline) hydrological regimes and those driven by freshwater regimes. The greatest proportion of this asset is made up by the Riparian Scrub EVC, which is characterised by a dense shrubland growing to 5 metres on waterlogged substrates and an understorey of sedges. This EVC generally occurs along creeks and minor stream tributaries.

The asset also includes the Riparian Forest EVC which has been subject to other influences on its condition including the 2009 fire in the Five Mile Beach area, and a combination of historic logging and fire in the Sealers Cove area. Fragmentation of this community is also increased by the establishment of trails by introduced herbivores such as Hog Deer and native herbivores such as Swamp Wallabies. Managing these impacts is vital to continue to increase water quality and provide drought refugia for a range of terrestrial species.

The main driver of condition within this asset is water regimes: timing, duration, frequency and quality are all determinants of condition. The condition of the Riparian and Wetland asset varies across the park landscape. Higher-quality examples are associated with unmodified hydrological regimes. However, hydrological regimes can change dramatically following major flood events (as in 2011), with washouts and shifts of waterways occurring (e.g. in the perched lake behind Five Mile Beach), which may result in the establishment of new hydrological regimes, water bodies and riparian systems.

Climate change impacts

Freshwater aquatic ecosystems appear to have the highest proportion of species at risk of extinction by climate change, and lentic (still) and lotic (fast-flowing) ecosystems are considered the most sensitive to land use change, exotic species and climate change (Sala et al. 2000).

Across a range of climate change scenarios, there is likely to be increased inconsistency of stream flows due to drying, warming and flood events. Freshwater EVCs may experience reduced inflows or increased intensity of inflows. The flood events in 2011 and 2021 resulted in significant washout and shifting of waterways and changed how water flows in

Black Fish Creek and how Sealers Swamp drains. River and stream mouths across the landscape may change with large rainfall events or storm surges causing large movement of sand. Extreme flood events may open up new drains and empty wetlands completely. With lots of water movement, soil may bury vegetation, killing trees or burying seedbank. In extreme cases, erosion may occur back to bedrock.

In scenarios of extreme warming and drying, damp areas may dry out significantly or too quickly, reducing extent or connectivity, and there is a risk of aquatic faunal species loss due to drying and heat stress. Estuarine wetlands may be more vulnerable to algal blooms. The number of invasive species is likely to increase in wetlands as a consequence of climate change, resulting in many wetlands becoming suitable for breeding populations of various invasive species (Jin, Cant and Todd 2009).

Sea level rise caused by climate change is expected to adversely affect coastal wetlands through altered tidal flows and increased frequency and severity of coastal storm surges (Jin, Cant and Todd 2009). This can increase salinisation and turbidity through sand movement, changing wetland topography and altering water quality. Coastal wetlands may disappear following coastal erosion, compounded by potential dieback of shoreline vegetation from increased salinity. Rising sea levels may also contribute to the retreat of wetlands and subsequent encroachment of the sea into other ecosystems.

Specifically, threatened EVCs present at Tidal River may be at risk if the river becomes further inundated. There may be increased risk of exotic species in the river and the lower river may become more estuarine. Across Black Fish Creek, Sealers Creek, Refuge Cove, Miranda Creek, Tidal River and Darby River, sea level rise or storm surge increasing salinity may threaten freshwater species such as Galaxiids. If coastal erosion to the cliffs is significant, the entrance to Darby River may get blown out and cause impacts further upstream, affecting species composition.

Of particular concern is the risk of coastal erosion causing breaks in the dunes into the coastal lakes (e.g. Five Mile Beach, Cotters Lake), causing saltwater intrusion which will affect freshwater species and could cause a shift in ecosystem entirely, including changes to vegetation type and the loss and replacement of freshwater species.

Overall, this asset is considered to be in Good condition, and the trend in the last five years is stable.

Nested assets

Nested asset	Examples of components
Wetland-dependent birds	Lewin's Rail, Intermediate Egret, Eastern Great Egret
Important aquatic fauna	Spotted Galaxias, estuarine fish assemblages, Southern Shortfin Eel
Threatened fauna*	Dandenong Freshwater Amphipod, Dwarf Galaxias, South Gippsland Spiny Crayfish, Ancient Greenling Damselfly, Lilly Pilly Burrowing Crayfish, Growling Grass Frog
Threatened flora	Leafy Twig-sedge, Creeping Rush, Rough Blown-grass, Dune Fan-flower, Wiry Bog-sedge
Sanctuary WRP species	King Quail, Eastern Ground Parrot

*Listed as a threatened species under the *Fauna and Flora Guarantee Act 1988* or *Environment Protection and Biodiversity Conservation Act 1999*

Condition

Key ecological attributes	Indicator	Current condition	Current trend	KEA Goal	Strategy abbrev.
Intactness	Game trail extent	Fair	→	Reduce the number of game trails through riparian and wetland areas	Herbivores
Water quality	Index of Stream Condition Flow regime or consistency	Good	→	Improve the quality of aquatic and wetland ecosystems	Fire Condition
Availability of drought refugia	Extent and structure of wetlands and riparian vegetation	Unknown	Unknown	Improve the quality of riparian and wetland vegetation	Fire Condition
Frog, freshwater fish and invertebrate assemblages	Species richness and abundance of key frog, fish and invertebrate species	Good	→	Maintain presence of priority frog, fish and invertebrate species at focal sites	Predation Condition

Conservation outcome

Riparian and Wetland	Current condition	Desired trend	Desired condition
By 2031, improve water quality and habitat quality to support diverse riparian and wetland flora and fauna.	Good	→	Good

4.6 Coastal (including islands)

This asset makes up 4 012 hectares of the Wilsons Promontory Parks Landscape and includes the vegetated areas of sandy beaches, coastal dune grasslands and scrub, and shrublands and grasslands on exposed coastal cliffs and headlands, including on the 16 coastal islands that surround Wilsons Promontory.

Of particular importance are the Australian Fur Seal and New Zealand Fur Seals which breed on some islands, play a pivotal role as marine apex predators and (along with seabirds) are an important vector for the transfer of marine nutrients to the terrestrial ecosystems of the islands. These seals also represent an important economic resource for ecotourism operators, particularly the breeding population on Kanowna Island, which is one of the four largest such colonies in Victoria. The current extent of the breeding population is expanding, with an additional population now occurring at Rag Island. This recolonisation is indicating that fur seal populations are still recovering from the severe over-exploitation of the commercial sealing era (1798–1825); the current population is only about 30% of its pre-sealing size.

There are also two breeding colonies of the protected Little Penguin on Anser and Wattle Islands, and three of the islands within the Marine National Park are recognised as important breeding sites for a range of other seabird species including the Crested Tern, Silver Gull, Pacific Gull, Short-tailed Shearwater, Fairy Prion and Common Diving-petrel.

The islands also provide refugia from predation for species such as the Swamp Antechinus; abundant populations inhabit a number of islands in the absence of predators. This asset also includes grasses and halophytes (succulents) that colonise and stabilise the foredunes of ocean beaches which provide important habitat for nesting for Hooded Plover. The main drivers of condition in this asset are tidal processes, the relative isolation of coastal habitats and the level of disturbance (including weed invasion).

Higher-quality examples of this asset occur on isolated coastal islands, including Shellback, Cleft and Wattle Islands, where habitats are subject to minimal disturbance by humans and there are no introduced predators. The more disturbed areas are generally associated with areas of greater human visitation, such as Norman Bay and Leonard Bay, although a number of islands, including Kanowna, Rabbit and Little Rabbit Islands are in poorer condition because of the invasion of coastal weeds, which are spread by seabirds.

Climate change impacts

Across a range of climate change scenarios, vegetation stress caused by extremes of temperature or water availability may encourage weed growth, impacting seabird nesting habitat. Change in floristic composition on islands would affect Swamp Antechinus populations. Similarly, the frequency of zoonotic infectious events are expected to increase with climate extremes, and Avian flu brought in by migratory species would devastate seabird and shorebird populations.

Storm surge and sea level rise may contribute to erosion and habitat contraction on the mainland coast for mammals, fur seal haul out sites, and nesting or foraging shorebirds such as Hooded Plover. Coastal Dune Scrub and Grassland is likely to be susceptible to erosion and storm impacts. For some species such as Swamp Skink, habitat contraction may be offset by species range expansion or change or movement in the habitat type of the adjacent area. Shifting dunes caused by erosion may have significant impacts on the habitat behind it.

Fire in coastal vegetation will reduce habitat cover and soil stability, as well as directly impacting threatened EVCs and mammal habitat. On islands, fire caused by lightning strikes could reduce tussock grasses that are important habitat for a range of species. While tussock grasses are fairly fire tolerant, under a hotter and drier scenario, increases in temperature might contribute to their loss, decreasing nesting habitat for Short-tailed Shearwaters and Fairy Prions. The loss of tussock grasses would have flow on effects to whole island biogeography, impacting reptiles, small mammals and other bird species, and could cause loss of subspecies if speciation has occurred. Lost tussock areas could be colonised by other bird species such as terns or gulls.

Increasing temperatures could also impact shorebird breeding success and influence food and nesting availability on islands. Vegetation may become shift to become more vulnerable to fire, and heat extremes may reduce the time that seals spend hauled out. Under a warmer and wetter scenario, wet events in summer could cause mass mortality in seabird chicks, and large amounts of rainfall could scour away island vegetation, especially following a very dry period.

The overall condition of this asset is Very Good, and the trend in the last five years considered stable, with declines in some components of the asset.

Nested assets

Nested asset	Examples of components
Fur seal breeding populations	Australian Fur Seal, New Zealand Fur Seal
Coastal birds	Colonial nesting seabirds, dune-nesting shorebirds, beach-nesting birds, shorebirds
Threatened flora*	Dune Poa, Coast Lily, Shore Spleenwort, Paper Flower
Threatened fauna*	Black-browed Albatross, Indian Yellow-nosed Albatross, Shy Albatross, Hooded Plover, White-bellied Sea Eagle, Swamp Skink, Glossy Grass Skink
Sanctuary WRP species	Swamp Antechinus*, Broad-toothed Rat* Potential to reintroduce: Spot-tailed Quoll

*Listed as a threatened species under the *Fauna and Flora Guarantee Act 1988* or *Environment Protection and Biodiversity Conservation Act 1999*

Condition

Key ecological attributes	Indicator	Current condition	Current trend	KEA Goal	Strategy abbrev.
Fur seal breeding populations	Population trends	Very Good	↗	Maintain the area of habitat suitable for fur seal breeding populations. Maintain breeding success of fur seals	Condition
Fur seal haul-out sites	Site suitability	Very Good	↗	Maintain the area of habitat suitable for fur seal haul-out sites	Condition
Colonial nesting seabirds	Colony extent of key species (e.g. Little Penguins,	Good	↘	Maintain the current extent of seabird nesting colonies. Maintain	Fire Weeds

	Fair Prions, shearwaters, diving petrels) Condition of nesting habitat			the area of habitat suitable for seabird nesting.	Predation Condition
	Species richness on islands	Very Good	→	Maintain species richness of birds on islands	
Breeding populations of resident beach-nesting birds	Breeding success of Hooded Plover	Very Good	→	Maintain breeding success of Hooded Plovers	Predation Visitors
Small mammal abundance	Swamp Antechinus abundance Extent of suitable habitat	Good	↘	Maintain Swamp Antechinus abundance and genetic diversity Maintain number of sites where focal ground-dwelling mammals occur	Fire Predation Reintros

Conservation outcome

Coastal (including islands)	Current condition	Desired trend	Desired condition
Over the 15 years to 2031, maintain suitable conditions for fur seal haul-outs and breeding, and maintain the extent and heterogeneity of coastal vegetation to provide suitable nesting habitat for colonial nesting seabirds, shorebirds and ground-dwelling mammals.	Very Good	→	Very Good

4.7 Unvegetated Soft Sediment

This asset makes up 13 087 hectares of the Wilsons Promontory Parks Landscape. Intertidal and subtidal soft sediments are widespread around Wilsons Promontory and are mostly unvegetated. Soft sediments are predominantly inhabited by infauna (small crustaceans and worms that burrow into the sand), meiofauna (very small animals that live between the sand grains), and a range of bottom-dwelling fish including skates and rays. Drift algae (beach wrack) and algae attached to shells and debris are also common on soft sediments. Beach wrack is a significant source of food for scavenging birds and contribute to the detrital cycle that nourishes many of the invertebrates, such as bivalves, living in the sand.

In protected and sheltered waters, such as in bays (especially adjacent to estuaries) and behind headlands, fine particles in the water settle out, forming nutrient-rich mud. At low tide some of these fine sediments are exposed, providing opportunities for many shorebirds and waders, including a number of species of high conservation significance that migrate annually from the northern hemisphere, to feed on animals hidden within the sediments. At high tide fish also move in to feed on the intertidal sediments in turn providing food for sea birds and larger fish.

In areas of higher wave energy or strong tidal currents, such as around the southern tip of the Promontory, sediments are much coarser and form vast sandy plains. Tides form ripples of sand along the bottom, appearing as large rolling waves of sand in deep water. These sandy areas include intertidal areas of beaches that are important foraging areas for a range of shorebirds, including the threatened Hooded Plover. Infauna, including marine worms and bivalves such as pipis, can be found in intertidal sandy plains, while animals such as scallops live in deeper waters, and many fish and other larger animals forage in these areas, such as larger sharks and rays (PV 2023). While there have been some surveys of subtidal soft sediment communities at Wilsons Promontory there are still some considerable knowledge gaps.

Climate change impacts

The greatest threat from climate change to this asset comes from sea level rise, storm surge and increasing sea surface temperatures. Significant sea level rise may change the duration of submersion for intertidal sediments and reduce the accessible area of soft sediment to shorebirds and waders. Loss of habitat for foraging shorebirds may shift their distribution. Beach nesting birds such as Hooded Plovers may lose nesting habitat or even experience chicks washing away with high tides or storm surge.

Warming waters may causing range shifts in large mobile fish or change in community assemblages or abundance of invertebrates. Warm waters may also create opportunities for marine pest or invasive species to move in, such as Northern Pacific Sea-star, for which management has been undertaken in Shallow Inlet and Tidal River.

The overall condition of the asset is considered to be Very Good, and the trend in the last five years is stable.

Nested assets

Nested asset	Examples of components
Characteristic invertebrate communities	Soldier crabs, moon shells, burrowing worms
Characteristic demersal fish communities	Sparsely-spotted Stingaree, Banded Stingaree, Southern Sand Flathead, rays, flathead, goatfish, leatherjackets
Shorebirds	Sooty Oystercatcher, Red-capped Plover
Threatened fauna*	White-throated Needletail, Hooded Plover, Eastern Curlew

*Listed as a threatened species under the *Fauna and Flora Guarantee Act 1988* or *Environment Protection and Biodiversity Conservation Act 1999*

Condition

Key ecological attributes	Indicator	Current condition	Current trend	KEA Goal	Strategy abbrev.
Abundance of foraging shorebirds	Presence of key indicator species (e.g. Hooded Plover, Sooty Oystercatcher)	Very Good	→	Maintain richness of foraging shorebirds. Maintain abundance of foraging shorebirds.	Predation Visitors
Large mobile fish	Presence and abundance of key indicator species (e.g. Sand Flathead, Banded Stingaree)	Very Good	→	Maintain the presence and abundance of key large mobile fish species	Condition

Conservation outcome

Unvegetated Soft Sediment	Current condition	Desired trend	Desired condition
Over the 15 years to 2031, maintain the extent of intertidal soft sediments to support characteristic invertebrate communities, foraging shorebirds and characteristic demersal fish in the Wilsons Promontory marine protected areas.	Very Good	→	Very Good

4.8 Subtidal Reefs

This asset makes up 8 567 hectares of the Wilsons Promontory Parks Landscape. The subtidal rocky reefs around Wilsons Promontory are largely extensions of the granitic mass of the terrestrial landscape. They form a complex underwater habitat that includes many areas hidden from sunlight in underwater canyons and caves or are part of the rocky seafloor.

In areas where there is plenty of sunlight, subtidal reefs are covered in a wide range of marine algae, including large brown algae such as Bull Kelp or Crayweed that form underwater kelp forests. Beneath the larger kelps, smaller soft red algae are abundant where wave exposure is moderate, while in area of high wave energy only encrusting algae grazed by tough molluscs are likely to be seen.

In deeper water or where sunlight is limited, the subtidal reefs are some of the most spectacular and pristine in Victoria. They are largely covered in a wide range of sessile invertebrates such as Yellow Zoanthids, brightly coloured sponges, a range of soft corals, and many other filter feeding organisms like colonial ascidians and hydroids.

Sessile invertebrates such as sponges, as well as the canopy-forming algae, are important habitats and food sources for a range of other invertebrates, including sea urchins, sea stars, and bryozoans, and reef fish such as Old Wife, Bastard Trumpeter, Rosy Perch, Southern Maori Wrasse, Southern Hulafish, Sea Sweep, and many species of leatherjackets.

Climate change impacts

The main impacts of climate change on this asset are likely to be caused by rising sea surface temperatures and increased storm surge and wave energy. Change to ocean temperatures may cause range shifts in species that are at the limit of their distribution and create opportunities for marine pest or invasive species to colonise, such as overabundant sea urchins. Increasing populations of Black Spined Sea Urchins can cause barrens with large areas of removed macroalgae, which in turn impacts fish populations. Food availability for a range of species may change, including fish and macroinvertebrates. Monitoring may observe a change in species assemblages and community composition, life history and reproduction, and declines in algae population, extent and cover.

In cases of extreme temperature increases or heatwave events, there may be a direct loss of important habitat-forming macroalgae and increased instances of disease, infection and rot, including abalone disease. Heat-stress may impact abalone physiology and make them more susceptible to infection. Bleaching of the reef may also occur.

In the case of increases in storm and wave energy, plants may be uprooted, causing direct loss of individuals, or changes in currents may cause gradual change in species or community level composition, such as replacement of Golden Kelp with Crayweed.

The overall condition of the asset is considered to be Very Good, and the trend in the last five years is stable.

Nested assets

Nested asset	Examples of components
Assemblages of species at the limit of their distribution	*Cystophora grevillei* (brown macroalgae); *Plocamium preissianum* (red macroalgae), *Nectria macrobrachia* and *Nectria multispina* (Ocellate seastars); *Nemadactylus douglasii* (Blue morwong), *Aetapcus maculatus* (Warty Prowfish)
Beds dominated by brown macroalgae	Golden Kelp, Crayweed, Bull Kelp, sub-canopy brown macroalgae (*Seirococcus axillaris, Cystophora spp, Sargassum spp*.)
Large mobile fish	Sharks, rays
Mobile macroinvertebrates	
Sessile invertebrate communities	Sponges, gorgonians, zoanthids, ascidians, bryozoans

*Listed as a threatened species under the *Fauna and Flora Guarantee Act 1988* or *Environment Protection and Biodiversity Conservation Act 1999*

Condition

Key ecological attributes	Indicator	Current condition	Current trend	KEA Goal	Strategy abbrev.
Assemblages of species at the limit of their distribution (eastern, western and northern limits)	Presence and abundance of characteristic species at the edge of their distribution	Very Good	→	Maintain presence and abundance of characteristic species at the edge of their distribution	Condition
Beds dominated by brown macroalgae	Total extent, cover and patchiness	Good	↘	Maintain the area, cover and patchiness of algal beds dominated by brown macroalgae	Marine
Large mobile fish, including sharks and rays	Presence of key species	Very Good	→	Maintain richness and abundance of focal large fish species	Condition
Mobile macroinvertebrates	Size class distribution and abundance	Very Good	↘	Maintain size class distribution and abundance of focal mobile macroinvertebrates	Marine
Sessile invertebrate communities (dense sessile invertebrate assemblages such as sponges, gorgonians, zoanthids, ascidians, and bryozoans)	Diversity and cover of sessile invertebrates	Very Good	→	Maintain cover and diversity of sessile invertebrate communities	Marine

Conservation outcome

Subtidal Reefs	Current condition	Desired trend	Desired condition
Over the 15 years to 2031, maintain the highly productive dense stands of habitat-forming macroalgae that provide cover and food for the diverse assemblage of fish and macroinvertebrates inhabiting subtidal reefs.	Very Good	→	Very Good

4.9 Seagrass Beds

Seagrasses are flowering plants that form underwater meadows in the sheltered parts of bays and estuaries. They grow in silt or sand, where their roots help bind the unstable seabed, as well as on some exposed rocky coasts, where different species are found.

In the Wilsons Promontory Park Landscape only a few areas are dominated by seagrasses, including some patches within Refuge and Sealers Cove, and in some of the estuaries. Seagrass beds of Paddleweed and Dark-stem Eelgrass are restricted to sheltered waters, in particular Waterloo and Oberon Bays. Strapweed has been recorded just outside the Marine National Park in shallow water at Great Glennie Island and Norman Bay. (The extensive seagrass beds in Corner Inlet are not within this Parks Landscape.)

Seagrass provides a home and food source for a range of marine life, including many invertebrates such as marine worms, amphipods, snails, and crabs scavenge seagrass detritus. A variety of fish have been recorded on seagrass and associated sand substrate, including the Southern Goatfish, Silverbelly, Wide-bodied Pipefish, Spotted Pipefish, Slender Weed Whiting, Blue-throated Wrasse, gobies, weedfish and Toothbrush Leatherjacket. These in turn attract seabirds that can catch fish in the relatively shallow waters.

Climate change impacts

Seagrass is expected to be somewhat resilient to some of the impacts of climate change, as it a dynamic system and accustomed to some level of fluctuation and change in depth and temperature. However, this will depend on the extremes and speed of change. Sudden and extreme change in temperature could cause dieback in particularly shallow or intertidal seagrass. Heat stress may reduce seagrass extent or alter the timing of flowering. However, it is possible that increasing sea surface temperature is offset to some degree by sea level rise, increasing the depth of seagrass beds. More indirectly, increasing sea temperatures may encourage algal blooms and the growth of sea urchin populations, which would increase their grazing on seagrass.

Increased storm event frequency and intensity, wave energy in embayments and flood events may cause the removal of seagrass, reducing their extent and cover. Sea level rise may scour channels such as Shallow Inlet to a greater degree, changing local currents, topography and the depth of seagrass meadows, which may remove shelter and lead to loss.

The overall condition of the asset is considered to be Very Good, and the trend in the last five years is stable.

Nested assets

Nested asset	Examples of components
Seagrass plant communities	Dark-stem Eelgrass, Narrow-leaf Eelgrass, Paddleweed, Strapweed
Fish	Wide-bodied Pipefish, Spotted Pipefish*, Little Weed Whiting

*Listed as a threatened species under the *Fauna and Flora Guarantee Act 1988* or *Environment Protection and Biodiversity Conservation Act 1999*

Condition

Key ecological attributes	Indicator	Current condition	Current trend	KEA Goal	Strategy abbrev.
Seagrass cover	Percentage cover	Very Good	→	Maintain cover of seagrass	Marine
Seagrass bed extent	Extent	Very Good	→	Maintain extent of seagrass beds	Marine
Seagrass bed patchiness	Patchiness	Very Good	→	Maintain patchiness of seagrass beds	Marine

Conservation outcome

Seagrass Beds	Current condition	Desired trend	Desired condition
Over the 15 years to 2031, maintain the extent, cover and connectivity of intertidal and subtidal seagrass communities in order to support an abundant and diverse assemblage of invertebrate and fish communities including listed pipefish species in the seagrass beds of the Marine National Park.	Very Good	→	Very Good

4.10 Water Column

Many animals and plants live in the open waters of Bass Strait that surround Wilsons Promontory. These waters are affected by strong winds, powerful tidal currents, and large waves. Open waters are inhabited by organisms that can swim strongly, such as larger fish, seals, whales, and dolphins, as well as a myriad of weak swimmers that make up the plankton community, such as the larval stages of fish and invertebrates that drift through these areas.

The open waters of the Wilsons Promontory Marine National Park and its surrounds are notable as a haven for a number of larger fish species, including the endangered Great White Shark that breeds in the waters around the Promontory and uses the area to the east as an important nursery area. These sharks feed on larger fish and also prey on fur seals that breed on the coastal islands.

The open waters within the Park Landscape are also widely used for foraging by seabirds, including Little Penguins, Australasian Gannets, and a number of threatened species, including albatrosses. Many of these species may use coastal islands for breeding but spend long periods of time over open waters.

Because of the often highly transient nature of the fauna occupying the Water Column, it is not always clear what role the Wilsons Promontory environment plays in supporting some species that depend on this asset. Examples of such species include local populations of Kingfish and Bottlenose Dolphins and require further investigation.

The main drivers of the health of the Water Column are factors that influence the water quality and major oceanic processes, including currents and upwellings. While water quality at locations of higher human activity such as camping areas has been identified as a concern, the very limited alteration to natural habitats on land means that the overall quality of the water is very high. Physical aspects of the water such as temperature and pH are driven largely by factors such as the strength of water currents, especially the East Australian Current.

Climate change impacts

Changes to marine systems associated with climate change are already being observed, including changes in currents and the consequent arrival of species from other regions. The importance of managing anthropogenic impacts, including fishing, are likely to increase in order to ensure the resilience of existing species.

The water column at Wilsons Promontory is generally buffered from changes to temperature but increases in sea surface temperature may alter some species composition such fish, or other species at the limits of their distribution, due to their physiology or declines in productivity and food sources. Consequently, predators of these species such as seals or sharks may move to follow their prey source. Increases in sea surface temperature may also have some effect on nutrient levels.

The overall condition of the asset is considered to be Very Good, and the trend in the last five years is stable.

Nested assets

Nested asset	Examples of components
Seabirds	Little Penguin, Australasian Gannet
Fur seals	Australian Fur Seals, New Zealand Fur Seals
Large pelagic sharks	Great White Shark, Broadnose Sevengill Shark
Small whales	Minke whales, Pygmy Right Whale
Water Column specialist fish	Yellowtail Kingfish, Trevally, Southern Bluefin Tuna
Endangered fauna	Humpback Whale*, Southern Right Whale*, Leatherback Turtle*

*Listed as a threatened species under the *Fauna and Flora Guarantee Act 1988* or *Environment Protection and Biodiversity Conservation Act 1999*

Condition

Key ecological attributes	Indicator	Current condition	Current trend	KEA Goal	Strategy abbrev.
Fur seal foraging populations	Population trend	Very Good	↗	Maintain fur seal breeding populations	Visitors Condition
Size of Great White Shark population	Abundance / sightings of Great White Sharks	Very Good	→	Maintain abundance of Great White Sharks	Visitors Condition
Water quality	Nutrient levels, dissolved oxygen, chlorophyll A, turbidity, pH and salinity	Very Good	→	Maintain the water quality in MPAs	Visitors Condition Climate

Conservation outcome

Water Column	Current condition	Desired trend	Desired condition
Over the 15 years to 2031, maintain a well-connected and highly productive water column ecosystem in the Marine National Park that supports planktonic health and nutrient cycles, to provide the trophic base for higher-order species including the Great White Shark, fur seals, seabirds, whales and dolphins.	Very Good	→	Very Good

5 Threats

Identifying priority threats to conservation outcomes

A broad range of key threats to the conservation assets of the Wilsons Promontory Parks Landscape were identified by experts including participants in the conservation action planning workshops. These threats have been assessed and classified using the methodology described in Appendix F. The highest-ranked threats identified from this process are discussed in the following sections and will be addressed directly through this plan.

The key threats to the conservation assets relate to impacts on the key ecological attributes and are generally considered to be those with the greatest impact on the regeneration, recruitment and restoration of species and ecological communities. The outcome of mitigating these threats is to ensure that habitats and ecological communities are functioning within acceptable bounds to maintain key species and threatened flora and fauna populations (e.g. small mammals, heathland birds, colonial nesting birds).

Identifying and addressing threats associated with climate change

Climate change is one of the main underlying drivers of long-term condition across all terrestrial and marine conservation assets (Section 1.4). In this plan, threatening processes associated with climate change have been considered both in the way that they compound other anthropogenic threats and through their direct impacts on habitats such as through drying, warming or sea-level rise. Identifying and mitigating compounded threats will increase the resilience of ecosystems to climate change and improve their capacity to adapt.

Impacts of future climatic conditions projected with a high or very high degree of confidence for the Wilsons Promontory Parks Landscape specifically include:

> Increased average temperatures in all seasons; increase in heatwave occurrence and intensity; altered rainfall seasonality (reduced cool season rainfall and possible warm season changes in rainfall); increased intensity of rainfall events; continue seal level rise, inundation and coastal erosion; and harsher fire-weather climate.

Planning and decision-making tools such as the Resist-Accept-Direct framework (Section 1.5) and climate change scenario planning (Appendix G) have been used to ensure that the threats facing the Wilsons Promontory Parks Landscape will be identified and thoroughly considered, and the strategies developed to address climate and non-climate threats will be robust throughout the lifespan of the plan, including under uncertain climatic condition.

Priority threatening processes

Of the threatening processes that were assessed in the Wilsons Promontory Parks Landscape (in Table 5.1), those posing high or very high risk to conservation assets, or their component key ecological attributes are considered priority threatening processes and are described in this section of the plan. The Heathland conservation asset was listed as two components, Heathland (sands) and Wet heathland, for the purposes of threat assessment, as these two components have very different risks and vulnerabilities.

The characteristics and impacts of these priority threats are described in the following pages, together with an objective for the level of threat reduction required over a 5-year period to effectively reduce the impacts on achieving conservation outcomes.

Table 5.1 *Key threats to the conservation assets of the Wilsons Promontory Parks Landscape.*

Threatening process	Threat agent(s) and impact	Heathland (sands)	Wet heathland	Mixed Dry Forest and Woodland	Wet Forest and Rainforest	Coastal Grassy Woodland	Riparian and Wetland	Coastal (including islands)	Unvegetated Soft Sediments	Subtidal Reefs	Seagrass Beds	Water Column
Inappropriate fire regimes and management	**Prescribed burning and bushfire** – too frequent/infrequent, wrong season/ severity/scale	Very High	Very High	Very High	Very High	Very High	Very High	High				
	Impacts of fire management – fire ignition, suppression, new track construction, off-track driving, strategic fire or fuel breaks	Very High	Very High	Moderate	High	Moderate	High					
Habitat fragmentation and disturbance	**Internal infrastructure and development** – access roads/tracks, buildings and structures, jetties	Low	Low	Low	High	Moderate	Moderate	Low				
	Disturbances from external land sources (e.g. adjoining land use) – inappropriate development, clearing, roads, agriculture	Low			Moderate		Moderate	Moderate				
Human disturbance and natural resource use	**Recreational activities (legal/illegal)** – mountain bikes, camping, off-track walking, physical presence by humans, personal watercraft, boating	Low	Low	Low	Low		High	High	High	Moderate	Moderate	Low
	Recreational activities – pollution – recreational pollution, littering, recreational products (e.g. fishing tackle), noise pollution, light pollution	Low	Low	Low	Low		High	High	Moderate	Moderate	Low	Low

Threatening process	Threat agent(s) and impact	Heathland (sands)	Wet heathland	Mixed Dry Forest and Woodland	Wet Forest and Rainforest	Coastal Grassy Woodland	Riparian and Wetland	Coastal (including islands)	Unvegetated Soft Sediments	Subtidal Reefs	Seagrass Beds	Water Column
	Natural resource extraction (legal/illegal) – firewood collection, fishing, bait collection			Low	Low		Low	Low	Low	Moderate	Low	Low
Alteration to natural hydrology and precipitation regimes	**Warming, drying, flooding** – increased frequency/severity of drought, floods, increased evapotranspiration, changes in timing/duration of frosts, extreme temperatures occurring earlier or later in season, dieback, loss of tree cover, ecosystem encroachment, mis-timed or unsuccessful reproduction, poor water quality	Moderate	Moderate	Very High	Very High	Very High	Very High	Very High	Moderate			
	Aquatic system modifications – channelisation, de-snagging, channel modification, dredging, breakwater, in-stream barriers				Low		Low					
	Harvesting or diversion (legal/illegal) – Ground water harvesting, surface water diversions, channels, pipelines				Low		Low					
	Pollution – oil/chemical spill, sewage, nutrients, fertiliser, stormwater runoff, heavy metals leaching into groundwater				Low		Very High	Moderate		Low	Low	

Threatening process	Threat agent(s) and impact	Heathland (sands)	Wet heathland	Mixed Dry Forest and Woodland	Wet Forest and Rainforest	Coastal Grassy Woodland	Riparian and Wetland	Coastal (including islands)	Unvegetated Soft Sediments	Subtidal Reefs	Seagrass Beds	Water Column
	Sedimentation from human disturbances – soil disturbance, land clearing, recreational activities, stormwater runoff, dredging, fire, stream crossings, poor water quality and introduction of weeds			Moderate	Low		Very High			Low		
Alterations to marine and coastal habitat	**Coastal erosion** – sea level rise, increased severity or frequency of storm surge/wave action							Very High	Very High			
	Marine climate change – increased sea surface temperature, lower pH, increased severity or frequency of wave energy								High	High	Moderate	Moderate
	Pollution, vessel effluents, drifting waste – oil/chemical spill, ballast water, commercial shipping or fishing, port activities, plastics, netting, changes to freshwater input from catchments into marine								High	High	High	Moderate
Invasion of terrestrial/ aquatic habitats by weeds	**Weeds, overabundant/ range-shifting native species** – herbaceous perennial, woody, aquatic exotic species, ecosystem encroachment by native species, contraction or displacement of native species/communities	Very High	High	High	Moderate	Very High	Very High	Very High				

Threatening process	Threat agent(s) and impact	Heathland (sands)	Wet heathland	Mixed Dry Forest and Woodland	Wet Forest and Rainforest	Coastal Grassy Woodland	Riparian and Wetland	Coastal (including islands)	Unvegetated Soft Sediments	Subtidal Reefs	Seagrass Beds	Water Column
Infection of plants and animals	**Pathogens** – virus, bacterium or other micro-organisms including fungus (e.g. Phytophthora, chytrid fungus, abalone herpes, avian influenza, toxoplasmosis)	Moderate	High	Very High	High	High	Very High	High	Low	High		
Predation	**Introduced predators** – fox, cat, dog, rodents, fish	High	Very High	Very High	Very High	Very High	Very High	Very High	Low			
Competition and land degradation by herbivores	**Introduced herbivores** – over grazing/browsing, trampling and wallowing – rabbits, deer, rodents	High	High	Very High	Very High	Very High	Very High	Very High				
	Overabundant native herbivores – over grazing/ browsing by kangaroos, wallabies, koalas, wombats, possums, insects, Cape Barren Geese	High	High	Very High	Moderate	Very High	Very High	Very High				
Competitive interactions (marine)	**Exotic marine species –** Northern Pacific Sea Star, New Zealand Screw Shell, Pacific Oyster, European Shore Crab								Very High	Very High	High	Low
	Native and range-shifting marine species – Black Spined Sea-urchin								Moderate	Very High	Moderate	Low
Competitive interactions (other)	**Overabundant/ range-shifting native fauna and introduced fauna –** wallabies, wombats, kangaroos, deer, bees, Cape Barren Geese, possums	High	High	Moderate	Low	Very High	High					

5.1 Inappropriate fire regimes

Threat description

Fire is an important driver of ecosystem condition, with biodiversity and ecosystem health determined by the scale, intensity, frequency and timing of individual events and their pattern over longer timescales. Inappropriate fire poses an very high risk to a range of assets across the Wilsons Promontory Parks Landscape. The primary threat is the over-application of fire or the exclusion of fire. Inappropriate fire regimes skew growth stages and reduce heterogeneity of vegetation and habitat, which affects the ability of many species to persist and survive in the landscape. Applying fire in the landscape to ensure that assets are maintained within tolerable fire Intervals and within appropriate intensity, timing and season will help to ensure that the variability of growth stages is enhanced and that this threat is mitigated.

[FMS] Fire frequencies that are too high or too low have the potential to change the composition and structure of vegetation communities. The preferred interval between fires for any given EVD is determined by the time taken by a representative species to reach maturity and set seed (minimum TFI), and the time to local extinction in the absence of fire (maximum TFI) (Cheal, 2010). If the interval between fires is too long, species that depend on fire for regeneration may die out (Cheal, 2010).

As demonstrated by the long list of past bushfires and shown again in the impacts of the most recent large fire (the Cathedral Fire in 2009), the risks of fire in the Wilsons Promontory landscape is an important and ongoing management consideration. The likelihood of fires occurring and spreading in different situations, and the consequences of these fires to values such as park visitor safety, critical infrastructure, park assets and fire-sensitive species and ecological communities must be managed through appropriate risk management measures. While not all fires will be of high consequence, large fires where at least parts of the fire area burn at high intensity have the potential to harm vulnerable values including, but not limited to:

- Park visitors and campers - Life risk to the transient tourist population in summer is a particularly acute risk in peak season where there can be between 7 500 to 10 000 visitors within the park on peak days.
- Aboriginal Cultural Heritage & European Cultural Heritage sites.
- Fire-sensitive species and ecological communities (e.g. Wet Forests and Rainforests and Mixed Dry Forests and Woodland).
- Species reintroduction programs, such as the current Eastern Bristlebird program, particularly in the early stages of re-introduction.

[FMS] Wilsons Promontory Sanctuary: Fire Management Strategy

- Vegetation where time-since-last-fire is below minimum TFI.

Secondary impacts on fire-sensitive values can also occur, such as an increase in weed species that are often successful early colonisers following disturbance, and the increased risk of flood and soil movement that usually follows high severity fire. An example of these impacts is the mass seeding recruitment of Coast Tea-tree that has occurred following previous severe fire events.

Some assets are more vulnerable to fire than others, with the notable example of 'landscape traps' in Wet Forest and Rainforest.

WFRRP Records indicate that the Wet Forests of the Prom would have historically experienced a large-scale fire every 200 to 300 years. However, the first half of the 1900s saw a period of frequent, intense fires followed by the absence of fire until 2005.

These areas, now recognised as "Unclassified Non-Eucalypt Forest", have experienced significant change in composition without the time required to regenerate between fires. In their new compromised state, they remain highly vulnerable to fire, perpetuating further regime shifts.

Fire management can also have an impact on conservation assets through activities such as track and control line establishment for bushfire suppression and planned burning. Fire management vehicles can also spread pathogens and weeds. Using existing roads and tracks where possible should limit the physical impact of fire management activities and also the spread of pathogens and weeds.

This threat is addressed through the Conservation Strategy *6.1 Landscape-scape ecological burn program* and *6.10 Building climate resilience and refugia*.

Threat objective(s)

By 2029, increase the area and extent of Heathland, Coastal Grassy Woodland, Mixed Dry Forest and Woodland, Wet Forest and Rainforest, and Riparian and Wetland assets that are managed in accordance with tolerable fire intervals and appropriate growth stage distributions.

Sanctuary plan outcomes and objectives

	CGWRP	CGW STO5	Ensure fire has no negative impacts on Coastal Grassy Woodland.
	HRP	H STO3	Ensure fire has no negative impacts on heathland.
	FMS	FE STO1	Resist loss of grasslands in swales to domination by Coast Tea-tree and Coast Wattle. Accept some swale grasslands are transitioning into a different EVC.
		FE STO2	Resist loss of Coast Banksia Woodlands but accept some Coast Banksia Woodlands are transitioning into a different EVC (Coastal EVD, Clarke et. al. 2022).
		FE STO3	Resist loss of Manna Gum woodlands to domination by Coast Tea-tree and Coast Wattle. Accept some woodlands are transitioning into a different EVC.
		FE STO4	Resist loss of Heathland to domination by Coast Tea-tree wherever feasible (Heathland (Sand) EVD, Clarke et. al. 2022).
		FE STO7	Resist loss of Tall Mixed Forest wherever feasible. Resist loss of Granitic Hillslopes wherever feasible (Tall Mixed Forest and Granitic Hillslopes EVD's, Clarke et. al. 2022).
		FE STO10	Resist loss of Moist Forest wherever feasible. Direct some former Moist Forest that has been destocked of eucalypts due to too frequent high severity fire to a more fire resilient form of tall eucalypt forest. Accept some former Moist Forest patches are transitioning into a different, yet to be determined EVC (Moist Forest EVD, Clarke et. al 2022).

FE STO11	Resist loss of Tall Mist Forest wherever feasible. Direct some former Tall Mist Forest that has been destocked of eucalypts due to too frequent high severity fire to a more fire resilient form of tall eucalypt forest. Accept some former Tall Mist Forest patches are transitioning into a different, yet to be determined EVC (Tall Mist Forest EVD, Clarke et. al. 2022).
FE STO12	Resist loss of Closed Forest wherever feasible, especially given the loss of rainforest regionally in the 2019/2020 bushfires. Exclude fire from EVC's within this EVD (Closed Forest EVD, Clarke et. al. 2022).
FMO1	To minimise the impact of major bushfires on human life, communities, essential and community infrastructure, industries, the economy, and the environment. Human life will be afforded priority over all other considerations.

5.2 Weed and pathogen invasion

Threat description

Weeds, overabundant native species and pathogens are a very high threat to many of the terrestrial assets in Wilsons Promontory. Invasive or overabundant native species are damaging to areas of native vegetation because they outcompete native plants, change vegetation structure and fire regimes, and alter ecosystem functions such as hydrological regimes and nutrient cycling. Many weeds colonise open or disturbed ground, which is created with vegetation removal, grading and surfacing roads and paths, pest animal activity such as herbivore movement or over-grazing, fire and edge effects. They are dispersed by vectors including wind, water, vehicles, footwear and animals.

[TMS] Environmental weeds limit habitat availability and quality and impact on recovery and restoration efforts in Coastal areas (including islands), Mixed and Dry Forests, Coastal Grassy Woodlands and Heathlands.

A number of significant weeds are already having a direct impacting on assets, and limiting recovery and restoration of assets, particularly Coastal (including islands) where species such as Spartina, Mirror Bush, Sea Spurge and woody weeds are limiting habitat availability and quality. Focussing weed control on existing weed species that are known to be degrading key ecological attributes will result in a significant improvement in the condition of assets.

There is also a significant threat of invasion of several native species, including Coast Tea-tree, White Kunzea and Coast Wattle. In particular, Coast Tea-tree is an extreme threat to the Heathland and Coastal Grassy Woodland assets, where it alters community structure and habitat quality.

[HRP] Coast Tea-tree is usually confined to the first and second dunes of the coast, but invasion beyond this zone is a critical threat to both Sand Heathland EVCs and to Heathy Woodlands. The degree of invasion varies dramatically across different sites but is typically more severe along the west coast of the Prom.

Without intervention to manage Coast Tea-tree invasion, heathland communities could be permanently lost. If allowed to reach maturity, Coast Tea-tree individuals are larger than most of the heath species and may form a closed canopy. Beneath this canopy, the heathland species are likely to senesce and die. Dominant, less flammable Coast Tea-tree may suppress typical heathland fires and cause the loss of heathland obligate seeder species that require fire to regenerate (e.g., hakea and banksia species). Eventually, the species-rich heathlands will be replaced by species- poor thickets and scrubs (Cunningham et al. 1996).

[TMS] Wilsons Promontory Sanctuary: Threat Management Strategy

CGWRP If allowed to reach maturity, Coast Tea-tree individuals may form a closed canopy and restrict sunlight from reaching the Coastal Grassy Woodland understorey.

The threat of weeds will change over time with shifting climates, the introduction of new weeds, and the spread of existing weeds. It is essential to have an appropriate monitoring program coupled with appropriate resources to directly treat and eradicate new populations of weeds that are likely to affect key ecological attributes. Effective detection, monitoring and management of invasive species is necessary to limit their impacts as eradication is often not feasible.

Diseases, fungi and parasites can also affect the health of native species, reducing their ability to reproduce or survive. Threatened species or flora populations that are stressed due to other factors are particularly susceptible to outbreaks of disease. Phytophthora dieback is caused by the pathogen *Phytophthora cinnamomi* (also called Cinnamon Fungus), an aggressive plant pathogen that affects the root systems of susceptible species, which can result in death. The fungus is spread on the shoe of hikers, on management and recreational vehicles and by animals moving through the landscape. heathy ecosystems are particularly affected by this fungus. Currently, Phytophthora is scattered throughout Wilsons Promontory National Park, but is having a major impact of dieback in certain areas such as Vereker and Miller's landing and Tidal Overlook.

Additionally, several pathogens are of concern if they were to establish a large presence in this Parks Landscape, including Chytrid fungus and Avian Flu. Chytrid fungus lives in water or soil and is thought to infect frogs when their skin comes into contact with water and soil that contains fungal spores, which can be easily spread through vectors such as shoes, equipment, pest animal species and even other frogs. The fungus significantly impacts amphibian populations and could be devastating if it became widespread at Wilsons Promontory. Similarly, Avian Flu brought to the landscape through migratory birds could have significant impacts on the seabird and shorebird populations at Wilsons Promontory, which include a number of threatened species. Monitoring for these pathogens may assist in early detection if they establish in the landscape.

This threat is addressed through the Conservation Strategy *6.2 Integrated weed and pathogen control program*.

Threat objective(s)

By 2029, eradicate any new and emerging weeds wherever they occur and control existing weeds at sites where high priority biodiversity values are at risk.

Sanctuary plan outcomes and objectives

	TMS	TMS STO 1.3	By 2027, the impact of key species of invasive introduced flora will be contained, and the trend in 2028 will be reducing.
	CGWRP	CGW STO1	Reduce the extent and severity of Coast Tea-tree invasion of Coastal Grassy Woodland.
		CGW STO2	Eradicate Coast Tea-tree from Swales by 2027.
		CGW STO3	Eradicate Coast Wattle from Swales by 2027.
	HRP	H STO1	Reduce the extent and severity of Coast Tea-tree and White Kunzea invasion of heathland.

5.3 Total grazing and browsing pressure

Threat description

Total grazing and browsing pressure poses a very high risk to a range of assets across the Wilsons Promontory Parks Landscape. This threat is largely caused by the combined impacts of introduced species such as European Rabbits, Hog Deer and Sambar Deer, as well native species. These species collectively impact the regeneration of heathland, woodland and forest ecosystems, as they prevent young plants from reaching reproductive maturity, and reduce competition with less palatable species such as Coast Tea-tree and White Kunzea. Historic grazing by cattle has also contributed to total condition, particularly of grassland areas.

Managing this threat is essential to supporting the regeneration of key species (e.g. Coast Banksia) and the establishment of diverse vegetation structures and composition across a range of systems.

[TMS] The impacts of total grazing pressure of Hog Deer and Sambar Deer include trampling of streambanks and wetlands, damage to vegetation, loss of diversity and vegetation structure, competition with native herbivores, and the facilitation of weed invasion through seed dispersal and exposure of soil. Total grazing pressure of rabbits impact on the recruitment of canopy species and affects diversity and structure of vegetation communities and facilitates weed invasion through exposure of soil.

[NWRMP] Threats from introduced herbivores are not limited to grazing and browsing, other impacts include tree rubbing, ring barking, thrashing, wallow formation, excessive tracking, soil pugging and vegetation crushing. While cumulative impact of these threats should be considered, the total impact from grazing and browsing pressure was identified as a key threat to the following five conservation assets: Heathland, Mixed Dry Forest and Woodland, Wet Forest and Rainforest, Coastal Grassy Woodland, and Riparian and Wetland. Within these five conservation assets, there are a range of Ecological Vegetation Communities (EVCs) that can be susceptible to grazing pressure.

Land-use change since European settlement has resulted in dramatically altered grazing and fire regimes on Yanakie Isthmus. The eradication of dingoes by 1912 (Kershaw 1913), plus reduction in hunting of native animals by humans, has effectively removed 'top-down' mechanisms that played a significant role in regulating population numbers of large native herbivores such as wallabies, kangaroos and wombats. Along with the introduction of invasive herbivores (rabbits and deer), the resultant increase in total grazing pressure has reduced cover of ground-layer plants (especially grasses), altered fire regime and impaired recruitment of key canopy species (e.g., Coast Banksia) (Morgan, Wright et al. 2018). Ultimately, this has led to a large-scale encroachment of Coast Tea-tree, which has transformed a significant

[NWRMP] Wilsons Promontory Sanctuary: Native Wildlife Risk Management Plan

proportion of CGW on Yanakie Isthmus from open woodlands with a grassy understory, to dense closed shrublands with little or no ground-layer.

Within CGW on Yanakie Isthmus, changes to vegetation community composition and structure have reduced the total area of suitable habitat for a range of fauna. Most notably for critical-weight-range mammals, such as Pookila (New Holland Mouse), Southern Brown Bandicoot, Long-nosed Potoroo, and Eastern Pygmy-possum (Morgan, Wright et al. 2018). It is thought that reduction and continued suppression of populations of ground-dwelling mammals, particularly soil engineers, may be playing a critical role in the ongoing dieback and impaired regeneration of Coast Banksia (Parks Victoria 2017).

Three native wildlife species contribute to overall grazing and browsing pressure on vegetation communities in CGW: Common Wombat, Eastern Grey Kangaroo, and Swamp Wallaby.

CGWRP There is some evidence to demonstrate which grazing species have the highest relative abundance in the Coastal Grassy Woodlands, based on volunteer scat analysis (Davis, 2018) and grazing exclusion plots. Overall, wombats and Swamp Wallabies appear to have the highest grazing impact (Davis et al., 2008); however, the level of impact by grazing species can be variable across the Coastal Grassy Woodlands.

NWRMP Seven native wildlife species are likely to contribute to overall grazing and browsing pressure across Heathland, Mixed Dry Forest and Woodland, Wet Forest and Rainforest, Riparian and Wetland ecosystems: Common Wombat, Eastern Grey Kangaroo, Swamp Wallaby, Common Brushtail Possum, Common Ringtail Possum, Koala, and Emu.

Long-term, landscape-scale suppression (or eradication) of cats and foxes is a critical component of the Wilsons Promontory Sanctuary Blueprint program. However, this management approach introduces the potential risk for eruptive population dynamics in native herbivores, particularly in some macropods (e.g. Swamp Wallaby). This can lead to serious decline in the cover and abundance of palatable vegetation, while less-palatable species increase, potentially causing broadscale habitat degradation. Within WPNP, the Swamp Wallaby is the most likely species to pose an increased risk in the short- to medium-term, although Eastern Grey Kangaroo recruitment can also be influenced by fox removal (refer Banks et al. 2000).

The effective management of this threat will involve the reduction and effective elimination of grazing and browsing pressure by introduced herbivores, including European Rabbits, Hog Deer and Sambar Deer, and the management of grazing and browsing pressure by native herbivores to support the regeneration of these significant assets.

This threat is addressed through the Conservation Strategy *6.3 Herbivore management*.

Threat objective(s)

By 2029, ensure that total grazing pressure in Coastal Grassy Woodland, Mixed Dry Forest and Woodland, Heathland, Wet Forest and Rainforest, and Riparian and Wetland is managed to improve key ecological attributes.

Sanctuary plan outcomes and objectives

	TMS	STO 1.2	By 2027, the impact of over-grazing/over-browsing and trampling of terrestrial vegetation by introduced herbivores will be minimised.
	NWRMP	OBJ1.1	Maintain the density of native herbivores on Yanakie Isthmus at levels that minimise the risk of unsuccessful recovery of CGW.
		OBJ1.2	Ensure that grazing/browsing pressure by native herbivores is managed to minimise the risk of negative impacts on all other conservation assets.
	CGWRP	CGW STO4	Contain the impact of herbivores on native flora within Coastal Grassy Woodland. The goal for 2028 is for the trend to be reducing.
	HRP	H STO2	Contain the impact of herbivores on native flora within heathland. The goal for 2028 is for the trend to be reducing.

5.4 Predation by foxes and cats

Threat description

Feral cats and Red Foxes pose a very high risk to all terrestrial assets across the Wilsons Promontory Park Landscape.

[TMS] Predation by cats and foxes degrades faunal assemblages especially those that support ecological processes and skew populations, habitat associations and distribution of those species that are more resilient to predation pressures.

Changes in the composition of native fauna populations can disrupt the function of food chains and introduced predators can contribute to the spread of unwanted weeds and pathogens. The coastal islands of Wilsons Promontory are valuable for their lack of introduced predators, which allows the many seabirds and small mammals they support to live free from the impacts of foxes or cats. Small mammals, herpetofauna and birds are most at risk from predation by introduced predators, as are endangered species such as Hooded Plovers which nest on beaches.

Invasive predators can also spread weeds, propagules and diseases (such as toxoplasmosis spread by feral cats) throughout the landscape.

Programs that focus on single predator species may have undesirable consequences for other predators as well as prey species. For this reason, the control of terrestrial predation pressures in an integrated manner is an important step to effectively managing this threat. Unfortunately, there have historically been a number of barriers to controlling feral cats, including challenges associated with the current policy and legislation regulating feral cat control, and relatively limited knowledge and field experience in controlling feral cats in Victoria.

The roles of native predators, especially those that have been lost from the Parks Landscape, remains a knowledge gap. Introduced predators are likely to modify the food chain and disrupt the behaviour of native predators. Building knowledge on both the role of native predators and the interactions between native and introduced predators will support the ongoing effective management of predation pressure and aid the recovery of native predator species.

This threat is addressed through the Conservation Strategy *6.4 Sustained control of introduced predators*.

Threat objective(s)

By 2029, reduce the impact of predation sufficiently to ensure that predation-sensitive species occupy at least 50% of their potential habitat.

Sanctuary plan outcomes and objectives

	TMS	STO 1.1	In 2027, there will be reduced predation of native terrestrial fauna by feral cats and foxes compared to 2022.
	WRP	TO 5.1	In 2027, there will be reduced predation of native terrestrial fauna by feral cats and foxes compared to 2022.
		TO 10.1	In 2032, there will be reduced predation of native terrestrial fauna by feral cats and foxes compared to 2027.
		NHM TIT 5.3.a, 10.2.a SA TIT 5.6.a, 10.2.a BTR TIT 5.5.a, 10.3.a KQ TIT 5.3.a, 10.2.a GP TIT 5.2.a, 10.2.a EQ TIT 5.3.a, 10.2.a STQ TIT 5.3.a, 10.2.a EB TIT 5.3.a, 10.2.a RBP TIT 5.3.a, 10.2.a BTRW TIT 5.3.a, 10.2.a SBB TIT 5.3.a, 10.2.a LNB TIT 5.2.a, 10.2.a LNP TIT 5.2.a, 10.2.a WFD TIT 5.2.a, 10.2.a EBB TIT 5.2.a, 10.2.a	Predation pressure and competition from invasive predators (foxes, cats) has decreased

5.5 Marine invasive or overabundant species

Threat description

Marine invasive or overabundant species pose a very high risk to a range of marine assets in the Wilsons Promontory Parks Landscape. While the current extent of marine invasive species is low across the landscape, the number of boats and marine recreational activities is increasing as they become more affordable and popular. Boats visiting the marine parks and reserves of Wilsons Promontory launch from Port Welshpool as well as the Prom itself, which increases the risk of spread of pests from sources external to the parks in this landscape. Furthermore, commercial traffic is expected to increase in the future with the development of offshore wind farms and vessels travelling in close proximity to the marine parks and reserves.

Marine invasive species may outcompete and prey on native species, decreasing diversity and abundance of native species in the park. Marine pests that feed on benthic invertebrates and infauna (such as the Northern Pacific Sea-star) may have indirect impacts on other predators via competitive exclusion. Overabundant native marine species also behave like marine pests and impact marine habitats. Although sea urchins are native to many marine systems, the native Black-spined Urchin has become overabundant in eastern Victoria, occurring in high densities that alter the biomass of marine vegetation, causing denuded 'barrens' where they feed on seaweed. This significantly alters the ecosystem by liming the food and cover available to marine fauna while also providing habitat opportunities for other species of marine fauna that would not usually occur at the site.

Species of concern at the Prom that have been previously detected but have either been eradicated or not established significant damaging populations include the Northern Pacific Sea-star, New Zealand Screw Shell, Pacific Oyster, European Shore Crab and the green seaweed *Codium fragile*. Other species that present a potential threat due to proximity in nearby areas include the New Zealand Sea-star and the native Black-spined Urchin. Other species that are not yet present in Victoria but may move in with the warming waters brought by the East Australian Current (EAC) include the green seaweed *Caulerpa taxifolia*. The EAC is strengthening with climate change and has already contributed to an increase in density of the Black-spined Sea Urchin in East Gippsland.

Managing this threat is essential for regenerating key canopy species in Subtidal Reefs (e.g. brown macroalgae) and increasing the health of other marine assets. The effective management of this threat will involve the reduction and effective elimination of a number of key invasive species and the management of grazing pressure by native species to ensure that regeneration of these significant assets can occur.

This threat is addressed through the Conservation Strategy *6.5 Managing marine pests and overabundant species*.

Threat objective(s)

By 2029, maintain and enhance effective pest surveillance and monitoring programs, and if necessary and feasible, eradicate new and existing marine pests and overabundant native species to maintain the health of key ecological attributes of these systems.

5.6 Human disturbance (visitor impacts and natural resource use)

Threat description

Wilsons Promontory National Park and the marine parks and reserves in this landscape are some of the most well-known and frequented parks in Victoria, drawing over 100 000 visitors a year for a wide range of recreational activities, including camping, hiking, boating, fishing, swimming and snorkelling. A number of licensed tour operators also offer a variety of experiences that include mountain biking, four-wheel driving, birdwatching, surfing and diving. The visitor facilities at Wilsons Promontory include powered and unpowered campsites, roofed accommodation, walking tracks, toilets, a café, general store and visitor centre. These facilities both support the high visitor numbers at Wilsons Promontory and draw visitors with the accessibility they offer. There is therefore a great need to balance enjoyment of the parks with protection from human disturbance and conservation of fauna, flora and ecosystems as both legal and illegal activities can degrade natural and cultural assets.

Illegal activities recorded in the landscape include illegal access, camping, fishing and poaching, which can disturb wildlife, has the potential to spread weeds and diseases and reduce populations in protected areas. Poaching of abalone, rock lobster and other molluscs and fish (including larger pelagic species) may lead to a reduction in size and abundance, as it is often larger individuals that are targeted. Larger individuals often contribute disproportionately to reproductive output and loss of too many of these individuals may result in reduced reproduction and recruitment for these species. Reduced numbers of these species may lead to alterations in the habitat and in numbers of both their prey and predators. Litter that ends up in the marine environment can be ingested by marine fauna including seabirds, or cause entanglement, leading to injury or death of the animal.

Permissible recreational activities can also have detrimental effects on the environment. Runoff from toilets, dish washing or caravan grey water can impact water quality and cause algal blooms which may deplete oxygen levels in the water column, resulting in fauna mortality. Excessive nutrients may result in increased epiphyte loads that may smother seagrass and cause dieback, impacting other species. Water quality issues have been observed at Tidal River, Sealers Cove and Refuge Cove. Increases in boating have been accompanied by increases in boat discharge and anchor scour damaging marine assets.

A significant and ongoing issue is that of disturbance to wildlife from high visitation pressure or inappropriate behaviour. Watercraft too close to seals or noise from recreational vessels may cause stampedes on islands, potentially resulting in trampling of pups, driving pups off cliffs or forcing them into the water. Stress to animals may mean increased energy expenditure and less time and energy invested into foraging, breeding and survival. There is anecdotal evidence to suggest that an increase in recreational and licensed tour operator boat usage in Wilsons Promontory Marine National Park is disturbing seals, shorebirds, whales and dolphins.

Similarly, terrestrial activities like hiking or birdwatching can disturb shorebirds and other fauna, which may cause nesting failures. Attributing a meaningful visit at Wilsons Promontory to activities such as cairn building, close encounters with wildlife or a 'wilderness experience' by walking off tracks may contribute to increases in these activities and disturbance to the ecosystem.

Historically, there has been infrastructure development or disturbance on some of Wilsons Promontory's islands, including navigations aids on Citadel Island and Cliffy Island and large volumes of asbestos on Cliffy Island that degrade environmental values. The proposed installation of offshore wind farms across Gippsland may have impacts to some mobile species such as birds or marine species that may be disturbed throughout construction with consequences for populations whose distributions include Wilsons Promontory.

While uncommon, there is a risk of oil spills occurring from vessels from the shipping lane that passes close to Wilsons Promontory marine protected areas. Oil spills may smother sensitive intertidal ecosystems, resulting in damage or loss of habitat forming flora and fauna and associated communities such as shorebirds, seabirds and other wildlife. Oil spill clean-up using dispersants may also have toxic effects on flora and fauna.

Managing this threat is essential as visitation pressure is increasing at Wilsons Promontory with its popularity and will require strong communication of permissible activities and the impacts of inappropriate activities in the parks and reserves.

This threat is addressed through the Conservation Strategy *6.7 Reducing the impacts of human disturbance*.

Threat objective(s)

By 2029, ensure that recreational and commercial activities are undertaken in ecologically appropriate areas with low/no impact on natural values, and reduce the incidence of illegal activities in marine and terrestrial parks.

5.7 Climate change

Threat description

Storms, floods, fires, heatwaves, erosion and droughts are natural phenomenon that have always been part of the Wilsons Promontory Parks Landscape. However, these extreme weather events are increasing in frequency, severity and intensity due to climate change, which has dire consequences for all ecosystems, and their component species and functions.

Climate change is generally described as predicted change in average, variability and extremes of temperature and rainfall, as well as degree of sea level rise, sea surface temperature and a range of other associated variables. The amount and direction of change in these variables is predicted using a range of climate change models which are in turn dependent on inputs such as historic data and future emissions scenarios, which generally refer to either a representative concentration pathway (RCP) 4.5 (moderate) or RCP 8.5 (severe) emissions scenario. Therefore, various climate change models produced by different sources have different predictions of change.

In order to allow for the uncertainty in which climate change scenario may be most accurate, three divergent climate change scenarios have been considered using a climate change scenario planning approach (see Appendix G for description of this methodology).

Scenario 1: mild warming and precipitation change

This model predicts that by 2050, the Wilsons Promontory area may experience low warming of less than one degree, a moderate increase in temperature extremes and heatwaves (50% more time in heatwave), altered rainfall seasonality with wetter Spring/Autumn and drier Summer/Winter, much shorter dry periods, slightly longer wet periods, very wet days and once in 20-year rainfall events that are 50% greater. Fire conditions may be worse due to warming, with increased heatwaves and drier summers.

Average sea surface temperatures are predicted to be approximately one degree higher, inundation and erosion due to sea level rise of 13 cm compared to 1986-2005 baseline and increased ocean acidity of around 0.1 pH.

Scenario 2: moderate warming with wet periods

This model predicts that by 2050, the Wilsons Promontory area may experience significant warming of around 1.3 degrees, particularly in Spring, a substantial increase in temperature extremes (twice as many days over 35°C and time spent in heatwaves), altered rainfall seasonality with drier Spring/Winter and wetter Summer/Autumn. Rainfall extremes will increase with shorter extreme dry periods, more wet days and extreme wet periods more than twice as long and one in 20-year rainfall events up to twice as large, particularly in Summer.

Inundation and erosion due to sea level rise is predicted to be around 25cm compared to baseline and ocean acidity increase of around 0.12 pH. Sea surface temperature may increase to a moderate degree.

Scenario 3: extreme warming and drying

This model predicts that by 2050, the Wilsons Promontory area may experience severe warming of approximately two degrees across all seasons, with a severe increase in high temperature extremes (4.5 times as many days over 35°C, three times as many days spent in heatwaves and once in 20-year maximum temperatures 6.4°C hotter), less rainfall overall (-20% annually) particularly in Spring/Summer. There may be shorter extreme dry periods and larger once in 20-year rainfall events. Fire conditions may be much worse due to severe warming, temperature extremes and drier Spring/Summer.

Average sea surface temperatures are predicted to be 1.2 – 1.3°C higher, inundation and erosion due to sea lever rise of 33cm compared to baseline, increased ocean acidity of around 0.17 pH and a slight increase in average sea surface current velocity.

Impacts of climate change

The impact of bushfires and change in fire regimes is described in '5.1 Inappropriate fire regimes'. Increased UV radiation may cause cell damage to plants and animals, reducing their fitness and increasing heat stress. Depending on the species, this may result in reduced breeding, reproduction and even mortality.

Storms and floods have many ecological benefits such as flushing wetlands, distributing plant propagules and animals across the landscape, refreshing drought refuges and bringing nutrients that increase productivity. However, they can degrade habitat by removing or destabilising vegetation and soil, increasing erosion. Storm damage may affect tall, wet forests, which may be susceptible to damage from wind and heavy rainfall events. Increased intensity and frequency of storms may result in storm surges and more frequent and extensive inundation of intertidal areas, as well as increased coastal erosion. This is turn may directly affect coastal species such as shorebirds, and increase water turbidity, reducing light availability and increasing siltation and deposition, with flow on impacts to marine flora and fauna such as smothering, reduced productivity and loss of habitat.

Changes in ocean current strength and patterns of upwelling may cause changes in the distribution of marine species, including marine pests, and change underwater habitat. Climate change has already resulted in a strengthening of the East Australian Current, with impacts on the dispersal of larval stages of sub-tropical and tropical species and increased rate of denudation of macroalgae caused by native urchins in East Gippsland. Sea level rise may cause intertidal habitats and species to become permanently inundated resulting in displacement or loss of ecosystems and associated fauna and flora, especially where these have no room to migrate landwards.

For shallow subtidal or intertidal species, increased air temperature may increase desiccation and thermal stress, resulting in decline or loss of habitats, especially when low tide coincides with the hottest part of the day. Increased sea surface temperature may affect metabolic and other biochemical processes which may affect the fitness of many species and in some cases, push species beyond their thermal tolerance limits, resulting in mortality. Increased ocean temperature influences pH and ocean acidification will have negative impacts on development and various physiology processes in calcifying organisms. Potential changes in species distributions and abundances will ultimately impact wider marine food webs.

An analysis of marine values most vulnerable or at risk to the impacts of climate change suggested that these included seabirds and shorebirds (heat stress, changed food availability), brown macroalgae (invasive species, loss of habitat, changed water quality), fish (loss of habitat, reduced species richness/abundance), and seagrass beds (loss of habitat, changed water quality, heat stress; BMT 2023).

There are many indirect impacts of climate change on both terrestrial and marine assets. The stress of change on various ecosystems and species can make them more susceptible to disease, and some habitats are more easily colonised by pest plants and animals, which in turn predate on or outcompete native species. There may be synergistic effects between climate change stressors, or with other threatening processes.

All Conservation Strategies will contribute to the resilience of assets against climate change, but this threat is primarily addressed through the Conservation Strategy *6.10 Building climate resilience and refugia*.

Threat objective(s)

By 2029, fire risk is reduced in areas designated as refugia and the impacts of coastal erosion, sea level rise, storm surge and sea surface temperature on coastal and marine assets are minimised.

6 Conservation strategies

Priority conservation strategies

A broad range of conservation strategies have been considered, including those in existing park management plans and regional catchment strategies as well as additional actions identified by regional staff and conservation partners. These strategies have been designed to achieve the desired conservation outcomes identified in this plan.

Where possible, adaptations to climate change have been considered in developing these strategies. These strategies will support the persistence of conservation assets in this Parks Landscape by mitigating priority threats, thereby strengthening the capacity of ecosystems to absorb impacts of long-term climatic change. In some assets, such as Wet Forest and Rainforest, where climate change will have a profound impact on the function and composition of these ecosystems, proposed adaptation measures have the aim of maintaining ecosystem function with altered composition, facilitating movement of communities or species, or maximising species persistence through managing in-situ or ex-situ refugia.

Strategies for this Parks Landscape have been developed considering a range of recognised climate adaptation actions (Gross et al. 2016) such as:

- **Ensuring functional connectivity** – ensuring connectivity of riparian systems by protecting climate refugia.
- **Protecting key ecosystem features** – such as seagrass beds and subtidal reefs which provide important marine biodiversity habitat.
- **Supporting ex-situ conservation and relocating organisms** – such as the Eastern Bristlebird release program.
- **Reducing non-climate stressors** – including controlling pest plants and animals which hinder the ability of ecosystems to withstand or adjust to changing climate.

Priority strategies have been further developed to establish guiding statements around the key implementation components of each strategy. These were tested through the development of results chains, which test the logic of the strategy in a stepwise manner for delivering the desired outcomes. These results chains were used to develop key implementation milestones for each strategy, which include measurable outputs and outcomes that help managers to understand the impacts of management on improving the viability of conservation assets and managing threats.

Each strategy may be suitable for further refinement or development with conservation partners and stakeholders who wish to further support conservation outcomes in the Wilsons Promontory Parks Landscape.

Strategies prioritised and developed through this process are:

- Landscape-scale ecological burn program
- Integrated weed and pathogen control program
- Herbivore management
- Sustained control of introduced predators
- Managing marine pests and overabundant species
- Restoration of Coastal grassy Woodland, Heathland and Wet Forests
- Reducing the impacts of human disturbance
- Augmentation, reintroduction and introduction of key native species

- Collaborative partnerships to address key knowledge gaps
- Building climate resilience and refugia

Strategy description format

Conservation strategies are detailed on the following pages in the format described below.

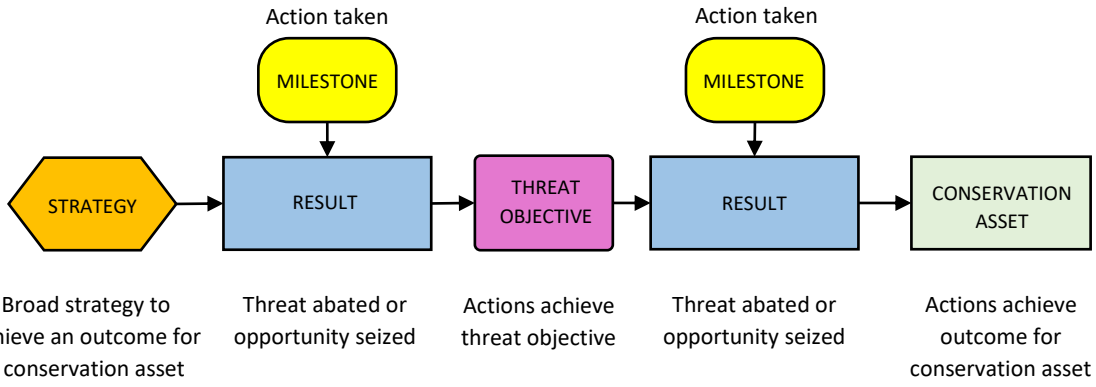
Conservation strategy

Conservation strategy development has focused on either addressing key threats or improving the health of key conservation assets or both. The development of these priority strategies has been undertaken using results chains to ensure that the actions that are defined within the strategy are those that will lead directly to addressing the objectives and conservation outcomes of this plan. Each strategy is captured in a statement which defines:

- the impacts of the strategy on key threats
- the approaches to be applied
- the measures of success
- the impact of the strategy on conservation outcomes.

Results chain

Results chains have been developed for all conservation strategies. They express the relationship between the conservation strategy, identified threats and an improvement in the desired state of conservation assets, as well as the assumptions that underpin how we think a conservation strategy will contribute to maintaining the conservation asset(s). The results chain helps visualise and identify some initial monitoring indicators and milestones. Below is a simple example of a results chain.



Implementation milestones

Result	Action
Statement of what implementation success looks like	• Milestone from results chain, with locational and other detail •
	•
	•
Threat objective	•

6.1 Landscape-scale ecological burn program

This strategy replaces the *Landscape-scale ecological fire program* strategy from Iteration 1 of the Wilsons Promontory Conservation Action Plan (2017). It draws upon actions from the Sanctuary Fire Management Strategy, Heathlands Restoration Implementation Plan, Coastal Grassy Woodland Restoration Implementation Plan, Wet Forest and Rainforest Restoration Implementation Plan and Wildlife Restoration Plan.

This strategy aims to improve the ecological and cultural health of the Wilsons Promontory Parks Landscape through managing bushfire and planned burning. This will involve understanding the ecological requirements of conservation assets both for the exclusion and application of fire and developing prescriptive burns to achieve ecological objectives. It will also involve a coordinated and informed response to bushfire, ensuring that both fire and the management activities to suppress fire have minimal impacts on natural values. Fire planning and management will be carried out in partnership with DEECA, who are responsible for planning and delivery of fire management activities across Victoria, and Traditional Owners.

FMS Parks Victoria's ten strategic directions for fire management (PV 2023) will support Parks Victoria to meet their land management responsibilities and will confirm roles with partner agencies. They also support prioritising future investment in roles that improve Parks Victoria's ability to meet legislative responsibilities, including working with Traditional Owners, protection of cultural heritage and natural values, and implementation of the fire ecology components of Conservation Action Plans.

The Wilsons Promontory Fire Management Strategy developed as part of the Sanctuary project takes into account the detailed fire history and ecological requirements of different EVCs, such as Tolerable Fire Intervals (TFIs) and growth stage structure (GSS). Complementary actions from other Sanctuary plans have also been included to place all fire-related actions into a single Conservation Strategy. A significant preliminary analysis has been undertaken to assess the condition and requirements of different conservation assets and suggest the approach to burning in key assets.

FMS This analysis indicates that in Coastal Grassy Woodlands old growth stages are well above minimum targets and younger mature, adolescent and juvenile growth stages are under-represented. Thus, areas in old growth stages could be burnt to improve the representation of younger growth stages. In Heathlands mature growth stages are well above the minimum targets and old, juvenile and adolescent growth stages are under-represented. Some of the older patches of mature heathlands should be retained to transition to the 'old' growth stage. Other mature areas can be considered for planned burning to contribute to under-represented juvenile and adolescent growth stages.

Mixed Dry Forests and Woodlands have 'old' growth stages that reach the minimum target. These should be retained to ensure these growth stages don't fall below minimum targets. Mature growth stages are well above the minimum target and could be considered for planned burning to contribute to under-represented younger juvenile and

adolescent growth stages. Wet Forest and Rainforests are above the minimum target for all but the 'old' growth stage. These EVCs are not suitable for planned burning and should be protected from fire, where possible, to enable transition to under-represented mature and old growth stages.

Climate change scenario planning

As part of climate change scenario planning, future fire risk was considered for all terrestrial conservation assets. A 'no regret' approach to fire includes improvement and maximisation of fire management to protect vulnerable ecosystems such as Wet Forest and Rainforest, and the coordination of complementary actions across different strategies. Additional actions were included in this strategy to take into account the increased risk and severity of bushfire in the landscape under climate change. These include increasing the tools available to detect and respond to fire, a focus on fire ecology roles, and increasing our understanding of the impacts of fire through monitoring. Additional actions have been included in strategy *6.10 Building climate resilience and refugia*.

This strategy will be carried out in coordination with other strategies that manage pest plants and animals to ensure that fire management actions do not adversely affect their outcomes. In addition, this strategy should be carried out in conjunction with strategy *6.10 Building climate resilience and refugia*, as fire regime is a large and important component of climate change.

Conservation outcomes

The application of an ecological burn program in the Wilsons Promontory Parks Landscape is a key strategy for improving the structural diversity and distribution of vegetation growth stages in various habitats, leading to the restoration of assets and species and reducing the risk of future fire.

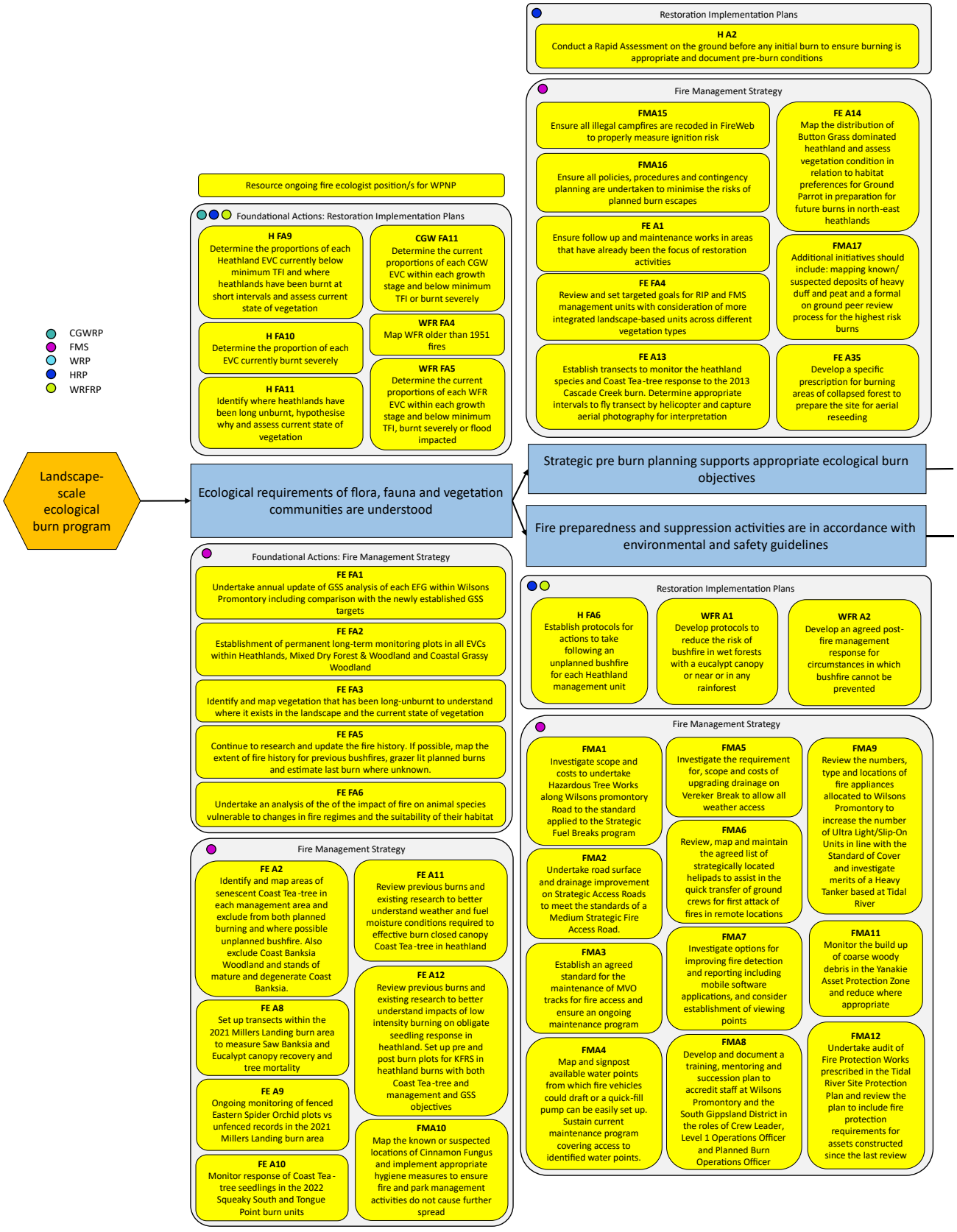
Sanctuary plan outcomes and objectives

	FMS	FMO2	To maintain or improve the resilience of natural ecosystems and their ability to deliver services such as biodiversity, water and carbon storage.
		FE MTO1	Progress towards Growth Stage Structure targets as per Clarke et al. 2022.
		FE MTO2	Progress towards meeting TFI threshold goals as per Clarke et al. 2022.
		FE STO5	Plan the best locations for re-introduction of fire beyond the year 2027 and determine the operational methodology for conducting burns in this fuel type.
		FE STO6	Exclude planned burning and suppress unplanned fires within Mixed Dry Forest and Woodland except where exemptions apply.
		FE STO8	Undertake field sampling of fuel loads and moistures to build understanding of the drying patters and seasonal windows best suited to planned burning in this vegetation type.
		FE STO9	Identify and protect long unburnt areas which in this case will constitute examples of Lowland Forest, Shrubby Foothills Forest and Granitic Hills Woodland not affected by the 2005 and 2009 bushfires. These areas should be mapped and monitored to measure long term changes in understorey and lower strata fuels in the long-term absence of fire.

Strategy summary

A coordinated and well-informed approach to fire management will ensure planned burns are conducted within an appropriate fire regime and protect high value assets and areas from future fire, and that fire management and conservation needs are met before, during and after bushfire.

Results chain



Threat Objectives:
By 2029, increase the area and extent of Heathland, Coastal Grassy Woodland, Mixed Dry Forest and Woodland, Wet Forest and Rainforest, and Riparian and Wetland assets that are managed in accordance with tolerable fire intervals and appropriate growth stage distributions.

- **CGW STO5:** Ensure fire has no negative impacts on Coastal Grassy Woodland
- **H STO3:** Ensure fire has no negative impacts on Heathlands
- **FE STO1:** Resist loss of grasslands in swales to domination by Coast Tea-tree and Coast Wattle. Accept some swale grasslands are transitioning into a different EVC.
- **FE STO2:** Resist loss of Coast Banksia Woodlands but accept some Coast Banksia Woodlands are transitioning into a different EVC
- **FE STO3:** Resist loss of Manna Gum woodlands to domination by Coast Tea-tree and Coast Wattle. Accept some woodlands are transitioning into a different EVC
- **FE STO4:** Resist loss of Heathland to domination Coast Tea-tree wherever feasible (Heathland (Sand) EVD)
- **FE STO7:** Resist loss of Tall Mixed Forest wherever feasible. Resist loss of Granitic Hillslopes wherever feasible.
- **FE STO10-11:** Resist loss of Moist Forest and Tall Mist Forest wherever feasible
- **FE STO12:** Resist loss of Closed Forest wherever feasible, especially given the loss of rainforest regionally in the 2019/20 bushfires. Exclude fire from EVCs within this EVD
- **FMO1:** To minimise the impact of major bushfires on human life, communities, essential and community infrastructure, industries, the economy and the environment. Human life will be afforded priority over all other considerations.

Fire Management Strategy

FE A3
Complete burn preparation works for short-term protection of areas occupied by New Holland Mouse in areas of Little Drift and Back Drift Track

FE A15-A34, A36
Undertake priority burn nominations in 2022-2027

FE A41
Ensure high priority threatened species translocation programs/genetic rescue programs are not compromised by planned burning operations

FE A4-A7
Undertake planned burns in Coastal Grassy Woodland 2023-2027

Restoration Implementation Plans

CGW A1
Apply ecological burning as outlined in the Fire Management Strategy

CGW A7
Protection from high intensity fire (Coast Banksia)

Wildlife Restoration Plan

NHM ACT (5.8, 10.4), SA ACT (5.10, 10.5), BTR ACT (5.10, 10.5), KQ ACT (5.6, 10.6), GP ACT (5.5, 10.4), EQ ACT (5.4, 10.4), STQ ACT (5.4, 10.5), EB ACT 10.5, RBP ACT 10.7, BTRW ACT 10.7, SBB ACT (5. 5, 10.4), LNB ACT (5.4, 10.4), LNP ACT (5.4, 10.4), WFD ACT (5.4, 10.4), EBD ACT (5.3, 10.3)
Implement appropriate fire regimes for various native species in otherwise suitable habitat

WRP ACT (5.5, 10.5)
Investigate and implement appropriate fire regimes for focal species

Planned burns are delivered relative to objectives

Response to bushfires is timely and well informed

Impacts of suppression activities to natural values are minimised

Risk of large-scale and high intensity bushfire impacting high value habitats reduced

High value areas of mid & older growth stages are managed appropriately

Area burnt below minimum TFIs is minimised

Establish fire ecology monitoring plots to measure burn outcomes and the flow-on effects of habitat condition after fire

Habitat condition is improved & impacts on ecological assets are reduced

Post fire establishment of invasive species is minimised

Fire Management Strategy

FMA13
Implement a Daily Preparedness list for all staff working at Tidal River and Yanakie

FMA14
Encourage a Readiness Culture that ensure staff have their fire equipment and personal gear at hand when required and that fire vehicles are maintained in a deployable condition

FMA18
Incorporate the DEECA Gippsland Risk and Evaluation for Wilsons Promontory in future reviews

FMA19
Options for the modified response to bushfire, including considerations and guidance on which parts of the landscape and under what conditions Incident Controllers may choose to allow naturally caused fires to run their course

FMA20
In line with FMA19, develop a set of Minimum Impact Suppression Strategies, including guidance on the most sensitive parts of the landscape where options for different suppression methods should be applied

Fire Management Strategy

FE A40
Apply careful hygiene management for personnel, vehicles and equipment to all fire management activities to avoid any further unnecessary spread of Cinnamon Fungus

Fire Management Strategy

FE A37
Ensure follow up pest plant monitoring and control activities are undertaken in response to planned burning

FE A38
Implement a targeted approach to predator baiting in recently burnt areas in addition to the regular ongoing baiting program particularly where high priority natural assets are at risk of predation

FE A39
Monitor post burn grazer pressure and implement control works to reduce grazing impacts where post fire grazing is considered a significant inhibiting factor to key vegetation species' recovery

CONSERVATION ASSETS

- Wet Forest and Rainforest
- Mixed Dry Forest and Woodland
- Heathland
- Coastal Grassy Woodland
- Riparian and Wetland

Implementation milestones

Result	Action
Ecological requirements of flora, fauna and vegetation communities are understood	• Resource ongoing fire ecologist position for WPNP • **H FA9:** Determine the proportions of each Heathland EVC currently below minimum TFI and where heathlands have been burnt at short intervals and assess current state of vegetation • **H FA10:** Determine the proportion of each EVC currently burnt severely • **H FA11:** Identify where heathlands have been long unburnt, hypothesise why and assess current state of vegetation • **CGW FA11:** Determine the current proportions of each CGW EVC within each growth stage and below minimum TFI or burnt severely • **WFR FA4:** Map WFR older than 1951 fires • **WFR FA5:** Determine the current proportions of each WFR EVC within each growth stage and below minimum TFI, burnt severely or flood impacted • **FE FA1:** Undertake annual update of GSS analysis of each EFG within Wilsons Promontory including comparison with the newly established GSS targets • **FE FA2:** Establishment of permanent long-term monitoring plots in all EVCs within Heathlands, Mixed Dry Forest & Woodland and Coastal Grassy Woodland • **FE FA3:** Identify and map vegetation that has been long-unburnt to understand where it exists in the landscape and the current state of vegetation • **FE FA5:** Continue to research and update the fire history. If possible, map the extent of fire history for previous bushfires, grazer lit planned burns and estimate last burn where unknown. • **FE FA6:** Undertake an analysis of the of the impact of fire on animal species vulnerable to changes in fire regimes and the suitability of their habitat • **FE A2:** Identify and map areas of senescent Coast Tea-tree in each management area and exclude from both planned burning and where possible unplanned bushfire. Also exclude Coast Banksia Woodland and stands of mature and degenerate Coast Banksia. • Identify and map current and past Banksia Woodland extent and select potential areas for reestablishment • **FE A8:** Set up transects within the 2021 Millers Landing burn area to measure Saw Banksia and Eucalypt canopy recovery and tree mortality • **FE A9:** Ongoing monitoring of fenced Eastern Spider Orchid plots vs unfenced records in the 2021 Millers Landing burn area • **FE A10:** Monitor response of Coast Tea-tree seedlings in the 2022 Squeaky South and Tongue Point burn units • **FE A11:** Review previous burns and existing research to better understand weather and fuel moisture conditions required to effective burn closed canopy Coast Tea-tree in heathland • **FE A12:** Review previous burns and existing research to better understand impacts of low intensity burning on obligate seedling response in heathland. Set up pre and post burn plots for KFRS in heathland burns with both Coast Tea-tree and management and GSS objectives

Result	Action
	• **FMA10:** Map the known or suspected locations of Cinnamon Fungus and implement appropriate hygiene measures to ensure fire and park management activities do not cause further spread
Strategic pre burn planning supports appropriate ecological burn objectives	• **H A2:** Conduct a Rapid Assessment on the ground before any initial burn to ensure burning is appropriate and document pre-burn conditions • **FMA15:** Ensure all illegal campfires are recorded in FireWeb to properly measure ignition risk • **FMA16:** Ensure all policies, procedures and contingency planning are undertaken to minimise the risks of planned burn escapes • **FE A1:** Ensure follow up and maintenance works in areas that have already been the focus of restoration activities • **FE FA4:** Review and set targeted goals for RIP and FMS management units with consideration of more integrated landscape-based units across different vegetation types • **FE A13:** Establish transects to monitor the heathland species and Coast Tea-tree response to the 2013 Cascade Creek burn. Determine appropriate intervals to fly transect by helicopter and capture aerial photography for interpretation • **FE A14:** Map the distribution of Button Grass dominated heathland and assess vegetation condition in relation to habitat preferences for Ground Parrot in preparation for future burns in north-east heathlands • **FMA17:** Additional initiatives should include: mapping known/ suspected deposits of heavy duff and peat and a formal on ground peer review process for the highest risk burns • **FE A35:** Develop a specific prescription for burning areas of collapsed forest to prepare the site for aerial reseeding
Planned burns are delivered relative to objectives	• **FE A3:** Complete burn preparation works for short-term protection of areas occupied by Pookila (New Holland Mouse) in areas of Little Drift and Back Drift Track • **FE A4-A7:** Undertake planned burns in Coastal Grassy Woodland 2023-2027 • **FE A15-A34, A36:** Undertake priority burn nominations in 2022-2027 • **FE A41:** Ensure high priority threatened species translocation programs/genetic rescue programs are not compromised by planned burning operations • **CGW A1:** Apply ecological burning as outlined in the Fire Management Strategy • **CGW A7:** Protection from high intensity fire (Coast Banksia) • **NHM ACT (5.8, 10.4), SA ACT (5.10, 10.5), BTR ACT (5.10, 10.5), KQ ACT (5.6, 10.6), GP ACT (5.5, 10.4), EQ ACT (5.4, 10.4), STQ ACT (5.4, 10.5), EB ACT 10.5, RBP ACT 10.7, BTRW ACT 10.7, SBB ACT (5. 5, 10.4), LNB ACT (5.4, 10.4), LNP ACT (5.4, 10.4), WFD ACT (5.4, 10.4), EBD ACT (5.3, 10.3):** Implement appropriate fire regimes for various native species in otherwise suitable habitat • **WRP ACT (5.5, 10.5):** Investigate and implement appropriate fire regimes for focal species

Result	Action
Fire preparedness and suppression activities are in accordance with environmental and safety guidelines	• **H FA6:** Establish protocols for actions to take following an unplanned bushfire for each Heathland management unit • **WFR A1:** Develop protocols to reduce the risk of bushfire in wet forests with a eucalypt canopy or near or in any rainforest • **WFR A2:** Develop an agreed post-fire management response for circumstances in which bushfire cannot be prevented • **FMA1:** Investigate scope and costs to undertake Hazardous Tree Works along Wilsons promontory Road to the standard applied to the Strategic Fuel Breaks program • **FMA2:** Undertake road surface and drainage improvement on Strategic Access Roads to meet the standards of a Medium Strategic Fire Access Road. • **FMA3:** Establish an agreed standard for the maintenance of MVO tracks for fire access and ensure an ongoing maintenance program • **FMA4:** Map and signpost available water points from which fire vehicles could draft or a quick-fill pump can be easily set up. Sustain current maintenance program covering access to identified water points. • **FMA5:** Investigate the requirement for, scope and costs of upgrading drainage on Vereker Break to allow all weather access • **FMA6:** Review, map and maintain the agreed list of strategically located helipads to assist in the quick transfer of ground crews for first attack of fires in remote locations • **FMA7:** Investigate options for improving fire detection and reporting including mobile software applications, and consider establishment of viewing points • **FMA8:** Develop and document a training, mentoring and succession plan to accredit staff at Wilsons Promontory and the South Gippsland District in the roles of Crew Leader, Level 1 Operations Officer and Planned Burn Operations Officer • **FMA9:** Review the numbers, type and locations of fire appliances allocated to Wilsons Promontory to increase the number of Ultra Light/Slip-On Units in line with the Standard of Cover and investigate merits of a Heavy Tanker based at Tidal River • **FMA11:** Monitor the build up of coarse woody debris in the Yanakie Asset Protection Zone and reduce where appropriate • **FMA12:** Undertake audit of Fire Protection Works prescribed in the Tidal River Site Protection Plan and review the plan to include fire protection requirements for assets constructed since the last review
Response to bushfires is timely and well informed	• **FMA13:** Implement a Daily Preparedness list for all staff working at Tidal River and Yanakie • **FMA14:** Encourage a Readiness Culture that ensure staff have their fire equipment and personal gear at hand when required and that fire vehicles are maintained in a deployable condition • **FMA18:** Incorporate the DEECA Gippsland Risk and Evaluation for Wilsons Promontory in future reviews • **FMA19:** Options for the modified response to bushfire, including considerations and guidance on which parts of the landscape and under what conditions Incident Controllers may choose to allow naturally caused fires to run their course

Result	Action
	• **FMA20:** In line with FMA19, develop a set of Minimum Impact Suppression Strategies, including guidance on the most sensitive parts of the landscape where options for different suppression methods should be applied
Impacts of suppression activities to natural values are minimised	• **FE A40:** Apply careful hygiene management for personnel, vehicles and equipment to all fire management activities to avoid any further unnecessary spread of Cinnamon Fungus
Risk of large-scale and high intensity bushfire impacting high value habitats reduced High value areas of mid & older growth stages are managed appropriately Area burnt below minimum TFIs is minimised	
Post fire establishment of invasive species is minimised	• **FE A37:** Ensure follow up pest plant monitoring and control activities are undertaken in response to planned burning • **FE A38:** Implement a targeted approach to predator baiting in recently burnt areas in addition to the regular ongoing baiting program particularly where high priority natural assets are at risk of predation • **FE A39:** Monitor post burn grazer pressure and implement control works to reduce grazing impacts where post fire grazing is considered a significant inhibiting factor to key vegetation species' recovery

Habitat condition is improved and impacts on ecological assets are reduced	• Establish fire ecology monitoring plots to measure burn outcomes and the flow-on effects of habitat condition after fire
	  • Report on whether planned burns have achieved ecological objectives
	  • Determine whether values were retained during burn delivery
	  • Use monitoring data to adapt management, to inform most appropriate growth stage distributions
	  • When competing objectives must be managed, ensure that monitoring data supports the decision-making, e.g. some high value areas for threatened species may require active fire exclusion, contrary to risk-minimisation needs
	  • In the absence of monitoring data, other knowledge sources such as expert opinion or local knowledge may need to be used

6.2 Integrated weed and pathogen control program

This strategy replaces the *Integrated weed program* strategy from Iteration 1 of the Wilsons Promontory Conservation Action Plan (2017). It draws upon actions from the Sanctuary Heathlands Restoration Implementation Plan, Coastal Grassy Woodland Restoration Implementation Plan, Wet Forest and Rainforest Restoration Implementation Plan and Threat Management Strategy.

This strategy involves a range of actions for reducing the spread, establishment and impacts of non-native weeds, overabundant native flora species and pathogens that have, or are likely to have, significant impacts on the health and ecological processes that occur within the conservation assets of the Wilsons Promontory Parks Landscape. Any new weed or pathogen species that are identified within the Parks Landscape needs to be dealt with rapidly to prevent its establishment and spread. Locations where incursions have been observed previously are likely to be key invasion points. Additionally, the strategy will contribute to significantly reducing or eradicating a number of species that are already established. A focus on weed species that are altering ecological processes is likely to improve outcomes.

A significant component of this strategy is the control of overabundant Coast Tea-tree, which primarily affects the Coastal Grassy Woodland and Heathland assets. Actions include mapping, prioritising treatment areas and treating Coast Tea-tree according to the ecological requirements of these assets and in the context of fire management.

A biosecurity approach to weed management is a Victorian Government standard for identifying the threat of an invasive species and undertaking an assessment of its relative risk to determine an appropriate intervention. There are four general management responses to controlling weeds: prevention, eradication, containment and asset protection.

Prevention

Prevention is a pre-emptive action to manage the risk of introduced weeds and soil borne pathogens into the Parks Landscape and ensuring works or disturbance events do not provide an opportune environment for weed establishment. This is achieved by identifying high-risk weeds at likely invasion points, which are often vehicle access and parking sites and location where animals are likely to act as vectors. Pre-emptive action includes measures such as maintaining vehicle and equipment hygiene, avoiding the introduction of soils, gravels and other materials which may carry seeds and spores, and ensuring that appropriate site preparation and risk identification is achieved before planned disturbance events such as planned burning is carried out.

This approach is particularly important for the spread of pathogens such as Chytrid Fungus and Phytophthora, the spread of which is only effectively curtailed by restricting management activities and off-track access in unaffected areas. Careful planning of the construction of new tracks to avoid sensitive pathogen-free areas can prevent the spread of fungi into ecosystems that are known to be highly susceptible.

Eradication of new and emerging weeds

For weeds at the early stages of invasion, initial control efforts and surveillance are prioritised. The objective of control is generally eradication with new populations eradicated to limit the potential for establishment. The process of addressing new and emerging weed threats should follow the Weeds in Early Stage of Invasion Framework (Blood et al. 2019) outlined below:

- Search and detect
- Name and notify
- Assess the risk
- Delimit the invasion
- Decide the response
- Implement eradication

Containment

Containment is an ongoing maintenance approach to manage the spread of established weeds. Containment is used when a species is not considered feasibly eradicable in the short-medium term, however a strategy establishing containment lines and constricting the containment area over time may have a long-term eradication goal. Management tracks, ridgelines and other landscape features are useful in defining containment boundaries. This group includes Bluebell Creeper, Blackberry, Blue Periwinkle, Thistle, Asparagus Fern and Spartina.

It is important to inspect a buffer around an established containment area to ensure efforts are effective and new populations are not establishing beyond containment boundaries. Where there are pathways of spread through a containment area (e.g. vehicles, walkers, river corridors), a concerted effort should be made to undertake control works along tracks and waterways to decrease the likelihood of spread. Containment includes the eradication of satellite or local populations of weeds outside the containment area.

Asset Protection

Some weeds are well established and widespread in the Parks Landscape. At this scale, there are limited control options available. Eradication or containment of these species is unlikely to be possible without the development of novel control agents and/or methods, and as such, management of this group of species is generally limited to reducing their impact on high priority assets. Weed species indicative of this group include Sea Spurge, Ragwort and Mirror Bush. Because widespread control is not feasible, the objective for these species is to reduce their abundance and to prevent invasion into priority areas.

Feasibility of eradication

An eradication feasibility assessment and cost-benefit analysis of different control options for weeds was undertaken as part of the Wilsons Promontory Sanctuary project. The recommended approach is given below.

[TMS] Development of the strategy has focussed on providing strategic direction for the control of a set of established weed species in priority ecological communities (Coastal Grassy Woodland, Heathland, Wetlands, Islands). Following analysis, weed eradication was found to be infeasible for five species that were assessed and not to be cost-effective for a further eight species.

The control of eleven weed species were assessed as being cost-effective based on the benefits, feasibility and costs of search and treatment in nominated ecological communities (Asset Protection). Control of these priority species aims to achieve a 90% reduction in effective cover and/or a 50% reduction in effective cover.

In addition to search and treatment, the control of priority weeds will involve planning and approvals (where required) and regular surveillance and monitoring. During implementation of this strategy, Parks Victoria will also undertake action to reduce the spread of other priority weeds including those on the islands.

This strategy recognises the need to address new and emerging weeds as well as those prioritised for control. Addressing weeds at the early stage of invasion requires regularly searching for, and detecting weeds, and responding as required and is essential to help prevent the environmental consequences associated with wide-scale establishment (Sheehan, James, & Blood, 2021).

A structured approach to searching (i.e. deliberate and systematic searches within a defined area) will be used in the eradication of priority species and should also be applied when a weed is suspected or known to be established or when there is a need to determine if a weed is present. Opportunistic searches and reports from volunteers and members of the community can supplement more structured approaches and help to direct effort to particular locations.

Actions and the treatment approach taken in response to detected weeds will depend on the threat posed by the weed, the extent of infestation and objective.

Climate change scenario planning

As part of climate change scenario planning, climate change-related interactions with weed and pathogen infestation were considered for all terrestrial conservation assets. A 'no regret' approach to weeds and pathogens includes a strong focus on hygiene protocols, identifying knowledge gaps in the interaction of climate on invasive species and monitoring high risk or high value assets for dieback. Additional actions were included in this strategy to determine the current distribution of key pathogens across Wilsons Promontory and increasing the tools available to detect and monitor weeds and pathogens. Other related actions have been included in strategy *6.10 Building climate resilience and refugia*.

This strategy will be carried out in conjunction with other strategies to ensure a coordinated approach to land management, especially strategy *6.10 Building climate resilience and refugia*.

Conservation outcomes

The management of weeds, overabundant native plant species and pathogens will improve the health of terrestrial conservation assets and species susceptible to disease.

Strategy summary

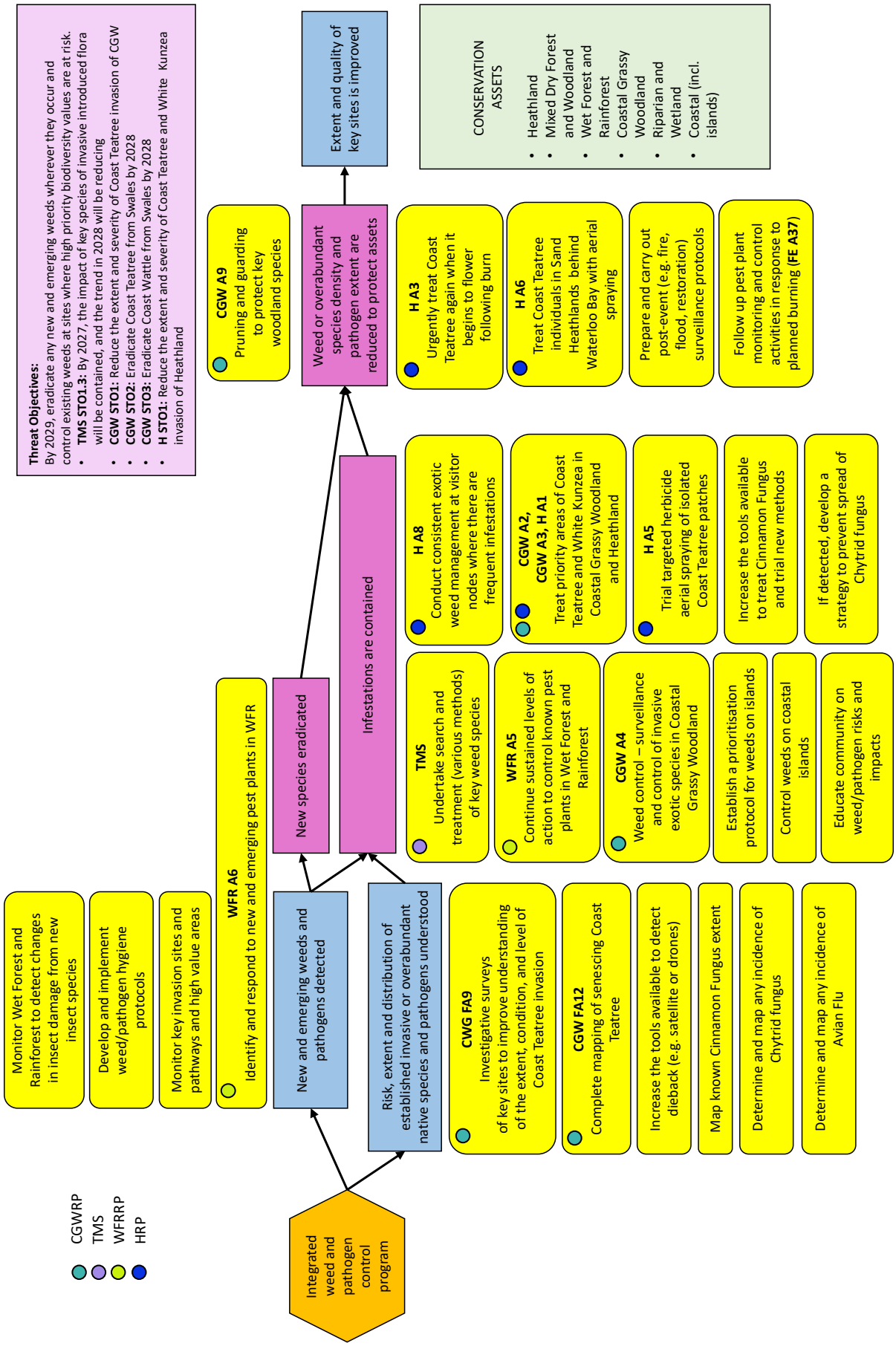
Weeds, overabundant native flora species and pathogens are managed to reduce their spread, establishment and impact with a focus on high risk species in high value sites.

Table 6.1 *Feasible control objectives for priority weeds in the Wilsons Promontory Parks Landscape (taken from the Sanctuary Threat Management Strategy).*

Priority Conservation Asset	Feasible control objective (% control in current cover)	Species
Coastal Grassy Woodlands	50% - 90%	Briar Rose
		Mirror Bush
		Ox-eye Daisy
		White Bladder-flower
	50% only	Blackberry
		Blue Periwinkle
		Cape Ivy
		Dolichos Pea
		Ragwort
		Thistles
Heathlands	50 - 90%	Banana Passionfruit
	50% only	Blackberry
Riparian and Wetlands	50% only	Dolichos Pea
		Ragwort
		Thistles
Islands (Coastal (including islands))	50 - 90%	Mirror Bush
	50% only	Blackberry
		Blue Periwinkle
		Cape Ivy
		Cape Wattle

* For the specific KEA Goals associated with this strategy, see the Condition table in the relevant Conservation Asset description

Results chain



Implementation milestones

Result	Action
New and emerging weeds and pathogens are detected	• Monitor Wet Forest and Rainforest to detect changes in insect damage from new insect species • Develop and implement weed/pathogen hygiene protocols • Monitor key invasion sites and pathways and high value areas • **WFR A6:** Identify and respond to new and emerging pest plants in Wet Forest and Rainforest
New species eradicated	
Risk, extent and distribution of established invasive or overabundant native species and pathogens understood	• **CGW FA9:** Investigate surveys of key sites to improve understanding of the extent, condition and level of Coast Tea-tree invasion • **CGW FA12:** Complete mapping of senescing Coast Tea-tree • Increase the tools available to detect dieback (e.g. satellite or drones) • Map known Cinnamon Fungus extent • Determine and map any incidence of Chytrid fungus • Determine and map any incidence of Avian flu
Infestations are contained	• **TMS:** Undertake search and treatment (various methods) of key weed species • **WFR A5:** Continue sustained levels of actions to control known pest plants in Wet Forest and Rainforest • **CGW A4:** Weed control – surveillance and control of invasive exotic species in Coastal Grassy Woodland • **H A8:** Conduct consistent exotic weed management at visitor nodes where there are frequent infestations • **CGW A2, CGW A3, H A1:** Treat priority areas of Coast Tea-tree and White Kunzea in Coastal Grassy Woodland and Heathland • **H A5:** Trial targeted herbicide aerial spraying of isolated Coast Tea-tree patches • Establish a prioritisation protocol for weeds on islands • Control weeds on coastal islands • Educate community on weed/pathogen risks and impacts • Increase the tools available to treat Cinnamon Fungus and trial new methods • If detected, develop a strategy to prevent spread of Chytrid fungus

Weed or overabundant species density and pathogen extent are reduced to protect assets	• **CGW A9:** Pruning and guarding to protect key woodland species
	• **H A3:** Urgently treat Coast Tea-tree again when it begins to flower following burn
	  • Burn at 5% flowering rate at first flowering event following fire in Coast Tea-tree-invaded Heathland
	  • Mulching as a second treatment is likely preferable to a second burn if obligate seeder species have not reached reproductive maturity

Result	Action
	• **H A6:** Treat Coast Tea-tree individuals in Sand Heathlands behind Waterloo Bay with aerial spraying • Prepare and carry out post-event (e.g. fire, flood, restoration) surveillance protocols • Follow up pest plant monitoring and control activities in response to planned burning (**FE A37**)
Extent and quality of key sites is improved	

6.3 Herbivore management

This strategy replaces the *Landscape-scale control of deer* strategy from Iteration 1 of the Wilsons Promontory Conservation Action Plan (2017). It draws upon actions from the Sanctuary Heathlands Restoration Implementation Plan, Coastal Grassy Woodland Restoration Implementation Plan, Wet Forest and Rainforest Restoration Implementation Plan, Threat Management Strategy and the Native Wildlife Risk Management Plan.

The aim of herbivore management is to increase the health of habitats for native flora and fauna and the health of waterways in the landscape. A number of exotic grazing and browsing species, as well as some overabundant native species, will be managed concurrently to reduce overall competition and degradation to conservation assets. This will involve building community awareness, trialling new control methods, and monitoring impact and effectiveness of control, particularly in key or degraded habitats such as Coastal Grassy Woodland, Heathland and Wet Forest and Rainforest.

Increasing community awareness of the historical and ongoing impacts of Hog deer on the significant assets of the Wilsons Promontory Parks Landscape is an important first step in ensuring that control activities are able to be implemented successfully. Targeting control activities at high-value sites where deer are having the greatest impact will maximise conservation outcomes.

As part of the Sanctuary project, a predator and grazer exclusion fence will be constructed across the narrow entrance to Wilson Promontory on Yanakie Isthmus, to enable effective pest reduction or elimination within the park, prevent further incursion of invasive species and create safe locations for threatened species recovery and translocations. The construction of the fence will significantly change historical approaches to invasive species control in the park, providing support for landscape scale suppression of deer, fox and cat populations and prevention of re-invasion of these species.

An eradication feasibility assessment and cost-benefit analysis of different control options for introduced herbivores was undertaken as part of the Wilsons Promontory Sanctuary Project. The recommended strategy for deer and rabbits is given below.

Deer

TMS Deer numbers at Wilsons Promontory are dominated by Hog Deer, with a very small contribution from Sambar Deer, however current estimates of the Hog Deer population are uncertain and could be higher than estimated. The strategy is based on an integrated approach involving ground and aerial shooting as the basis of a broadscale program designed to achieve control to very low levels and if possible, eradication of Hog Deer and eradication of Sambar Deer, and prevention of establishment of a breeding population.

To achieve this goal, a high level of effort is required over years 1-10, then decreasing in years 11-30. The strategy assumes that there may be a small number of animals entering the park over time via swimming from other islands where they are present, at potentially leaky end points of the planned predator and grazer exclusion fence, or illegal release by humans. This means that ongoing surveillance and control effort is required to maintain the Hog Deer population at low or zero density. The allocation of effort within the aerial and ground-based shooting programs are primarily designed to treat Hog Deer. In the case that Sambar Deer are detected outside of their known locations, an adaptive approach will be required to apportion effort accordingly to achieve the target of park wide eradication.

Aerial shooting is used to deliver deer control in remote terrain where access via tracks and roads is limited. There are some locations (e.g. Tidal River, Titania Creek) where ground shooting is required to supplement aerial shooting. Trade-offs will need to be made about controlling deer in zones where there are high visitor numbers, as the park must be closed to undertake shooting around Tidal River.

Rabbits

TMS The goal for rabbits is to achieve localised suppression in the Coastal Grassy Woodland asset and Coastal Scrubs and Grassland habitats. Rabbits are known to occur around the Yanakie Isthmus and in grassy ecosystems within the park and these are the focus of management effort.

Annual inoculation of RHDV1-K5 is recommended to maintain the rabbit population at a density at or below 0.5 rabbits per hectare. Delivery of RHDV1-K5 can be undertaken via small quantities of oat or carrot laced baits, or by direct injection into captured rabbits. Both options will be considered, although bait delivery may be more effective and is considered more humane as rabbits do not need to be caught (Sharp, 2016).

The use of Pindone or 1080 are not recommended due to the potential for off-target impacts. Warren ripping is not recommended as Parks Victoria staff report that rabbits in the park are not known to be warren forming preferring instead to harbour in scrub.

The recommended approach is a departure from best practice for rabbit control which normally stipulates a combination of fumigation, ripping and baiting. However, given the limitations associated with chemical and physical methods, virus release will be trialled to see if suppression of rabbits can be achieved in Coastal Grassy Woodland and Coastal Scrubs.

Native species management

NWRMP Current threats of native herbivore grazing and associated impacts on vegetation communities vary across conservation assets in the WPNP landscape. Consequently, the approach to native herbivore management in CGW will need to be different to that applied in other assets, such as Heathland, Mixed Dry Forest and Woodland, Wet Forest and Rainforest, and Riparian and Wetland. The overall approach will comprise four broad strategic management activities:

- Abatement of current threats via active control of native herbivores in CGW on Yanakie Isthmus.
- Monitoring and evaluation of current threats posed by native herbivores to other conservation assets in the WPNP landscape.
- Ongoing monitoring and evaluation of future threats after construction of the exclusion fence (containment) and suppression (or eradication) of invasive predators and herbivores (predator and competition release).
- Partner, stakeholder and community engagement

Climate change scenario planning

As part of climate change scenario planning, climate change-related interactions with invasive or overabundant herbivores were considered for all terrestrial conservation assets. A ‘no regret’ approach to herbivores includes identifying management or density targets for each species in the context of the ecological requirements of vegetation

that may be impacted by climate change. Ideally, herbivore control will contribute to the resilience of conservation assets that may experience stress under various future climate scenarios.

This strategy will be carried out in conjunction with other strategies to ensure a coordinated approach to land management, especially strategy *6.10 Building climate resilience and refugia*.

Conservation outcomes

The coordinated management of introduced and overabundant native herbivores will promote the regeneration of key canopy species and increase the diversity and health of terrestrial assets.

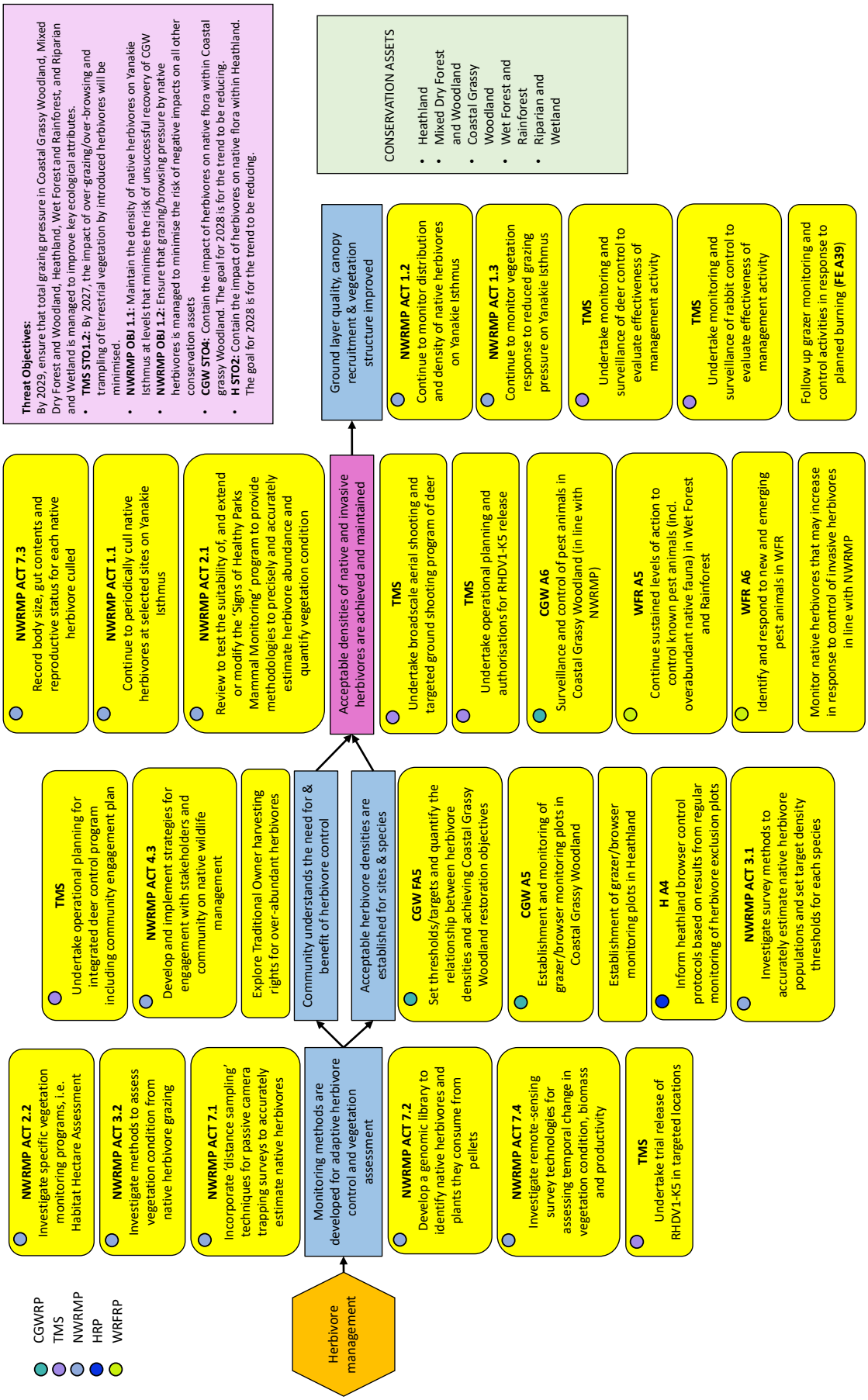
Sanctuary plan outcomes and objectives

	NWRMP	STO1.1	By 2028, the impact of over-grazing/over-browsing on native flora within Coastal Grassy Woodlands by over-abundant native wildlife will be minimised.
		STO 1.2	By 2028, the impact of over-grazing/over-browsing on native flora within all other conservation assets by over-abundant native wildlife will be minimised.
		STO2.1	Facilitate restoration of habitat in Coastal Grassy Woodland on Yanakie Isthmus, allowing for restoration of the woodland canopy and a floristically diverse understorey, including native grasses.
		STO2.2	Facilitate an increase in the diversity and viability of all terrestrial attributes in other conservation assets.
		STO3.1	Improved baseline understanding of the density of native and introduced herbivores on Yanakie Isthmus.
		STO3.2	Improve knowledge of sustainable population densities of native herbivores.
		STO4.1	Seek the involvement of Traditional Owners in native wildlife planning and management.
		STO4.2	Potential for conflict with the public and damage to reputation is minimised.
		OBJ1.3	Allow for restoration of the woodland canopy and a floristically diverse understorey in CGW, including native grasses.
		OBJ1.4	Allow for the regeneration of key canopy species and an increase in the diversity.
		OBJ1.5	Improve knowledge on appropriate density thresholds for focal native herbivore species in key conservation assets.

Strategy summary

Targeted monitoring and control of deer, rabbits and key native species through integrated control methods to achieve very low herbivore population densities and improved vegetation quality.

Results chain



Implementation milestones

Result	Action
Monitoring methods are developed for adaptive herbivore control and vegetation assessment	• **NWRMP ACT 2.2:** Investigate specific vegetation monitoring programs, i.e. Habitat Hectare Assessment • **NWRMP ACT 3.2:** Investigate methods to assess vegetation condition from native herbivore grazing • **NWRMP ACT 7.1:** Incorporate 'distance sampling' techniques for passive camera trapping surveys to accurately estimate native herbivores • **NWRMP ACT 7.2:** Develop a genomic library to identify native herbivores and plants they consume from pellets • **NWRMP ACT 7.4:** Investigate remote-sensing survey technologies for assessing temporal change in vegetation condition, biomass and productivity • **TMS:** Undertake trial release of RHDV1-K5 in targeted locations
Community understands the need for and benefit of herbivore control	• **TMS:** Undertake operational planning for integrated deer control program including community engagement plan • **NWRMP ACT 4.3:** Develop and implement strategies for engagement with stakeholders and community on native wildlife management • Explore Traditional Owner harvesting rights for over-abundant herbivores
Acceptable herbivore densities are established for sites and species	• **CGW FA5:** Set thresholds/targets and quantify the relationship between herbivore densities and achieving Coastal Grassy Woodland restoration objectives • **CGW A5:** Establishment and monitoring of grazer/browser monitoring plots in Coastal Grassy Woodland • Establishment of grazer/browser monitoring plots in Heathland • **H A4:** Inform heathland browser control protocols based on results from regular monitoring of herbivore exclusion plots • **NWRMP ACT 3.1:** Investigate survey methods to accurately estimate native herbivore populations and set target density thresholds for each species
Acceptable densities of native and invasive herbivores are achieved and maintained	• **NWRMP ACT 7.3:** Record body size, gut contents and reproductive status for each native herbivore culled • **NWRMP ACT 1.1:** Continue to periodically cull native herbivores at selected sites on Yanakie Isthmus • **NWRMP ACT 2.1:** Review to test the suitability of, and extend or modify the 'Signs of Healthy Parks Mammal Monitoring' program to provide methodologies to precisely and accurately estimate herbivore abundance and quantify vegetation condition • **TMS:** Undertake broadscale aerial shooting and targeted ground shooting program of deer • **TMS:** Undertake operational planning and authorisations for RHDV1-K5 release • **CGW A6:** Surveillance and control of pest animals in Coastal Grassy Woodland (in line with NWRMP)

Result	Action
	• **WFR A5:** Continue sustained levels of action to control known pest animals (incl. overabundant native fauna) in Wet Forest and Rainforest • **WFR A6:** Identify and respond to new and emerging pest animals in WFR • Monitor native herbivores that may increase in response to control of invasive herbivores in line with NWRMP
Ground layer quality, canopy recruitment and vegetation structure improved	• **NWRMP ACT 1.2:** Continue to monitor distribution and density of native herbivores on Yanakie Isthmus • **NWRMP ACT 1.3:** Continue to monitor vegetation response to reduced grazing pressure on Yanakie Isthmus • **TMS:** Undertake monitoring and surveillance of deer control to evaluate effectiveness of management activity • **TMS:** Undertake monitoring and surveillance of rabbit control to evaluate effectiveness of management activity • Follow up grazer monitoring and control activities in response to planned burning (**FE A39**)

6.4 Sustained control of introduced predators

This strategy replaces the *Broad-scale introduced predator control* strategy from Iteration 1 of the Wilsons Promontory Conservation Action Plan (2017). It draws upon actions from the Sanctuary Heathlands Restoration Implementation Plan, Coastal Grassy Woodland Restoration Implementation Plan, Wet Forest and Rainforest Restoration Implementation Plan, Threat Management Strategy and Wildlife Restoration Plan.

This strategy aims to guide the ongoing control of introduced predators at Wilsons Promontory and support the persistence of native species across terrestrial conservation assets. It focusses on targeted control of foxes and cats paired with monitoring and surveillance of both introduced predators and predation-sensitive species. The construction of the predator and grazer exclusion fence across Yanakie Isthmus will greatly support this strategy.

An eradication feasibility assessment and cost-benefit analysis of different control options for cats and foxes was undertaken as part of the Wilsons Promontory Sanctuary Project. The recommended strategy for each assessed species is given below.

Foxes

TMS Following assessment of available options, the recommended strategy for foxes is based on use of sodium monofluoroacetate (1080) poison baiting as part of a broadscale program designed to achieve sustained and effective control (Sharp, 2012). The risk of a small but continuous number of immigrants into Wilsons Promontory (via swimming and the potentially leaky exclusion fence ends) means that ongoing surveillance and control effort is required to maintain the population at low density.

Aerial baiting is potentially the most cost-effective control method as the Prom has large, sparsely populated areas that are remotely located and require intensive effort to access by vehicle or on foot (Sharp, 2012). However, this method of bait delivery may not be able to be used in Wilsons Promontory National Park (subject to permits and approvals). It is proposed that further work be undertaken to assess the effectiveness and risks of aerial baiting for foxes, given its potential for significant cost reductions in delivering fox control at a landscape scale.

Ground baiting alone has been modelled to be similarly effective to aerial baiting however there are limits on what can be delivered in terms of the allowable baiting density, and access to parts of the park is constrained by the track network. The ground baiting-only option has significantly higher costs than a combined strategy as a result of the inefficiencies of bait deployment for ground versus aerial bait application over remote areas of the Wilsons Promontory National Park requiring an approximately ten-fold increase in effort. In the absence of access to aerial baiting it is proposed that ground baiting be established at a landscape scale while other control tools are developed.

To achieve control to very low levels under either option, a high level of effort is required over years 1-10 then decreasing in years 11-30. Other methods, such as leghold trapping, cage trapping and shooting were found to contribute little to the achievement of the goal. However they may be deployed as supplementary activities to apply additional pressure where required as reliance on one method alone is unlikely to achieved desired outcomes.

Cats

[TMS] A combined strategy involving aerial and ground baiting of para-aminopropiophenone (PAPP) is recommended to achieve control of cats to very low levels. The strategy is based around use of the Curiosity™ bait, which delivers a PAPP formulation within an acid-soluble pellet incorporated into a moist meat bait (Sharp, 2020).

The risk of a small but continuous number of immigrants into the Prom (as described for other invasive fauna; via swimming or leaky exclusion fence end points) means that ongoing surveillance and control effort is required to maintain the population at low density. The baiting program is constrained to two passes of aerial baiting and two pulses of ground baiting, because of the presence of Lace Monitors and Blotched Blue-tongue Lizards in the park and the need to reduce the risk of off-target impacts.

To achieve control to very low levels, a high level of effort is required over years 1-10, decreasing in years 11-30. Leghold trapping may not be available for deployment in the program as current policy settings do not support its use in suppression programs. However, if eradication becomes feasible within a three year period the application to use leghold traps an application to use leghold traps could be considered.

Leghold trapping, cage trapping and shooting may be deployed as supplementary activities to apply additional pressure where required and subject to appropriate permits. Shooting in particular should be used opportunistically when cats are observed during other invasive species shooting operations.

Suppression of introduced predators will increase the scope for the protection of endangered species, including the augmentation of species, reintroduction of locally lost species and introduction of threatened species or species that perform a specific ecological function that has been lost at Wilsons Promontory. This strategy supports two of the Wilsons Promontory Sanctuary elements: [WRP]

- **Pest free nature**: "…remove the threats of… introduced cats, and foxes… Suppression or eradication of feral cats and foxes will greatly improve survival of native small ground mammals such as potoroos, bandicoots, native rodents and dunnarts."
- **Back from the brink:** "Support rare wildlife species still present in Wilsons Promontory National Park. …through removal of introduced cats and foxes, survival of rare species such as Southern Brown Bandicoot will be greatly improved…"

Control of introduced predators should be coordinated with herbivore management, as reducing numbers of predators can consequently increase the abundance of prey species. Furthermore, predator control programs focussing on one predator can cause increases in the abundance of other predators. For example, the reduction of fox or cat numbers may increase the number of Black Rats or Brown Rats, which may prey on beach nesting birds.

Climate change scenario planning

As part of climate change scenario planning, climate change-related interactions with introduced predators were considered for all terrestrial conservation assets. A 'no regret' approach to introduced predators includes consistent surveillance of introduced predators and predation-sensitive species in key habitats such as Coastal Grassy Woodlands, Heathland and Coastal and being able to triage species and populations for intervention under certain conditions. Additional actions were included in this strategy to investigate additional tools for controlling cats, the potential impact

[WRP] Wilsons Promontory Sanctuary: Wildlife Restoration Plan

on cats if foxes are successfully controlled and investigating the potential impacts of other predator species such as wild dogs or rodents. Other related actions have been included in strategy *6.10 Building climate resilience and refugia*.

This strategy will be carried out in conjunction with other strategies to ensure a coordinated approach to land management, especially strategies *6.8 Augmentation, reintroduction and introduction of key native species* and *6.10 Building climate resilience and refugia*.

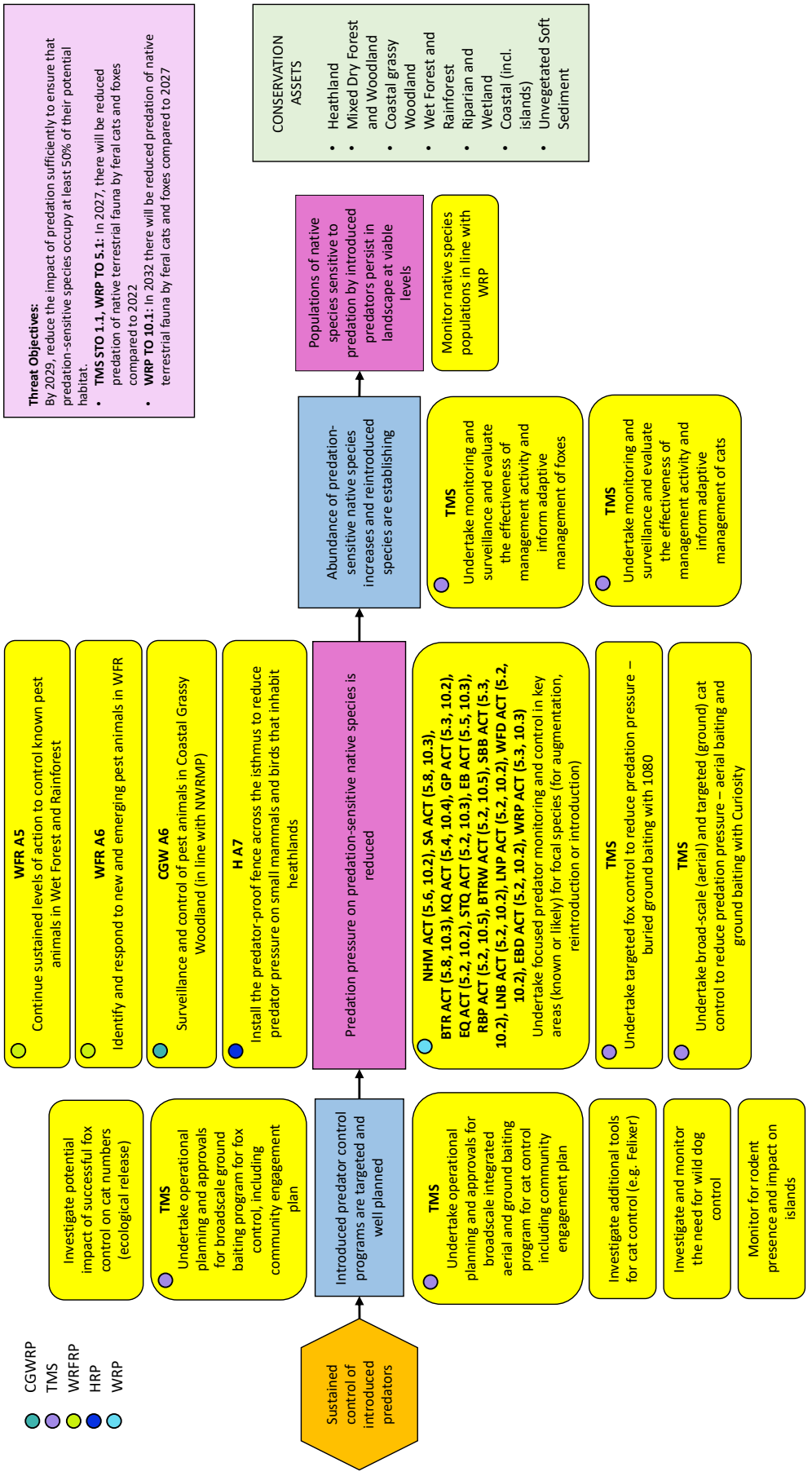
Conservation outcomes

Sustained control of introduced predators will support the appropriate density, diversity and distribution of predation-sensitive terrestrial fauna and the introduction or reintroduction of key native species.

Strategy summary

Sustained control of foxes and cats using a range of control methods and consistent monitoring will reduce introduced predators to very low levels, supporting key native species.

Results chain



Implementation milestones

Result	Action
Introduced predator control programs are targeted and well planned	• Investigate potential impact of successful fox control on cat numbers (ecological release) • **TMS:** Undertake operational planning and approvals for broadscale ground baiting program for fox control, including community engagement plan • **TMS:** Undertake operational planning and approvals for broadscale integrated aerial and ground baiting program for cat control including community engagement plan • Investigate additional tools for cat control (e.g. Felixer) • Investigate and monitor the need for wild dog control • Monitor for rodent presence and impact on islands
Predation pressure on predation-sensitive native species is reduced	• **WFR A5:** Continue sustained levels of action to control known pest animals in Wet Forest and Rainforest • **WFR A6:** Identify and respond to new and emerging pest animals in WFR • **CGW A6:** Surveillance and control of pest animals in Coastal Grassy Woodland (in line with NWRMP) • **H A7:** Install the predator-proof fence across the isthmus to reduce predator pressure on small mammals and birds that inhabit heathlands • **NHM ACT (5.6, 10.2), SA ACT (5.8, 10.3), BTR ACT (5.8, 10.3), KQ ACT (5.4, 10.4), GP ACT (5.3, 10.2), EQ ACT (5.2, 10.2), STQ ACT (5.2, 10.3), EB ACT (5.5, 10.3), RBP ACT (5.2, 10.5), BTRW ACT (5.2, 10.5), SBB ACT (5.3, 10.2), LNB ACT (5.2, 10.2), LNP ACT (5.2, 10.2), WFD ACT (5.2, 10.2), EBD ACT (5.2, 10.2), WRP ACT (5.3, 10.3):** Undertake focused predator monitoring and control in key areas (known or likely) for focal species (for augmentation, reintroduction or introduction) • **TMS:** Undertake targeted fox control to reduce predation pressure – buried ground baiting with 1080 • **TMS:** Undertake broad-scale (aerial) and targeted (ground) cat control to reduce predation pressure – aerial baiting and ground baiting with Curiosity
Abundance of predation-sensitive native species increases and reintroduced species are establishing	• **TMS:** Undertake monitoring and surveillance and evaluate the effectiveness of management activity and inform adaptive management of foxes • **TMS:** Undertake monitoring and surveillance and evaluate the effectiveness of management activity and inform adaptive management of cats
Populations of native species sensitive to predation by introduced predation persist in landscape at viable levels	• Monitor native species populations in line with WRP

6.5 Managing marine pests and overabundant species

This strategy replaces the *Marine and estuarine management* strategy from Iteration 1 of the Wilsons Promontory Conservation Action Plan (2017).

This strategy aims to increase the health of marine habitats for native species. Because marine invasive species can arrive in new areas on the hulls of boats and fishing equipment, and in the bilge and ballast water of larger vessels, increasing public awareness of marine pests and good boat and equipment hygiene practices is essential. This is particularly important as the number of boats visiting Wilsons Promontory is increasing, as are the number of vessels capable of reaching the Prom from more distant points of origin. Parks Victoria will work with the community, agency partners and tour operators to increase awareness of the dangers of marine pests and support the implementation of boat hygiene regulations, as well as ensuring that ballast water is not discharged into areas likely to result in the introduction of marine pests.

Continual monitoring and surveillance of the marine environment is required to identify and respond to new outbreaks of marine pests before they become established. Warmer waters driven by currents along the eastern coast facilitate the movement of pest species into Victoria that may eventually reach Wilsons Promontory. It will be important to monitor and document the extent, presence, abundance and distribution of potential and current marine pests in the marine parks and reserves of Wilsons Promontory and nearby areas. A rapid control response to identified incursions will result in a reduced likelihood of pest populations becoming established but will require additional planning in partnership with other agencies to enable an adequate control response.

Rapid Health Assessments (RHAs) of key areas will enable the early detection of pests and assessment of their potential impacts and identify any shifts in species composition that may indicate overpopulation of species such as sea urchins. RHAs should be supplemented by additional comprehensive monitoring and surveillance programs including the use of technology capable of reaching areas that are inaccessible to staff. In cases where urchins are overabundant and act like marine pests, assessment will be required to determine to what extent urchin barrens are a natural part of the ecosystem, the feasibility and desirability of control, and the best course of action for managing any population based on the location, extent and density of urchins.

Climate change scenario planning

As part of climate change scenario planning, climate change-related interactions with marine pests and overabundant species were considered for all marine conservation assets. A ‘no regret’ approach to marine pests includes maintaining current good condition of marine assets to increase their resilience to climate change, and monitoring for early detection and rapid response to new infestations or concentrations of key species, including species that are

unexpected. Staff should be capable of recognising changes in key drivers or indicators that suggest the ecosystem may be experiencing upheaval.

This strategy will be carried out in conjunction with other strategies to ensure a coordinated approach to land management, especially strategy *6.10 Building climate resilience and refugia*.

Conservation outcomes

This strategy will identify new threats so that marine pests have a minimal impact on marine ecosystems in marine protected areas, minimising the disturbance, competition and predation of native species and maintaining the health of marine assets.

Strategy summary

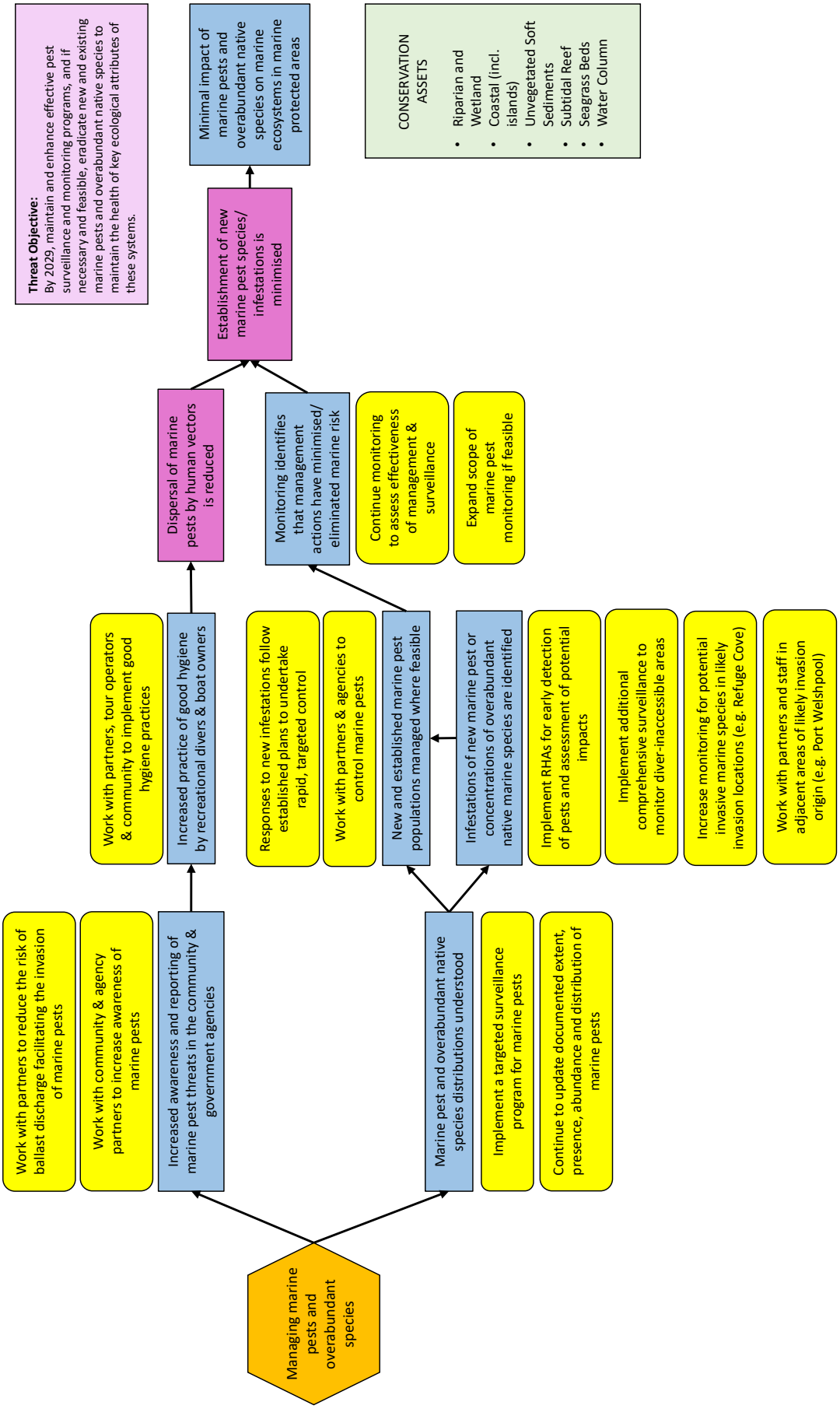
Increasing community awareness of the impacts of marine pests, consistent monitoring and the ability to respond rapidly to detected pest incursions or overabundant species will reduce the likelihood of new populations establishing.

Table 6.5 *Threat and control objectives for priority marine pests in the Wilsons Promontory Parks Landscape.*

Target species	Threat	Action type	Conservation Asset*
Northern Pacific Sea-star	Current (previously eradicated from Tidal River)	Surveillance, eradication	Unvegetated Soft Sediment, Seagrass
New Zealand Screw Shell	Current (previously detected)	Surveillance, eradication	Unvegetated Soft Sediment
Pacific Oyster	Current (previously detected)	Surveillance, eradication	Subtidal Reef, Unvegetated Soft Sediment
European Shore Crab	Current (detected in Corner Inlet)	Surveillance, prevention	Unvegetated Soft Sediment
Green seaweed (*Codium fragile*)	Current (previously detected)	Surveillance, eradication	Subtidal Reef
Black-spined Urchin	Potential (present in small numbers)	Surveillance, adaptive management	Subtidal Reef
Japanese Kelp	Potential (present in VIC)	Surveillance	Subtidal Reef
Asian Shore Crab	Potential (present in VIC)	Surveillance	Unvegetated Soft Sediment, Subtidal Reef
New Zealand Seastar / Cushion Star	Potential (not yet in VIC)	Surveillance	Unvegetated Soft Sediment, Subtidal Reef
Green seaweed (*Caulerpa taxifolia*)	Potential (not yet in VIC)	Surveillance	Subtidal Reef

* For the specific KEA Goals associated with this strategy, see the Condition table in the relevant Conservation Asset description

Results chain



Implementation milestones

Result	Action
Increased awareness and reporting of marine pest threats in the community and government agencies	• Work with partners to reduce the risk of ballast discharge facilitating the invasion of marine pests • Work with community & agency partners to increase awareness of marine pests
Increased practice of good hygiene by recreational divers and boat owners	• Work with partners, tour operators & community to implement good hygiene practices
Dispersal of marine pests by human vectors is reduced	
Marine pest and overabundant native species distributions understood	• Implement a targeted surveillance program for marine pests • Continue to update documented extent, presence, abundance and distribution of marine pests
Infestations of new marine pest or concentrations of overabundance native marine species are identified	• Implement RHAs for early detection of pests and assessment of potential impacts • Implement additional comprehensive surveillance to monitor diver-inaccessible areas using technologies such as Remote Operated Vehicles • Increase monitoring for potential invasive marine species in likely invasion locations (e.g. Refuge Cove) • Work with partners and staff in adjacent areas of likely invasion origin (e.g. Port Welshpool)
New and established marine pest populations managed where feasible	• Responses to new infestations follow established plans to undertake rapid, targeted control • Work with partners & agencies to control marine pests
Monitoring identifies that management actions have minimised/ eliminated marine risk	• Continue monitoring to assess effectiveness of management & surveillance • Expand scope of marine pest monitoring if feasible
Establishment of new marine pest species/infestations is minimised	
Minimal impact of marine pests and overabundant native species on marine ecosystems in marine protected areas	

6.6 Restoration of Coastal Grassy Woodland, Heathland and Wet Forests

This strategy replaces the *Coastal Grassy Woodland restoration* strategy from Iteration 1 of the Wilsons Promontory Conservation Action Plan (2017). It draws upon actions from the Sanctuary Heathland Restoration Implementation Plan, Coastal Grassy Woodland Restoration Implementation Plan and Wet Forest and Rainforest Restoration Implementation Plan.

This strategy aims to restore the three most degraded or vulnerable ecosystems in the Wilsons Promontory Parks Landscape:

- Coastal Grassy Woodland (poor condition)
- Heathland (fair condition)
- Wet Forest and Rainforest (good/unknown condition, considered highly vulnerable)

These assets suffer from a number of combined threats that will benefit from an overarching approach to restoration. Key threats to Coastal Grassy Woodland include inappropriate fire regimes (frequency, timing, season and intensity), invasion by Coast Tea-tree, total grazing pressure, introduced predators, weed invasion, climate change impacts, absence of native predators and reduced ecosystem resilience (CGWRP). Key threats to Heathlands include inappropriate fire regimes, invasion by Coast Tea-tree, browsing pressure, absence of native predators, introduced predators, reduced ecosystem resilience, invasion by White Kunzea, Coast Wattle and Brown Stringybark, weed invasion, and pathogens and diseases (HRP). Key threats to Wet Forest and Rainforest include increased bushfire frequency and inappropriate fire management, flooding and extreme weather events, climate change, weed invasion, invasive fungi, over-browsing by herbivores, predation by cats and foxes, edge effects, visitation impacts, and soil disturbance and erosion (WFRRP).

The nature of the threats to these ecosystems necessitates a multi-tiered approach to restoration, with actions that address different threats sitting in different strategies. The Wilsons Promontory Sanctuary project includes a Restoration Implementation Plan for each of these conservation assets which details actions that contribute to fire management, weed management, herbivore management and predator management strategies in the Conservation Action Plan.

Coastal Grassy Woodland

CGWRP It is envisaged that over the next 20 to 50 years, the current area of healthy Coastal Grassy Woodlands will be protected from conversion to a Coast Tea-tree monoculture, and 300 hectares of Coast Tea-tree-invaded grassland across the park landscape (including the Oberon Bay grasslands) will be restored to open woodlands with a biodiverse understory. Healthy groundcover will ensure that Coast Tea-tree cannot recolonize, and a committed ecological

burning program will maintain this condition. A variety of Growth Stage Structures (GSS; juvenile, adolescent, mature, and old) will be achieved for each EVC, within management units, and across the park landscape.

Reduced predatory pressure and increased habitat suitability through improvements to floristic diversity and vegetation structure over the next five years will contribute to moving the system along the desired trajectory to achieve the long-term vision. An increase in herbivore numbers is likely to occur as predatory pressure is reduced, increasing grazing and browsing pressure on regenerating vegetation, and will need to be managed accordingly.

Heathland

HRP In the three heathland Ecological Vegetation Classes (EVCs) that grow over sandy substrates (Sand Heathlands, Coastal Sand Heathlands and Heathy Woodlands), urgent restoration actions are required to mitigate domination by the native pest shrubs Coast Tea-tree (*Leptospermum laevigatum*) and White Kunzea (*Kunzea ambigua*). The Sand Heathland EVC is the most vulnerable to domination by the pest species and is therefore of highest restoration priority. Wet Heathland is less vulnerable to pest plant invasion.

Long-term ecological burning regimes are required to address the threat to ecological resilience posed by uniformity of Growth Stage Structures (GSS) across vast areas of heathlands, caused by recent large-scale and high-intensity bushfires. Heathlands in good condition are associated with mosaic ecological fire, as opposed to high-intensity, large-scale fires or the long-term absence of fire. Ecologically appropriate fire regimes create multiple GSS across the park landscape to ensure the resilience of the ecosystem group.

Across all heathland management units and EVCs, ecological burning regimes are the primary management tool. These regimes must be long-term, adaptive, and committed, and they must be accompanied by other restoration activities, including browser management, weed management and visitor management.

Wet Forest and Rainforest

WFRRP The long-term vision for the Wet Forests and Rainforests of Wilsons Promontory is based on the goal of protecting those areas that remain undisturbed, restoring the viability of the vegetation communities of the Wet Forests and Rainforests in areas that are currently disturbed and developing and implementing a strategy for immediate recovery actions (such as aerial reseeding) to be applied to areas that may transition into collapsed forest due to unplanned future disturbance. Achieving this vision will require building the knowledge base in relation to the condition and species composition of the Wet Forests and Rainforests and then using this information to develop the methods and strategies required.

In areas of collapsed forest, the short-term objectives are all components of one goal: to test proposed restoration methods that rebuild ecosystem structure and composition, with a focus on rebuilding forest canopy. An important management focus of the minimally impacted Wet Forests and Rainforests is to understand more about their current condition (including forest age), species composition and threats.

Restoration approach

The focus of this strategy is on actions that describe understanding the needs of each ecosystem and building tools to address those needs, outside of actions that relate to other strategies in the Conservation Action Plan. However, the approach to restoration should be integrated across relevant strategies to ensure that management actions are coordinated across the ecosystem.

For each conservation asset, assessment and decision support tools will be developed to determine habitat condition and determine the best path to restoration. Determining baseline condition of EVCs, including proportion of vegetation within growth stages, will enable land managers to make informed decisions. A large part of this strategy is identifying knowledge gaps and building missing knowledge with regards to restoration methods and efficacy, impacts of over-abundant grazers, and drivers for over-abundant native plant invasion. Selective reseeding can be undertaken as deemed necessary and appropriate.

The restoration of these key habitats will increase the scope to consider the augmentation, reintroduction and introduction of threatened and important native species, including native predators and soil engineers.

Climate change scenario planning

As part of climate change scenario planning, climate change impacts were considered for Coastal Grassy Woodland, Heathland and Wet Forest and Rainforest. A 'no regret' approach to restoring these key habitats includes pairing fire management and revegetation actions with pest plant and animal management. A focus on monitoring will promote an adaptive management response to condition, help to detect dieback and address other knowledge gaps.

This strategy will be carried out in conjunction with other strategies to ensure a coordinated approach to land management, especially strategy *6.10 Building climate resilience and refugia*.

Conservation outcomes

This strategy will restore canopy and understorey species, improve floristic diversity and vegetation structure, protect undisturbed areas and increase ecological resilience, supporting native species to flourish.

Sanctuary plan outcomes and objectives

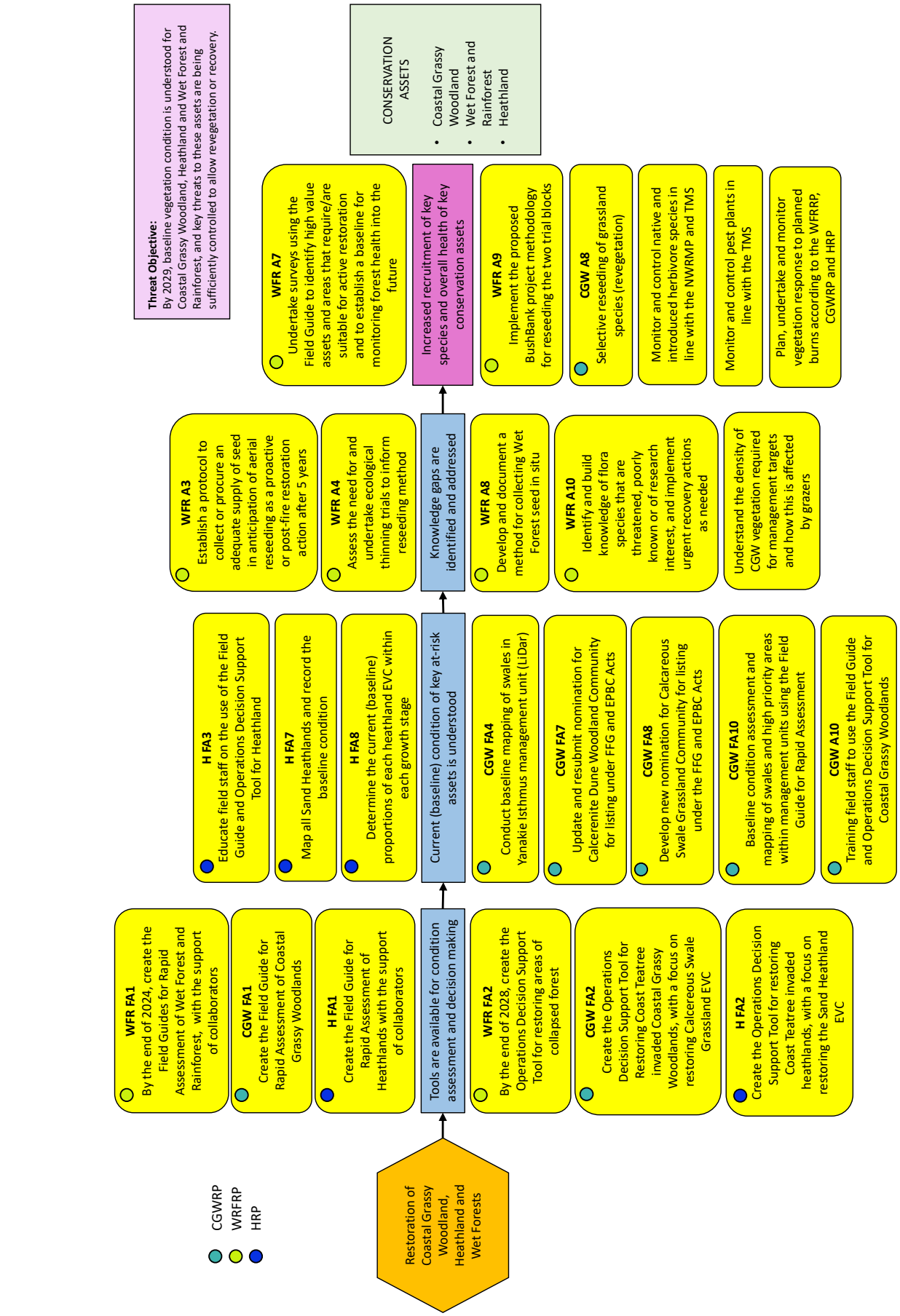
	CGWRP	MTO	Restore 300 hectares of Coastal Grassy Woodland ecosystem group currently invaded by Coast Tea-tree (including the Oberon Bay grasslands).
		MTO	Distribution of a variety of Growth Stage Structures across the 300 hectares of Coastal Grassy Woodlands currently invaded by Coast Tea-tree.
		STO6	Improve the health of Coastal Grassy Woodland. This includes: • Further improving the condition of the 10 hectares of restored Coastal Grassy Woodlands in Block 3 on the Yanakie Isthmus • Improving the health of 100 hectares of Calcareous Swale Grasslands on the Yanakie Isthmus in Block 3 • Improving the health of 300 hectares of Calcareous Swale Grasslands across the Yanakie Isthmus in Blocks 2 and 4.
		STO7	Improve baseline condition mapping and assessment of Coast Tea-tree invasion and remnant vegetation across the Yanakie Isthmus.
		STO8	Improve knowledge of the most effective approaches to the restoration of native grasses within Coastal Grassy Woodland.
		STO9	Improve knowledge of the cause/s of Coast Banksia dieback within Coastal Grassy Woodland.
	HRP	MTO1	Protect from invasion by Coast Tea-tree all heathland currently uninvaded.
		MTO2	Restore all Sand Heathlands currently invaded by Coast Tea-tree to a state where the pest plant is absent, with treatment efforts starting inland at the invasion front, moving west towards the heavily invaded coastal heathlands.
		MTO3	Create a distribution of GSS for each heathland EVC within an acceptable range for ecological resilience. Greater GSS diversity in the Northeast management unit should be achieved within the next 20 years.
		MTO4	Rigorously monitor and document the outcomes of management actions (e.g., extent of Coast Tea-tree coverage in Sand Heathlands, the Wet Heathland's GSS composition), and review the Resist, Accept, Direct (RAD) options adopted.
		STO4	Improve the health of heathland ecosystems.

		STO5	Improved knowledge of the conditions that trigger early reproductive maturity and seed capsule release by Coast Tea-tree.
		STO6	Improved knowledge of Coast Tea-tree seed source threat area within Heathlands ecosystems.
		STO7	Improve knowledge of the most effective approaches to the restoration of Heathland.
		STO8	Improved knowledge of the drivers of Coast Tea-tree invasion in Sand and Coastal Sand Heathlands.
		STO9	Improve knowledge of the viability of Sand Heathland recovery after severe and prolonged invasion.
		STO10	Improve knowledge of the influence of fire on Coast Tea-tree within Heathland ecosystems.
	WFRRP	MTO	Actively exclude fire from the following: • All Wet Forest and Rainforests that have not burned since before 1951 and actively exclude bushfire from these areas. • All Wet Forests that were severely impacted in the 2005 and 2009 fires and which are now recovering with the regeneration of seedlings only and actively exclude bushfire from these areas until the minimum Tolerable Fire Interval is reached. • All Cool Temperate Rainforest
		MTO	Implement and continually review and improve restoration protocols for collapsed forests based on the results (especially the establishment and growth rate of canopy species) from the initial BushBank revegetation trials and from follow-up pilot programs.
		STO1	Test proposed restoration methods that rebuild ecosystem structure and composition, with a focus on rebuilding forest canopy.
		STO2	Develop a response protocol with detailed methodology for the immediate aerial reseeding of recently burnt areas of collapsed forest after ecological and unplanned bushfire.
		STO3	Improve Park managers' understanding of areas where the forest canopy is still intact, e.g., by ground-truth EVC mapping and establishing baseline condition data.

Strategy summary

The development of tools to assess condition and support adaptive decision making to restore degraded Coastal Grassy Woodland, Heathland and Wet Forests will increase recruitment of key species and the overall health of conservation assets.

Results chain



Implementation milestones

Result	Action
Tools are available for condition assessment and decision making	• **WFR FA1:** By the end of 2024, create the Field Guides for Rapid Assessment of Wet Forest and Rainforest, with the support of collaborators • **CGW FA1:** Create the Field Guide for Rapid Assessment of Coastal Grassy Woodlands • **H FA1:** Create the Field Guide for Rapid Assessment of Heathlands with the support of collaborators • **WFR FA2:** By the end of 2028, create the Operations Decision Support Tool for restoring areas of collapsed forest • **CGW FA2:** Create the Operations Decision Support Tool for Restoring Coast Tea-tree invaded Coastal Grassy Woodlands, with a focus on restoring Calcereous Swale Grassland EVC • **H FA2:** Create the Operations Decision Support Tool for restoring Coast Tea-tree invaded heathlands, with a focus on restoring the Sand Heathland EVC
Current (baseline) condition of key at-risk assets is understood	• **H FA3:** Educate field staff on the use of the Field Guide and Operations Decision Support Tool for Heathland • **H FA7:** Map all Sand Heathlands and record the baseline condition • **H FA8:** Determine the current (baseline) proportions of each heathland EVC within each growth stage • **CGW FA4:** Conduct baseline mapping of swales in Yanakie Isthmus management unit (LiDar) • **CGW FA7:** Update and resubmit nomination for Calcerenite Dune Woodland Community for listing under FFG and EPBC Acts • **CGW FA8:** Develop new nomination for Calcareous Swale Grassland Community for listing under the FFG and EPBC Acts • **CGW FA10:** Baseline condition assessment and mapping of swales and high priority areas within management units using the Field Guide for Rapid Assessment • **CGW A10:** Training field staff to use the Field Guide and Operations Decision Support Tool for Coastal Grassy Woodlands
Knowledge gaps are identified and addressed	• **WFR A3:** Establish a protocol to collect or procure an adequate supply of seed in anticipation of aerial reseeding as a proactive or post-fire restoration action after 5 years • **WFR A4:** Assess the need for and undertake ecological thinning trials to inform reseeding method • **WFR A8:** Develop and document a method for collecting Wet Forest seed in situ • **WFR A10:** Identify and build knowledge of flora species that are threatened, poorly known or of research interest, and implement urgent recovery actions as needed • Understand the density of CGW vegetation required for management targets and how this is affected by grazers

Result	Action
Increased recruitment of key species and overall health of key conservation assets	• **WFR A7:** Undertake surveys using the Field Guide to identify high value assets and areas that require/are suitable for active restoration and to establish a baseline for monitoring forest health into the future • **WFR A9:** Implement the proposed BushBank project methodology for reseeding the two trial blocks • **CGW A8:** Selective reseeding of grassland species (revegetation) • Monitor and control native and introduced herbivore species in line with the NWRMP and TMS • Monitor and control pest plants in line with the TMS • Plan, undertake and monitor vegetation response to planned burns according to the WFRRP, CGWRP and HRP

6.7 Reducing the impacts of human disturbance

The aim of this strategy is to encourage the public to enjoy nature-based tourism activities and take pride in the marine and terrestrial parks at Wilsons Promontory, while reducing the impacts of illegal activities. The extensive natural wilderness and range of activities available has drawn an increasing number of visitors in recent years. It will be essential to balance the pressure of visitation with the opportunity to connect with nature in the unique environment of the Wilsons Promontory landscape.

In order to efficiently direct communication and compliance work, Parks Victoria will first identify areas of inappropriate and illegal activity and target groups for engagement. The channels and methods of communication will be tailored accordingly. Increased public awareness of harvest, collection and camping restrictions and the penalties that apply for infringements should encourage park uses to undertake appropriate activities. Parks Victoria will collaborate with commercial operators and other partners to promote permissible behaviour and ensure that natural resource extraction and access activities are undertaken in compliance with regulations (e.g. encourage the use of Go Fish No Fish app). Commercial operators will be encouraged to operate in ecologically appropriate areas with little to no impact on natural values.

Similarly, education around the impacts of cairn building and wildlife photographers, bird watchers and other enthusiasts who may flip rocks or visit vulnerable areas to observe fauna will minimise habitat disruption and encourage park users to take pride in the Wilsons Promontory Parks Landscape.

Parks Victoria will investigate additional tools for monitoring and detecting illegal activities, and if feasible, increase staff accreditation and patrol numbers to match increased visitation. Collaboration with relevant enforcement agencies and monitoring target species or areas will increase community perception of enforcement risk.

Climate change scenario planning

As part of climate change scenario planning, climate change-related interactions with visitation pressure and illegal activities were considered for all conservation assets. A ‘no regret’ approach to managing human disturbance includes a high level of education and community engagement on significant environmental values and inappropriate activities. By encouraging sustainable visitation to Wilsons Promontory, the health of all assets is improved, which increases the resilience of habitat to other stressors, including climate change.

This strategy will be carried out in conjunction with other strategies to ensure a coordinated approach to land management, especially strategy *6.10 Building climate resilience and refugia*.

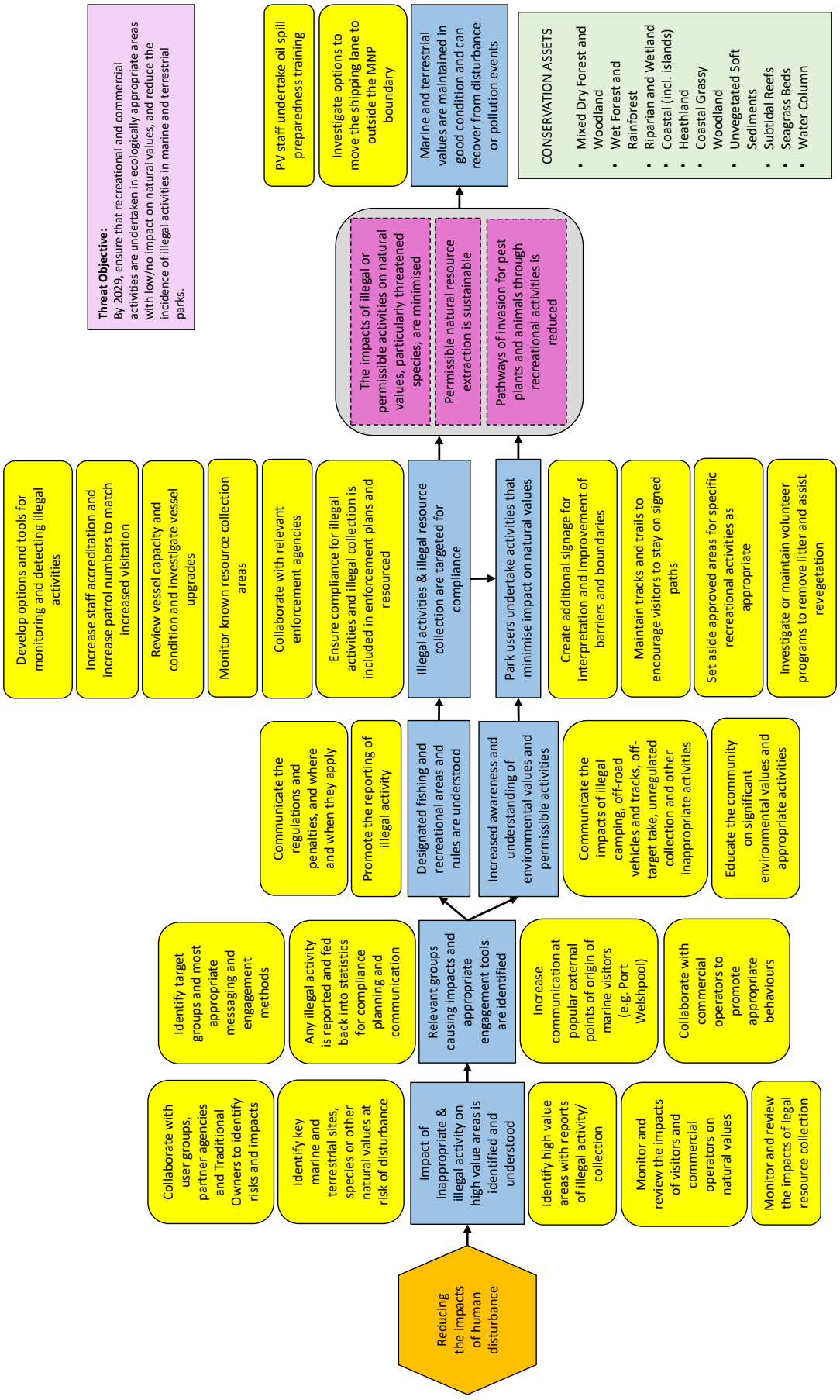
Conservation outcomes

The impacts of permissible and illegal activities on terrestrial and marine assets are minimised and sustainable visitation is promoted, reducing disturbance of habitat and species.

Strategy summary

Targeted education and compliance reduce the impacts of recreation, illegal activities and resource extraction, encouraging the public to enjoy sustainable nature-based tourism while reducing the impacts of illegal activities.

Results chain



Implementation milestones

Result	Action
Impact of inappropriate & illegal activity on high value areas is identified and understood	• Collaborate with user groups, partner agencies and Traditional Owners to identify risks and impacts • Maintain and improve relationship with VFA to share data on illegal activities and management activities • Identify key marine and terrestrial sites, species or other natural values at risk of disturbance • Identify high value areas with reports of illegal activity/ collection • Monitor and review the impacts of visitors and commercial operators on natural values • Monitor and review the impacts of legal resource collection
Relevant groups causing impacts and appropriate engagement tools are identified	• Identify target groups and most appropriate messaging and engagement methods • Any illegal activity is reported and fed back into statistics for compliance planning and communication • Increase communication at popular external points of origin of marine visitors (e.g. Port Welshpool) • Collaborate with commercial operators to promote appropriate behaviours
Designated fishing and recreational areas and rules are understood	• Communicate the regulations and penalties, and where and when they apply • Promote the reporting of illegal activity
Illegal activities & illegal resource collection are targeted for compliance	• Develop options and tools for monitoring and detecting illegal activities • Increase staff accreditation and increase patrol numbers to match increased visitation • Review vessel capacity and condition and investigate vessel upgrades • Monitor known resource collection areas • Collaborate with relevant enforcement agencies • Ensure compliance for illegal activities and illegal collection is included in enforcement plans and resourced
Increased awareness and understanding of environmental values and permissible activities	• Communicate the impacts of illegal camping, off-road vehicles and tracks, off-target take, unregulated collection and other inappropriate activities • Educate the community on significant environmental values and appropriate activities
Park users undertake activities that minimise impact on natural values	• Create additional signage for interpretation and improvement of barriers and boundaries • Maintain tracks and trails to encourage visitors to stay on signed paths • Set aside approved areas for specific recreational activities as appropriate

Result	Action
	• Investigate or maintain volunteer programs to remove litter and assist revegetation
The impacts of illegal or permissible activities on natural values, particularly threatened species, are minimised Permissible natural resource extraction is sustainable Pathways of invasion for pest plants and animals through recreational activities is reduced	
Marine and terrestrial values are maintained in good condition and can recover from disturbance or pollution events	• PV staff undertake oil spill preparedness training • Investigate options to move the shipping lane to outside the MNP boundary

6.8 Augmentation, reintroduction and introduction of key native species

This strategy represents the actions of the Sanctuary Wildlife Restoration Plan.

This strategy outlines the steps involved in supporting or restoring key native fauna at Wilsons Promontory, which necessitates a degree of success in reducing the threat of introduced predators and inappropriate fire regimes and restoring key habitat. Actions for addressing these additional issues are represented in other Conservation Strategies. The construction of the predator and grazer exclusion fence at Yanakie Isthmus will greatly support this strategy.

This strategy supports one of the Wilsons Promontory Sanctuary elements: [WRP]

- **Back from the brink:** Support rare wildlife species still present in Wilsons Promontory National Park. To protect and nurture recovery of key resident wildlife species, including bringing vulnerable species back from the brink – such as Southern Brown Bandicoot, Long-nosed Potoroo and Eastern Ground Parrot. For example, through removal of introduced cats and foxes, survival of rare species such as Southern Brown Bandicoot will be greatly improved and can be further supported through programs such as genetic mixing to increase genomic diversity.

[WRP] Menkhorst et al. (2021) assessed the suitability of WPNP to act as a haven for threatened fauna and concluded that there is great potential for the park to protect several threatened species in Victoria.

Population augmentation, or supplementation, involves the translocation of threatened fauna within its indigenous range into an existing population of conspecifics with the intent to enhance population viability through increasing population size, increasing genetic diversity, or increasing the representation of specific demographic groups or stages. Reintroduction involves the translocation of threatened fauna within its indigenous range from which it has disappeared. Species introduction is the intentional movement and release of threatened fauna outside its historic range and can be for the purpose of avoiding extinction of populations threatened elsewhere, or to perform a specific ecological function that has been lost in the ecosystem.

The following species were proposed or selected for augmentation, reintroduction and introduction at Wilsons Promontory:

- Augmentation of existing populations at WPNP:
    a) Pookila / New Holland Mouse (*Pseudomys novaehollandiae*)
    b) Swamp Antechinus (*Antechinus minimus*)
    c) Broad-toothed Rat (*Mastacomys fuscus*)
    d) King Quail (*Synoicus chinensis*)

e) Eastern Ground Parrot (*Pezoporus wallicus wallicus*)

- Re-introduction to WPNP:
    a) Eastern Quoll (*Dasyurus viverrinus*)
    b) Spot-tailed Quoll (*Dasyurus maculatus*)
    c) Eastern Bettong (*Bettongia gaimardi*)
    d) Rufous-bellied Pademelon (*Thylogale billardieri)*
    e) Eastern Bristlebird (*Dasyornis brachypterus*) – translocation program is already underway
- Introduction to WPNP:
    a) Brush-tailed Rock-wallaby (*Petrogale penicillata*)

For other small-medium-sized mammals (White-footed Dunnart, Southern Long-nosed Bandicoot, Southern Brown Bandicoot and Long-nosed Potoroo) the recommendation is to continue camera-trap monitoring, and, at present, no further action is required provided predator control continues at current or improved efficacy.

A key element of reintroduction biology is removing the cause of species decline prior to attempting a reintroduction or augmentation of an existing population. The Sanctuary program integrates intensified threat management and habitat restoration to support improved conditions for existing fauna, and re-introduction of missing species contingent on reaching appropriate threat reduction and habitat condition and availability thresholds.

It is acknowledged that reintroducing, introducing species and augmenting populations is an adaptative process including learning about the risks and benefits these interventions may have.

A significant component of this strategy is recognising knowledge gaps and aiming to achieve a greater understanding of the population status, genetic health, precise habitat requirements and potential climate change impacts on target species prior to proposed reintroduction or introduction to Wilsons Promontory National Park. Furthermore, the strategy considers the costs and benefits of translocation at a landscape, state and national scale; the degree to which key threats have been minimised; and the ecological role and social and political impact of reintroduction of key species. Translocation or reintroduction is suggested to be investigated only if it is deemed ecologically and socially appropriate to do so. Actions and outcomes in this strategy are planned for either a 5-year or 10-year point in time.

Other species that were not part of the original assessment may be included following implementation and review of this strategy. For example, koalas are believed to have been more abundant than they are now, but further investigation is required to achieve a better understanding of their current numbers, requirements and history at Wilsons Promontory.

Climate change scenario planning

As part of climate change scenario planning, climate change risks and impacts were considered for the translocation or reintroduction of key native species. A 'no regret' approach to restoring or augmenting these species includes significant focus and research on the potential impacts of climate change on the habitat suitability of target species and acknowledging the pressure of adding additional species into Wilsons Promontory, which is a climate refuge for the species that already inhabit the landscape. Introductions of species that are at risk from climate change on a statewide scale may be considered to ensure persistence of these species, for which Wilsons Promontory may be a climate refuge.

A focus on complementary strategies such as fire management and pest plant and animal management will improve the health of conservation assets to increase their resilience to climate change and increase the scope for potential translocations or reintroductions.

This strategy will be carried out in conjunction with other strategies to ensure a coordinated approach to land management, especially strategies *6.4 Sustained control of introduced predators* and *6.10 Building climate resilience and refugia*.

Conservation outcomes

This strategy supports the improvement of terrestrial conservation asset health and, if deemed ecologically and socially appropriate, the translocation or reintroduction of key native species may improve the population status and genetic health of endangered fauna species and restore ecosystem function.

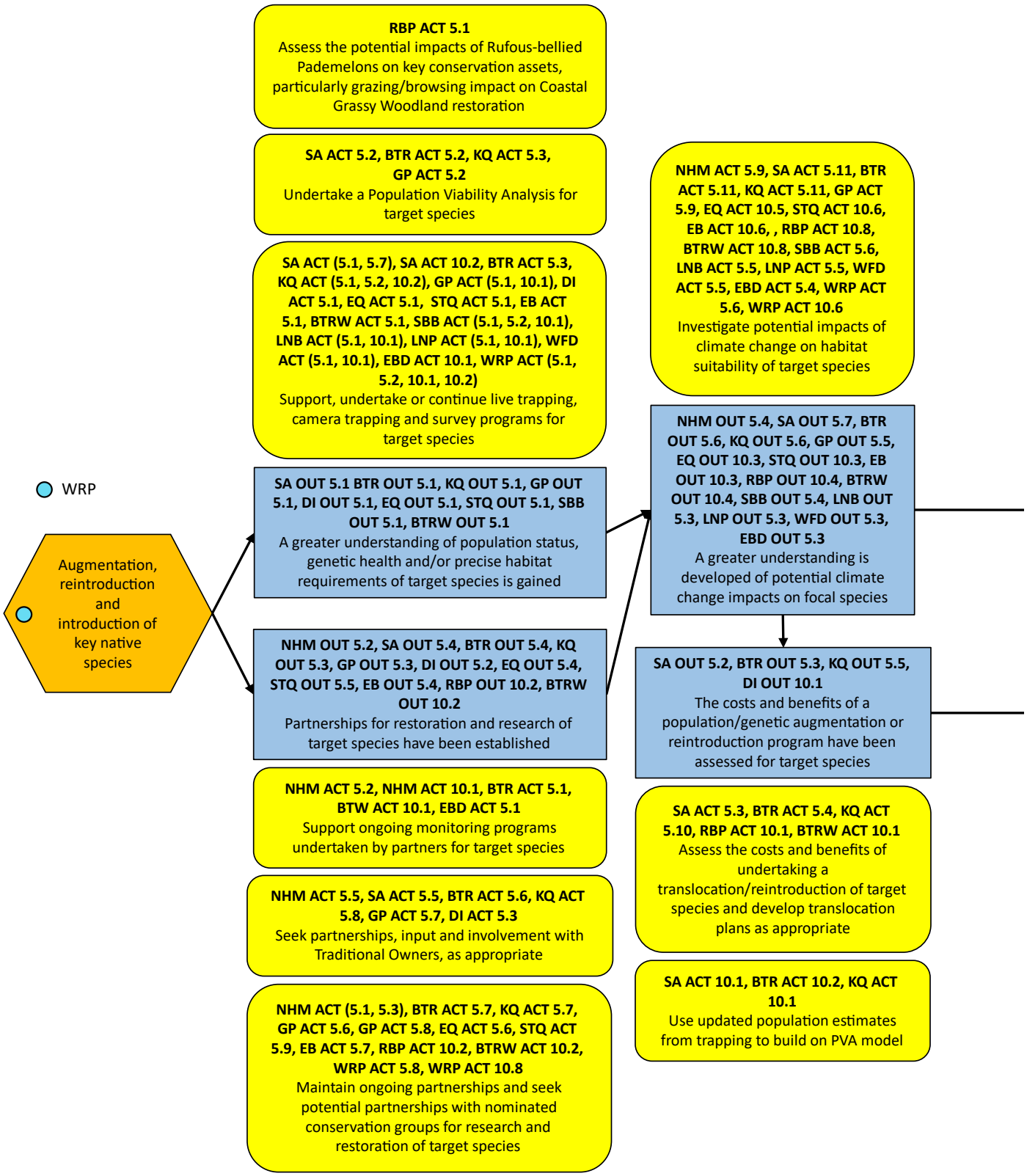
Sanctuary plan outcomes and objectives

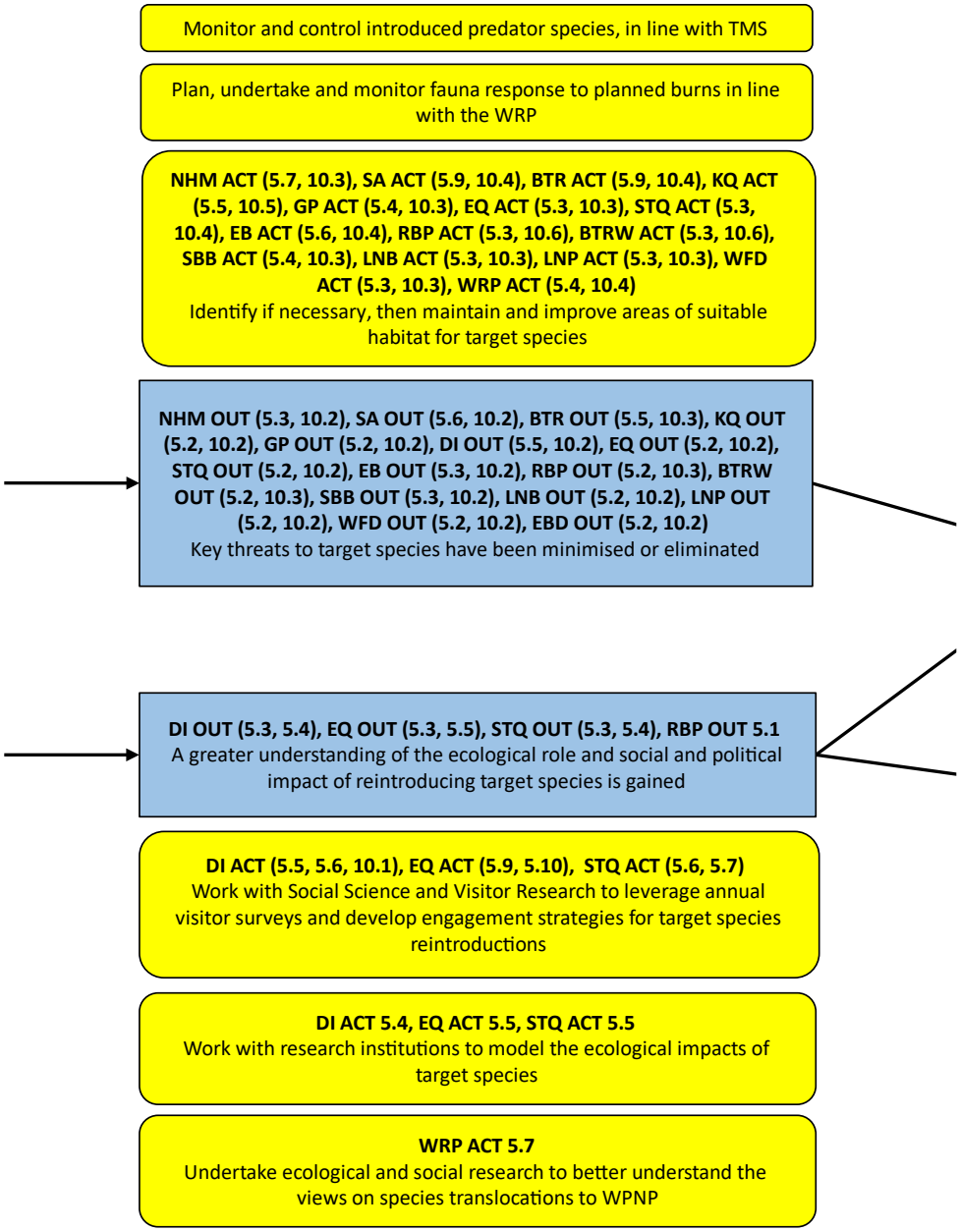
	WRP	TO 5.2 (2027) TO 10.2 (2032)	The habitat suitability for threatened native terrestrial fauna has been improved compared to 2022.
		CAO 5.1 (2022-2027) CAO10.1 (2027-2032)	Increases will be observed in the abundance of key species of known resident terrestrial threatened fauna.
		CAO 5.2 (2022-2027) CAO 10.2 (2027-2032)	Genetic diversity of key threatened fauna species has increased, or not declined, at WPNP.
		CAO 5.3 (2027) CAO 10.3 (2032)	If deemed ecologically and socially appropriate, a predator species is reintroduced to WPNP.
		KLO 5.1 (2022-2027) KLO 10.1 (2027-2032)	The population status of key threatened species is known at WPNP.
		KLO 5.2 (2027) KLO 10.2 (2032)	The suitability of WPNP to support viable populations of key species has been assessed – including ecological and social considerations.
		KLO 5.3 (2027) KLO 10.3 (2032)	Research and restoration partnerships or working relationships to aid in addressing knowledge gaps have been established (by 2027) or maintained (by 2032).

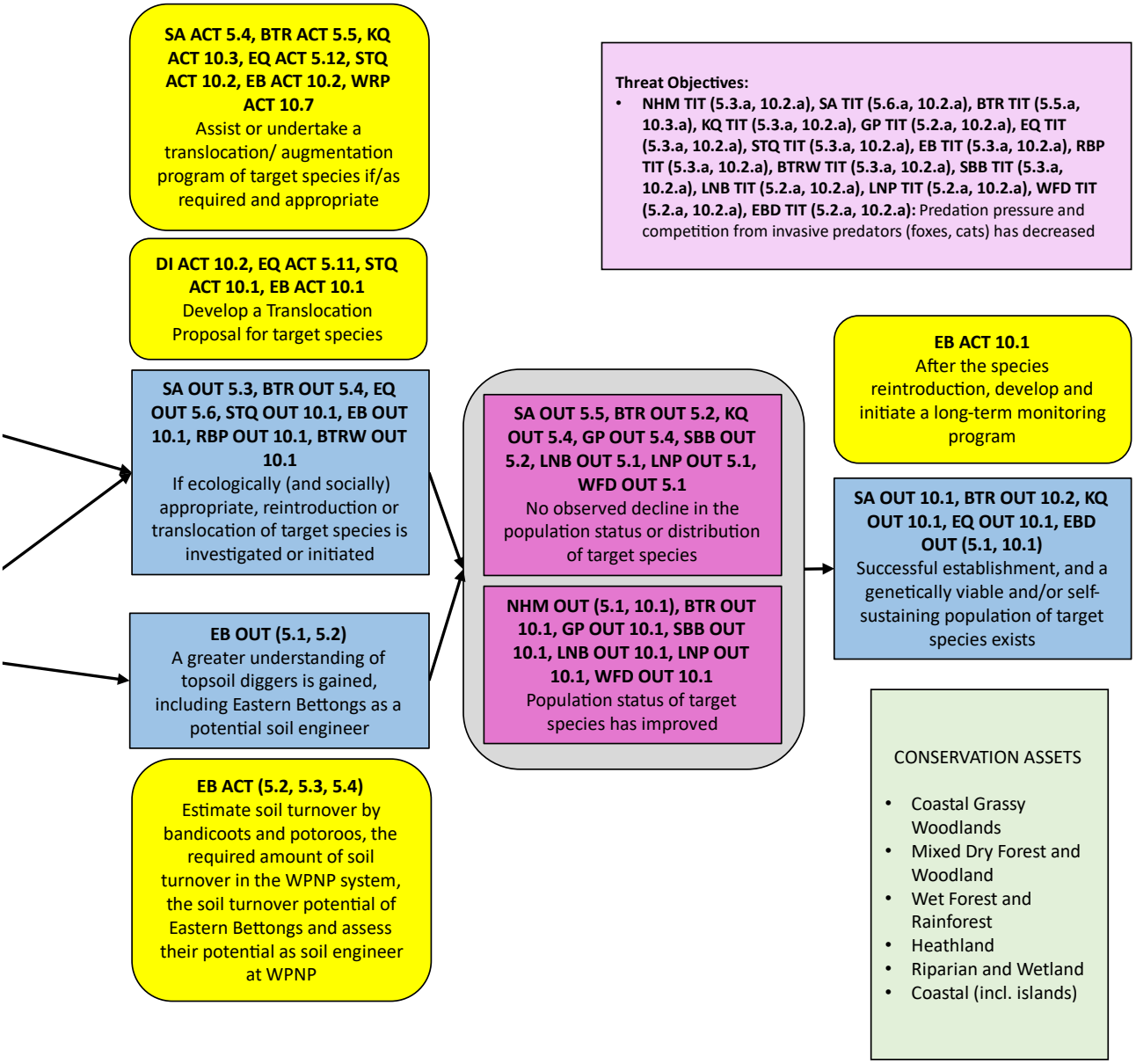
Strategy summary

Establishing partnerships, eliminating threats to terrestrial conservation assets and assessing the viability of translocation or reintroduction of key native species supports endangered species and the role of Wilsons Promontory as a climate change refuge.

Results chain




Monitor and control introduced predator species, in line with TMS
Plan, undertake and monitor fauna response to planned burns in line with the WRP
NHM ACT (5.7, 10.3), SA ACT (5.9, 10.4), BTR ACT (5.9, 10.4), KQ ACT (5.5, 10.5), GP ACT (5.4, 10.3), EQ ACT (5.3, 10.3), STQ ACT (5.3, 10.4), EB ACT (5.6, 10.4), RBP ACT (5.3, 10.6), BTRW ACT (5.3, 10.6), SBB ACT (5.4, 10.3), LNB ACT (5.3, 10.3), LNP ACT (5.3, 10.3), WFD ACT (5.3, 10.3), WRP ACT (5.4, 10.4)
Identify if necessary, then maintain and improve areas of suitable habitat for target species
NHM OUT (5.3, 10.2), SA OUT (5.6, 10.2), BTR OUT (5.5, 10.3), KQ OUT (5.2, 10.2), GP OUT (5.2, 10.2), DI OUT (5.5, 10.2), EQ OUT (5.2, 10.2), STQ OUT (5.2, 10.2), EB OUT (5.3, 10.2), RBP OUT (5.2, 10.3), BTRW OUT (5.2, 10.3), SBB OUT (5.3, 10.2), LNB OUT (5.2, 10.2), LNP OUT (5.2, 10.2), WFD OUT (5.2, 10.2), EBD OUT (5.2, 10.2)
Key threats to target species have been minimised or eliminated
DI OUT (5.3, 5.4), EQ OUT (5.3, 5.5), STQ OUT (5.3, 5.4), RBP OUT 5.1
A greater understanding of the ecological role and social and political impact of reintroducing target species is gained
DI ACT (5.5, 5.6, 10.1), EQ ACT (5.9, 5.10), STQ ACT (5.6, 5.7)
Work with Social Science and Visitor Research to leverage annual visitor surveys and develop engagement strategies for target species reintroductions
DI ACT 5.4, EQ ACT 5.5, STQ ACT 5.5
Work with research institutions to model the ecological impacts of target species
WRP ACT 5.7
Undertake ecological and social research to better understand the views on species translocations to WPNP


SA ACT 5.4, BTR ACT 5.5, KQ ACT 10.3, EQ ACT 5.12, STQ ACT 10.2, EB ACT 10.2, WRP ACT 10.7
Assist or undertake a translocation/ augmentation program of target species if/as required and appropriate
DI ACT 10.2, EQ ACT 5.11, STQ ACT 10.1, EB ACT 10.1
Develop a Translocation Proposal for target species
SA OUT 5.3, BTR OUT 5.4, EQ OUT 5.6, STQ OUT 10.1, EB OUT 10.1, RBP OUT 10.1, BTRW OUT 10.1
If ecologically (and socially) appropriate, reintroduction or translocation of target species is investigated or initiated
EB OUT (5.1, 5.2)
A greater understanding of topsoil diggers is gained, including Eastern Bettongs as a potential soil engineer
EB ACT (5.2, 5.3, 5.4)
Estimate soil turnover by bandicoots and potoroos, the required amount of soil turnover in the WPNP system, the soil turnover potential of Eastern Bettongs and assess their potential as soil engineer at WPNP
SA OUT 5.5, BTR OUT 5.2, KQ OUT 5.4, GP OUT 5.4, SBB OUT 5.2, LNB OUT 5.1, LNP OUT 5.1, WFD OUT 5.1
No observed decline in the population status or distribution of target species
NHM OUT (5.1, 10.1), BTR OUT 10.1, GP OUT 10.1, SBB OUT 10.1, LNB OUT 10.1, LNP OUT 10.1, WFD OUT 10.1
Population status of target species has improved
Threat Objectives:
NHM TIT (5.3.a, 10.2.a), SA TIT (5.6.a, 10.2.a), BTR TIT (5.5.a, 10.3.a), KQ TIT (5.3.a, 10.2.a), GP TIT (5.2.a, 10.2.a), EQ TIT (5.3.a, 10.2.a), STQ TIT (5.3.a, 10.2.a), EB TIT (5.3.a, 10.2.a), RBP TIT (5.3.a, 10.2.a), BTRW TIT (5.3.a, 10.2.a), SBB TIT (5.3.a, 10.2.a), LNB TIT (5.2.a, 10.2.a), LNP TIT (5.2.a, 10.2.a), WFD TIT (5.2.a, 10.2.a), EBD TIT (5.2.a, 10.2.a): Predation pressure and competition from invasive predators (foxes, cats) has decreased
EB ACT 10.1
After the species reintroduction, develop and initiate a long-term monitoring program
SA OUT 10.1, BTR OUT 10.2, KQ OUT 10.1, EQ OUT 10.1, EBD OUT (5.1, 10.1)
Successful establishment, and a genetically viable and/or self-sustaining population of target species exists
CONSERVATION ASSETS
Coastal Grassy Woodlands
Mixed Dry Forest and Woodland
Wet Forest and Rainforest
Heathland
Riparian and Wetland
Coastal (incl. islands)

Implementation milestones

Result	Action
NHM OUT 5.2, SA OUT 5.4, BTR OUT 5.4, KQ OUT 5.3, GP OUT 5.3, DI OUT 5.2, EQ OUT 5.4, STQ OUT 5.5, EB OUT 5.4, RBP OUT 10.2, BTRW OUT 10.2 Partnerships for restoration and research of target species have been established	• **NHM ACT 5.2, NHM ACT 10.1, BTR ACT 5.1, BTW ACT 10.1, EBD ACT 5.1:** Support ongoing monitoring programs undertaken by partners for target species • **NHM ACT 5.5, SA ACT 5.5, BTR ACT 5.6, KQ ACT 5.8, GP ACT 5.7, DI ACT 5.3:** Seek partnerships, input and involvement with Traditional Owners, as appropriate • **NHM ACT (5.1, 5.3), BTR ACT 5.7, KQ ACT 5.7, GP ACT 5.6, GP ACT 5.8, EQ ACT 5.6, STQ ACT 5.9, EB ACT 5.7, RBP ACT 10.2, BTRW ACT 10.2, WRP ACT 5.8, WRP ACT 10.8:** Maintain ongoing partnerships and seek potential partnerships with nominated conservation groups for research and restoration of target species
SA OUT 5.1 BTR OUT 5.1, KQ OUT 5.1, GP OUT 5.1, DI OUT 5.1, EQ OUT 5.1, STQ OUT 5.1, SBB OUT 5.1, BTRW OUT 5.1 A greater understanding of population status, genetic health and/or precise habitat requirements of target species is gained	• **RBP ACT 5.1:** Assess the potential impacts of Rufous-bellied Pademelons on key conservation assets, particularly grazing/browsing impact on Coastal Grassy Woodland restoration • **SA ACT 5.2, BTR ACT 5.2, KQ ACT 5.3, GP ACT 5.2:** Undertake a Population Viability Analysis for target species • **SA ACT (5.1, 5.7), SA ACT 10.2, BTR ACT 5.3, KQ ACT (5.1, 5.2, 10.2), GP ACT (5.1, 10.1), DI ACT 5.1, EQ ACT 5.1, STQ ACT 5.1, EB ACT 5.1, BTRW ACT 5.1, SBB ACT (5.1, 5.2, 10.1), LNB ACT (5.1, 10.1), LNP ACT (5.1, 10.1), WFD ACT (5.1, 10.1), EBD ACT 10.1, WRP ACT (5.1, 5.2, 10.1, 10.2):** Support, undertake or continue live trapping, camera trapping and survey programs for target species
NHM OUT 5.4, SA OUT 5.7, BTR OUT 5.6, KQ OUT 5.6, GP OUT 5.5, EQ OUT 10.3, STQ OUT 10.3, EB OUT 10.3, RBP OUT 10.4, BTRW OUT 10.4, SBB OUT 5.4, LNB OUT 5.3, LNP OUT 5.3, WFD OUT 5.3, EBD OUT 5.3 A greater understanding is developed of potential climate change impacts on focal species	• **NHM ACT 5.9, SA ACT 5.11, BTR ACT 5.11, KQ ACT 5.11, GP ACT 5.9, EQ ACT 10.5, STQ ACT 10.6, EB ACT 10.6, , RBP ACT 10.8, BTRW ACT 10.8, SBB ACT 5.6, LNB ACT 5.5, LNP ACT 5.5, WFD ACT 5.5, EBD ACT 5.4, WRP ACT 5.6, WRP ACT 10.6:** Investigate potential impacts of climate change on habitat suitability of target species
NHM OUT (5.3, 10.2), SA OUT (5.6, 10.2), BTR OUT (5.5, 10.3), KQ OUT (5.2, 10.2), GP OUT (5.2, 10.2), DI OUT (5.5, 10.2), EQ OUT (5.2, 10.2), STQ OUT (5.2, 10.2), EB OUT (5.3, 10.2), RBP OUT (5.2, 10.3), BTRW OUT (5.2, 10.3), SBB OUT (5.3, 10.2), LNB OUT (5.2, 10.2), LNP OUT (5.2, 10.2), WFD OUT (5.2, 10.2), EBD OUT (5.2, 10.2) Key threats to target species have been minimised or eliminated	• Monitor and control introduced predator species, in line with TMS • Plan, undertake and monitor fauna response to planned burns in line with the WRP • **NHM ACT (5.7, 10.3), SA ACT (5.9, 10.4), BTR ACT (5.9, 10.4), KQ ACT (5.5, 10.5), GP ACT (5.4, 10.3), EQ ACT (5.3, 10.3), STQ ACT (5.3, 10.4), EB ACT (5.6, 10.4), RBP ACT (5.3, 10.6), BTRW ACT (5.3, 10.6), SBB ACT (5.4, 10.3), LNB ACT (5.3, 10.3), LNP ACT (5.3, 10.3), WFD ACT (5.3, 10.3), WRP ACT (5.4, 10.4):** Identify if necessary, then maintain and improve areas of suitable habitat for target species

Result	Action
SA OUT 5.2, BTR OUT 5.3, KQ OUT 5.5, DI OUT 10.1 The costs and benefits of a population/genetic augmentation or reintroduction program have been assessed for target species	• **SA ACT 5.3, BTR ACT 5.4, KQ ACT 5.10, RBP ACT 10.1, BTRW ACT 10.1:** Assess the costs and benefits of undertaking a translocation/reintroduction of target species and develop translocation plans as appropriate • **SA ACT 10.1, BTR ACT 10.2, KQ ACT 10.1:** Use updated population estimates from trapping to build on PVA model
DI OUT (5.3, 5.4), EQ OUT (5.3, 5.5), STQ OUT (5.3, 5.4), RBP OUT 5.1 A greater understanding of the ecological role and social and political impact of reintroducing target species is gained	• **DI ACT (5.5, 5.6, 10.1), EQ ACT (5.9, 5.10), STQ ACT (5.6, 5.7):** Work with Social Science and Visitor Research to leverage annual visitor surveys and develop engagement strategies for target species reintroductions • **DI ACT 5.4, EQ ACT 5.5, STQ ACT 5.5:** Work with research institutions to model the ecological impacts of target species • **WRP ACT 5.7:** Undertake ecological and social research to better understand the views on species translocations to WPNP
SA OUT 5.3, BTR OUT 5.4, EQ OUT 5.6, STQ OUT 10.1, EB OUT 10.1, RBP OUT 10.1, BTRW OUT 10.1 If ecologically (and socially) appropriate, reintroduction or translocation of target species is investigated or initiated	• **SA ACT 5.4, BTR ACT 5.5, KQ ACT 10.3, EQ ACT 5.12, STQ ACT 10.2, EB ACT 10.2, WRP ACT 10.7:** Assist or undertake a translocation/ augmentation program of target species if/as required and appropriate • **DI ACT 10.2, EQ ACT 5.11, STQ ACT 10.1, EB ACT 10.1:** Develop a Translocation Proposal for target species
EB OUT (5.1, 5.2) A greater understanding of topsoil diggers is gained, including Eastern Bettongs as a potential soil engineer	• **EB ACT (5.2, 5.3, 5.4):** Estimate soil turnover by bandicoots and potoroos, the required amount of soil turnover in the WPNP system, the soil turnover potential of Eastern Bettongs and assess their potential as soil engineer at WPNP
SA OUT 5.5, BTR OUT 5.2, KQ OUT 5.4, GP OUT 5.4, SBB OUT 5.2, LNB OUT 5.1, LNP OUT 5.1, WFD OUT 5.1 No observed decline in the population status or distribution of target species **NHM OUT (5.1, 10.1), BTR OUT 10.1, GP OUT 10.1, SBB OUT 10.1, LNB OUT 10.1, LNP OUT 10.1, WFD OUT 10.1** Population status of target species has improved	
SA OUT 10.1, BTR OUT 10.2, KQ OUT 10.1, EQ OUT 10.1, EBD OUT (5.1, 10.1) Successful establishment, and a genetically viable and/or self-sustaining population of target species exists	• **EB ACT 10.1:** After the species reintroduction, develop and initiate a long-term monitoring program

6.9 Collaborative partnerships to address key knowledge gaps

This strategy replaces the *Collaborative partnerships to address key knowledge gaps* strategy from Iteration 1 of the Wilsons Promontory Conservation Action Plan (2017). It draws upon actions from the Sanctuary Heathlands Restoration Implementation Plan, Coastal Grassy Woodland Restoration Implementation Plan, Wet Forest and Rainforest Restoration Implementation Plan, Wildlife Restoration Plan and Native Wildlife Risk Management Plan.

This strategy involves increasing levels of collaboration and partnerships with researchers and land managers in applying adaptive management approaches. Developing a WPNP Research Strategy to identify and prioritise research and knowledge gaps will support the objectives and outcomes of every strategy and Sanctuary plan, particularly as climate change becomes a greater focus for decision-making in land management.

Input and support through partnership and collaboration with Traditional Owners across all plans and actions, including restoration actions and on-ground works should be sought as early as possible, as detailed in Section 8.2. Collaboration with community volunteer groups and research agencies and institutions will increase the scope of research possible across plans and strategies and improve land management practices, including restoration protocols, species translocations and reintroductions and monitoring programs.

A key element of this strategy is to maintain successful partnerships that have been instrumental to recent progress, including the Traditional Owner Leadership Steering Committee, the Wilsons Promontory Technical Advisory Group and the Research Partners Program.

In order to integrate and disseminate research outcomes to inform management actions in a timely and strategic manner, Parks Victoria will establish a system of data curation for research relating to Wilsons Promontory and identify appropriate messaging and engagement approaches to share outcomes with partners.

Climate change scenario planning

As part of climate change scenario planning, knowledge gaps and areas of research regarding climate impacts of interactions were identified across all strategies. Addressing these knowledge gaps will allow Parks Victoria to make more informed decisions around adaptive management as extreme weather events, bushfire incidence, sea level rise and average temperatures increase with climate change. The RAD framework can then be used more effectively to triage ecosystems and species that are vulnerable to change, with evidence to support decisions to restore, reintroduce and reseed (resist), do nothing (accept), or introduce (direct).

These areas of research are largely represented in strategy *6.10 Building climate resilience and refugia.* The implementation of this strategy will support all other strategies in the Conservation Action Plan.

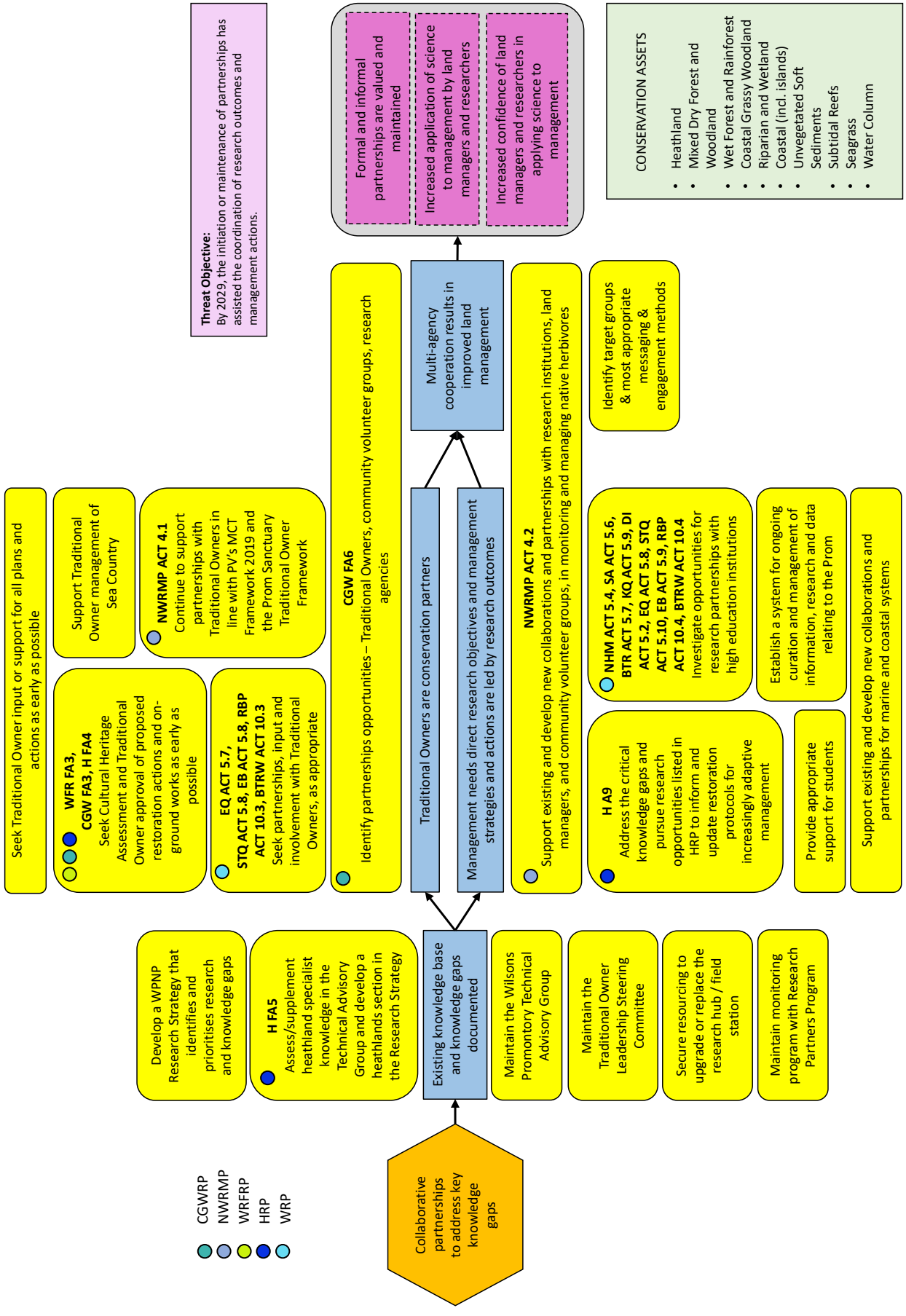
Conservation outcomes

This strategy will allow Parks Victoria to proactively manage threats and pursue opportunities and support the outcomes for all conservation assets in the Wilsons Promontory Parks Landscape.

Strategy summary

The development and maintenance of partnerships and collaborations with Traditional Owners, research institutes and agencies and community groups will increase the effectiveness and efficiency of management at Wilsons Promontory and build knowledge to support responses to climate change.

Results chain



Implementation milestones

Result	Action
Existing knowledge base and knowledge gaps documented	• Develop a WPNP Research Strategy that identifies and prioritises research and knowledge gaps • In partnership with Traditional Owners • **H FA5:** Assess/supplement heathland specialist knowledge in the Technical Advisory Group and develop a heathlands section in the Research Strategy • Maintain the Wilsons Promontory Technical Advisory Group • Maintain the Traditional Owner Leadership Steering Committee • Secure resourcing to upgrade or replace the research hub / field station • Maintain monitoring program with Research Partners Program
Traditional Owners are conservation partners	• **WFR FA3, CGW FA3, H FA4:** Seek Cultural Heritage Assessment and Traditional Owner approval of proposed restoration actions and on-ground works as early as possible • **EQ ACT 5.7, STQ ACT 5.8, EB ACT 5.8, RBP ACT 10.3, BTRW ACT 10.3:** Seek partnerships, input and involvement with Traditional Owners, as appropriate • Seek Traditional Owner input or support for all plans and actions as early as possible • Support Traditional Owner management of Sea Country • **NWRMP ACT 4.1:** Continue to support partnerships with Traditional Owners in line with PV's MCT Framework 2019 and the Prom Sanctuary Traditional Owner Framework • **CGW FA6:** Identify partnerships opportunities – Traditional Owners, community volunteer groups, research agencies
Management needs direct research objectives and management strategies and actions are led by research outcomes	• **NWRMP ACT 4.2:** Support existing and develop new collaborations and partnerships with research institutions, land managers, and community volunteer groups, in monitoring and managing native herbivores • **H A9:** Address the critical knowledge gaps and pursue research opportunities listed in HRP to inform and update restoration protocols for increasingly adaptive management • Provide appropriate support for students • **NHM ACT 5.4, SA ACT 5.6, BTR ACT 5.7, KQ ACT 5.9, DI ACT 5.2, EQ ACT 5.8, STQ ACT 5.10, EB ACT 5.9, RBP ACT 10.4, BTRW ACT 10.4:** Investigate opportunities for research partnerships with high education institutions • Establish a system for ongoing curation and management of information, research and data relating to the Prom • Support existing and develop new collaborations and partnerships for monitoring and management of marine and coastal systems
Multi-agency cooperation results in improved land management	• **CGW FA6:** Identify partnerships opportunities – Traditional Owners, community volunteer groups, research agencies

Result	Action
	• **NWRMP ACT 4.2:** Support existing and develop new collaborations and partnerships with research institutions, land managers, and community volunteer groups, in monitoring and managing native herbivores • Identify target groups and most appropriate messaging and engagement methods
Formal and informal partnerships are valued and maintained Increased application of science to management by land managers and researchers Increased confidence of land managers and researchers in applying science to management	

6.10 Building climate resilience and refugia

Climate change will have widespread impacts across all conservation assets, both direct and indirect. To give species and ecosystems the best chance, we need to reduce the other pressures acting on then through the Conservation Strategies that improve or maintain their condition against compounding threats such as introduced predators and herbivores, weeds, pathogens and human disturbances. Coordinated action across these strategies will increase the resilience of marine and terrestrial assets to climate change. This strategy focusses on additional actions that address knowledge gaps, detection of ecosystem change and proactive planning for climate events.

Optimising current management

Viewing current management techniques and approaches, such as fire regimes, revegetation and reintroductions through the lens of climate change and potential future scenarios can help to identify areas of improvement for business-as-usual activities. For example, predicted change in the timing or seasonality of flowering due to changes in temperature or precipitation may influence ideal fire regimes and timing of planned burns for ecological outcomes. Similarly, changes to breeding periods for endangered species such as the Hooded Plover may necessitate changes to the normal timing or extent of protection actions or regulations.

Management actions need to be more flexible and adaptive to respond to changing conditions, which will rely on consistent monitoring to detect changes in the environment. For Heathland and Coastal Grassy Woodland, planned burn windows may need to be shifted to account for detected changes in climate and additional techniques such as mulching or thinning may need to be used in Mixed Dry Forest and Woodland to manage potentially smaller burn windows.

Shoring up knowledge gaps

As described in strategy 6.9, developing a WPNP Research Strategy will support all Conservation Strategies to increase our knowledge about ecosystems, species and climate change. Prioritising research that will answer questions specific to the impacts of climate change or its interaction with other threats will inform decision-making for adaptive management into the future, as the trajectory of climate change becomes clearer. Some identified knowledge gaps include invertebrate response to climate change across all assets, response of Coast Tea-tree to fire under different climate scenarios, the capacity of coastal species to shift with sea level rise and the vulnerability of marine species and systems to increasing sea surface temperatures.

An important aspect of this strategy is to understand baseline conditions in order to detect change. This requires a focus on both research and monitoring, particularly of high-risk or vulnerable assets or species in order to assess and respond to tipping points. This includes monitoring key ecological attributes such as populations of threatened fauna and

keystone species, brown macroalgae extent and quality, vegetation structure in Coastal Grassy Woodland, and climatic variables such as sea surface temperature. Sufficient capacity to monitor long term trends and changes to key ecological attributes will be required. Additionally, staff should be capable of recognising changes in indicators, species or processes that suggest an ecosystem may be experiencing upheaval.

Climate and fire refugia

In a statewide context, Wilsons Promontory National Park and Marine National Park is considered a climate refuge, which is the basis for many of the Sanctuary plans, including the Wildlife Restoration Plan. However, within the landscape, some areas will be more vulnerable to climate change than others. Identifying climate refugia in both marine and terrestrial conservation assets will be essential to protect these ecosystems under changing climate. Climate refugia are areas that buffer species from environmental changes such as increasing temperatures and reduced precipitation. This may describe pockets or islands that retain their abiotic characteristics despite change in the surrounding environment, or that change more slowly. Refugia are a crucial element of ecosystem resilience as they allow species to persist, migrate or adapt to changes in the environment or disturbance regimes (Meddens et al. 2018).

Fire refugia are areas that remain unburnt following fire or have been minimally affected by fire and retain much or all of their pre-fire characteristics (Meddens et al. 2018). Fire refugia can occur due to both natural factors (topography, moisture level, natural fuel level) or human-mediated factors (firebreaks, roads, human-determined fuel level). However, fire refugia can also occur due to unpredictable shifts in weather or fire behaviour during a fire event and are thus not restricted to gullies and valley bottoms.

Refugia provide shelter for species during fire, are a source of food and shelter following fire, and support population reestablishment in the long-term as the surrounding vegetation recovers. Increases in warming and drying in terrestrial systems will disproportionately affect temperature- or moisture-dependent species such as reptiles and amphibians, as their physiological niche shrinks or migrates. Wet forest communities may be the most likely candidates for climate refugia but are also the most vulnerable to fire as they contain fire-sensitive species and are less likely to recover quickly following fire. It is important to identify and protect climate refugia from future fire events, which will mean that they are also fire refugia.

Marine climate refugia are underwater areas that may be protected from changes to ocean currents and temperature based on geographic variation and local conditions. Marine refugia may protect vulnerable species such as kelp from dieback and should be a focus for targeted management of other threats such as invasive species, overabundant sea urchins and human disturbances.

Identifying, modelling and mapping habitat patches with appropriate bioclimatic characteristics and sustained monitoring of these areas will be important for their long-term persistence in both marine and terrestrial assets. Planning should be undertaken to identify current and potential refugia that can be identified based on topography, presence of firebreaks, aspect and previous fire history.

Preparing for the worst

By taking a proactive approach to potential climate futures, ecosystems and species can be prepared for extreme or ‘worst-case’ scenarios. Parks Victoria should investigate opportunities to address sea level rise on coastal ecosystems, such as mapping potential habitat for species that are expected to experience habitat contraction. Seed can be collected from threatened or vulnerable communities such as Coastal Grassy Woodland, Heathland and Wet Forest and Rainforest to create a seed bank that can be used to restore areas of habitat that are lost to fire, dieback or other threats compounded by climate change.

Despite our ability to predict climate change impacts and take into account the variation in climate futures, climate events often occur suddenly and unexpectedly and require additional management resources, which typically results in an uncoordinated response. To address this, the development of a climate emergency response protocol could direct a prepared response to fire, flood, extreme drying, storms or other climate events. An additional climate vulnerability assessment tool could identify the relative importance of endangered species in the landscape in a statewide context,

allowing land managers to prioritise emergency response to species with potentially low local but high statewide value. Staff working with incident and emergency response teams could include dedicated conservation and cultural heritage officers with a range of relevant training, such as fire and handling injured wildlife. Resources should be made available to create insurance populations of species that are highly vulnerable or contain high genetic value.

Response to climate events may include artificial structures to support coastal species impacted by sea level rise, creating or moving sand banks to manage wetlands that are blown out following extreme rainfall events, replanting depleted seagrass or Heathland, Coastal Grassy Woodland and Wet Forest and Rainforest species, and triaging or extracting rare or endangered species under threat of extreme loss.

Climate change scenario planning takes the uncertainty of the future into account and allows land managers to consider a variety of actions that may be more necessary under one climate future than another. Table 6.10 describes suggestions for managing conservation assets using the RAD framework under a 'worst case' scenario.

Table 6.10 *Suggested management actions for the conservation assets of the Wilsons Promontory Parks Landscape under a climate change scenario of extreme warming and drying by 2050.*

RAD approach	Conservation Asset*	Suggested action
Resist	Wet Forest and Rainforest	Maintain growth stage distribution of unburnt areas Genetic rescue to support populations with fire and heat tolerant strains Assisted migration of vegetation to new areas Seed banking rare and threatened flora Aerial reseeding of Mountain Ash
	Heathland	Seed banking for insurance populations Protect small area of vegetation of any age
	Coastal Grassy Woodland	Seed banking for insurance populations
	Riparian and Wetland	Support sand banks in extreme rainfall events Captive breeding or relocation of frogs, freshwater fish and invertebrate species
	Mixed Dry Forest and Woodland	Prioritise protection of high value areas
	Coastal (including islands)	Create artificial structures for seal haul outs and seabirds
	Seagrass	Replant depleted areas
Accept	Wet Forest and Rainforest	Remove koalas from impacted habitat Monitor changes to bird community composition
	Heathland	Remove rare or threatened species from impacted areas
	Coastal Grassy Woodland	Monitor changes to vegetation composition, relative proportion or species richness Change benchmarks of condition
	Riparian and Wetland	Monitor change to asset with significant peat fires
	Mixed Dry Forest and Rainforest	Monitor changes to bird community composition
	Unvegetated Soft Sediment	Monitor retreat or loss of habitat with sea level rise
Direct	Wet Forest and Rainforest	Replant with hardier species in burnt areas
	Mixed Dry Forest	Herb forest shift to heathy fire-adapted understorey

* For the specific KEA Goals associated with this strategy, see the Condition table in the relevant Conservation Asset description

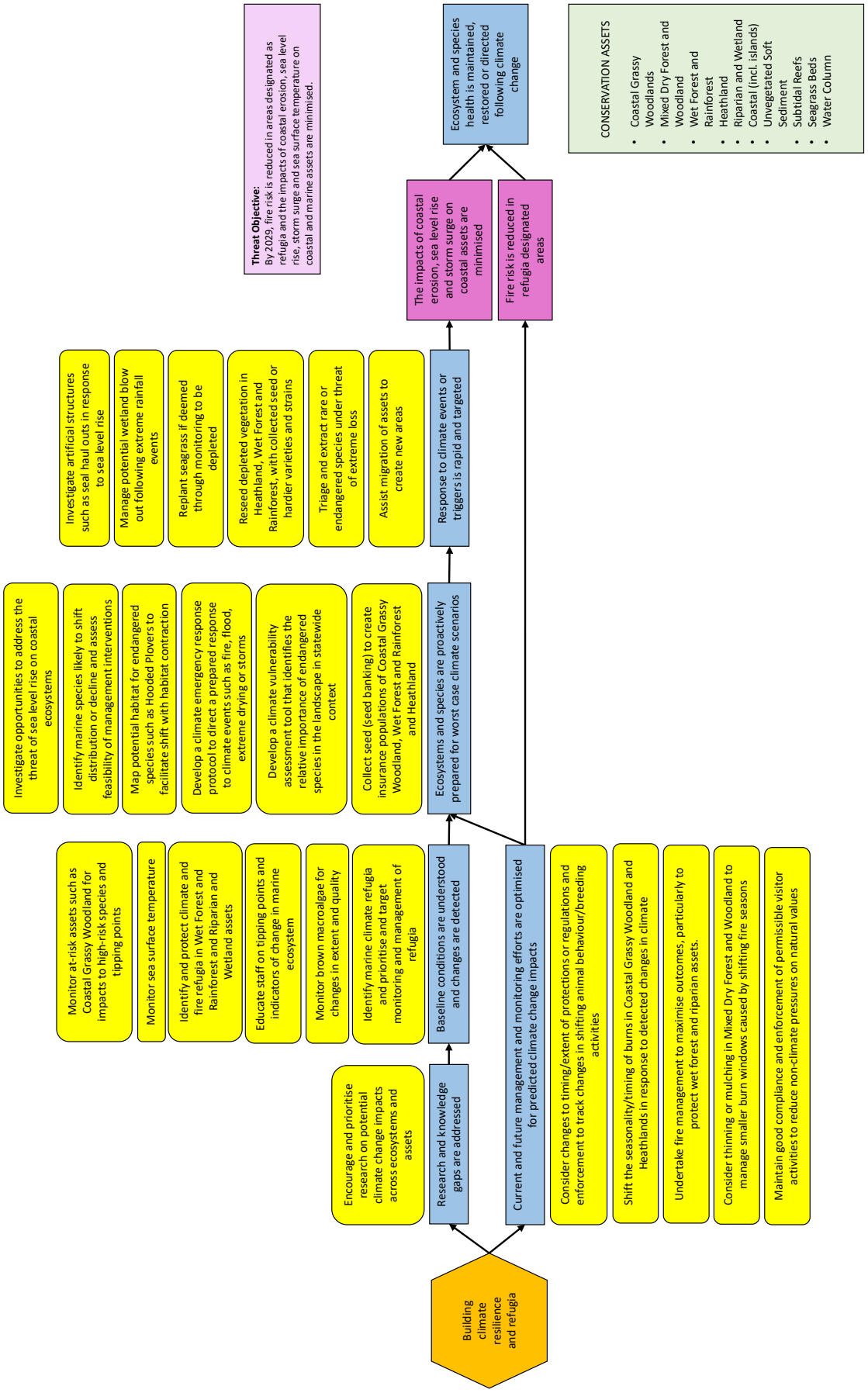
Conservation outcome

This strategy guides the proactive planning required for projected climate change, increasing the resilience of conservation assets, and protecting species, communities and ecosystem function.

Strategy summary

Optimising current management, identifying knowledge gaps, modelling and protecting refugia, and proactively preparing for extreme climate scenarios will maintain, restore or direct ecosystems and species.

Results chain



Implementation milestones

Result	Action
Research and knowledge gaps are addressed	• Encourage and prioritise research on potential climate change impacts across ecosystems and assets
Baseline conditions are understood, and changes are detected	• Monitor at-risk assets such as Coastal Grassy Woodland for impacts to high-risk species and tipping points • Monitor sea surface temperature • Identify and protect climate and fire refugia in Wet Forest and Rainforest and Riparian and Wetland assets • Educate staff on tipping points and indicators of change in marine ecosystems • Monitor brown macroalgae for changes in extent and quality • Identify marine climate refugia and prioritise and target monitoring and management of refugia
Current and future management and monitoring efforts are optimised for predicted climate change impacts	• Consider changes to timing/extent of protections or regulations and enforcement to track changes in shifting behaviour/breeding/flowering activities • Shift the seasonality/timing of burns in Coastal Grassy Woodland and Heathland in response to detected changes in climate • Ensure that planned burns are tailored to conditions • Undertake fire management to maximise outcomes, particularly to protect wet forest and riparian assets • Consider thinning or mulching in Mixed Dry Forest and Woodland to manage smaller burn windows caused by shifting fire seasons • Maintain good compliance and enforcement of permissible visitor activities to reduce non-climate pressures on natural values

Ecosystems and species are proactively prepared for worst case climate scenarios	• Investigate opportunities to address the threat of sea level rise on coastal ecosystems
	• Identify marine species likely to shift distribution or decline and assess feasibility of management interventions
	• Map potential habitat for endangered species such as hooded Plovers to facilitate shift with habitat contraction
	• Develop a climate vulnerability assessment tool that identifies the relative importance of endangered species in the landscape in a statewide context
	• Develop a climate emergency response protocol to direct a prepared response to climate events such as fire, flood, extreme drying or storms
	  • Provide training for fire situations and handling injured wildlife
	  • Resource response equipment such as wildlife cages
	  • Coordinate response with incident and emergency response teams
	  • Collaborate with partners to develop insurance populations of threatened or highly impacted species

Result	Action
	• Identify trigger species and impacts to extract endangered species for insurance populations • Investigate genetic rescue for fire and heat tolerance in Wet Forest and Rainforest species • Collect seed (seed banking) to create insurance populations of Coastal Grassy Woodland, Wet Forest and Rainforest and Heathland species
Response to climate events or triggers is rapid and targeted	• Investigate artificial structures such as seal haul outs in response to sea level rise • Manage potential wetland blow out following extreme rainfall events • Replant seagrass if deemed through monitoring to be depleted • Reseed depleted vegetation in Heathland and Wet Forest and Rainforest with collected seed or hardier varieties and strains • Consider aerial reseeding obligate seeder species such as Mountain Ash • Assist migration of assets to create new areas
The impacts of coastal erosion, sea level rise and storm surge on coastal assets are minimised	
Fire risk is reduced in refugia designated areas	
Ecosystem and species health is maintained, restored or directed following climate change	

7 Measuring performance

Monitoring, evaluation and reporting allows Parks Victoria to quantify the effectiveness of implementing the prioritised conservation strategies and supports continuous improvement through value-based and evidence-informed decision-making.

Measuring performance in conservation action planning involves the assessment of the effects of management actions in relation to the desired state of key ecological attributes and conservation assets. In developing an effective Conservation Action Plan, agreeing on what will be measured and how measurement will be made before works are implemented is a critical step. Performance measures enable an integrated assessment of:

- the quantity and quality of management actions (activity measures)
- the impacts of an activity on threats (threat measures)
- the results of management on the conservation asset (outcome measures).

The analysis and interpretation of performance data is the cornerstone of applying a 'learning by doing' approach. The evaluation of the Conservation Action Plan is an important step in documenting lessons learnt and communicating ideas around the improvement of policy, planning and management within Parks Victoria and to external audiences through appropriate reporting.

7.1 Interim performance measures

The following performance measures, developed in collaboration with experts in this field, provide a useful starting point for developing a Monitoring, Evaluation and Learning Plan for the Wilsons Promontory Parks Landscape (see Table 7.1). This can be used to guide interim assessments of performance until a detailed plan is established.

Table 7.1 *Performance measures for each strategy developed for the Wilsons Promontory Parks Landscape.*

Activity measures	Threat measures	Outcome measures
FIRE		
STRATEGY: 6.1 Landscape-scale ecological burn strategy **THREAT ADDRESSED: 5.1 Inappropriate fire regimes**		
• Mapping of proportions of conservation assets below minimum TFI • Timeliness of bushfire recovery and rehabilitation programs • Number of fire ecology monitoring plots established and monitored • Documentation of answers to research questions (FMS)	• Extent and timing of all planned burning and bushfires • Percentage of the Parks Landscape burnt below the minimum tolerable fire intervals • Number and extent of fires in priority areas (release sites, nesting areas, threatened species habitat)	• Age-class structure of canopy species • Spatial and temporal vegetation growth stage structure • Flora species composition • Change in cover/extent of Coast Tea-tree • Extent of old growth/vulnerable EVCs

Activity measures	Threat measures	Outcome measures
WEEDS		
STRATEGY: 6.2 Integrated weed and pathogen control program **THREAT ADDRESSED: 5.2 Weed and pathogen invasion**		
• Treatment of new and emerging weeds/pathogens (species, area treated, person-days) • Surveillance effort for new and emerging weeds/pathogens (species, area treated, person-days) • Percentage of high priority locations with control activities undertaken • Area of priority weeds treated (species, area treated, person-days) • Mapping of Coast Tea-tree	• Weed cover (TMS) • Number of new pest plant or pathogen incursions • Presence and number of different pest plant species • Proportion of pest plant cover relative to native plants • Severity of Coast Tea-tree invasion	• Vegetation structure and composition at priority locations • Floristic diversity • Life form cover proportion • Abundance/diversity of native vegetation species affected by pest plants/pathogens (or in affected areas) • Extent and cover of native vegetation
HERBIVORES		
STRATEGY: 6.3 Herbivore management **THREAT ADDRESSED: 5.3 Total grazing and browsing pressure**		
• Extent, frequency and method of control (number and species removed) • Effectiveness of control (units of effort per target species) • Extent of monitoring in high value areas • Number of herbivore monitoring plots established and monitored	• Herbivore density • Regularity of review of target herbivore densities • Density of rabbits (individuals/ha) in nominated areas of Coastal Grassy Woodland, Coastal scrubs and grassland (TMS)	• Improved structure and composition of native vegetation communities • Intactness of vegetation • Seedling recruitment
PREDATION		
STRATEGY: 6.4 Sustained control of introduced predators **THREAT ADDRESSED: 5.4 Predation by cats and foxes**		
• Extent, frequency and method of fox control in identified high-risk areas • Extent, frequency and method of cat control in identified high-risk areas • Effectiveness of control (units of effort per target species) • Frequency and area of monitoring	• Population size of foxes (TMS) • Population size of cats (TMS) • Fox activity in identified high-risk areas • Cat activity in identified high-risk areas	• Extent of occupancy of predation-sensitive species • Species richness of predation-sensitive species • Breeding success of Hooded Plovers and other beach-nesting birds
MARINE		
STRATEGY: 6.5 Managing marine pests and overabundant species **THREAT ADDRESSED: 5.5 Marine invasive or overabundant species**		
• Number of person days of surveillance for pests and overabundant species • Number of partners engaged in marine hygiene practices • Area of established marine pest populations being actively managed • Hectares of marine parks surveyed for marine pests	• Change in extent/density of marine pest infestations (hectares, species) • Number of new pest species/ infestations established • Number of new infestations removed	• Cover of habitat forming species in reef ecosystems and seagrass beds • Abundance and species richness of key gastropods and other macroinvertebrate groups

Activity measures	Threat measures	Outcome measures
RESTORATION		
STRATEGY: 6.6 Restoration of Coastal Grassy Woodland, Heathland and Wet Forests **THREAT ADDRESSED: All terrestrial threats**		
• Mapping and condition assessments • Documentation of answers to research questions	• Cover/extent/density of Coast Tea-tree • Average flowering rate of Coast Tea-tree • Area of burnt senescing Coast Tea-tree • Cover/extent/density of Coast Wattle • Cover/extent/density of White Kunzea • Proportion of bare ground • Extent of Phytophthora dieback	• Rate of recovery of key flora species • Presence/absence of key flora species • Growth stage of key flora species • Diversity of key ground layer functional floristic groups • Presence and reproductive stage of key obligate seeder species • Abundance/density/diversity of regenerating eucalypt seedlings
VISITORS		
STRATEGY: 6.7 Reducing the threat of human disturbance **THREAT ADDRESSED: 5.6 Human disturbance (visitor impacts and natural resource use)**		
• Number of compliance operations • Number of collaborations with user groups and partner agencies • Number of new communications around illegal activities and natural values • Monitoring effort in high value areas • Number of warnings/infringements issued per patrol effort	• Reports of recreational damage on significant conservation values • Incidence of illegal activities • Poaching incidence • Incidence and extent of oil spills • Wildlife injuries from boats/human activities • Amount of litter/debris in target areas	• Fledging success at key Hooded Plover breeding sites • Stable populations of species subject to legal extraction • Abundance/size of target poaching species • Breeding success of seals and penguins
REINTRODUCTION		
STRATEGY: 6.8 Augmentation, reintroduction and introduction of key native species **THREAT ADDRESSED: 5.4 Predation by foxes and cats, 5.7 Climate change**		
• Documentation of ecological requirements of target species • Area of suitable habitat for release • Number of species with population estimates • Number of Translocation Proposals submitted • Number of augmentation/release programs • Number of partnerships established • Number of target species trapped • Frequency and area of monitoring	• Fox abundance in suitable target species habitat • Cat abundance in suitable target species habitat • Mortality rate of released animals	• Target species population density and abundance • Extent of suitable habitat • Site occupancy • Recruitment of released animals

Activity measures	Threat measures	Outcome measures
PARTNERSHIPS		
STRATEGY: 6.9 Collaborative partnerships to address key knowledge gaps		
THREAT ADDRESSED: All threats		
• Number of partnerships established • Number of onground activities carried out with partner groups • Number of research projects supported/carried out • Development of Research Strategy • Number of research questions addressed	• Total effort to manage each threat • Total cost to manage a unit of threat	• Strength of partnership with Traditional Owners and other groups • Research database development • Health of conservation assets
CLIMATE		
STRATEGY: 6.10 Building climate resilience and refugia		
THREAT ADDRESSED: 5.7 Climate change		
• Sites most vulnerable to sea level rise identified • Sites most vulnerable to future fire identified • Area assigned as fire or climate refugia • Documentation of answers to research questions • Mapping potential habitat for species with contracting habitat • Development of climate vulnerability assessment tool	• Extent of sea level rise • Average air temperature • Average sea surface temperature • Timing, length, duration of heatwaves • Frequency and intensity of extreme weather events • Ocean acidity • Change in ocean currents • Presence of algal blooms	• Boundaries of ecosystems/ habitats expected to move or contract • Quality of habitat • Abundance and diversity of key species • Time since fire in terrestrial refugia • Extent of refugia • Number of vulnerable species protected from climate events

7.2 Monitoring, evaluation and learning plan

A Monitoring, Evaluation and Learning (MEL) Plan will be developed from the interim performance indicators in this Conservation Action Plan, and will include key evaluation questions, more specific monitoring questions, and appropriate metrics and measures. Specifically, the MEL Plan is essential for:

- determining whether the combined activities of the conservation strategies have been adequately implemented and whether they are resulting in achieving the desired conservation outcomes
- monitoring and demonstrating trends in the level of threat and the consequent condition of conservation assets
- evaluating the effectiveness and efficiency of resources invested in the Conservation Action Plan
- supporting the review and adaptation of conservation strategies.

Fundamentally, the MEL process aims to determine what was done, how well it was done, and if it had any effect on desired Key Ecological Attribute (KEA) goals and outcomes. This approach would also identify knowledge gaps, poor or inappropriate indicators, and gaps in the effectiveness of planning and implementation (Figure 7.1).

	Conservation Action Plan		
	Actions	**Threats**	**Assets**
	Were the actions carried out?	*Have our actions influenced the threat?*	*Have our asset goals been achieved?*
Progress	What progress has been made on actions?	What progress has been made on threat objectives?	What progress has been made on conservation outcomes?
Effectiveness	How effectively were actions delivered?	How effectively was threat monitoring delivered?	How effectively was asset monitoring delivered?
Adequacy	Were the actions sufficient to effect change?	Was monitoring sufficient to observe change? Were the indicators and targets appropriate?	Was monitoring sufficient to observe change? Were the indicators and targets appropriate?
Synthesis	To what extent have the actions implemented causally contributed to observed achievements? Are there areas of uncertainty that require investigation?		

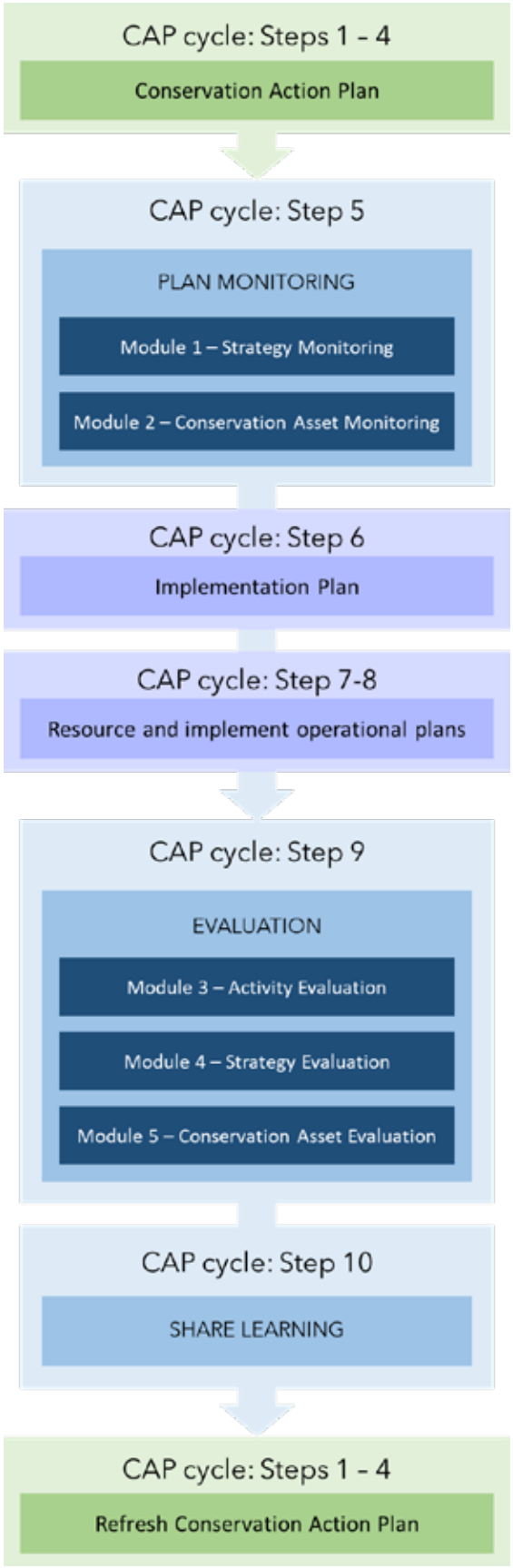
Figure 7.1 *The logic framework for evaluating the effectiveness of CAP actions and their impacts.*

The MEL process is organised according to the steps in the Conservation Action Planning cycle (Figure 1.2). The MEL process is structured in five modules, and each step and the modules it contains are summarised in Figure 7.2 below. A product of Step 5 in the CAP cycle is the MEL Plan, a module-based tabular data tool that will be used to:

- describe the evaluation and monitoring questions, and identify the appropriate indicators based on the results chain Actions and Milestones, Threat Objectives, Key Ecological Attributes and Conservation Outcomes.
- collate the information from different data sources required to answer the questions posed.

At Step 6, monitoring projects are detailed to the extent that responsibilities and the resources required can be identified and costed in the CAP Implementation Plan (Section 8). More detailed monitoring design and operational planning will be required to implement on ground monitoring actions (Steps 7 & 8).

The output of the Evaluation (Step 9), is the analysis and interpretation of data, summarised in a report that describes the findings of the MEL process, makes recommendations for improvement and addressing knowledge gaps, and enables the revision or refreshing of the CAP (Step 10).



Step 4

During the development of the CAP, interim performance measures are identified for key strategy results.

Step 5

The MER Plan links the interim performance measures into a full monitoring approach through two modules:

Module 1 - a monitoring table, set up to answer the broader questions *Were the actions delivered?* and *Has the threat been mitigated?* Describes indicators, monitoring questions, planned data sources and other information necessary to monitor progress against each Conservation Strategy.

Module 2 - a monitoring table, set up to answer the broader question *Have asset goals been achieved?* for each Conservation Asset. Describes indicators, planned data sources and other information necessary to monitor the progress towards Key Ecological Attribute goals.

Steps 6, 7 & 8

Indicators identified in Modules 1 and 2 are used to develop monitoring plans or programs to be carried out through the next five years through the Implementation Plan.

Elements of the Implementation Plan should include action responsibility, frequency, location, method and the resources required, among others.

Step 9

Both the CAP and its implementation are evaluated through three modules.

Module 3 - Evaluates the extent of the activity carried out and how well it was done, gaps in implementation, and how to address them.

Module 4 - Evaluates the achievement of threat targets, the adequacy of scale, frequency and scope of threat monitoring, and addresses gaps.

Module 5 - Evaluates the achievement of Key Ecological Attribute goals, the adequacy of scale, frequency and scope of asset monitoring, and addresses gaps in research and monitoring.

Step 10

A summary of findings and recommendations for improvement should be presented in a CAP Evaluation Report, including extent of progress made towards achieving Conservation Outcomes and Threat Objectives, and what external factors, barriers and gaps were responsible for any lack of progress.

Figure 7.2 *The process steps and modules for Monitoring, Evaluation and Learning for conservation action planning.*

8 Plan implementation

The 10-step conservation action planning process (Figure 1.2) describes the last five steps of the planning cycle as *Step 6 – Develop implementation plan*, *Step 7 – Resource allocation and project management, Step 8 – Implement operational plans*, *Step 9 – Evaluate results and adapt plan*, and *Step 10 – Share learning*. Considerations associated with implementation steps (Step 6, 7 and 8) are described in the following sections, which deal with scoping the resources required (8.1), cultural heritage, and Traditional Owner partnerships (8.2), operational planning, delivery, and adaptation (8.3).

8.1 Implementation planning

This Conservation Action Plan specifies the strategies and actions required to achieve the goals described for each asset and lists the priority parks and reserves for on ground threat mitigation or restoration treatments. Some prioritisation of on ground actions has already occurred through the Strategic Management Prospects tool (DELWP 2019). Some actions are already being implemented with recurrent resources or tied (grant) funding, however, to achieve the Conservation Action Plan's goals, and measure performance, many actions will require additional resourcing.

An Implementation Plan will be developed for this Conservation Action Plan, that includes an assessment of the following, over a period of five years:

- the mapped area and estimated cost of treatment of on ground threat mitigation or restoration treatments at the required frequency, including project management costs
- the extent that the planned actions will contribute to Biodiversity 2037 area treatment targets
- the labour and associated costs required for foundational actions such as planning, engagement and research that are specified in the results chain, and that are required to support the achievement of threat mitigation and asset goals
- the scale and scope of monitoring and associated costs required to be able to evaluate the conservation strategies and their impact on conservation assets
- the allocation of organisational responsibilities to implement the planned actions
- the extent to which actions are already resourced; and the additional resourcing required
- any refinement of priority based on assessments of impact, feasibility and cost.

The Implementation Plan will be a tabular document, and will be used to track implementation of actions, and provides a basis for seeking additional resources through the development of instruments such as grant applications, investment prospectus or business case. The Implementation Plan will be developed using a template established by Conservation, Science and Fire Directorate, but implementation planning will be led by regional staff, and should be undertaken with Traditional Owners to discuss cultural needs and traditional ecological knowledge and priorities.

8.2 Traditional Owner and cultural heritage considerations

Parks Victoria has organisational commitments and legal obligations to ensure that land management activities are both culturally appropriate and support the capacity and role of Traditional Owners to manage Country. Parks Victoria must work within existing legal frameworks and agreements relevant to each Traditional Owner group and parks landscape. Practically, this means partnering with Traditional Owners to implement conservation strategies in a way that is consistent with their recognised rights and interests under the *Native Title Act 1993* (C'wth), *Traditional Owner Settlement Act 2010* (Vic) and/or *Aboriginal Heritage Act 2006* (Vic).

Parks Victoria conducts or authorises many land management activities that have the potential to harm Aboriginal cultural heritage. Harming Aboriginal heritage without an appropriate authorisation is illegal, and compliance with the provisions of the *Aboriginal Heritage Act 2006* (Vic) is mandated across all activities on land and waters managed by Parks Victoria. Procedures to assist in complying with the Act are available to the organisation (*PRO-819 Compliance with the Aboriginal Heritage Act*).

In accordance with these procedures, it is essential that activities to implement Conservation Strategies are assessed by Parks Victoria Aboriginal heritage specialists prior to commencement of works, as the assessment process will ensure adequate management and protection measures are in place to mitigate the risk of harm to Aboriginal cultural heritage. Depending on the nature of the works and characteristics of the site, the assessment may be undertaken as a desktop analysis or may require a site visit. Where the activity is considered likely to harm Aboriginal heritage, a recommendation may be made to modify the proposed activity or change the location of proposed works. Where adapting the activity is not possible, cultural heritage statutory authorisations, such as a Cultural Heritage Permit or Cultural Heritage Management Plan, will be required. By initiating the assessment early in the planning stages, the risk of time delays will be minimised and resourcing requirements for complying with the *Aboriginal Heritage Act 2006* can be identified and appropriately incorporated into project budgets.

Implementation of this Conservation Action Plan through on-ground land management can provide opportunities for Traditional Owner involvement and further sharing of contemporary and traditional land management learnings. Where possible, planning for the implementation of conservation strategies should consider the incorporation of traditional land management techniques by Traditional Owners. This commitment should also promote the cultivation and adaptation of Traditional Owner land management methods to achieve joint environmental and cultural outcomes, thereby addressing the component objectives for Traditional Owner Cultural Landscapes Management (FVTOC 2021).

Implementation should also explore opportunities and partnerships to involve Traditional Owners and should consider the nature of individual Traditional Owner agreements in each parks landscape. Procurement of goods and services related to implementing Conservation Strategies must be consistent with Parks Victoria guidelines for Traditional Owner procurement, which include a first right of refusal for all contracts within a Recognition and Settlement Agreement area, which, while not currently in place for this landscape, may be in the future. Actively identifying opportunities to incorporate cultural and management services in park management activities, and ensuring the right Traditional Owners are involved, can facilitate effective partnerships which are mutually beneficial and empowering.

8.3 Implementation steps for priority strategies and actions

Step 7: Resource allocation and project management

Following on from the development of the Implementation Plan (8.1), resources for prioritised actions identified in the Implementation Plan need to be sought. Throughout the lifetime of the Conservation Action Plan, priorities that have been identified, including actions, parks, species, communities or ecosystem processes, can be continually referenced in funding applications by Parks Victoria and other partners and stakeholders.

Once resources have been secured, detailed project planning for those actions will be carried out at an operational level within the Parks Victoria region or directorate that has responsibility for the relevant actions in the Parks Landscape. This will include onground threat mitigation actions, monitoring actions, or foundational actions such as community engagement, research or policy change.

Detailed project planning will include consideration of logistic issues including access, potential impact on cultural heritage or natural values and operational safety and may result in a refinement of resource requirements. Detailed project planning and procurement will be undertaken using standard procedures. At all stages of planning and implementation, Traditional Owners should be involved to ensure that their priorities, goals and outcomes have been consistently included where required.

Step 8: Implement operational plans

The Conservation Action Plan will be implemented by a regional team, often in collaboration with partners, other agencies, research institutions, Friends groups and volunteers. Operational conservation activities will be implemented in accordance with relevant Parks Victoria policies and procedures and legislative obligations.

Step 9: Evaluate results and adapt plan

In the context of adaptive management, the evaluation of the Conservation Action Plan is important in determining and communicating whether or not the conservation strategies and specific on-ground activities have abated threats and achieved the desired conservation outcomes. The Conservation Action Plan is not a static document. It will be revised in response to the outcomes of the Monitoring, Evaluation and Learning Plan (Section 7.2) and in response to emerging issues. Revision of this Conservation Action Plan may lead to a restructure of conservation strategies, including the amendment of results chains and their underlying assumptions and a refinement of specific on-ground activities. Changes to Traditional Owner priorities, plans and joint management agreements will be reflected in revised versions of conservation strategies or other elements of the Conservation Action Plan.

Step 10: Share learning

Following evaluation of the Conservation Action Plan, a summary report will be prepared outlining the extent of progress made towards achieving Conservation Outcomes and Threat Objectives and what external factors, barriers and gaps were responsible for any lack of progress, given the implemented management activities and funding available. The report will also describe any recommendations for improvement that should be noted for the revision of the plan.

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Appendices

Appendix A — Parks and reserves and their protection status

The Protected Areas Category System

The protected area management categories of the International Union for Conservation of Nature and Natural Resources (IUCN) classify protected areas according to their management objectives. The categories are recognised by international bodies such as the United Nations and by many national governments as the global standard for defining and recording protected areas, and as such are increasingly being incorporated into government legislation. For further information, see the IUCN website: http://www.iucn.org/theme/protected-areas/about/categories

Category Ia Strict Nature Reserve — strictly protected area set aside to protect biodiversity and also possibly geological/geomorphological features, where human visitation, use and impacts are strictly controlled and limited.

Category Ib Wilderness Area — usually large unmodified or slightly modified area, retaining its natural character and influence without permanent or significant human habitation.

Category II National Park — large natural or near natural area set aside to protect large-scale ecological processes, along with the complement of species and ecosystems characteristic of the area.

Category III Natural Monument or Feature — set aside to protect a specific natural monument, which can be a landform, sea mount, submarine cavern, geological feature such as a cave or even a living feature such as an ancient grove.

Category IV Habitat/Species Management Area — aims to protect particular species or habitats and management reflects this priority.

Category V Protected Landscape/ Seascape — protected area where the interaction of people and nature over time has produced an area of distinct character with significant, ecological, biological, cultural and scenic value.

Category VI Protected area with sustainable use of natural resources — conserves ecosystems and habitats together with associated cultural values and traditional natural resource management systems.

Table A.1: List of parks and reserves in the Wilsons Promontory Parks Landscape

Park/reserve name	Reserve type	IUCN categ.	Area (hectares)
Wilsons Promontory National Park	National Park - Schedule 2, National Parks Act	II	48 244
Seal Island Wildlife Reserve	Nature Conservation Reserve – Crown Land (Reserves) Act	Ia	36
Wilsons Promontory Marine National Park	National Park - Schedule 2, National Parks Act	II	15 604
Wilsons Promontory Marine Park	Park or reserve - Schedule 4, National Parks Act	VI	5 566
Wilsons Promontory Marine Reserve	Park or reserve - Schedule 4, National Parks Act	VI	627

Appendix B — Scientific names and conservation status of species

Common name	Scientific name	Conservation status[2]		Threat: Risk rating	
		EPBC	FFG	Type	Risk rating
Ancient Greenling damselfly	*Hemiphlebia mirabilis*		Endangered		
Asian Shore Crab	*Hemigrapsus sanguineus*			Introduced	
Asparagus Fern	*Asparagus scandens*			Weed	Very High Risk
Austral Bracken	*Pteridium esculentum*				
Australasian Gannet	*Morus serrator*				
Australian Fur Seal	*Arctocephalus pusillus*				
Banana Passion-fruit	*Passiflora tarminiana*			Weed	Very High Risk
Banded Stingaree	*Urolophus cruciatus*				
Bass guinea-flower	*Hibbertia hirticalyx*		Endangered		
Bassian Pomaderris	*Pomaderris oraria*				
Bastard Trumpeter	*Latridopsis forsteri*				
Black Rat	*Rattus rattus*			Introduced	
Blackberry	*Rubus fruticosus spp. agg.*			Weed	High Risk
Black-browed Albatross	*Thalassarche melanophris*	Vulnerable			
Black-spined Urchin	*Centrostephanus rodgersii*			Native - local threat	
Blady Grass	*Imperata arundinacea*				
Blue Morwong	*Nemadactylus douglasii*				
Blue Periwinkle	*Vinca major*			Weed	High Risk
Bluebell Creeper	*Billardiera fusiformis*			Weed	Very High Risk
Blue-throated Wrasse	*Notolabrus tetricus*				
Bog Gum/Gippsland Mallee	*Eucalyptus kitsoniana*		Critically endangered		
Bottlenose Dolphin	*Tursiops truncatus*				
Briar Rose	*Rosa rubiginosa*			Weed	High Risk
Brickmaker's Sedge	*Gahnia grandis*		Endangered		
Broad-leaf Prickly Moses	*Acacia verticillata subsp. Ruscifolia*		Endangered		
Broadnose Sevengill Shark	*Notorynchus cepedianus*				
Broad-toothed Rat	*Mastacomys fuscus*	Endangered	Vulnerable		
Brown macroalgae	*Cystophora grevillei*				
Brown macroalgae	*Seirococcus axillaris*				
Brown macroalgae	*Cystophora spp.*				
Brown macroalgae	*Sargassum spp.*				
Brown Rat	*Rattus norvegicus*			Introduced	
Brown Stringybark	*Eucalyptus baxteri s.l.*				
Brush-tailed Rock-wallaby	*Petrogale penicillata*	Vulnerable	Critically endangered		
Bull Kelp	*Durvillaea potatorum*				
Bushy Peppercress	*Lepidium desvauxii*		Endangered		
Cabbage Fan-palm	*Livistona australia*		Critically endangered		

[2] EPBC = National status under the *Environment Protection and Biodiversity Conservation Act 1990*
FFG = Victorian status under the *Flora and Fauna Guarantee Act 1998*

Cape Barren Goose	*Cereopsis novaehollandiae*				
Cape Ivy	*Delairea odorata*			Weed	Very High Risk
Cape Wattle	*Paraserianthes lophantha subsp. lophantha*			Weed	High Risk
Cat	*Felis catus*			Introduced	
Chytrid fungus	*Batrachochytrium dendrobatidis*			Disease	
Climbing Lignum	*Muehlenbeckia adpressa*				
Coast Ballart	*Exocarpos syrticola*		Endangered		
Coast Banksia	*Banksia integrifolia*				
Coast Beard Heath	*Leucopogon parviflorus*				
Coast Bitter-bush	*Adriana quadripartita*		Endangered		
Coast Daisy Bush	*Olearia axillaris*				
Coast Lily	*Bulbine crassa*		Endangered		
Coast Manna Gum	*Eucalyptus viminalis ssp. pryoriana*				
Coast Needlewood	*Hakea decurrens subsp. platytaenia*		Endangered		
Coast Tea-tree	*Leptospermum laevigatum*			Native - local threat	Very High Risk
Coast Wattle	*Acacia longifolia subsp. sophorae*			Native - local threat	
Coast Wirilda	*Acacia uncifolia*		Endangered		
Common Brushtail Possum	*Trichosurus vulpecula*				
Common Diving-petrel	*Pelecanoides urinatrix*				
Common Ringtail Possum	*Pseudocheirus peregrinus*				
Common Wombat	*Vombatus ursinus*				
Crayweed	*Phyllospora comosa*				
Creeping Rush	*Juncus revolutus*		Endangered		
Crested Tern	*Thalasseus bergii*				
Crimson Berry	*Leptecophylla oxycedrus*		Critically endangered		
Crisped Mitre-moss	*Distichophyllum crispulum*		Endangered		
Currant-wood	*Monotoca glauca*		Endangered		
Dandenong Freshwater Amphipod	*Austrogammarus australis*		Critically endangered		
Dark-stem Eelgrass	*Zostera nigricaulis*				
Dingo	*Canis lupus dingo*		Vulnerable		
Dolichos Pea	*Dipogon lignosus*			Weed	Very High Risk
Drooping Sheoak	*Allocasuarina verticillata*				
Dune Fan-flower	*Scaevola calendulacea*		Endangered		
Dune Poa	*Poa poiformis var. ramifer*		Endangered		
Dwarf Galaxias	*Galaxiella pusilla*	Vulnerable	Endangered		
Dwarf Sheoak	*Allocasuarina pusilla*				
Eastern Bettong	*Bettongia gaimardi*	Endangered (extinct in VIC)	Endangered (extinct in VIC)		
Eastern Bristlebird	*Dasyornis brachypterus*	Endangered	Critically endangered		
Eastern Curlew	*Numenius madagascariensis*	Critically endangered	Critically endangered		
Eastern Great Egret	*Ardea modesta*		Vulnerable		
Eastern Grey Kangaroo	*Macropus giganteus*				

Eastern Ground Parrot	*Pezoporus wallicus wallicus*		Endangered	
Eastern Pygmy Possum	*Cercartetus nanus*			
Eastern Quoll	*Dasyurus viverrinus*	Endangered	Endangered (extinct in VIC)	
Eastern Spider Orchid	*Caladenia orientalis*	Endangered	Endangered	
Emu	*Dromaius novaehollandiae*			
European Rabbit	*Oryctolagus cuniculus*			Introduced
European Shore Crab	*Carcinus maenas*			Introduced
Fairy Prion	*Pachyptila turtur*	Vulnerable		
Forest Hook-sedge	*Carex umbricola*		Critically endangered	
Fox	*Vulpes vulpes*			Introduced
Fringed Helmet-orchid	*Corybas fimbriatus*		Endangered	
Glossy Grass Skink	*Pseudemoia rawlinsoni*		Endangered	
Golden Kelp	*Ecklonia radiata*			
Granite Greenhood	*Pterostylis tunstallii*		Endangered	
Great White Shark	*Carcharodon carcharias*			
Green Midge-orchid	*Genoplesium pumilum*		Endangered	
Green seaweed	*Codium fragile*			Native - local threat
Green seaweed	*Caulerpa taxifolia*			Native - local threat
Green-striped Greenhood	*Pterostylis chlorogramma*	Vulnerable	Endangered	
Growling Grass Frog	*Litoria raniformis*	Vulnerable	Endangered	
Hazel Pomaderris	*Pomaderris apetala*			
Heath Teatree	*Leptospermum myrsinoides*			
Hog Deer	*Axis porcinus*			Introduced
Hooded Plover	*Thinornis cucullatus*	Vulnerable	Vulnerable	
Humpback Whale	*Megaptera novaeangliae*		Critically endangered	
Indian Yellow-nosed Albatross	*Thalassarche carteri*	Vulnerable	Endangered	
Intermediate Egret	*Ardea intermedia*			
Japanese Kelp	*Undaria pinnatifida*			Introduced
Jungle Bristle-fern	*Abrodictyum caudatum*		Endangered	
Kangaroo Apple	*Solanum laciniatum*			
Kangaroo Grass	*Themeda triandra*			
King Quail	*Synoicus chinensis*		Endangered	
Knobby Club Rush	*Ficinia nodosa*			
Koala	*Phascolarctos cinereus*			
Lax Twig-sedge	*Machaerina laxa*		Endangered	
Leafy Greenhood	*Pterostylis cucullata*		Endangered	
Leafy Twig-sedge	*Cladium procerum*		Endangered	
Leatherback Turtle	*Dermochelys coriacea*	Endangered	Critically endangered	
Lewin's Rail	*Lewinia pectoralis*		Vulnerable	
Lilly Pilly Burrowing Crayfish	*Engaeus australis*	Vulnerable	Critically endangered	
Little Penguin	*Eudyptula minor*			
Little Weed Whiting	*Neoodax balteatus*			
Long Clubmoss	*Phlegmariurus varius*		Critically endangered	
Long-footed Potoroo	*Potorous longipes*	Endangered	Endangered	
Long-nosed Potoroo	*Potorous tridactylus*	Vulnerable	Vulnerable	
Messmate Stringybark	*Eucalpytus obliqua*			

Mirror Bush	*Coprosma repens*			Weed	Very High Risk
Mountain Ash	*Eucalyptus regnans*				
Myrtle Beech	*Nothofagus cunninghamii*				
Narrow-leaf Eelgrass	*Zostera muelleri*				
Narrow-leaf Peppermint	*Eucalyptus radiata*				
New Zealand Fur Seal	*Arctocephalus forsteri*				
New Zealand Screw Shell	*Maoricolpus roseus*			Introduced	
New Zealand Sea-star	*Patiriella regularis*			Introduced	
Northern Pacific Sea-star	*Asterias amurensis*			Introduced	
Ocellate seastar	*Nectria macrobrachia*				
Ocellate seastar	*Nectria multispina*				
Old Wife	*Enoplosus armatus*				
Orange-tip Finger-orchid	*Caladenia aurantiaca*		Endangered		
Otway Messmate	*Eucalyptus obliqua x E. regnans*				
Oval Fork-fern	*Tmesipteris ovata*		Endangered		
Oval Wedge-fern	*Lindsaea trichomanoides*		Critically endangered		
Oxy-eye Daisy	*Leucanthemum vulgare*			Weed	High Risk
Pacific Gull	*Larus pacificus*				
Pacific Oyster	*Crassostrea gigas*			Introduced	
Paddleweed	*Halophila australis*				
Paper Flower	*Thomasia petalocalyx*		Endangered		
Phytophthora	*Phytophthora cinnamomi*			Disease	
Pookila (New Holland Mouse)	*Pseudomys novaehollandiae*	Vulnerable	Endangered		
Powerful Owl	*Ninox strenua*		Vulnerable		
Prawn Greenhood	*Pterostylis pedoglossa*		Endangered		
Promontory Daisy-bush	*Olearia rugosa subsp. allend erae*		Endangered		
Promontory Peppermint	*Eucalyptus willisii s.s.*		Vulnerable		
Pygmy Right Whale	*Caperea marginata*				
Ragwort	*Senecio jacobaea*			Weed	Moderately High Risk
Red macroalgae	*Plocamium preissianum*				
Red-capped Plover	*Charadrius (Charadrius) ruficapillus*				
Rock Banksia	*Banksia saxicola*		Endangered		
Rock Lobster	*Jasus edwardsii*				
Rosy Perch	*Callanthias allporti*				
Rough Blown-grass	*Lachnagrostis rudis subsp. rudis*		Endangered		
Rufous-bellied Pademelon	*Thylogale billardieri*		Threatened		
Rush Lily	*Sowerbaea juncea*		Vulnerable		
Sambar Deer	*Rusa unicolor*			Introduced	
Saw Banksia	*Banksia serrata*				
Scrub Sheoak	*Allocasuarina paludosa*				
Sea Spurge	*Euphorbia paralias*			Weed	High Risk
Sea Sweep	*Scorpis aequipinnis*				
Shore Spleenwort	*Asplenium decurrens*		Endangered		
Short-tailed Shearwater	*Ardenna tenuirostris*				
Shy Albatross	*Thalassarche cauta*	Endangered	Endangered		
Silver Banskia	*Banksia marginata*				

Silver Gull	*Chroicocephalus novaehollandiae*				
Silverbelly	*Parequula melbournensis*				
Slender Tree-fern	*Cyathea cunninghamii*		Critically endangered		
Slender Weed Whiting	*Siphonognathus attenuatus*				
Small Fork-fern	*Tmesipteris parva*		Endangered		
Small Shade-nettle	*Australina pusilla subsp. pusilla*		Endangered		
Small Sickle Greenhood	*Pterostylis lustra*		Endangered		
Snow Gum	*Eucalyptus pauciflora*				
Sooty Oystercatcher	*Haematopus fuliginosus*				
South Gippsland Spiny Crayfish	*Euastacus neodiversus*		Endangered		
Southern Blue Gum	*Eucalyptus globulus subsp. globulus*		Endangered		
Southern Bluefin Tuna	*Thunnus maccoyii*				
Southern Brown Bandicoot	*Isoodon obesulus*	Endangered	Endangered		
Southern Emu-wren	*Stipiturus malachurus*				
Southern Goatfish	*Upeneichthys vlamingii*				
Southern Hulafish	*Trachinops caudimaculatus*				
Southern Long-nosed Bandicoot	*Perameles nasuta*				
Southern Maori Wrasse	*Ophthalmolepis lineolata*				
Southern Right Whale	*Eubalaena australis*	Endangered	Critically endangered		
Southern Sand Flathead	*Platycephalus bassensis*				
Southern Sassafras	*Atherosperma moschatum*				
Southern Shortfin Eel	*Anguilla australis*				
Southern Toadlet	*Pseudophryne semimarmorata*		Endangered		
Southern Xanthosia	*Xanthosia tasmanica*		Endangered		
Sparsely-spotted Stingaree	*Urolophus paucimaculatus*				
Spartina	*Spartina spp.*			Weed	High Risk
Spiny Mat-rush	*Lomandra longifolia*				
Spot-tailed Quoll	*Dasyurus maculatus*	Endangered	Endangered		
Spotted Galaxias	*Galaxias truttaceus*				
Spotted Pipefish	*Stigmatopora argus*				
Strapweed	*Posidonia australis*				
Stunted Sheoak	*Allocasuarina nana*				
Swamp Antechinus	*Antechinus minimus*	Vulnerable	Vulnerable		
Swamp Gum	*Eucalyptus regnans*				
Swamp Skink	*Lissolepis coventryi*	Endangered	Endangered		
Swamp Wallaby	*Wallabia bicolor*				
Sweet Bursaria	*Bursaria spinosa*				
Thick-lipped Spider Orchid	*Caladenia tessellata*	Vulnerable			
Thistle	*Carthamus spp.*			Weed	Lower Risk
Toothbrush Leatherjacket	*Acanthaluteres vittiger*				
Trevally	*Pseudocaranx spp.*				
Variable Bossiaea	*Bossiaea heterophylla*		Endangered		
Victorian Smooth Froglet	*Geocrinia victoriana*				
Wallaby Grasses	*Amphibromus spp.*				
Warty Prowfish	*Aetapcus maculatus*				

White Bladder-flower	*Araujia sericifera*			
White Correa	*Correa alba*			
White Kunzea	*Kunzea ambigua*			Native - local threat
White-bellied Sea Eagle	*Haliaeetus leucogaster*		Endangered	
White-footed Dunnart	*Sminthopsis leucopus*		Vulnerable	
White-throated Needletail	*Hirundapus caudacutus*	Vulnerable	Vulnerable	
Wide-bodied Pipefish	*Stigmatopora nigra*			
Wiry Bog-sedge	*Schoenus carsei*		Endangered	
Yellow Stringybark	*Eucalyptus muelleriana*			
Yellowtail Kingfish	*Seriola lalandi*			

Appendix C — Methodology for identifying conservation assets

For planning and managing the terrestrial environment, Parks Victoria has classified conservation assets in its Parks Landscapes according to similarities in biodiversity and natural values, and management drivers. The classification is based on the eight terrestrial ecosystem groups described in Victoria's previous biodiversity strategy (DNRE 1997):

- Alps
- Coastal
- Dry Forest and Woodland
- Grassland
- Heathland
- Inland Waters and Wetlands
- Mallee
- Wet Forest and Rainforest.

Within each of these ecosystem groups, a number of sub-ecosystems have also been identified, defined by groupings of Ecological Vegetation Classes and Divisions (EVCs and EVDs) (White 2010).

Parks Victoria have identified seven key marine habitats across Victoria (Pocklington et al. 2012). The classification of marine assets is based on these groupings:

- Estuary
- Intertidal Rocky Reef
- Mangroves and Saltmarsh (Fringing Marshes)
- Seagrass
- Soft Sediments
- Subtidal Rocky Reef
- Water Column (Pelagic)

Conservation assets within the parks landscapes have been identified by assigning ecosystems, sub-ecosystems and habitats from Parks Victoria's classification system, on the basis that they have similar ecological processes and threats.

Finer-scale assets that are an important focus of conservation have also been identified, to help define each conservation asset more completely. These 'nested' assets are mostly species assemblages and communities but may also include habitat features and ecosystem services. Individual species are aggregated with others if they occur together across the landscape and have similar attributes that are important in determining their persistence in the landscape. Keystone species and rare, threatened or endemic species may also be included as nested assets if they have unique conservation requirements. Species or communities of cultural importance to Traditional Owners may also be included.

Appendix D — Area and composition of conservation assets

Table C.1: Area of conservation assets

The extent (hectares) of conservation assets and their alignment to EVDs and EVCs within the Wilsons Promontory Parks Landscape.

Conservation asset	EVD	EVC	Total (ha)
Heathland	Heathland (sands)	Coastal Sand Heathland	21
		Heathy Woodland	3 302
		Sand Heathland	770
		Sand Heathland/Wet Heathland Mosaic	3 347
		Wet Heathland	5 984
		Wet Heathland/Damp Heathland Mosaic	43
		Heathland total	**13 467**
Mixed Dry Forest and Woodland	Granitic Hillslopes	Granitic Hills Woodland	3 974
	Foothills Forest	Shrubby Foothills Forest	3 789
	Tall Mixed Forest (Eastern)	Lowland Forest	3 877
	Rocky Knoll	Rocky Outcrop Shrubland/Rocky Outcrop Herbland Mosaic	225
		Wet Rocky Outcrop Scrub	517
		Bare Rock/Ground	77
		Dry Forest and Woodland total	**12 459**
Wet Forest and Rainforest	High Altitude Shrubland/Woodland	Montane Rocky Shrubland	115
	Closed-forest	Cool Temperate Rainforest	142
		Warm Temperate Rainforest	1 110
	Moist Forest	Damp Forest	3 679
	Tall Mist Forest	Wet Forest	3 954
		Wet Forest and Rainforest total	**9 006**
Coastal Grassy Woodland	Coastal	Calcareous Swale Grassland	557
		Coast Banksia Woodland	655
		Coastal Alkaline Scrub	3 561
	Forby Forest	Damp Sands Herb-rich Woodland	571
		Coastal Grassy Woodland total	**5 344**
Riparian and Wetland	Damp Scrub	Riparian Scrub	2 339
		Swamp Scrub	374
	Riparian (higher rainfall)	Riparian Forest	45
	Freshwater Wetland (ephemeral)	Wet Swale Herbland	175
	Freshwater Wetland (permanent)	Blocked Coastal Stream Swamp	29
		Coastal Lagoon Wetland	59
		Sedge Wetland	70
		Water Body — Fresh	11
		Wetland Formation	79
	Saline Wetland	Coastal Saltmarsh*	147
		Estuarine Wetland	340
		Mangrove Shrubland*	12
		Riparian and Wetland total	**3 680**

Coastal (including islands)	Coastal	Bird Colony Shrubland	25
		Coastal Dune Scrub/Coastal Dune Grassland Mosaic	2 008
		Coastal Headland Scrub	393
		Coastal Tussock Grassland	141
		Spray-zone Coastal Shrubland	42
		Sandy Beach	1 055
	n/a	Rocky Shore	348
		Coastal Ecosystem Total	**4 012**
Unvegetated Soft Sediment			13 087
Subtidal Reefs			8 567
Seagrass Beds			-
Landscape total			69 622

* These EVCs form a fuzzy boundary with the Gippsland Plains and Strzelecki Ranges Parks Landscape. Management of these EVCs is included within that landscape.

Appendix E — Determining condition and goals for conservation assets

Determining the desired outcomes for the overall condition of a conservation asset starts with identifying the critical factors required for ecological integrity[3], which are called the *key ecological attributes*. These include attributes of structure, composition and process related to the assets. An important characteristic of a key ecological attribute is that it must be readily measurable using one or more indicators. The current and desired condition of the attribute can then be assessed, and the overall ecological integrity of the asset can be assigned to a defined category.

The assessment of the ecological integrity (or overall condition) of a conservation asset is a five-step process utilising key ecological attributes:

1. **Identify a small number of key ecological attributes (typically 3–5) for each conservation asset.** Some common key ecological attributes are structure (e.g. remnant size or population abundance, distribution of communities, and configuration of patches or age class), composition (e.g. species diversity), and interactions and biotic and abiotic processes (e.g. hydrological regime or water quality).
2. **Identify appropriate indicators for each key ecological attribute.** An indicator is a readily measurable parameter that can be used to assess the condition of the key ecological attributes. For example, the presence or absence of a particular habitat-sensitive species may be an appropriate indicator for species diversity or habitat condition.
3. **Develop criteria for rating the current value of each indicator.** The development of criteria for rating the value of each indicator may be an iterative process over a period of adaptive management and monitoring. It typically starts with a simplified qualitative assessment (e.g. many, some, few) and is progressively developed into more refined and measurable numeric values (e.g. 1000 megalitres of water for 3 months during late spring). A value range for the indicator is defined to correspond with a ranking for poor, fair, good, and very good.
4. **Determine and rate the current and desired condition of the indicators for each key ecological attribute.** The next step in determining the ecological integrity of the conservation assets is to rate the current condition of each indicator. The ratings used are poor, fair, good, and very good. The time period for evaluating trend in condition is the preceding 15 years. Desired condition is assessed over the next 15-year period and considers the impact of climate change over that period, and the impact, if any, of proposed management interventions during that period.
5. **Rate the ecological integrity of conservation assets.** For current and desired future states, the overall ecological integrity of the conservation asset is assigned to a defined category, using the condition ratings for key ecological attributes and their associated indicators. A qualitative, summary goal statement (the *conservation outcome*) is constructed for each conservation asset, based on the desired condition status of its component key ecological attributes.

The current condition and trend, and the likely condition under desired management, have been assessed using available literature and the expert knowledge of interviewed experts or participants in the conservation action planning workshops. The condition of each asset is considered across its occurrence in the landscape's parks and reserves. As far as possible, desired condition of key ecological attributes are articulated as SMART goals : **S**pecific, **M**easurable, **A**chievable, **R**elevant and **T**ime-bound. However, to achieve this, collection of baseline data may be required as part of implementing and revising the Plan.

The key ecological attributes for each asset, including assessments of their current and desired status, conservation outcomes and their ratings, are presented in the asset descriptions in Section 4. These attributes and outcomes have been used to guide the development of conservation strategies.

[3] Defined as: the degree to which an ecosystem's observed structure, function and composition resemble those characteristic of regionally appropriate historical benchmarks or other high-integrity reference states that support ecosystem and biodiversity persistence and are minimally impaired by threatening processes (IUCN 2022)

Appendix F — Risk assessment method

Parks Victoria uses a method for assessing the risk posed by environmental threats that was developed by associates of the Australian Centre of Excellence for Risk Analysis, broadly following the process outlined in the Australian Standard for Risk Management (Carey et al. 2007). Threats to conservation assets are assessed against their impact on achieving the defined conservation outcome for each asset and their direct impact on key ecological attributes. The assessment is a three-step process.

1 Identify threats to conservation outcomes

Threats to conservation assets are identified by assessing the threat agents, as well as the impact of the threatening process, on key ecological attributes. For example, the effect of foxes (agent) is predation (process), which reduces the abundance and diversity of small ground-dwelling fauna (impact).

2 Classify threats

Threats are classified according to a risk assessment matrix that defines both the likelihood and ecological consequence of the identified threats impacting on key ecological attributes (Carey et al. 2007) over a defined period of 15 years. Threats are assessed assuming the absence of any ongoing mitigation activity. This is to ensure that priorities are not biased towards threats that do not have any current mitigation action. Threats are ranked as extreme, high, moderate or low risk. Priority areas for the risk abatement of threats are mapped.

Scale, consequence and likelihood definitions used in the risk assessment are provided at Table F.1 and F.2.

3 Develop threat management objectives

Threat management objectives are developed to mitigate the impact of the threats that are the greatest risk to conservation assets. Threat management objectives specify the change in high risk threats required to achieve a particular conservation outcome for a conservation asset.

Table F.1 Scale definitions

SCALE		
Rating	**Category**	**Description**
i	All sites	the threat will operate in all parts of the ecosystem across the landscape at 100% of sites where the natural asset goal occurs (i.e. drought)
ii	Most sites	the threat will operate across the majority of the ecosystem impacting on >75% of sites where the natural asset goal occurs (i.e. large scale bushfire)
iii	Some sites	the threat will operate scattered across the ecosystem impacting on 25-75% of sites the natural asset goal occurs.
iv	Few sites	the threat will operate at few sites across the ecosystem impacting on <25% of sites where the natural asset goal occurs.

Table F.2 Consequence and likelihood definitions

	RISK ASSESSMENT High Risk (9-10) - Outside acceptable level of risk. Immediate attention needed. Treatment plan and monitoring required. Significant Risk (7-8) - May be outside acceptable level of risk. Immediate attention needed. Treatment plan and monitoring required. Moderate Risk (5-6) - Within acceptable level of risk. May be managed without further treatment. Monitoring required. Low Risk (2-4) - Well within acceptable level of risk. Manage by routine procedures.		**IMPACT - CONSEQUENCE - ECOSYSTEM SCALE**				
			Alteration or disturbance to ecosystem remains within natural variability. Ecosystem interactions may have changed but it is unlikely that there would be any detectable change outside natural variation	Localised measurable changes to the ecosystem components without a major change in function (no loss of components or introduction of new species that affects ecosystem function). Recovery (if relevant) in 1 to 5 years, with little direct management intervention required.	Widespread measurable changes to the ecosystem components without a major change in ecosystem function (no loss of components or introduction of new species that affects function). Recovery (if relevant) in 5 to 20 years, with some management intervention.	Widespread measureable changes to the ecosystem components with a major change in ecosystem function. Recovery is achievable in 20 to 100 years (i.e. within historic natural variability), with substantial management intervention required.	Long term and possibly irreversible damage to one or more ecosystem functions, and/or loss (extinction) of components of national or State significance. Recovery, if at all, will take greater than 100 years, with significant management intervention required.
			Minimal	**Minor**	**Moderate**	**Major**	**Extreme**
LIKELIHOOD	**Rating**	**Score**	**Description**	1	2	3	4	5
	Almost certain	5	•• Impacts have a > 80% chance of occurring within 10-15 years[4] ••• Impact events should be expected within the current year[5]	**Moderate (6)**	**High (7)**	**High (8)**	**Very High (9)**	**Very High (10)**
	Likely	4	•• Impacts have a 60-80% chance of occurring within 10-15 years[5] ••• Impact events should be anticipated within the next 2 years[6]	**Moderate (5)**	**Moderate (6)**	**High (7)**	**High (8)**	**Very High (9)**
	Possible	3	•• Impacts have a 30-60% chance of occurring within 10-15 years[5] ••• Impact events may occur at some time in the next 3 years[6]	**Low (4)**	**Moderate (5)**	**Moderate (6)**	**High (7)**	**High (8)**
	Unlikely	2	•• Impacts have a 5-30% chance of occurring within 10-15 years[5] ••• Impact events could occur, but not anticipated during the next 3 years[6]	**Low (3)**	**Low (4)**	**Moderate (5)**	**Moderate (6)**	**High (7)**
	Rare	1	•• Impacts may occur in exceptional circumstances (<5%) within 10-15 years[5] ••• Impact events not likely to occur in the next 5 years[6]	**Low (2)**	**Low (3)**	**Low (4)**	**Moderate (5)**	**Moderate (6)**

[4] Incremental and cumulative impacts

[5] Impacts due to individual events

Appendix G — Climate change scenario planning method

Climate adaptation planning represents a significant challenge for conservation planning, due to the long-time horizons, the dramatic and potentially transformative nature of the impacts, and uncertainty associated with the projected changes for many climate drivers.

In many cases, basing plans on just average climate projections or single climate drivers in isolation will hamper the development robust strategies that adequately take into account the deep uncertainties and many interacting effects associated with climate change.

Scenario planning is a well-established approach to planning under conditions of uncertainty and is used increasingly in some form to assist climate adaptation planning. Contemporary applications of scenario planning for climate change often use a 'climate futures' approach, where the future scenarios considered are based on projections from a manageable subset of climate models. Doing so is intended to ensure that each scenario considered is a plausible (i.e. internally consistent) and comprehensive, yet divergent, representation of the future climate.

Challenges in this approach include the selection of an appropriate set of divergent climate models, defining and communicating the anticipated climate vulnerabilities, and translating assessments of climate projections and impacts into tractable conservation goals and actions which can be integrated with existing planning processes. To address these challenges, a climate futures-based approach to adaptation planning was developed as an adjunct to the established CAP planning approach.

Methodology

Climate analyses

Climate analyses were performed via desktop analyses, prior to any workshops. Climate projections were obtained from the Victoria's Future Climate Tool portal (https://vicfutureclimatetool.indraweb.io/), which is based on data from the Victorian Climate Projections 2019 (Clarke et al. 2019).

Two types of emissions pathways are typically used in climate projections. Representative Concentration Pathways (RCPs) were introduced in the Intergovernmental Panel on Climate Change (ICPP) 5th Assessment Report and describe future trajectories of greenhouse gas concentrations and associated radiative forcing. From the IPCC 6th Assessment Report, broader scenarios (Shared Socio-economic Pathways; SSPs) were included which better describe future social, economic and policy changes that may be associated with varying trajectories of greenhouse gas concentrations.

Several SSPs use equivalent scenarios for greenhouse gas concentrations as the previous RCPs (i.e. SSP2-4.5 is equivalent to RCP4.5 and SSP5-8.5 is equivalent to RCP8.5) and may be used interchangeably for the purposes of our climate scenario analyses. Many current resources, including CoastAdapt and the Victorian Climate Projections 2019 on which we have based most of our analyses, use only the older RCP terminology. Climate projections for our process have therefore been selected using RCPs to maintain consistency with previous planning based on RCP models.

Climate projections were obtained for the six General Circulation Models (GCM) experiments and two emissions pathways (RCP4.5, RCP8.5). Climate projections were dynamically downscaled to 5km grid cells for the planning landscape, and mean values for the entire planning landscape were recorded for selected variables. Climate change was represented in relation to a 1986-2005 baseline, and projections chosen for the 2040-2059 period to align with the duration of the CAP.

A clustering algorithm (k-means) was used to objectively assess divergence in 2050 climatic conditions among models, following Casajus et al. 2016. Results were visualised using distance matrix and two-dimensional scatter plots of principal components. These outputs were used to select three climate models that represented the most divergent climate scenarios for the landscape, and the associated scenarios were given descriptive names: "Mild warming and precipitation change" (Scenario 1: NCC-NorESM1-M, RCP4.5), "Moderate warming with wet periods" (Scenario 2: CSIRO-BOM-ACCESS!-0 RCP4.5), and "Extreme warming and drying" (Scenario 3: MOHC-HadGEM2-CC, RCP8.5).

Climate narratives were then prepared for each scenario. These comprised a qualitative description of the future climatic conditions expected under each selected model, and a table showing the projected values for each climate metric for the period 2040-2059 (Table G.1).

Sea level rise (SLR) presents a special case among the climate hazards considered, as SLR is expected to proceed in an approximately linear (or even accelerating) manner for centuries to come, and variation in the projected SLR until approximately 2050 is driven mainly by emissions already released, meaning that the rate of near-future SLR is largely insensitive to emissions pathways.

As such, where a single time horizon is chosen for adaptation planning this has a particularly large influence on the expected impacts of SLR, and the conditions under a "best case" scenario may resemble those of the "worst case" scenario only a few decades later. Moreover, exposure to SLR hazards is restricted to a subset of assets, such as coastal wetlands and intertidal reefs, but within these assets has the potential for highly transformative /destructive impacts such that retreat or mitigation may become the only viable adaptation options. For these reasons, we acknowledge that adaptation planning for SLR is particularly likely to benefit from further, targeted planning which takes into account dynamic adaptation pathways over a longer, continuous time period.

In addition to climate metrics from the Victorian Climate Projections 2019, climate narratives also presented sea surface temperature projections for 2050, using Bio-ORACLE v2.2 (http://bio-oracle.org). As these projections are not given for the models selected for other climate variables, the projections of sea surface temperature for RCP4.5 (moderate emissions) were selected to represent Scenario 1, and RCP8.5 (high emissions) were selected to represent Scenario 3, as these best aligned with moderate and extreme climate narratives.

Table G.1: *Climate projections for the Wilsons Promontory Parks Landscape*

Climate driver	Metric	Baseline (1986-2005)	Hot, slight drying	Warm, wet summers	Hot & dry
Change in average annual temperature	Sea surface temp.	**~16°C**	**~17°C**		**~17.2°C**
	Mean temp.	**14.1**	**14.9**	**15.4**	**16.1**
	Maximum temp.	**18.1°C**	**19.0°C**	**19.5°C**	**20.3°C**
	Spring	***17.5°C***	***18.5°C***	***19.1°C***	***19.9°C***
	Summer	***22.3°C***	***23.3°C***	***24.0°C***	***25.0°C***
	Autumn	***18.9°C***	***20.0°C***	***20.2°C***	***21.2°C***
	Winter	***13.7°C***	***14.4°C***	***14.8°C***	***15.4°C***
	Minimum temp.	**10.2°C**	**11.0°C**	**11.4°C**	**12.1°C**
Temperature extremes	Number of heatwaves	**1.9/year**	**3.1/year**	**4.2/year**	**6.5/year**
	Number hot days (>35°C)	**1.7/year**	**2.0/year**	**3.3/year**	**7.9/year**
	Heatwave duration	**5.3 days**	**7.0 days**	**8.3 days**	**9.9 days**
	Heatwave hottest day	**36.8°C**	**36.0°C**	**38.4°C**	**40.5°C**
	Max. temp (1 in 20 year event)	**38.3°C**	**41.2°C**	**42.9°C**	**44.7°C**
	Number of warm nights (>20°C)	**0.5/year**	**1.5**	**2.7**	**4.4**
	Number of cold nights (<2°C)	**0.5/year**	**0.1/year**	**0.1/year**	**0.1/year**
Change in average precipitation	Rainfall (annual)	**923mm**	**900mm**	**917mm**	**734mm**
	Spring	***258mm***	***284mm***	***237mm***	***172mm***
	Summer	***163mm***	***141mm***	***193mm***	***132mm***
	Autumn	***193mm***	***211mm***	***221mm***	***173mm***

	Winter	***312mm***	***278mm***	***262mm***	***263mm***
Precipitation extremes	Extreme dry periods – avg. duration	**5.3 months**	**2.0 months**	**2.7 months**	**2.5 months**
	Number very wet days (>20mm)	**6.2 days/year**	**6.1 days/year**	**7.1 days/year**	**5.6 days/year**
	Rainfall 1 in 20 year event	**65mm**	**95mm**	**135mm**	**88mm**
	Extreme wet periods – avg. duration	**3.0 months**	**3.7 months**	**6.8 months**	**2.9 months**
Sea level rise	Metres SLR at the Prom coast	**0cm**	**13cm**	**25cm**	**33cm**

Ecological futures

Workshops were held to assess ecological impacts and vulnerability and develop or adjust management goals and actions. At the start of the workshop, participants were familiarised with the climate narratives for each scenario, the conservation assets under consideration, and the proposed key ecological attributes (KEA) and their indicators for each asset. Participants were then asked to prepare brief ecological vulnerability narratives for each KEA, which identified the key climate impacts, capacity to adapt, and likely future condition of each KEA under each climate scenario.

Workshop participants included Parks Victoria's regional, planning and Environment and Science staff, and members of the Wilsons Promontory Technical Advisary Group.

Evaluation of goals and actions

For this stage, workshop participants were first asked to assess the viability of proposed conservation goals and the suitability of proposed actions, in light of the climate vulnerability of each KEA identified in the previous stage. This was done using an approach adapted from Runyon et al. (2021), whereby a table was prepared in which each KEA was assigned to one of three categories for each climate scenario:

- 'Stay the course' (or business as usual) – proposed goals are likely achievable and current actions are sufficient to achieve the goals
- 'Adjust the route' - proposed goals are likely achievable but new or different actions will likely be required to achieve them, or
- 'Reimagine the course' – the proposed goals are unlikely to be achievable, and new or different actions will be needed accordingly.

Finally, participants were asked to prepare a strategy narrative for each conservation asset which described how goals may need to be altered (if relevant) and the key climate-focussed actions that should be considered in the management of each asset. In particular, these narratives focussed on potential no- or low-regret actions, insurance actions (i.e. worst case preparedness), actions targeted to particular climate trajectories, and research and monitoring needs. Within these categories, actions may be targeted towards avoiding or ameliorating exposure to climate hazards, or by enhancing adaptive capacity (Prover et al. 2019). This information was then used on the preparation of Conservation Strategies to enhance the climate-readiness of this Conservation Action Plan.

Parks Victoria
Level 10, 535 Bourke St, Melbourne VIC 3000
parks.vic.gov.au
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