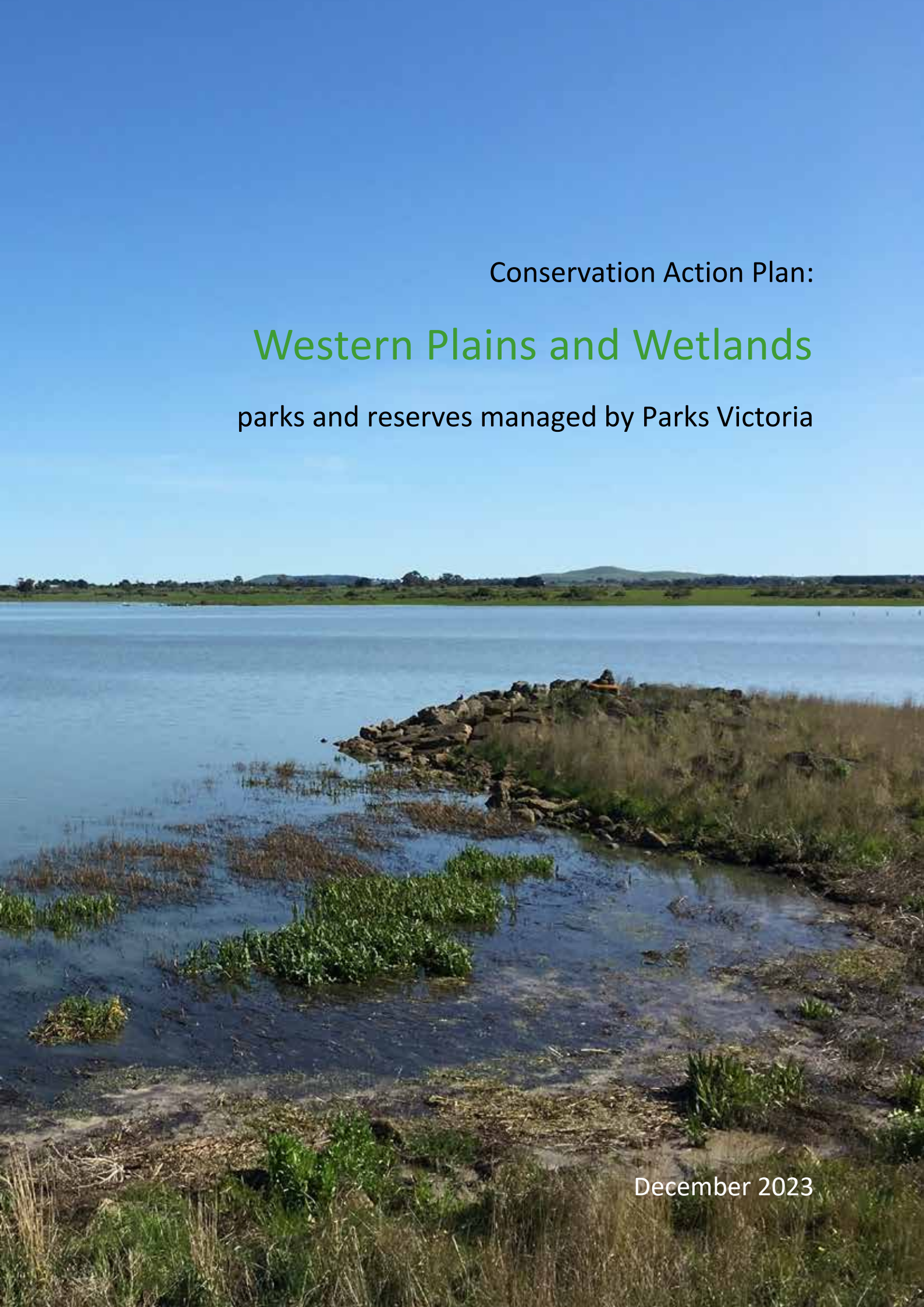
Conservation Action Plan:

Western Plains and Wetlands

parks and reserves managed by Parks Victoria



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Disclaimer

This plan is prepared without prejudice to any negotiated or litigated outcome of any native title determination applications covering land or waters within the plan's area. It is acknowledged that any future outcomes of native title determination applications may necessitate amendment of this plan; and the implementation of this plan may require further notifications under the procedures in Division 3 of Part 2 of the *Native Title Act 1993* (Cwlth).

The plan is also prepared without prejudice to any future negotiated outcomes between the Government/s and Traditional Owner Communities. It is acknowledged that such negotiated outcomes may necessitate amendment of this plan.

Every effort has been made to ensure that the information in this plan is accurate. Parks Victoria does not guarantee that the publication is without flaw of any kind and therefore disclaims all liability for any error, loss or other consequence that may arise from you relying on any information in the publication.

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Cover: Lake Colac Lake Reserve (Michael McKenzie)

Foreword

Parks Victoria recognises the diversity of cultures, deep connections, rights and responsibilities that Traditional Owners have over the lands and waters covered by the Western Plains and Wetlands Conservation Action Plan. We recognise that the ancient landscape we see today has been modified over many thousands of years of occupation and influenced by the skills, knowledge and activities of generations of Aboriginal land managers. We also acknowledge the impacts of more recent land use and the impacts that introduced threats, climate change continues to have on this unique cultural landscape. The plan is a starting place for conversations with Traditional Owners on the importance of the nature and wildlife of this Country.

Parks Victoria acknowledges, respects and works closely with Traditional Owners and other Aboriginal communities and organisations across Victoria. We pay our respects to Elders past and present, and to emerging Aboriginal leaders.

The Western Plains and Wetlands Conservation Action Plan focuses primarily on the first of Parks Victoria's three strategic themes:

- Caring for Country
- Connecting People and Nature
- Contributing to Healthy, Livable Communities.

The goal for Caring for Country is to sustainably manage, protect and conserve Victoria's natural and cultural landscapes. It is our primary responsibility to ensure parks are healthy and resilient for current and future generations.

It is guided by *Protecting Victoria's Environment – Biodiversity 2037*, Victoria's plan to stop the decline of our native plants and animals. It is also guided by the *Environment Protection and Biodiversity Conservation Act* 1999 (Cwlth) and the *Flora and Fauna Guarantee Act* 1988 (Vic.), which are the key pieces of Commonwealth and State legislation for the conservation of significant places, species and communities, and for the management of ecologically threatening processes.

The impacts of climate change, and the uncertainty it brings, will be considered in all conservation decisions and will significantly influence what can be achieved. The plan outlines Parks Victoria's understanding of the major threats to nature and wildlife in this ancient and unique cultural landscape, the impact of a changing climate, and the potential actions that we can take together with Traditional Owners and other partners in caring for and improving the health of the Western Plains and Wetlands parks landscape.

Matthew Jackson
Chief Executive Officer
Parks Victoria

Managing Country Together

Cultural significance

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 Western Plains and Wetland landscape we see today is influenced by the skills, knowledge and activities of Aboriginal land managers. Parks Victoria acknowledges the Traditional Owners of the Western Plains and Wetlands: The Eastern Maar People, Gunditjmara People and Wadawurrung People, recognising their continuing connection to Victoria's parks and reserves and their ongoing role in caring for Country.

Parks Victoria is committed to partnering with Traditional Owners to protect and conserve natural and cultural heritage, help guide the transition into a new park management future and improve land and sea management outcomes across cultural landscapes. The significant biodiversity values and ecological systems we manage are intrinsically linked with the ongoing cultural practices of Traditional Owners.

Parks Victoria has both a responsibility and opportunity to work closely with Traditional Owners to protect, conserve and improve the management of cultural values across the state. We have more work to do to fully embed best practice cultural heritage management into our land management approaches. In our rapidly changing land management context, where cultural authority and responsibility to look after cultural heritage are Traditional Owner rights recognised by law, we have an opportunity to redefine how we work in partnership with Traditional Owners to better manage Victoria's cultural landscapes. While moving in this direction, Parks Victoria will ensure we meet our responsibility to protect the natural heritage that is currently in our care and build a shared capacity and a strong foundation to achieve sustainable and effective protection of cultural landscapes into the future.

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, and opportunities to investigate and apply traditional ecological knowledge will be developed further in future iterations of the plan.

Recognition and agreements

The Federal Court recognised in 2011 that the Gunditjmara People and the Eastern Maar People both hold native title over Crown land in an area along the western edge of the Western Plains and Wetlands Parks Landscape. More recently, the Federal Court's 2023 native title determination acknowledges Eastern Maar's ongoing connection and intrinsic relationship with their Country in south-western Victoria, and recognises Eastern Maar's right to access, use, and protect public land in accordance with their traditional law and custom. Additionally, it recognises their right to be consulted on the use and development of land and natural resources – to ensure the protection and preservation of places and areas with cultural importance. The Eastern Maar Aboriginal Corporation is negotiating a Recognition and Settlement Agreement with the Victorian Government under the *Traditional Owner Settlement Act 2010* (Vic), including a Traditional Owner Land Management Agreement, regarding joint management of parks and reserves granted as Aboriginal title.

Feather-heads

Inverleigh Flora Reserve

Contents

Summary

The Western Plains and Wetlands Parks Landscape covers 62 728 hectares of parks and reserves, with extensive areas of grasslands and woodlands which are of significance for conservation as they are among the most depleted communities in Victoria. These grassland and woodland ecosystems, once widespread across the area, now exist as a network of mostly small, fragmented remnants in a landscape otherwise largely modified for agriculture. The parks and reserves of the Western Plains and Wetlands contain representatives of two critically endangered ecological communities, Natural Temperate Grassland and Grassy Eucalypt Woodland of the Victorian Volcanic Plain. As its name suggests, the Western Plains and Wetlands also feature a large number of freshwater and saline wetlands, including the Western District Lakes Ramsar site, a series of nine saline and brackish lakes recognised as wetlands of international importance. In addition to numerous wetlands and lakes.

This is a dynamic landscape with unique geomorphology where diverse wetland habitats and fragmented pockets of significant grasslands and woodlands are protected. Important cultural and natural assets such as migratory birds and other unique fauna and flora species are valued by community, and partnerships underpin conservation efforts.

This Conservation Action Plan defines and prioritises conservation strategies for the Western Plains and Wetlands Parks Landscape for the period to 2038 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 will direct the achievement of the conservation vision:

The resilience of natural assets in the Western Plains and Wetlands 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 describes 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.

Four terrestrial and one marine conservation asset have been identified in the Western Plains and Wetlands 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

- Dry Forest and Woodland is in poor condition.

- Lakes and Wetlands; Grassland; and Coastal and Estuarine conservation assets are in fair condition.

Marine conservation assets

- Merri Marine Sanctuary conservation asset is in good condition.

The trends in condition are mostly declining or stable. The anticipated future status of the majority of assets is to maintain condition but is dependent on the implementation of all the listed strategies.

The 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:

- terrestrial predation by foxes and cats,
- weed invasion,
- grazing and browsing by introduced herbivores,
- inappropriate fire regimes,
- altered water regimes and poor water quality,
- habitat degradation caused by visitor impacts and illegal activities,
- invasive or overabundant marine species.

The ability of species and ecosystems to persist in a changing climate will be determined by their capacity to tolerate and 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, and to improve the assets' capacity to adapt to the compounding effects of climate change. Lakes and wetlands and coastal assets are particularly vulnerable to the impacts of climate change, and specific adaptation strategy(ies) have been designed to, where feasible, maintain ecosystem function with altered composition or manage to a changed state and function and maximise the diversity of the new state.

The following conservation strategies are proposed to tackle the priority threats. They have been selected for their impact, feasibility and cost in achieving the desired conservation goals.

- **Fire management for ecological health** — develop ecological fire strategies with partners so that planned burns are conducted within an appropriate fire regime, improving habitat condition, increasing old and mid growth vegetation and protecting high value assets and areas from damage.
- **Supporting partnerships to address hydrological threats to water-dependent assets –** work with partners to reduce human impacts on water quality and hydrology to reduce pollutant input and improve flows to marine, saline and freshwater ecosystems.
- **Environmental weed control using a biosecurity approach** - manage weeds to reduce their spread, establishment and impact with a focus on species that have or are likely to have significant impacts on the health of conservation assets, prioritising high risk species in high vale locations.
- **Terrestrial herbivore management** - implement targeted control of rabbits, pigs, cattle and deer at priority sites for threatened vegetation, integrating available methods of control to achieve acceptable densities.
- **Control and monitoring of introduced terrestrial predators to support resilient native fauna populations** - implement targeted control of foxes and cats at priority and potential future sites for threatened and migratory fauna.
- **Integrated management of grassy ecosystems -** Manage grasslands and grassland components of grassy woodlands to maintain their ecological condition, provide habitat for

component species and promote recovery of threatened species through managing biomass and reducing the impacts of invasive plants and other threats.

- **Managing marine pests for healthy marine protected areas** - implement targeted marine pest monitoring to prevent incursions and seek to control new incursions as soon as they occur.
- **Reducing the impacts of recreation, illegal activities and resource extraction on natural values** - undertake communication and compliance activities to protect sensitive habitats and species and promote sustainable resource extraction.

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.

Parks Victoria's Conservation Action Plans generally define and prioritise conservation strategies for five-year periods. However, Conservation Action Plans are also designed to evolve and adapt according to changes in circumstance and evidence. This first version of the Western Plains and Wetlands Parks Landscape Conservation Action Plan may be revised before its scheduled review period to integrate traditional ecological knowledge and input from Traditional Owners, and to further capture their role in managing this highly biodiverse and culturally significant landscape in future conservation strategies. It may also be reviewed in the event of a landscape scale perturbation such as bushfire.

Black-winged Stilt

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 focuses 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, considering 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.

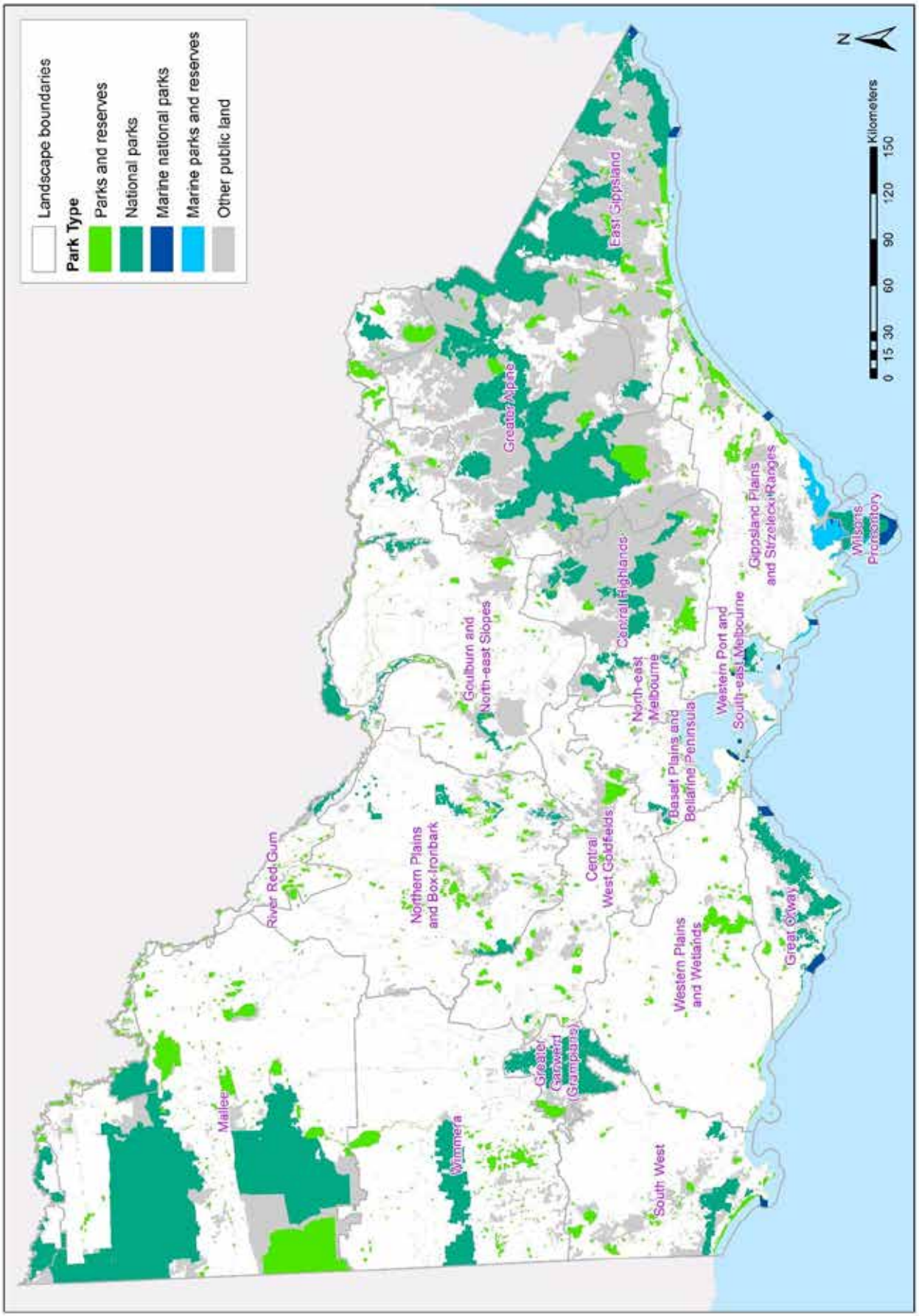


Figure 1.1: Parks Victoria's Parks Landscapes

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. Assess the viability of conservation assets and set conservation outcomes.
4. Identify and assess threats to conservation outcomes.
5. Develop action options from situational analysis.
6. Prioritise conservation strategies.
7. Set performance measures.
8. Plan work.
9. Implement operational plans.
10. Adapt the conservation action plan and operational activities.

This Conservation Action Plan is an output of steps 1 to 7 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 (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.

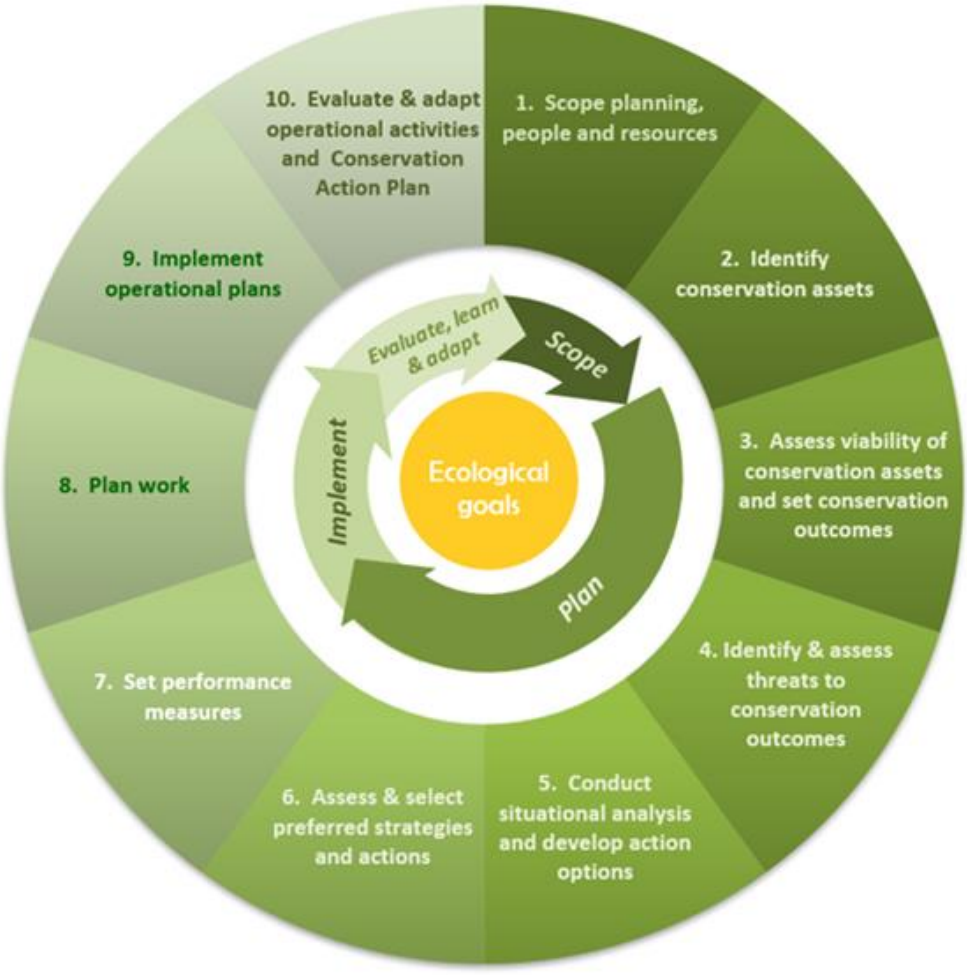


Figure 1.2: The 10-step conservation action planning process

Fat-tailed Dunnart

2 Scope

2.1 Geographic scope

There are 158 Parks Victoria parks and reserves in the Western Plains and Wetlands Park Landscape, covering a total of 62 728 hectares. These parks and reserves contain a diverse range of ecosystems and are especially important for the conservation of grasslands and woodlands, which are among the most depleted communities in Victoria. These grassland and woodland ecosystems, once widespread across the area, now exist as a network of mostly small, fragmented remnants in a landscape otherwise largely modified for agriculture. As its name suggests, the Western Plains and Wetlands also feature many freshwater and saline wetlands, including the Western District Lakes Ramsar site, a series of nine freshwater and brackish lakes recognised as wetlands of international importance.

In addition to numerous wetlands and lakes, the parks and reserves of the Western Plains and Wetlands contain representatives of two critically endangered ecological communities, Natural Temperate Grassland and Grassy Eucalypt Woodland. The landscape extends to the coast and includes one marine park and significant coastal vegetation.

Land use is primarily agriculture, especially sheep grazing. About 95% of land is in private ownership.

The Parks landscape includes terrestrial habitats within the Victorian Volcanic Plain and Warrnambool Plains Bioregions. In the marine environment, the Parks landscape includes marine protected areas within the Otway Marine Bioregion.

Notable parks and reserves include:

Park/reserve name	Area (ha)	IUCN Protected Areas Category
Illabarook Grassland Flora Reserve	2832	1a – Strict Nature Reserve
Inverleigh Flora Reserve	1050	1a – Strict Nature Reserve
Lake Beeac Wildlife Reserve	674	1a – Nature Conservation Reserve – Wildlife Reserve (no hunting).
Cobra Killuc Wildlife Reserve	638	1a – Nature Conservation Reserve – Wildlife Reserve (no hunting).
Blacks Creek Nature Conservation Reserve	241	1a – Strict Nature Reserve
Mt Mercer Nature Conservation Reserve	222	1a – Strict Nature Reserve
Lake Corangamite Lake Reserve	25 211	III – Natural Features Reserve – Lake Reserve
Lake Gnarpurt	2514	III – Natural Features Reserve – Lake Reserve
Merri Marine Sanctuary	29	III – Natural Monument or Feature
Tower Hill Wildlife Reserve	624	VI – protected area with sustainable use of natural resources
Belfast Coastal Reserve	1718	Not classified

2.2 Registered Aboriginal Parties

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 and protecting, managing and enjoying the land are important parts of this connection. For Traditional Owners, planning is an ongoing, holistic and adaptive relationship with Country (FVTOC 2021) 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.

Supporting the inclusion of traditional ecological knowledge in land management practices can heal Country and help to achieve conservation outcomes, including environmental drivers such as cultural water flows and the rekindling of cultural burning practices. Where possible, traditional ecological knowledge has been considered in the plan, and opportunities to investigate and apply traditional ecological knowledge will be developed further in implementing the plan.

Three Traditional Owner groups have been designated as Registered Aboriginal Parties for parts of the Western Plains and Wetlands Parks Landscape:

- Eastern Maar People
- Wadawurrung People
- Gunditjmara People

Eastern Maar

The western portion of the Western Plains and Wetlands Parks Landscape is within the Traditional lands of the Eastern Maar People who are represented by the Eastern Maar Aboriginal Corporation (EMAC). The Eastern Maar People, through the Eastern Maar Aboriginal Corporation as a Registered Aboriginal Party under the *Aboriginal Heritage Act 2006* (Vic.), have legislated authority for the protection and management of Aboriginal cultural heritage.

The Country of clans of the Eastern Maar People covers diverse landscapes. Lava flow country of the volcanic plains was particularly important for lakes and wetlands providing year-round food and water. Coastal estuaries and beaches were important for fish and shellfish, and forests provided seasonal food and trade routes. Dean Maar (Lady Julia Percy Island) and Tower Hill have particular spiritual significance as well as being sources of food and shelter (Eastern Maar Aboriginal Corporation, 2015).

Wadawurrung

The eastern portion of the Western Plains and Wetlands Parks Landscape is within the Traditional lands of the Wadawurrung People. The Wadawurrung People, through the Wadawurrung Traditional Owners Corporation as a Registered Aboriginal Party under the *Aboriginal Heritage Act 2006* (Vic.) have legislated authority for the protection and management of Aboriginal cultural heritage.

“Our country is interwoven with relationships no matter whether the shape of that relation is human, granite hills, (crow) or (Manna gum). Country is filled with relations speaking language, sharing stories and following lore. These spirits they link us back through time in a continuing connection with our past, our cultural practices and our stories. These spirits connect us to our Country and each other which gives us ongoing respect for our obligation to care for our Country” (Wadawurrung Traditional Owners Corporation, 2020).

Gunditjmara and Eastern Maar

The western edge of the Western Plains and Wetlands Landscape is shared by the Gunditjmara Peoples (represented by the Gunditj Mirring Traditional Owners Corporation) and Eastern Maar Peoples. The area includes Deen Maar, sacred to the Gunditjmara and Eastern Maar Peoples, and Lake Linlithgow and Bulrush Swamp Lake Reserve.

2.3 Significant natural values

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

- One area listed under the Ramsar Convention on Wetlands to protect habitat for migratory birds (Western District Lakes) including Lake Corangamite, the largest permanent saline lake in Australia and the largest natural lake in Victoria.
- Twenty-eight Nationally Important Wetlands
- Two vegetation communities of state significance (listed under the *Flora and Fauna Guarantee Act 1998* (Vic.)) Six vegetation communities of federal significance (listed under the *Environment Protection and Biodiversity Conservation Act 1999 (C'wth*))
- Two Important Bird Areas (IBA) - Yambuk Lakes Complex IBA and Port Fairy to Warrnambool IBA.
- Five nationally critically endangered flora and fauna species and eighteen nationally endangered or vulnerable fauna and flora species. More than thirty-three flora and fauna species are currently listed under the Victorian *Flora and Fauna Guarantee Act 1988*
- Thirty-five species listed under international conventions (JAMBA, CAMBA, ROKAMBA and Bonn) - Sperm Whale, the Pygmy Right Whale and 33 bird species.
- Tower Hill is one of the largest maars in the world. It is of international significance due to its geological and geomorphological formation as a nested maar, a volcanic crater.

The Victorian Biodiversity Atlas includes records of more than 1100 species from the Western Plains and Wetlands Parks Landscape, including:

- 525 plants
- 69 algae
- 76 mammals
- 344 birds
- 21 amphibians
- 40 reptiles
- 67 fish
- over 100 invertebrates

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.

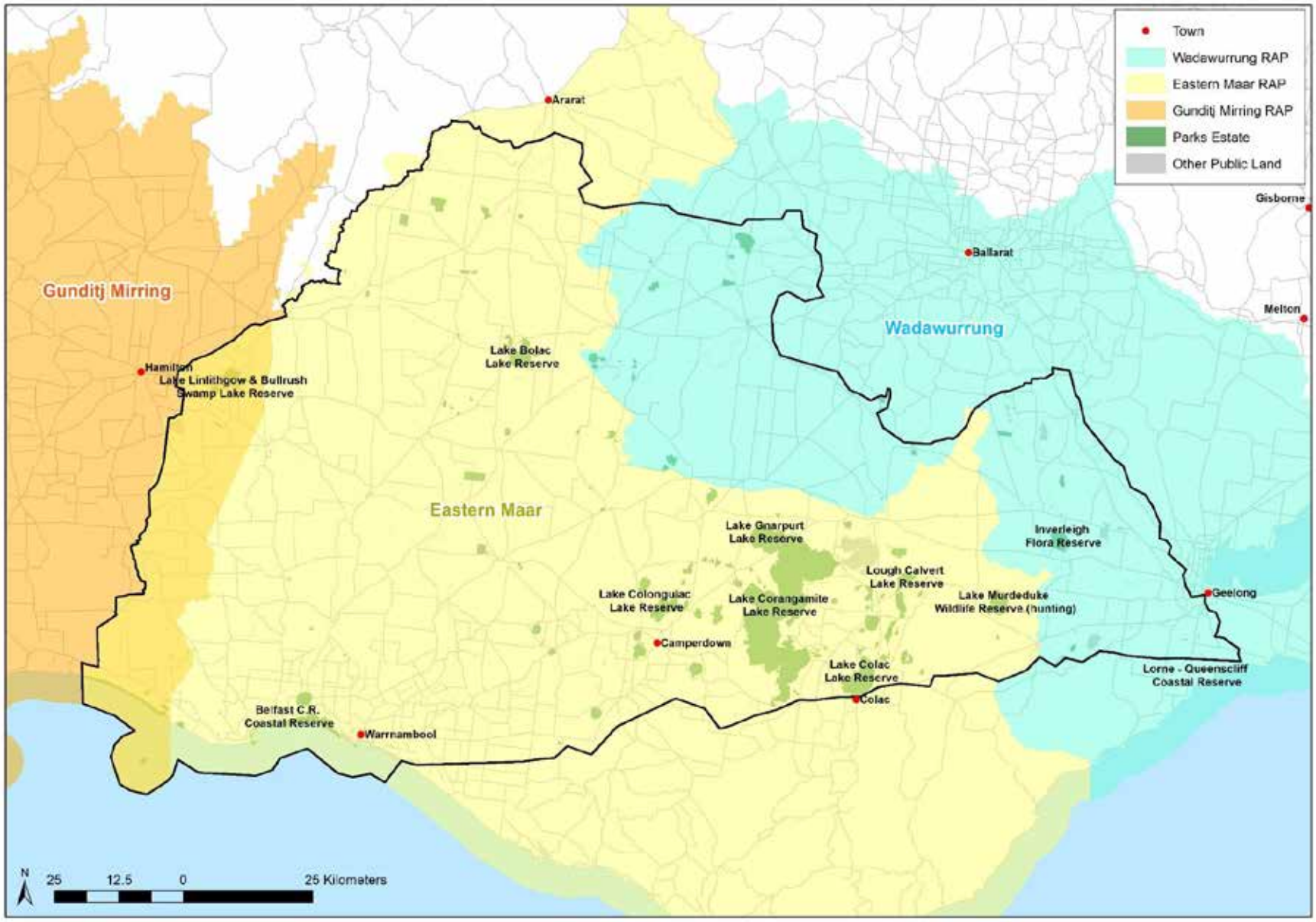


Figure 2.1: Geographic scope of conservation planning for the Western Plains and WetlandsParks Landscape, showing Registered Aboriginal Party (RAP) boundaries.

2.4 Legislative and planning context.

The management of land and water resources, cultural heritage, flora and fauna in the Western Plains and Wetlands 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 several 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 Western Plains and Wetlands 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.

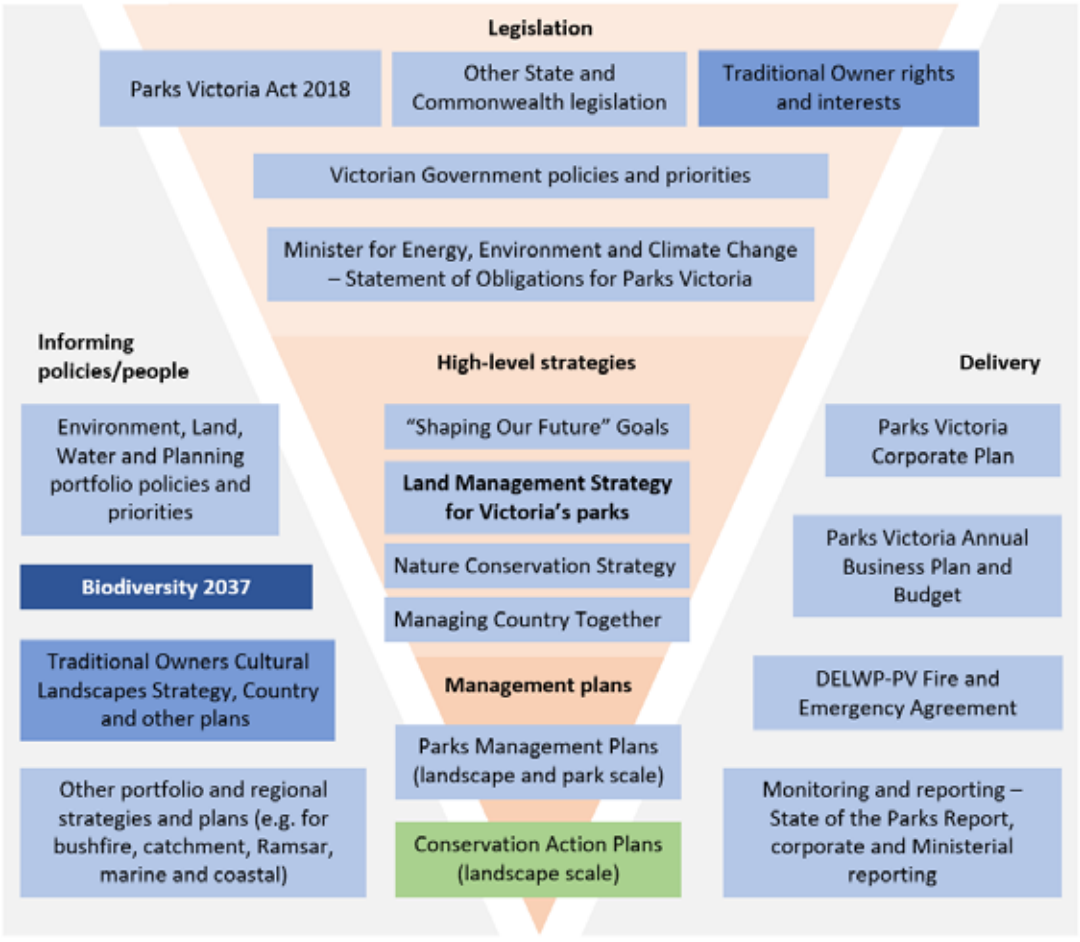


Figure 2.2: Parks Victoria's planning and management context

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

The Convention on Wetlands of International Importance, called the Ramsar Convention, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. Victoria has 12 Ramsar-listed sites, one of which occurs in the Western Plains and Wetlands Parks Landscape. The convention obliges contracting parties to manage Ramsar sites in such a way as to maintain their ecological character equivalent to that at the time of listing.

The primary purpose of management of a declared Ramsar wetland (as outlined in the Australia's Environment Protection and Biodiversity Conservation Regulations 2000) must be:

a) to describe and maintain the ecological character of the wetland; and
b) to formulate and implement planning that promotes:
    i. conservation of the wetland; and
    ii. wise and sustainable use of the wetland for the benefit of humanity in a way that is compatible with maintenance of the natural properties of the ecosystem.

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

- Twenty-nine hectares of marine protected area.
- 32 653 hectares of parks and reserves in the Parks Landscape are listed under the Ramsar Convention, which declares areas as internationally important wetlands.
- Nature Conservation Reserves make up 989 hectares. There are 29 058 hectares of other parks and reserves under various legislation, such as Regional Parks and Natural Feature Reserves.

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 the 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

Threatened Species Action Plan 2022-2032

The *Threatened Species Action Plan 2022-2032 (DCCEEW 2022)* sets out the Federal Government's pathway for threatened species conservation and recovery for the period to 2032. The plan prioritises 110 species

and 20 places for conservation. These species and places have been identified to drive action and focus conservation effort where it is needed most.

Seven of the priority species identified in the plan occur in the Western Plains and Wetlands Park Landscape. These are: Australasian Bittern, Hooded Plover, Orange-bellied Parrot, Swift Parrot, Southern Bent-wing Bat, Growling Grass Frog and Adamson's Blown-grass. The Western Victorian Volcanic Plain is also part of one of the 20 priority places to focus actions to improve condition.

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 2017).

Strategic Management Prospects

Under *Biodiversity 2037*, the Strategic Management Prospects (SMP) tool is a component of the Department of Environment, Land, Water and Planning's *NatureKit* (DELWP 2019). 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 several objectives and actions from the Corangamite and Glenelg-Hopkins Regional Catchment Strategies (RCS), in relation to the following assets:

- Threatened species and communities.
- Native vegetation.
- Wetlands and rivers.
- Marine and Estuaries.

This plan will support the priority directions for these RCS themes by:

- improving conservation status of threatened species and communities in the Western Plains and Wetlands Parks landscape
- improving quality of native vegetation in the Western Plains and Wetlands Parks landscape
- maintaining extent and quality of significant native vegetation within the Western Plains and Wetlands Parks landscape
- maintaining integrity of biota and habitat within the Western Plains and Wetlands Parks landscape marine protected areas
- maintaining water quality across the Western Plains and Wetlands Parks landscape particularly in regards reducing impacts on freshwater, estuarine and marine values.

Other information sources

Other plans and documents that have informed this CAP include (but are not limited to):

- Belfast Coastal Reserve Management Plan (Parks Victoria 2018)
- Belfast Coastal Reserve Management Plan Review (Parks Victoria 2022)
- A collaborative landscape plan for the Victorian Volcanic Plain. Summary report. (Greening Australia and Trust for Nature 2015)

- Western District Lakes RAMSAR site: Strategic Management Plan (DNRE 2002).
- Corangamite Waterway Strategy 2014-2022 (CCMA 2014)
- Merri Marine Sanctuary Management Plan (Parks Victoria 2007)

2.6 Participation

A series of conservation action planning workshops were held to support the planning process for this Conservation Action Plan. Conservation action planning is undertaken collaboratively between corporate and regional staff.

The success of the workshops and associated follow-up meetings and feedback drew from the great depth of knowledge and experience of contributors, including regional staff, Catchment Management Authorities, Department of Energy, Environment and Climate Action, technical experts, and Traditional Owners.

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 *Shaping our Future* goal for conserving its special places, is an aspirational statement that describes the intended outcome of management and the future state of the Western Plains and Wetlands Parks Landscape:

The resilience of natural assets in the Western Plains and Wetlands Parks Landscape is increased and ecosystem services are maintained in the face of climate change and other stressors.

The Parks landscape is fragmented and dispersed. While there are areas that are relatively intact and in good condition, the post-settlement history of the landscape, and its extensive use for agriculture has heavily influenced the vegetation and faunal communities that remain. In particular, the volcanic plains grasslands and grassy woodland communities cover less than 5% of their original distribution and, due to their small size, are facing continual pressure from weeds, feral animals and human activities. Grazing and water use, and diversions continue to impact on the condition of wetlands.

The aims are therefore to minimise the impacts of human interactions in coastal and marine environments and protect the marine biota and avifauna dependent on these habitats; to maintain hydrological function to support wetland and riparian habitats as far as is possible in a warming and drying climate and to improve the condition of grassland vegetation communities and have viable populations of threatened species.

Great Egret

4 Conservation assets

The Parks Landscape is divided into five *conservation assets* (Figure 3.1) or habitat types, according to similarities in biodiversity and natural values, and management drivers. The basis for this classification is described at Appendix C, and the component EVCs and EVDs that make up each conservation asset are listed in Appendix D. Although Merri Marine Sanctuary is made up of four individual marine assets, it has been considered as one conservation asset for the purposes of this plan.

Conservation Asset	Area (hectares)
Dry Forest and Woodland	3028
Lakes and Wetlands	49 412
Grassland	707
Coastal and Estuarine	772
Merri Marine Sanctuary	25

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.

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. Finally, the relevant strategy (abbreviated) is listed, for which the full strategy name and performance measures can be found in Table 7.1.

KEA	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 are documented in the Monitoring, Evaluation and Reporting Plan.

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 will make restoration or preventing extinction practically impossible.

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)
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

Indicator	Description
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
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
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

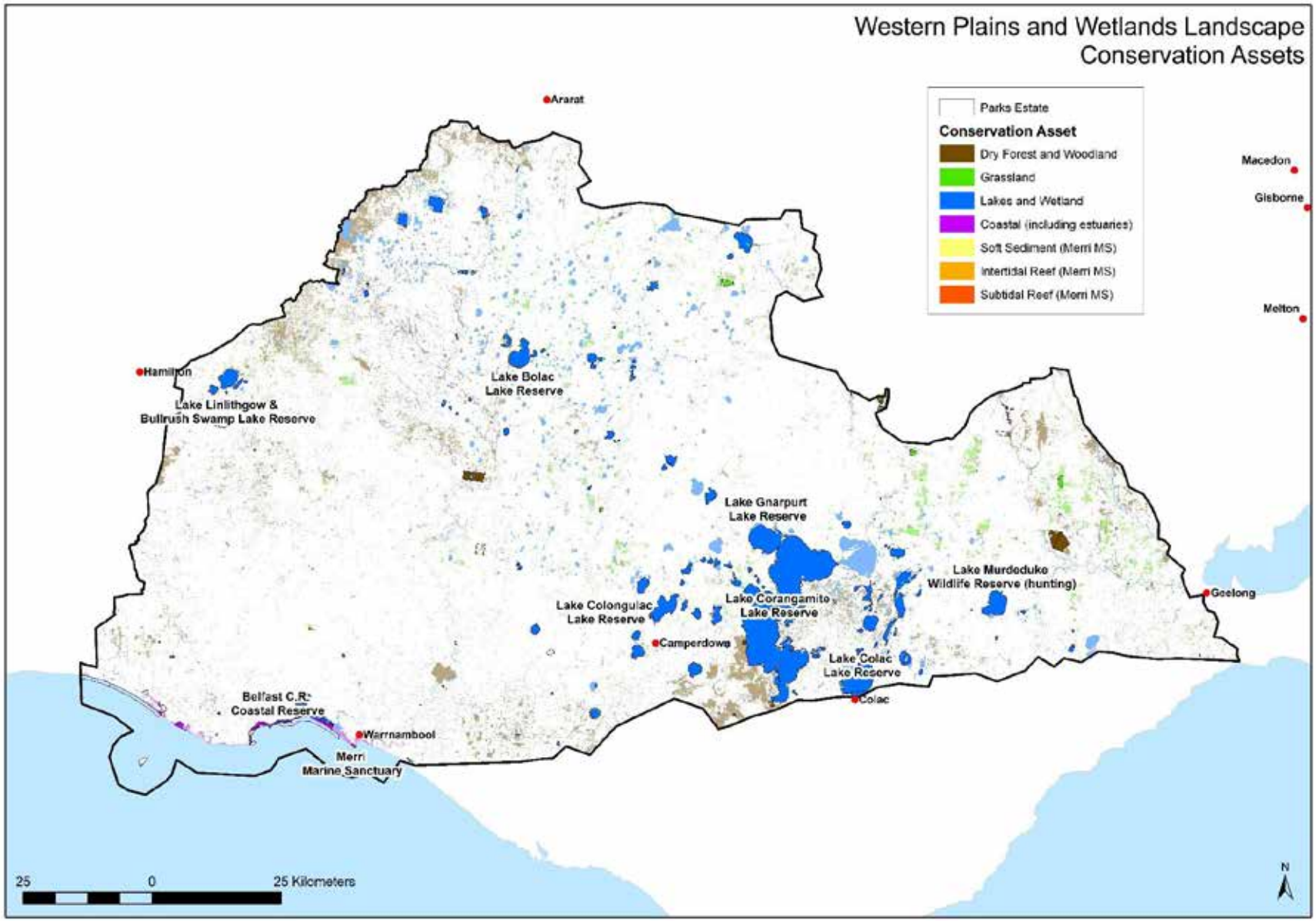


Figure 3.1: Conservation assets in the Western Plains and Wetlands Parks Landscape.

4.1 Dry Forest and Woodland

Dry forests and woodlands were once extensive on the Victorian Volcanic Plain but now comprise mostly small, highly fragmented remnants in a landscape that has been largely cleared for agriculture. Of the approximately 93 000 hectares remaining across the Western Plains and Wetlands Park Landscape, only 3029 hectares (3%) occurs on Parks Victoria estate. Illabarook FR, Cobra Killuc WR, Lake Corangamite, Tower Hill WR and Inverleigh FR are important reserves for this conservation asset. All the EVCs in this asset are endangered or vulnerable and it includes the nationally threatened Grassy Eucalypt Woodland of the Victorian Volcanic Plain.

Within this asset the predominate EVC is Plains Grassy Woodland (EVC 55_61). It is an open eucalypt woodland with a tree canopy typically dominated by River Red Gum over an open to sparse ground layer of grasses. Other canopy species may include Grey Box, Yellow Box, Swamp Gum and Manna Gum. This EVC is closely related to Plains Grassland and shares similar grass and herb ground vegetation. Parks important for these EVCs include Cobra Killuc WR, Inverleigh FR and Illabarook FR.

Volcanic woodland EVCs represent approximately one quarter of Parks Victoria land in the Western Plains and Wetlands. They are primarily Stony Rises Woodland (EVC 203) and Cinder Cone Woodland (EVC 644). Both are a eucalypt woodland on stony rises (highly irregular terrain on recent basalt flows) or tuff (volcanic ash) volcanoes in the case of cinder cone woodland. The soils of volcanic woodlands are fertile and well-drained but shallow or skeletal with limited soil development outside of rock-cracks. Vegetation consists of mainly Manna Gums, Swamp Gums and Blackwoods with diverse understory species such as Dogwood, Tree Violet, Bursaria and Tussock Grass. A large portion of volcanic woodlands EVCs is found in the Tower Hill Wildlife Reserve and Lake Corangamite Lake Reserve.

Damp-sands Herb-rich Woodland (EVC 3) and Grassy Woodland (EVC 175) also occur in this asset. Damp-sands Herb-rich Woodland is a low grassy or bracken dominated eucalypt forest or woodland typically including a canopy of Brown Stringybark over an understory of trees and shrubs such as Blackwood, Prickly Tea-tree and Silver Wattle with a ground layer of herbs and grasses. Grassy Woodland is a variable open eucalypt or occasionally Sheoak/Acacia woodland to 10m tall over a diverse ground layer of grasses and herbs. Typical species include Manna Gum, Narrow-leaf Peppermint, Drooping Sheoak and Lightwood with Sweet Bursaria, Tree Violet, Common Wallaby Grass and Weeping Grass.

Dry Forest and Woodland provides important habitat for a range of fauna species including reptiles and amphibians (Corangamite Water Skink, Striped Legless Lizard, Growling Grass Frog), ground-dwelling and arboreal mammals (Southern Brown Bandicoot, Southern Bent-wing Bat) and a large number of threatened flora species. It is particularly important for woodland birds. The Temperate Woodland Birds Conservation Action Plan (2020) identifies 51 bird taxa for active management that are dependent on woodland or open forest for their survival and are in decline. Nineteen of these have been recorded in the broader WPW CAP landscape with the small remaining patches of remnant woodlands within parks and reserves important areas for refuge, seasonal feeding, movement and breeding.

Drivers of condition in this asset are the timing and intensity of fires, grazing pressure, fragmentation, weed invasion and predation. Grazing by rabbits, livestock and kangaroos, too frequent fires and weed encroachment inhibit natural regeneration, altering the age structure of native vegetation and reducing the long-term viability of foraging and nesting resources. These threats also reduce the extent and diversity of native groundcover species.

Nested assets

Nested asset	Examples of components
Threatened EVCs	Plains Grassy Woodland, Stony Rises Woodland, Cinder Cone Woodland, Scoria Cone Woodland
Significant flora	Dwarf Spider-orchid, Woodland Leek-orchid, Purple Diuris, Limestone Spider-orchid, Clover glycine, White Sunray, Spiny Peppercress, Hairy Tails, Basalt Leek-orchid, Western Gaping Leek-orchid
Woodland birds	Diamond Firetail, Scarlet Robin, Dusky Woodswallow, Crested Shrike-tit, Eastern Jacky Winter, Flame Robin, Brown-headed honeyeater, Purple-crowned Lorikeet, Gang-gang Cockatoo
Significant fauna	Corangamite Water Skink*, Striped Legless Lizard*,

*Listed as a threatened species under the *Environment Protection and Biodiversity Conservation Act 1999*

Condition

Key ecological attributes	Indicator	Current condition	Current trend	KEA Goal	Strategy abbrev.
Understory vegetation	Intactness Structure	Poor	unknown	Weed cover less than 30% 50% of lifeforms are represented at key sites (Inverleigh, Cobra Killuc, Illabarook)20% bare ground	Fire Weeds Herbivores
Woodland canopy species	Growth stage distribution Tree density	Poor	↘	All growth stages of canopy trees are represented, and canopy tree density is between 8 and 15/ha at key sites of Inverleigh, Cobra Killuc and Illabarook	Fire Herbivores
Woodland birds	Site occupancy	Fair	↘	Site occupancy of woodland bird species is improved	Fire Herbivores

Conservation outcome

Dry Forest and Woodland	Current condition	Desired trend	Desired condition
By 2038, improve vegetation structure and composition of Dry Forest and Woodland EVCs, and species diversity of woodland birds in priority areas of Inverleigh FR, Cobra Killuc WR, Illabarook GR, Floating Islands FFE and Pomborneit Nth NCR.	Poor		Fair

4.2 Grassland

The open and fertile grassy plains of the Victorian Volcanic Plains once widespread have now been reduced to a few small, fragmented reserves. The Grassland Conservation Asset covers around 700 hectares of the Western Plains and Wetlands Park Landscape scattered over more than 40 isolated reserves in relatively small amounts and varying condition. The grasslands on the western volcanic plains once had enough food and resources for the Wadawurrung people to live all year round. Roots and tubers from Murnong (Yam Daisy) and Bulbine Lilies along with grasses were harvested for food (Wadawurrung Traditional Owners Corporation, 2020). However, the native vegetation of the Victorian Volcanic Plains Bioregion is one of the most depleted in Victoria.

The Grassland asset is almost entirely Plains Grassland EVC, with a small amount of Plains Grassland/Plains Grassy Woodland Mosaic. It is largely limited to the Victorian Volcanic Plain bioregion, with pockets in the Otway Plain, Dundas Tablelands and Central Victorian Uplands. Plains Grassland occupies flat to undulating plains with occasional stony rises and is limited to soils associated with Quaternary Basalt. This conservation asset also contains the critically endangered under the EPBC Act *Natural Temperate Grassland of the Victorian Volcanic Plain*.

Native grasslands on the Victorian Volcanic Plain are largely dominated by one or more tussock forming grasses, including Kangaroo Grass, with wallaby grasses and spear grasses on drier sites and Tussock-grasses in areas of higher rainfall. A variety of native herbs, including Blue Devil, Lemon Beauty-heads, Pink Bindweed, Featherheads and Cut-leaf Goodenia may be interspersed among tussocks. Tree cover and shrubs are usually sparse or absent. Species may vary depending on annual rainfall. Plains Grassland and Plains Grassy Woodland communities are closely related and often intergrade. They share a similar grass and herb ground vegetation but differ with respect to the presence of woody vegetation.

The grassland conservation asset also supports a number of threatened flora and fauna species including EPBC listed Spiny-rice Flower, Striped Legless-lizard, Corangamite Water Skink, Growling Grass Frog, Golden Sun Moth, Matted Flax-lily. Grassland reserves important for the protection of these threatened flora and fauna species include Blacks Creek NCR, Mt Mercer NCR, Boonderoo NCR and Cressy Flora Reserve.

Grassland condition is shaped by recent management history, with fire frequency and occurrence and intensity of grazing determining species presence and diversity. Disturbance regimes, such as fire and grazing to reduce biomass and maintain inter tussock spaces, play a vital role in maintaining biodiversity values. The lack of appropriate burning or grazing regimes is a significant threat to the integrity of the reserves. For grasslands dominated by Kangaroo Grass the absence of fire or increasing time-since-fire have significant consequences for ecosystem diversity and functioning (Morgan & Lunt, 1999)

Weeds, particularly fast-growing perennial grasses such as *Nasella* species, can rapidly invade disturbed soils and degraded grasslands, outcompeting and displacing native grasses and herbs.

Nested assets

Three nested assets have been identified for this asset.

Type of asset	Examples of components
Threatened grassland EVCs and communities	Plains grasslands, Plains Grassland/Plains Grassy Woodland Mosaic, *Natural Temperate Grassland of the Victorian Volcanic Plain*
Threatened flora	Salt-lake Tussock Grass*, Spiny Rice-flower*, Small Milkwort, Slender Bindweed, Clover Glycine*, Spiny Peppercress*, Basalt Peppercress*
Threatened fauna	Striped Legless Lizard*, Brolga, Tussock Skink, Fat-tailed Dunnart, Growling Grass Frog*

* Listed as nationally threatened under the EPBC Act.

Condition

Key ecological attributes	Indicator	Current condition	Current trend	KEA goal	Strategy abbrev.
Grassland vegetation structure	Inter-tussock spaces (biomass score)	Fair	?	Maintain structural heterogeneity at priority grasslands	Grassland Fire Weeds
Grassland composition	Species richness of flora	Poor	→	No decline in species richness in priority grasslands	Grassland Fire Weeds
Plains Grassland	Extent (within reserves)	Poor	→	Maintain current extent of plains grassland	Weeds
Threatened grassland species	Population size	Fair	?	Maintain viable populations of priority threatened species	Grassland Fire Weeds
Intactness	Distribution and density of invasive plants	Unknown	?	Improve intactness of plains grassland at priority sites	Weeds Fire

Conservation outcome

Grassland	Current condition	Desired trend	Desired condition
Over the 15 years to 2038 maintain grassland structure, extent and species richness of grassland communities. Maintain viable populations of threatened flora and fauna species.	Fair	→	Fair

4.3 Lakes and Wetlands

The waterbodies of the Western Plains and Wetlands Park Landscape have been shaped from volcanic activity with the flat to undulating plains scattered with volcanic features containing numerous lakes and wetlands. Formed in volcanic craters, depressions due to lava collapse and where drainage patterns have been interrupted by lava flows, the lakes and wetlands are a distinctive and defining feature of the landscape.

The Lakes and Wetlands conservation asset encompasses 49 076 hectares primarily on the Victorian Volcanic Plain Bioregion. It is dominated by both permanent and ephemeral lakes and wetlands from hypersaline to freshwater. Also included is swamp scrub which is the dominant riparian EVC associated with lakes and wetlands (both fresh and saltwater) in this landscape.

The vast majority (around 43 000 hectares) of wetlands within the park landscape are saline wetlands. These are spread across the Victorian Volcanic Plains and Dundas Tablelands Bioregions. They are largely influenced by topography, and many are fed by groundwater, the most notable being the lakes of the Western District Lakes Ramsar site which contains Lake Corangamite, the largest inland permanent saline lake in Australia (DCCEEW, 2005).

Saline wetlands are dominated by the classification 'Water body – salt' with over 40 000 hectares, over half of which is Lake Corangamite. The predominant vegetation community is Saline Lake Aggregate, a collective label for various zones of vegetation associated with the floors and verges of saline waterbodies. It can include Saline Aquatic Meadow (EVC 842), Plains Saltmarsh Aggregate (EVC 888), Brackish Herbland (EVC 538), Brackish Sedgeland (EVC 13) and, on drier verges, Brackish Grassland (EVC 934) and Brackish Shrubland (EVC 973). Typical species can include Beaded Glasswort, Austral Seablite, Wallaby Grasses, Sticky Saw Sedge, Gahnia and Round-leafed Wilsonia.

Saline Lake Aggregate is found in a number of lakes and wetlands in the landscape with the largest areas occurring in Lake Terrinallum WR and Lake Eyang WR.

Brackish Lake Aggregate EVC is a collective label for the various zones of vegetation associated with the floors and verges of brackish lakes. Only two reserves in the landscape have this vulnerable EVC, Lake

Linlithgow and Bullrush Swamp LR and Lake Barnie Buloke WR. Typical components include Brackish Aquatic Herbland (EVC 537), Brackish Herbland (EVC 538), Brackish Lakebed Herbland (EVC 539) and Brackish Wetland Aggregate (EVC 656). Salinity can increase during drying phases and species include Fleshy Pratia, Small River Buttercup, Round-leaf Wilsonia and Stoneworts. Scattered Red Gum trees may be present around outer fringes.

Freshwater wetlands are scattered in smaller reserves across the landscape. The majority are permanent freshwater wetlands usually 1 m deep and retaining water for longer than 12 months, however they can have periods of drying. The vegetation is predominantly Aquatic Herbland/Plains Sedgy Wetland with smaller areas of Freshwater Lake Aggregate, both endangered. Aquatic Herbland/Plains Sedgy Wetland Mosaic occurs across both the VVP and Dundas tablelands bioregions and is a mosaic of vegetation in permanent to semi-permanent wetlands. These include seasonally wet depressions on volcanic and sedimentary plains with primarily sedgy-herbaceous vegetation and sometimes with fringing eucalypts or paperbarks. Species can include Soft Tig-rush, Floating Pondweed and Running Marsh-flower and locations include Mt William Swamp (The Big Swamp) WR, Tower Hill WR, Lake Purrumbete WR and Lake Weering LR.

Ephemeral freshwater wetland EVCs of Plains Sedgy Wetland and Plains Grassy Wetland occur in very small amounts across a number of reserves, with Lake Corangamite LR, Mortlake Common FR and Lake Buninjon WR having the largest areas. These endangered EVCs occur in shallow seasonal wetlands of fertile lowland plains and include grasses (Swamp Wallaby Grass, Common Blown-grass, Common Spikerush) and a diverse herbaceous component including Murnong Yam Daisy, Swamp Billy Buttons and Prickfoot.

The predominant riparian component of the Western Plains and Wetlands Landscape is the fringing vegetation of lakes and wetlands, Swamp Scrub and Swamp Scrub/Aquatic Herbland Mosaic EVCs.

Swamp scrub is a dense shrubby vegetation dominated by Swamp Paperbark and Woolly Teatree frequently waterlogged for extensive periods. Where it occurs with Aquatic Herbland herbaceous aquatic species such as Running Marsh Flower, Watermilfoils, Giant Water Ribbons and Water Primrose may also be present.

Lake Corangamite LR has the largest area of Swamp Scrub and Belfast CR has the most significant area of the Swamp Scrub/Aquatic Herbland Mosaic

There are also small areas of Floodplain Riparian Woodland and Streambank Shrubland scattered across creeks and lakes.

Western District Lake Complex Ramsar Site

The Western District Lakes Ramsar Site, which was listed as a Ramsar Site in 1982, consists of nine separate lakes located on the volcanic plains. The lakes are large, relatively shallow and dominated by open water. They are a mix of fresh and saline and are both rainfall/runoff and groundwater fed systems.

Critical services/benefits for the Western District Lakes Ramsar Site include diversity of wetland types, physical habitat for feeding, breeding and moulting of waterbirds, priority wetland species and threatened species. The Ramsar site supports over 20 bird species that are listed under international migratory bird agreements with China, Japan and South Korea. Lake Corangamite also supports a breeding colony of Australian Pelican when conditions are favourable.

The Ramsar site supports two nationally threatened wetland dependent plant species: Salt Tussock Grass and Spiny Peppercress both listed as vulnerable under the EPBC Act. These two plants are limited in distribution and within Victoria only occur on the Victorian Volcanic Plain.

The saline and freshwater lakes and wetlands in the Lakes and Wetlands Conservation Asset support important feeding grounds for migratory and resident birds including Banded Stilts, Red-necked Avocet and Brolga. The larger, deeper and more permanent lakes provide important habitat for aquatic species like fish and waterbirds, such as Freckled Duck, Pelican, Royal Spoonbill and Yarra Pygmy Perch. These larger lakes and wetlands are also important drought refuges.

The condition of lakes and wetlands is governed primarily by the availability and quality of water. Changes to flow regimes and the prevention of natural fluctuations exacerbated by climate change leading to rising salinity levels can result in changes to the biota and loss of invertebrates important as a food source for birds. This is exacerbated by loss of fringing vegetation due to illegal grazing and cropping.

Poor water quality caused by nutrient and chemical runoff from surrounding land, soil disturbance and pest plants and animals are all threats to wetland function. The condition of wetland vegetation is particularly important for maintaining water quality as well as providing habitat for wildlife.

The landscape also encompasses 26 wetlands of National Importance. Nationally important wetlands must meet several listing criteria which include species habitat, ecosystem function and cultural significance.

Nested assets

Six nested asset types have been identified for this asset.

Type of asset	Examples of components
Resident waterbirds	Brolga, Musk Duck, Blue-billed Duck, Banded Stilt, Freckled Duck, Brolga, Black-winged Stilt, Great Egret, Magpie Goose
Migratory waterbirds	JAMBA, CAMBA, Ro KAMBA spp., Curlew Sandpiper,
Colonial nesting birds	Australian Pelican, Straw-necked Ibis, Australian White Ibis, Royal Spoonbill
Fauna	Growling Grass Frog*, Australasian Bittern*, Corangamite Water Skink*, Orange-bellied Parrot* Australian Short-finned Eel, Rakali
Threatened flora	Salt-tussock grass*, Spiny Peppercress*
Threatened EVCs	Aquatic Herbland/Plains sedgy wetland Mosaic, Swamp scrub, Freshwater Lake Aggregate, Swamp scrub/Aquatic Herbland Mosaic, Plains sedgy wetland

* Listed as nationally threatened under the EPBC Act.

Condition

Key ecological attributes	Indicator	Current condition	Current trend	KEA goal	Strategy Abbrev.
Wetland vegetation extent	Extent of Swamp Scrub and saltmarsh communities	Fair	↘	No decline in extent of swamp scrub and saltmarsh communities	Water Weeds
Water regime	Frequency and duration of inundation – Water regime index	Poor	→	No change in wetland hydrological type for any Ramsar wetland	Water

Key ecological attributes	Indicator	Current condition	Current trend	KEA goal	Strategy Abbrev.
Wetland extent	Extent index – maximum inundation	Poor	→	No decrease in wetland extent outside normal fluctuations	Water
Resident waterbirds	Abundance	Fair (resident) Good (vagrant)	→	Total waterbird numbers not less than 2800 during summer in a minimum of three years in any five-year period	Water Weeds Visitors
Migratory shore birds	Presence of key species	Fair	→	Presence o Curlew Sandpiper, Red-necked Stint and Sharp-tailed Sandpiper within the Ramsar site in at least one in every five years.	
Wetland condition	Index of Wetland Condition	variable	→	Maintain or improve wetland condition score for Nationally Important Wetlands	Water Weeds

Conservation outcome

Lakes and Wetlands	Current condition	Desired trend	Desired condition
Over the 15 years to 2038 maintain the water regime and wetland extent of priority wetlands (Nationally Important Wetlands and Ramsar) and the extent of endangered wetland vegetation communities. Maintain the abundance and diversity of resident waterbirds.	Fair	→	Fair

4.4 Coastal and Estuarine

The Coastal and Estuarine conservation asset encompasses approximately 771 hectares predominately coastal dune scrub with a small area of estuarine wetland. It occurs entirely in the Warrnambool Plain bioregion and stretches along the coast west of Warrnambool. This asset also includes two Nationally Important Wetlands – Kelly's swamp and Saltwater Swamp.

The coastal dune scrub which dominates this conservation asset (597 hectares) occurs on secondary dunes along ocean and bay beaches. It is a closed scrub of Seaberry Saltbush, Coast Beard-heath, Coast Wattle and Coast Daisy-bush to 3m with a ground cover including Bower Spinach, Small-leaved Clematis and Coast Stackhousia. Coastal dune scrub is the predominant EVC in Belfast Coastal Reserve, Eumeralla (Yambuk) Coastal Reserve and Yambuk Flora and Fauna Reserve. Lady Julia Percy Wildlife Reserve which does not have any EVCs mapped, would most likely also have been primarily coastal dune scrub.

The estuarine wetland EVC, which occurs in Belfast Coastal Reserve and Eumeralla (Yambuk) Coastal Reserve grows on anaerobic peat-rich muds on the edges of estuarine waterbodies such as creeks, and lagoons with intermediate salty conditions. Fluctuating changes in salinity caused by flood and tidal events determine vegetation type which is dominated by graminoids and halophytic herbs such as beaded glasswort, coast-tussock grass and Australian Salt-grass often fringed by Swamp Paperbark at the landward edge.

A wide diversity of birdlife utilises the Coastal and Estuarine asset for nesting, roosting, and foraging. This includes resident shorebirds, including beach-nesting species such as the Hooded Plover, Pied Oystercatcher and Red-capped plovers. Colonial nesting birds including Fairy Prions, Little Penguins and Short-tailed shearwaters also utilise the dense scrub for nesting.

Belfast Coastal Reserve is identified as being one of the most critical sections of coast for breeding and wintering Hooded Plovers as well as other resident shorebirds. It is also important for several EPBC-listed migratory shorebirds such as Sanderling, Sharp-tailed Sandpiper, Double-banded Plover and Ruddy Turnstone. Deen Maar (Lady Julia Percy Island) is home to a significant Australian Fur Seal breeding colony.

The main drivers of condition in this asset are the extent of disturbance, including the level of weed invasion and trampling. This asset is also particularly exposed to sea-level rise, increased storm surge activity, and a warming and drying environment associated with predicted climate change.

Threats to coastal and estuarine communities are changes to waterflows, increased salinity, and grazing and habitat degradation from cattle, sheep and pigs. Degradation of riparian vegetation through stock access and land development impacts water quality. Coastal tea-tree and Marram Grass reduce habitat for threatened plovers and high impact recreational threats including horse riding, off-leash dogs, trail bikes degrade habitat and disturb wildlife.

Nested assets

Five nested assets have been identified for this asset.

Type of asset	Examples of components
Resident shorebirds	Hooded Plover*, Pied Oystercatcher, Red-capped plovers
Colonial nesting birds	Fairy Prion*, Little Penguin, Short-tailed shearwater, Black-faced cormorants
Marine mammals	Australian Fur Seal breeding colony
Estuarine vegetation	Estuarine wetland EVC
Foredune vegetation	Coastal Dune Scrub
Migratory waders	Sanderling, Sharp-tailed Sandpiper, Double-banded Plover Ruddy Turnstone

*Listed as nationally threatened under the EPBC Act

Condition

Key ecological attributes	Indicator	Current condition	Current trend	Condition goal	Strategy abbrev.
Coastal vegetation community	Extent	Fair	→	Maintain current extent of coastal vegetation community	Weeds Visitors
Estuarine vegetation	Extent	Fair	→	Maintain current extent of estuarine vegetation	Weeds Water
Beach nesting birds	Breeding success of pairs Fledging success	Fair	↘	Prevent further decline in breeding success at key sites of Belfast CR, Yambuk FFR and Eumeralla CR	Predation Visitors
Colonial island nesting seabirds	Recruitment	Good	→	Maintain recruitment of colonial nesting seabirds	Predation Visitors

Conservation outcome

Coastal and estuarine	Current condition	Desired trend	Desired condition
Over the 15 years to 2038, maintain the extent of coastal and estuarine vegetation and estuarine fish. Prevent further decline of beach nesting birds.	Fair	→	Fair

4.5 Merri Marine Sanctuary

Merri Marine Sanctuary is 25 hectares and contains a mixture of largely marine habitats, including subtidal and intertidal reef, sandy soft sediments and rocky overhang.

Water quality is a driver of condition in the Merri Marine Sanctuary. It can be influenced by many natural and human-induced factors, from both internal and external sources. For instance, water flows from the extensively modified Merri River estuary empty directly into the Marine Sanctuary, depositing sediment and agricultural and urban run-off into the protected area. Pollution from oil spills can also impact water quality. Physical disturbance such as trampling, illegal recreational activities and marine pests, such as Abalone Viral Ganglioneuritus, are threats to the Merri Marine Sanctuary.

The Merri Marine Sanctuary contains the only marine habitats within the Western Plains and Wetlands Park landscape. The key marine habitats of the Merri Marine Sanctuary are described below consistent with the classification described in section 3.1 (Pocklington et al. 2012).

Unvegetated soft sediment

The intertidal soft sediment is an important feeding and roosting habitat for shorebirds. Beach-washed materials in sandy beach habitats are a significant source of food and contribute to the detrital cycle that nourishes many of the invertebrates living in the sand. It provides important feeding and roosting habitat for 51 threatened bird species such as the Fairy Tern. While marine habitat mapping has been largely restricted to Victorian Marine National Parks and Marine Sanctuaries, the waters of the Belfast Coastal Reserve also encompass large areas of intertidal soft sediment (an important feeding habitat for shorebirds) and areas of subtidal soft sediment, sometimes surrounding gradually sloping intertidal reef e.g., Mills Reef towards Rutledge's Cutting.

Intertidal reef

The large area of gradually sloping intertidal reef is exposed to the frequent large swells of Bass Strait and consequent changes in physical conditions. The predominant intertidal macrophytes include sea lettuce, turfing red coralline algae and the green algae *Caulerpa brownie* with Southern Bull Kelp present on the fringe of the intertidal reef.

Gastropods are the most common invertebrates and comprise over half of the species found in the area. Species include Turban Shell, Cart-rut Shell and Common Periwinkle. Limpets, sea stars, anemones, and

shore crabs are also common. Other species present include brittle stars, chitons, polychaete worms and mussels. In the larger rockpools fish including sweep and wrasse are sometimes found.

Intertidal reef provides important foraging areas for shorebirds and fifty-one shorebirds or seabirds of conservation significance have been recorded in or near the sanctuary, including the endangered Australasian Bittern, Fairy Tern and Little Egret.

Sub-tidal reef

Rocky overhangs and deep gutters of the subtidal reef provide a diverse habitat for many marine species. The brown kelps, Crayweed and Golden Kelp dominate the reef with green and red algae also present. Numerous sponges, brittle stars and soft corals are present. Fish species include sweep, Sea Mullet, Australian Salmon, Leather Jacket, Magpie Perch, eagle rays and Pot-bellied Seahorse live in the crevices and gutters. The subtidal reef within the Merri Marine Sanctuary supports the second highest diversity of algal species in subtidal reefs on the western Victorian coast. A small area of giant kelp occurs west of Middle Island.

Water Column

The water column incorporates non-vegetated zones found above any sub-tidal areas. Invertebrates such as copepods, plankton and jellyfish provide food for reef species and small fish. Large fish, sharks, seals and dolphins also feed in the water-column, and it is an important feeding area for Australasian Gannets, Caspian Terns and Little Penguins.

Nested assets

Five groups of nested assets have been identified for this asset.

Type of asset	Examples of components
Large mobile fish	Draughtboard Shark, Southern eagle Ray
Habitat forming algal communities	Turfing Red-coralline algae, Brown macro algae
Macrocystis community	Giant Kelp
Mobile macro-invertebrates	Gastropods, sea stars, sea urchins, anemones, Giant Cuttlefish
Resident and migratory shorebirds	Red-capped Plover, Pied Oystercatcher, Little Egret, Australasian Bittern*

* Listed as nationally threatened under the EPBC Act.

Condition

Key ecological attributes	Indicator	Current condition	Current trend	KEA goal	Strategy abbrev.
Intertidal habitat forming algae	Spatial extent % Cover of red/green algae	Fair	→	Improve the % cover and spatial extent of turfing red coralline algae	Marine Visitors Water
Subtidal habitat forming algae	% Cover of brown algal canopy	Good	→	Maintain the % cover of brown macro-algae	Marine Water
Resident and migratory shorebirds (intertidal)	Diversity and abundance	Good	→	Maintain diversity and abundance of intertidal resident and migratory shorebirds	Marine Visitors

Key ecological attributes	Indicator	Current condition	Current trend	KEA goal	Strategy abbrev.
Giant Kelp community	% Cover	Fair	→	Maintain the % cover of *Macrocystis pyrifera* community	Marine
Mobile macroinvertebrates	Abundance and size	Good	→	Maintain abundance and size of mobile macroinvertebrates	Marine Visitors Water
Large mobile fish	Species richness and abundance	Good	→	Maintain species richness and abundance of large mobile fish	Marine Visitors

Conservation outcome

Merri marine sanctuary	Current condition	Desired trend	Desired condition
By 2038 improve the patches of habitat-forming algae in the intertidal reef ecosystems and maintain the habitat-forming algae in the subtidal reef, and giant kelp bed.	Good	→	Good

5 Threats

Identifying priority threats to conservation outcomes

A broad range of key threats to the conservation assets of the Western Plains and Wetlands 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. Striped-legless Lizard, Hooded Plover, Spiny Peppercress).

Identifying and addressing threats associated with climate change

While there are likely to be many negative aspects of climate change across Victoria's environments, protected areas play a significant role in climate change adaptation and mitigation. Parks and reserves sequester and store carbon while well-managed protected areas are essential to the ability of biodiversity to adapt to future conditions. Climate change impacts the ability of ecosystems to function (e.g. through the reduction in availability of fresh water, and rising ocean levels) as well as causing shifts in species ranges to follow suitable climatic ranges. It 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. Victoria's parks and reserves stand to be particularly affected by climate change because they offer cool climate refuge for many species which already have relict distributions and because the legacy of land degradation and fragmentation precludes many mitigating processes such as migration and clinal adaptation.

Threatening processes associated with climate change have been considered in the way that they compound other anthropogenic threats such as invasive species, or through their direct impacts on habitats 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. In some cases, particularly where climate-vulnerable landscapes are impacted directly? such as coastal and freshwater ecosystems, climate change will have a profound impact on the functioning of these ecosystems to the extent that they may transition into different ecosystem types.

The threat table below (Table 5.1) identifies threatening processes and agents and their relative risk. These threats were considered in the context of key climate projections developed by CSIRO for the Southern Slopes Victoria West sub-cluster (CSIRO 2020). Impacts of future climatic conditions projected with a high or very high degree of confidence were considered as part of the threat identification and analysis process. These include:

- average temperatures increasing in all seasons
- sea level continuing to increase
- less rainfall in winter and spring
- increased intensity of extreme rainfall events
- harsher fire-weather.

Parks Victoria has recently adopted the RAD (Resist-Accept-Direct) framework for managing ecosystems transforming under climate change. This framework considers uncertainty in climate futures by considering multiple climate scenarios, and broadens the traditional focus on resisting ecosystem change by also considering whether accepting change or directing it along a preferred pathway might be more appropriate, as illustrated in Figure 5.1. While the planning process that underpins the RAD framework is under development and has not yet been applied in developing the Western Plains and Wetlands CAP, it may be used in planning responses for specific ecosystems within the landscape, or in periodic reviews of the CAP and its objectives.

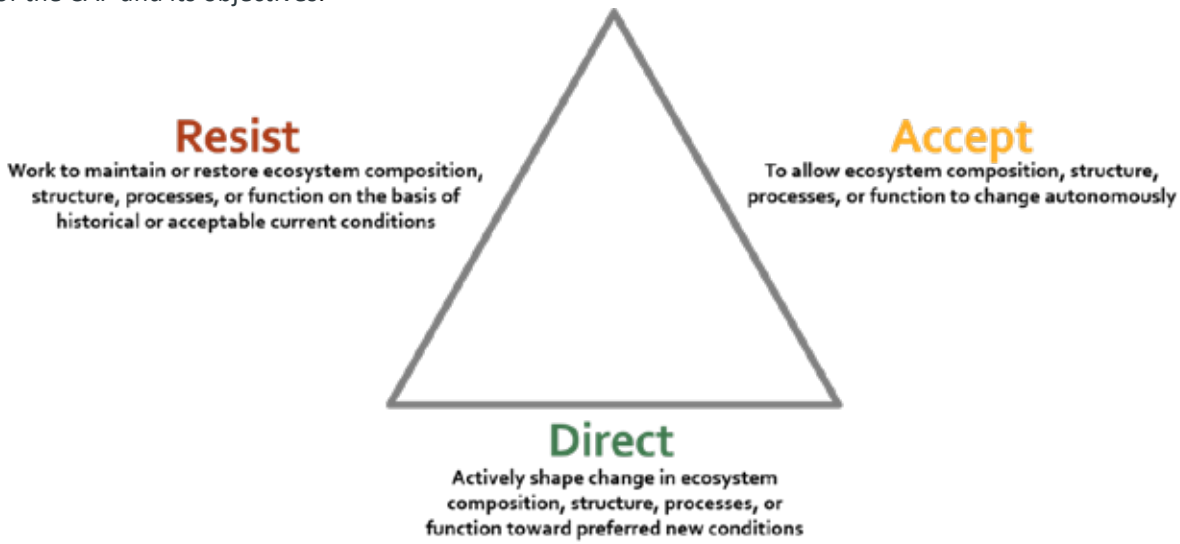


Figure 5.1 The RAD framework's three approaches for making management decisions for systems undergoing ecosystem transformation (USGS 2021)

Priority threatening processes

Of the threatening processes that were assessed in the Western Plains and Wetlands 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 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 Western Plains and Wetlands Parks Landscape

Threatening process	Threat agent(s) and impact	Dry Forest and Woodland	Grassland	Lakes and Wetlands	Coastal and estuarine	Merri Marine Sanctuary
Fire – regimes and management	Fire regimes which are too frequent, infrequent, wrong season/severity/scale, can cause the degradation of habitat, landscape functioning and connectivity. Can also result in a reduced capacity for the landscape to support biodiversity. Fire management actions such as construction of fuel breaks, off-track driving, fire ignition and use of chemicals can cause damage to habitat and areas of Aboriginal and European cultural heritage.	Very High	High			
Alterations to natural hydrology	Aquatic system modifications such as channel modification, dredging, dam-building, etc., disturb microhabitat for aquatic organisms, potentially affecting occupancy and breeding success of fauna species			Very High	Very High	High
	Harvesting or diversion of ground and surface water can impact hydrological processes and the species dependent upon them for reproduction and foraging. Construction of levy banks, dams, jetties, etc., can result in excessive sedimentation and disturbance of the marine habitat.			Very High	Very High	Very High
Extreme weather	Coastal erosion may be increased by more frequent extreme weather events. Storm surges and flooding have the capacity to greatly increase erosion in areas adjacent to the coast.	Very High	High	Very High	Very High	High
Terrestrial weed invasion	Weeds displace native species, alter vegetation structure and impact fire regimes. Transformer weeds have the capacity to change the character, condition, form or nature of ecosystems.	Very High	Very High	High	High	
Diseases	Plant pathogens such as Phytophthora can cause mass dieback of affected species. Animal pathogens such as chytrid fungus and abalone herpes can severely deplete populations and affect threatened species	Mod	Mod	Mod (VH to amphibians)	Mod	Very High
Predation	Decline in populations and abundance of native species due to terrestrial and aquatic predation. Introduced predators can act as disease and weed vectors.	Very High	High	Very High	Very High	
Browsing and grazing	Overgrazing by native herbivores (e.g. macropods) impact on regeneration and recruitment resulting in simplification of vegetation structure and reduced floral diversity. Introduced herbivores (e.g. cattle, deer, pigs, rabbits, goats) impact on the regeneration and recruitment of native species by overgrazing.	High	High	Very High	Mod	

Marine invasive or over-abundant species	Overabundant marine plants and animals, both native and introduced (e.g. Northern Pacific Sea Star, Japanese Kelp, sea urchins) can greatly change the marine environment and affect threatened communities.					Very High
Habitat degradation	Visitor impacts (e.g., horse riding, camping, motorbiking, four-wheel driving, off-track walking, littering, hunting, boating, fossicking) disturb habitat, cause erosion disturb nesting shorebirds and facilitate the movement of weeds and pathogens.	High	High	High	Very High	Very High
	Lack of biomass management in grassland and grassy woodland leads to reduced flora diversity and condition	High	High			
Habitat fragmentation	External impacts from adjoining land use, such as inappropriate development and agriculture, can reduce quality of habitat near edges and reduce available suitable habitat for some species outside of protected areas.	Mod	High	High	Mod	
Natural resource extraction	Legal and illegal natural resource extraction can destroy habitat (e.g., grazing, cropping, firewood collection, track creation) or directly affect species populations (e.g. fishing, shellfish collection).	High	Low	High	High	High
Pollution	Pollution from internal and external sources can cause large-scale death, changes to habitat, loss of flora or fauna, and the introduction of weeds and pathogens	Low	Low	Mod	High	High

5.1 Inappropriate fire regimes and management

Threat description

Bushfires, prescribed burning and fire management activities are a threat to grassland and dry forest and woodland conservation assets in the Western Plains and Wetlands Park Landscape. The threat of fire varies; in some parks/reserves? there is not enough fire to maintain ecosystem health, in others fire is too frequent and reduces habitat quality. Fire intensity can also act as a threat; for instance, high intensity fires can result in the loss of functional elements of an ecological community, such as large old trees. In particularly, repeat fires below minimum tolerable fire interval for an ecosystem are likely to result in decreased ecosystem health and habitat quality.

The Western Plains and Wetlands Park Landscape has not been subject to the large-scale bushfires seen in other areas in recent decades. Due to the often small and isolated nature of the majority of reserves the likelihood of bushfire is low, although any high intensity fire events are likely to impact entire reserves and can potentially take out an entire local population of a species. Fires in this landscape are often smaller but fast moving and may directly kill animals in the path of fire and reduce habitat and food availability of those that survive.

In grasslands and grassy woodlands fire that is too frequent, too hot or at the wrong time for plant life cycles can prevent recruitment of species, kill seeds in the soil, and destroy soil crust bryophytes and other organic matter. Changes in disturbance regimes with the removal of indigenous burning practices and introduction of livestock grazing has had a significant effect in these ecosystems. The loss of fire-dependent and grazing sensitive species has resulted in decreased floristic diversity and led to an increase in exotic species.

The impacts of fire management also contribute to this threat. Fire management activities, such as creating track and control lines for planned-burning and bushfire suppression, can result in loss of important habitat features (e.g. rocks) and damage soil crusts. Management vehicles can also introduce and spread weeds (highly invasive grassy weeds in particular).

Climate change

Climate change is likely to increase fire frequency and intensity and may lengthen fire seasons. Increased fire frequency in Dry Forests and Woodlands may not allow enough time for canopy species to regenerate and burning the already small populations of grassland herbs during flowering may reduce population viability. Loss of habitat because of wildfire in long unburnt coastal areas may also result in the decline of small mammal species.

Threat objective(s)

By 2028 apply appropriate ecological fire regimes to fire-dependent ecosystems. Reduce the negative impacts of other threats (weeds, pathogens and soil disturbance) during and following fire.

This threat is addressed through the Conservation Strategy: **6.1 Fire management for ecological health**.

5.2 Poor water quality inputs and altered hydrology

Threat description

Altered hydrology and poor water quality are considered high to very high threats in the Lakes and Wetlands, Coastal and Estuarine and Merri Marine Sanctuary assets of the Western Plains and Wetlands Park Landscape.

Wetland hydrology drives many wetland processes. The fundamental functions of wetlands are dependent on the maintenance of appropriate water regimes - the timing, frequency and duration of inundation. Changes to one or more of these elements is considered a change in hydrology and can, over time, disrupt natural productive cycles causing changes in vegetation and habitat. The lakes and wetlands within the landscape are dominated by either groundwater inflows or surface water inflows with some being fed by waterways such as Barangarook Creek and Woady Yaloak River.

Inflow obstructions such as farm dams and outflow impediments such as roadways all impact on the natural filling and drying cycles. Water diversion, drainage and harvesting change natural flooding and drying of wetlands altering the structure and function of biota. Reduced inflows exacerbated by climate change has led to increasingly high salinity levels, which can lead to reductions in the invertebrate fauna that resident waterbirds rely upon for food.

Within the Western District Lakes Ramsar site, drainage has been occurring since the 1800s. Diversion schemes such as the Woady Yallock Diversion and Lough Calvert Drainage scheme, have led to reductions in flooding and inflow frequency and, as a consequence, the available habitat for a number of waterbird species. Reduced inflows have also resulted in increasingly high salinity levels, which has previously led to reductions in the invertebrate fauna that resident waterbirds rely upon for food (Hale and Butcher 2011).

Water quality in the lakes and wetlands is largely impacted by agricultural influences on private land. The lakes and wetlands of the volcanic plain are scattered and largely surround by farming land. The main agricultural activities include dairying, stock grazing and cropping leading to pollutants such as fertilisers, organic effluent and other chemicals entering wetlands. Livestock accessing wetland systems can exacerbate erosion, increase nutrient loads and lower water quality. Increased nutrients can result in algal

blooms. In extreme circumstances crashes in algal blooms can lead to fish kills following rapid reduction in oxygen. Localised nutrient increases can lead to changes in aquatic biota.

In the Merri Marine Sanctuary water from the Merri and Hopkins Rivers enters the marine sanctuary. In addition, the Warrnambool wastewater outfall is located west of the sanctuary. The area around the sanctuary is highly modified with a large rural city on the doorstep. Pollutants entering waters around the marine sanctuary including excess metals, nutrients and organic matter can result in algal blooms and loss of sensitive species. Marine pollution (fuel/oil) from commercial and recreational vessels can have catastrophic effects if at a large scale but even smaller fuel spills can have significant localised impacts on marine fauna.

Climate Change

Climate change will have a significant impact on the hydrology of the lakes and wetlands of the Western Plains and Wetlands Park Landscape. Wetlands are among the ecosystems most vulnerable to climate change. Changes in rainfall and increased temperatures will result in more frequent drying of shallower lakes, reduced surface water inflows leading to a decrease in the number and area of permanent and seasonal wetlands, and an increase in the number and area of intermittent wetlands (DSE 2013). These effects may lead to less successful breeding of waterbirds.

In the Western District Lakes Ramsar Site, modelling suggests that there is likely to be lower water levels leading to increased salinity (Hale and Butcher 2011). Management activities to address the effects of reduced rainfall (or other hydrology matters) are limited as there are few opportunities for augmenting inflows.

Threat objective

By 2028 minimise the impact of changes to the hydrological regime as a consequence of adjacent land management activities and climate change.

This threat is addressed through the Conservation Strategy: **6.2 Supporting partnerships to address threats to water-dependent assets**.

5.3 Weed invasion

Threat description

Invasive plants, or weeds, are a high to very high threat to terrestrial conservation assets of the Western Plains and Wetlands Park Landscape. Invasive plants compete with native plant species for resources and alter the structure and function of habitat. Woody species such as boxthorn also provide harbour for foxes and rabbits.

The threat of weed invasion varies across this Parks Landscape. For instance, grassy ecosystems are largely affected by perennial grassy weeds, including Tall Wheat Grass, Phalaris, Serrated Tussock, Chilean Needle Grass and Texan Needle Grass. These highly invasive species can rapidly out-compete and smother native ground layer species as the gaps between tussocks that are necessary for recruitment by native species become occupied by weeds instead. Annual grasses such as Wild Oats, Ryegrass and Quaking Grasses and herbaceous weeds such as Blanketweed, Capeweed, Onion Weed and thistles are also issues within grasslands and grassy woodlands.

In coastal areas Marram Grass, introduced to stabilise dunes, out competes native vegetation such as indigenous spinifex. Marram Grass and Sea Spurge can alter the shape and ecology of foredunes and make habitat less suitable for Hooded Plovers, which prefer open sand areas for nesting (Glenelg-Hopkins CMA 2008). Woody species such as Coast Wattle and Coast Tea-tree can dominate coastal dune scrub. Coastal wetlands are impacted by Spiny Rush, Tall Wheatgrass and Sicilian Sea-lavender.

Grassy and woody weeds occur around the fringes of lakes and wetlands. Within the Western District Lakes Ramsar site, introduced pasture species (largely Tall Wheat Grass, Phalaris and Sweet Vernal Grass) occur on shorelines, while woody weeds such as Boxthorn, Bathurst Variegated Thistle are also present. By displacing native shoreline vegetation, these species reduce the availability of critical waterbird habitat and are a threat to the saltmarsh communities adjoining the lake.

Weeds can be spread in many ways but avoidable methods such as lack of appropriate hygiene practices for vehicles, mowers, slashers and other equipment is of particular concern. Mechanical works, such as fire prevention and management activities, create opportunities for weed invasion through soil disturbance and the spread of seed on equipment. Implementing effective hygiene practices for vehicles and equipment is essential in preventing new infestations and extending existing infestations.

Weeds on private land can be a significant source of both infestation and reinfestation to parks and reserves and in such a fragmented landscape as the Western Plains and wetlands a collaborative approach to management across land tenures is essential to increasing the health of vegetation assets.

Climate change

Climate change will favour species adaptable to a wide range of conditions, which is usually characteristic of invasive plants. Introduced plants that are currently not considered invasive could become so as conditions change.

Threat objective

By 2028, prevent new and emerging weeds from establishing in the landscape, contain the spread of identified established populations, and eradicate high-priority species from high value locations.

This threat is addressed through the Conservation Strategy: **6.3 Environmental weed control using a biosecurity approach**.

5.4 Terrestrial grazing, browsing and trampling.

Threat description

Introduced herbivores that graze and browse on native vegetation are a high threat in grasslands and grassy woodlands and a very high threat in the lakes and wetlands and coastal assets.

Overgrazing and browsing degrades vegetation communities by reducing native plant diversity, altering the structure of vegetation and reducing habitat resilience to disturbances such as fire and prolonged drought. Grazing can have a significant impact on threatened flora species and change the composition of vegetation by selective grazing on more palatable species. Introduced herbivores can also cause damage to soils, cause erosion and spread weeds.

Rabbits are widespread in the Western Plains and Wetlands landscape. In dry forests and woodlands without active management, canopy seedlings and saplings can be severely damaged or killed by selective grazing by rabbits. Grassy understory species also suffer from grazing and browsing pressure, compounded by competition with weedy plant species.

Over-grazing by rabbits on the fringes of lakes and wetlands has contributed to the loss of native perennial flora from the ground layer, particularly at Lakes Beeac, Corangamite, Gnarpurt and Colongulac (Dept Natural Resources and Environment, 2002) Scratching and burrowing by rabbits can exacerbate erosion caused by wave action, adding to sedimentation and contributing to poor water quality. Sandy soils in coastal areas are favoured habitat for rabbits and they can exacerbate fragmentation and vegetation impacts caused by recreational activities.

Large, introduced herbivores also have an impact on the Western Plains and Wetlands Landscape. Highly fragmented natural habitats, surrounded by farming and agriculture, have meant that livestock have traditionally accessed wetlands, grasslands and grassy woodlands. While licensed grazing by domestic stock can assist in the control of biomass, it has also contributed to the long-term modification of the structure and composition of the vegetation within the Western District Lakes Ramsar site and grassy ecosystems in the Western Plains and Wetlands Parks Landscape. Livestock selectively graze and trample

wetland vegetation communities and although stock has been excluded in many areas, the majority of lake islands and margins are still exposed to impacts by livestock.

Deer are not widely distributed in this landscape – largely due to the small and fragmented nature of the parks and reserves. Where deer do occur, they graze on and destroy native vegetation, reducing diversity and spreading weeds. They also compete with native wildlife for food sources. In this landscape deer have been recorded in coastal areas, lakes and wetlands, and grassy woodlands.

Feral pigs are present in a number of parks and reserves. As omnivores, pigs eat a wide range of food including plants, fish, frogs, birds, eggs, and they modify vegetation through feeding, trampling and wallowing. They can also be vectors for spreading weeds and pathogens such as *Phytophthora*. Pigs are a particular risk to wetlands and riparian areas given their preference to live in moist habitats so species that are restricted to wetlands are particularly vulnerable to damage by pigs. Pigs are generally localised and often the result of illegal releases.

Managing introduced herbivores to reduce their grazing and browsing impacts is necessary to promote the successful regeneration of canopy species, increase the diversity of plants and animals, and improve overall vegetation cover and complexity.

Climate change

The expected impact on the distribution and abundance of terrestrial browsing and grazing species as a result of climate change may favour adaptable pest species that tolerate a wider range of conditions, leading to establishment of herbivores in areas not currently impacted.

Threat objectives

By 2028, reduce grazing, browsing and trampling pressure on priority vegetation communities from rabbits, livestock, pigs, and deer, including by eradicating island pest populations and the exclusion of livestock.

This threat is addressed through the **Conservation Strategy: 6.4 Terrestrial herbivore management**.

5.5 Predation

Threat description

Predation by introduced animals – primarily cats and foxes – threatens a range of fauna in the Western Plains and Wetlands Parks Landscape. Foxes and cats threaten ground-dwelling and nesting fauna including woodland water and shore birds, small mammals and reptiles. Introduced aquatic predators are also a threat in the lakes and wetlands. For instance, mosquito fish, trout salmonids, carp and redfin perch threaten native freshwater species. Predation is a high to very high? threat across all terrestrial conservation assets in the Western Plains and Wetlands Park Landscape and has contributed to declines in sensitive fauna populations.

The primary threat of predators is through directly decreasingly the population numbers of prey species. However, reduced numbers of native fauna also affect the health of the ecosystems they inhabit, especially species that support ecological processes (such as small mammals that dig (soil engineers) or fauna that pollinate). Changes in the composition of native fauna populations can also disrupt the function of food chains. Furthermore, predators can act as weed and disease vectors, moving propagules across the landscape (such as blackberry seeds in fox droppings). Predation can also compound the impacts of drought, planned-burning and bushfire on animal populations.

There is little known about the abundance of cats in the Western Plains and Wetlands. Predator control programs across this landscape have generally combined with primary production requirements and are therefore focussed on controlling foxes. The integrated control of both predator species is important to effectively manage the threat whilst actively supporting the recovery of populations of native species (e.g. Corangamite Water Skink, waterbirds, Hooded Plover).

Wetland birds and wader/coastal species are particularly vulnerable to fox and cat predation. Within the Western District Lakes Ramsar site, foxes are known to take reptiles, including the endangered Corangamite Water Skink, and pose a threat to resident waterbirds (e.g. such as the Red-capped Plover, Great Cormorant, Australian White-billed Ibis, Black Swan and Australian Pelican). Further, known waterbird

breeding sites (e.g. Wool Rocks) are increasingly susceptible to fox predation when lake levels are low. Foxes, dogs and cats are also a serious threat to Little Penguin, Short-tailed Shearwater and Black-faced Cormorant populations on Middle and Merri Islands in the Merri Marine Sanctuary. In coastal areas foxes prey directly on the adults, chicks and eggs of Hooded Plovers.

Many of the parks and reserves in this Parks Landscape are isolated, surrounded by a matrix of private land. To effectively improve the health of native animal populations and address the effects of predator reinvasion, they require collaborative predator management beyond the estate boundaries. Because there are so many neighbours bordering the parks and reserves in the Western Plains and Wetlands Parks Landscape, engaging with them all is a significant challenge to cross-tenure, landscape scale introduced predator control.

Climate Change

It is not clear how climate change will impact predation by foxes and cats as they are already widespread throughout the Western Plains and Wetlands Landscape. However, climate impacts reducing the cover and availability of the habitat of prey species, particularly coastal and wetland species, are likely to make them more vulnerable to impacts of predation.

Threat objective(s)

By 2028, reduce fox predation at key locations and times to levels low enough to support increasing populations of priority native animal species.

This threat is addressed through the Conservation Strategy **6.6 Control and monitoring of introduced terrestrial predators to support resilient native fauna population.**

5.6 Marine predation and competition

Threat description

Marine invasive or overabundant species pose a very high risk to the Merri Marine Sanctuary marine asset. This threat involves a range of factors which have a demonstrated impact on the health of marine ecosystems through competition for space with native species, direct predation, and alterations to food chains.

Although marine pests have not been detected in the Merri Marine Sanctuary, the risk of invasion is high, and increasing, through both natural vectors, such as water currents, and human vectors such as the movement of vessels and materials along the coast, particularly from infected ports. Marine pests could colonise in adjacent aquatic areas such as Merri River and Lake Pertobe and spread into the sanctuary. Marine pests have the potential to decrease diversity and abundance of native species in the Marine Sanctuary and pests that feed on benthic invertebrates and infauna may have direct impacts on shorebirds by depleting important prey species.

On subtidal reefs there are particular concerns for the spread of species such as Japanese Kelp, already well established in Apollo Bay harbour, and from the highly predatory Northern Pacific Seastar, which is well established in Port Philip Bay and has spread to many locations east of Port Phillip Bay. Many other marine pests that are already well established in Victoria, particularly in Port Phillip Bay, could spread to the Parks landscape. Other potential marine pests of concern include Green Shore-crab, Broccoli Weed and European Fanworm.

An emerging threat in other areas of Victoria, particularly in eastern Victoria and Port Phillip Bay, is the rapid increase in numbers of overabundant native grazing animals such as sea urchins. These animals have the potential to radically alter subtidal reef communities by over-grazing and removing habitat-forming brown algae. Regular monitoring of the number of sea urchins, and responding early to significant increases in populations, are the best options available for preventing these significant impacts on marine assets.

An integrated approach to preventing marine pest spread is needed, along with vigilance in detecting new pests or overabundant native species within parks. An early response to incursions is essential if marine protected areas are to remain pest-free.

Climate Change

The increasing ocean temperature as a result of climate change is expected to result in marine species (pests and native species) adapted to warmer waters migrating further south. Currently pest-free areas such as the Merri Marine Sanctuary are under increasing risk of the establishment of marine pests and over-abundant natives.

Threat objective

By 2028, continue to support efforts to prevent marine invasive or overabundant marine native species from establishing and respond rapidly to new marine pest incursions in Merri Marine Sanctuary.

This threat is addressed through the Conservation Strategy: **6.7 Managing marine pests for healthy marine protected areas**.

5.7 Human-mediated habitat degradation/loss

Threat description

Habitat degradation in this Western Plains and Wetlands Parks Landscape is driven by a number of threat agents including a lack of biomass control and visitor/recreational impacts.

Lack of biomass control in grasslands and grassy woodlands

Lack of biomass management is seen as a high threat within grassy and grassy woodland ecosystems of the Western Plains and Wetlands Parks Landscape. In the absence of appropriate biomass management, usually in the form of ecological burning or grazing, dominant grass species will grow to out-compete and reduce inter-tussock spaces for smaller flowering herbs and biological soil crusts (surface crust of lichens, mosses and algae). Grass tussocks can also die off after accumulating dead biomass over time.

Human impacts and recreation

Visitor impacts are considered high to very high in all conservation assets of the Western Plains and Wetlands Landscape. There is an ever-increasing demand for visitation to the coastal areas within the Western Plains and Wetlands landscape. This brings increased pressure to ecosystems and species, many of which are already under stress. For example, human disturbance, horse riding, unrestrained dogs and illegal vehicles on coastal dunes and beaches threaten shorebird communities and fragile coastal vegetation.

Coastal dune habitats can be trampled and fragmented by horse riding, trail bikes and off-track walking leading to loss of vegetation and dune instability. Shorebird communities that nest and roost both in the dunes and sand can be disturbed by humans and dogs, causing birds to leave the nest when breeding or eggs and chicks to be crushed by horses and vehicles. Dogs can also have direct impacts by chasing birds, eating eggs or killing chicks. This is particularly significant in Belfast Coastal Reserve which is an important breeding and wintering area for Hooded Plovers and holds a significant proportion of the Victorian population (Birdlife Australia, 2014). The stretch of coastline from Warrnambool to Narrawong that

includes Belfast CR and Yambuk FFR has a high density of breeding pairs (35% of the Victorian population) but has the poorest breeding success. This is due to a number of factors including human impacts and recreation.

Orange -bellied Parrots also threatened by many of the same risks as Hooded Plovers – dogs, vehicles and horses. Other shorebirds including Pied Oystercatcher and Red-capped Plover sentence to be completed...

In marine habitats trampling of protective algae cover and other habitat forming species in intertidal zones can reduce their density and diversity, in turn impacting on species that rely on them. Physical disturbance from vessel impacts including anchors can damage sensitive subtidal reef communities and disturb wildlife. Illegal fishing and shellfish poaching can impact species diversity and habitat condition.

In grassland and grassy woodland areas soil disturbance is also a major cause of decline in condition. Many factors can disturb soil including vehicles (trail bikes and four-wheel drives), rock removal and livestock. Soil disturbance can lead to the loss of important soil crust components and weed invasion, and can prevent establishment of native grasses and herbs. Activities that create soil disturbance can destroy habitat for small mammals and reptiles, including Fat-tailed Dunnart and Striped Legless Lizard, that rely on the crevices in naturally cracking soils. Removal of trees and logs for firewood, particularly large old hollow-bearing trees, results in changes to vegetation structure and loss of habitat for arboreal fauna.

Lakes and wetlands are impacted by encroachment by adjoining landholders, including illegal cropping within reserve boundaries. This is particularly an issue within the Western District Lakes Ramsar Site. Illegal hunting also impacts lakes and wetlands causing disturbance to wildlife and damage to habitat.

Threat objectives

By 2028:

- Maintain biomass at appropriate levels for priority grasslands and grassy woodlands.
- Ensure opportunities for recreational activities in parks are undertaken in ecologically appropriate areas with low/no impact on natural values.
- Reduce impacts of trampling and other physical disturbances by visitors at priority sites and reduce illegal activities, including cropping, tree removal, fishing and shellfish collection, at priority sites.

This threat is addressed through the Conservation Strategies:

6.5 Integrated management of grassy ecosystems.

6.8 Reducing the impacts of recreation, illegal activities and resource extraction on natural values.

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. The Strategic Management Prospects tool (DELWP 2019) has been used to help determine the priority areas for threat mitigation treatments. Each strategy description is accompanied by a table of priority areas and/or actions. Where the SMP tool has been used to determine these priorities (i.e. control of terrestrial herbivores and weeds) the threshold of cost-effectiveness is included. For example, 'SMP 5' and 'SMP 20' indicates that a park contains areas where a particular action ranks among the top 5% or top 20% for cost-effectiveness across the state.

Where appropriate, 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 coastal and wetlands 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, managing to a changed state and function and maximising the diversity of the new state, 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:

- **Reducing non-climate stressors** – including controlling pest plants and animals which hinder the ability of ecosystems to withstand or adjust to changing climate, and
- **Protecting key ecosystem features –** for example protecting intertidal reefs which provide important foraging areas for shorebirds and seabirds.

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 Western Plains and Wetlands Parks Landscape.

Strategies prioritised and developed through this process are:

- Fire and biomass management for ecological health
- Supporting partnerships to address hydrological threats to water-dependent assets
- Environmental weed control using a biosecurity approach
- Terrestrial herbivore management
- Integrated management of grassy ecosystems
- Control and monitoring of introduced terrestrial predators to support resilient native fauna populations

- Managing marine pests for healthy marine protected areas
- Reducing the impacts of recreation, illegal activities and resource extraction on natural values

Strategy description format

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

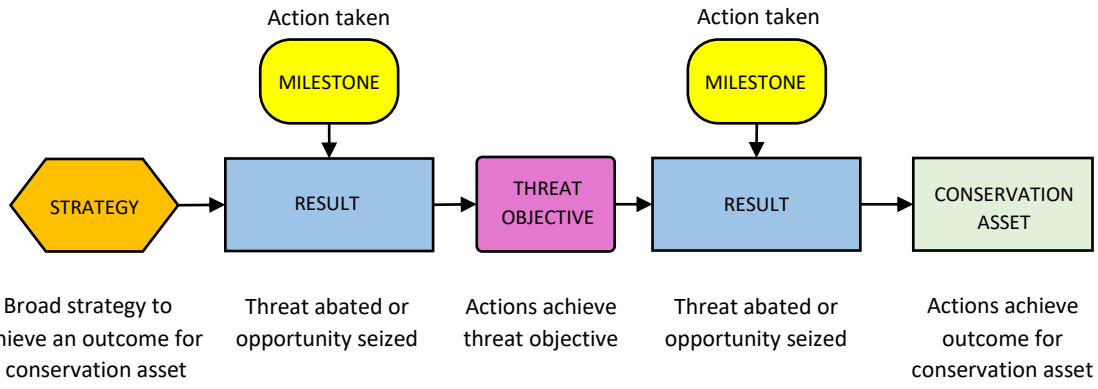
Conservation strategy

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 Fire management for ecological health

Conservation outcomes

Improved structural diversity and distribution of vegetation growth stages in various habitats leading to the restoration of assets and species.

Strategy

This strategy aims to improve the ecological health of the Western Plains and Wetlands Parks Landscape through ecological burning.

The principles are to:

- Apply ecologically sensitive fire to fire-dependent ecosystems
- Actively exclude fire from fire sensitive ecosystems
- Apply targeted fuel management to protect ecological, cultural and infrastructure assets
- Undertaking fire preparedness and suppression activities in accordance with environmental and fire management guidelines

Fire planning and management will be carried out with DEECA, in consultation with the CFA, neighbours and the community. Parks Victoria will work with Traditional Owners to help implement cultural fire practices guided by the Victorian Traditional Owner Cultural Fire Strategy, which provides policy direction and a framework for fire and land management agencies to better enable Traditional Owners to undertake cultural burning. Parks Victoria will also work with DEECA and Traditional Owners to determine areas of high ecological and cultural value and assess potential fire damage to ecological and cultural values.

As the Western Plains and Wetlands landscape has only small, forested areas, most of the landscape is considered low fuel hazard and as a result all fire management areas are zoned as Land Management Zones (with the exception of a small area within Inverleigh FR). As such, all planned burning should be undertaken within Tolerable Fire Intervals and to maximise ecological outcomes and land management objectives. Fire intervals vary depending on land management and fire management objectives and ecologically beneficial fire intervals are the goal (DELWP, 2020). Fires intervals that are too short may not allow enough time for

some species to regenerate and reproduce; fire intervals that are too long may result in biomass accumulation that suppresses some species by reducing available light and the amount of bare ground between tussocks for native flora regeneration.

Planning for ecological burning in grasslands needs to consider the timing of seed set of native species, and where refugia for fauna is available. Rocks, and soil cracks when the soil is dry enough, provide places for fauna to shelter during a burn. Burning to maintain patchiness is also essential for fauna viability and mosaic burning; application of fire in a patchy manner driven by different fuel loads and moisture content should be applied where possible.

Planned burning can also help control weed species when conducted at the right time and followed up with intensive weed control, and control excessive regeneration of shrub and tree saplings especially *Acacia* spp. Ecological burning can be used to promote favourable habitat conditions for reptile species including Striped Legless Lizard and Tussock Skink.

Firebreaks associated with ecological burning need to minimise impacts on the grasslands and grassy woodlands. Ploughed breaks or other forms of soil disturbance can lead to weed invasion and removal of rocks reduces habitat for fauna. Slashing and burning from existing track networks are preferred. Where possible, existing roads and tracks should be used to limit the physical impacts of fire management, as well as the spread of pathogens and weeds.

Ongoing monitoring of biomass and fire sensitive species will inform adjustments required to burning or grazing. The control of herbivores (rabbits and domestic livestock), weeds and predators will also be essential to compliment the burning program to reduce the potential for overgrazing and weed flush following planned burns.

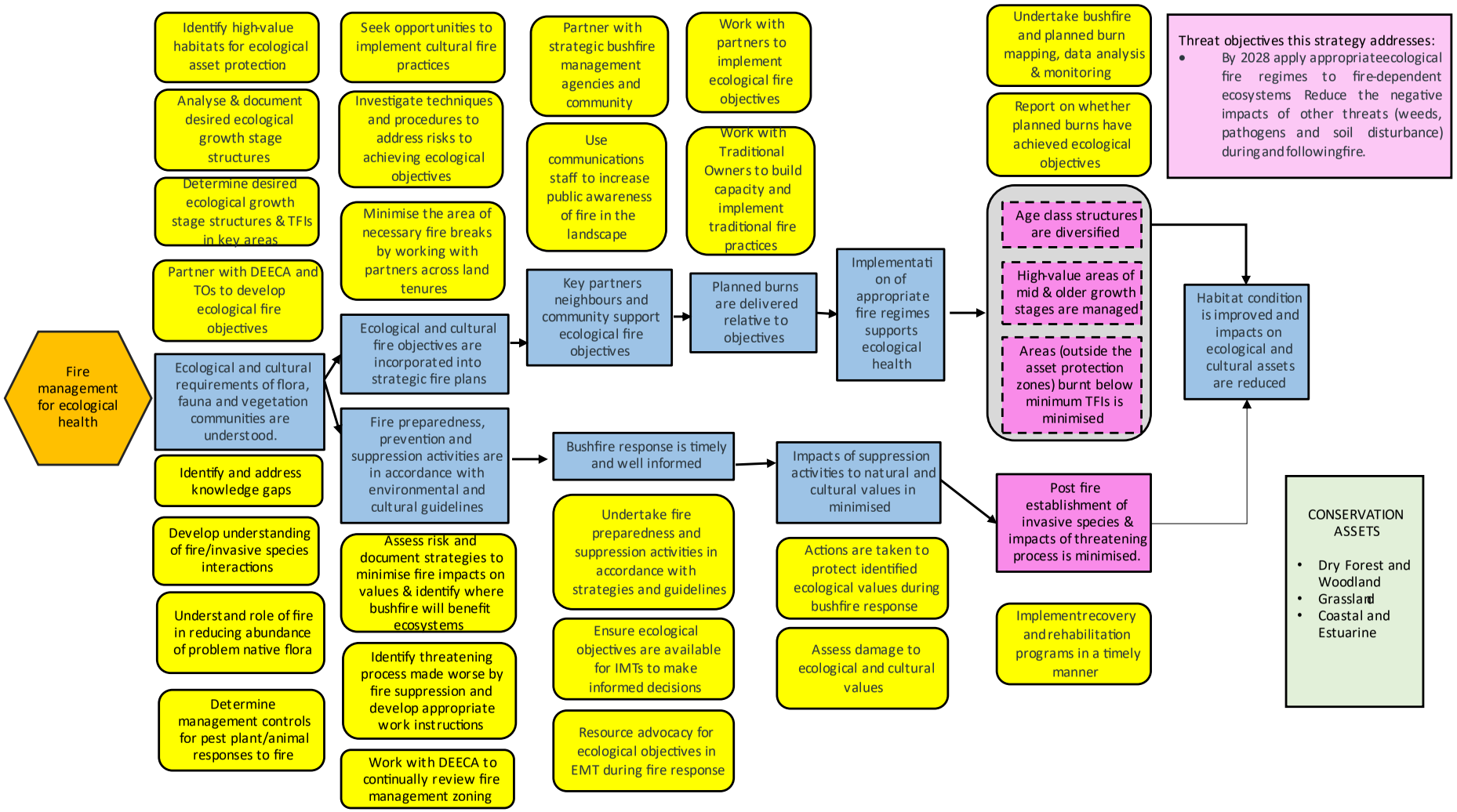
Strategy summary

Develop ecological fire strategies with partners so that planned burns are conducted within an appropriate fire regime, improving habitat condition, increasing old and mid growth vegetation and protecting high value assets and areas from damage. Reduce fire in fire sensitive areas.

Table 6.1 Priority fire management areas in the Western Plains and Wetlands Parks Landscape

Strategy	Conservation Assets to benefit*	Priority areas
Undertake appropriate ecological burning	Grasslands Dry Forest and Woodland	Blacks Creek, Inverleigh, Mt Mercer, Boonderoo, Cressy, Illabarook, Cobra Killuc
Benefit of reducing fire	Dry Forest and Woodland	Belfast CR, Tower Hill

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


Fire management for ecological health
Ecological and cultural requirements of flora, fauna and vegetation communities are understood.
Identify high-value habitats for ecological asset protection
Analyse & document desired ecological growth stage structures
Determine desired ecological growth stage structures & TFIs in key areas
Partner with DEECA and TOs to develop ecological fire objectives
Identify and address knowledge gaps
Develop understanding of fire/invasive species interactions
Understand role of fire in reducing abundance of problem native flora
Determine management controls for pest plant/animal responses to fire
Ecological and cultural fire objectives are incorporated into strategic fire plans
Seek opportunities to implement cultural fire practices
Investigate techniques and procedures to address risks to achieving ecological objectives
Minimise the area of necessary fire breaks by working with partners across land tenures
Fire preparedness, prevention and suppression activities are in accordance with environmental and cultural guidelines
Assess risk and document strategies to minimise fire impacts on values & identify where bushfire will benefit ecosystems
Identify threatening process made worse by fire suppression and develop appropriate work instructions
Work with DEECA to continually review fire management zoning
Key partners neighbours and community support ecological fire objectives
Partner with strategic bushfire management agencies and community
Use communications staff to increase public awareness of fire in the landscape
Work with partners to implement ecological fire objectives
Work with Traditional Owners to build capacity and implement traditional fire practices
Bushfire response is timely and well informed
Undertake fire preparedness and suppression activities in accordance with strategies and guidelines
Ensure ecological objectives are available for IMTs to make informed decisions
Resource advocacy for ecological objectives in EMT during fire response
Planned burns are delivered relative to objectives
Implementation of appropriate fire regimes supports ecological health
Impacts of suppression activities to natural and cultural values in minimised
Actions are taken to protect identified ecological values during bushfire response
Assess damage to ecological and cultural values
Undertake bushfire and planned burn mapping, data analysis & monitoring
Report on whether planned burns have achieved ecological objectives
Age class structures are diversified
High-value areas of mid & older growth stages are managed
Areas (outside the asset protection zones) burnt below minimum TFIs is minimised
Post fire establishment of invasive species & impacts of threatening process is minimised.
Implement recovery and rehabilitation programs in a timely manner
Habitat condition is improved and impacts on ecological and cultural assets are reduced
Threat objectives this strategy addresses:
By 2028 apply appropriate ecological fire regimes to fire-dependent ecosystems Reduce the negative impacts of other threats (weeds, pathogens and soil disturbance) during and following fire.
CONSERVATION ASSETS
Dry Forest and Woodland
Grassland
Coastal and Estuarine

Implementation milestones

Result	Action
Ecological and cultural requirements of flora, fauna and vegetation communities are understood.	• Identify high-value habitats for ecological asset protection, including fire sensitive vegetation, critical habitat and wildlife refugia in priority areas. • Analyse and document desired ecological growth stage structures • Partner with DEECA and Traditional Owners to develop ecological fire objectives. • Identify and address knowledge gaps • Determine desired ecological growth stage structures and TFIs in key areas • Develop/improve understanding of fire/invasive species interactions in the landscape • Determine appropriate management controls for pest plan and animal responses to fire • Understand the role of fire in reducing abundance of problem native vegetation species
Ecological and cultural fire objectives incorporated into strategic fire plans.	• Seek opportunities to implement cultural fire practices. • Investigate techniques and procedures to address risks to achieving ecological objectives • Minimise the area of necessary fire breaks by working with partners across land tenures
Key partners, neighbours & the community support ecological and cultural fire objectives	• Partner with strategic bushfire management agencies and undertake community engagement to prioritise ecological burning in grasslands and other fire-dependent vegetation. • Use the Joint Fuel Management Plan and DEECA fire communications staff to increase public awareness of ecological fire
Planned burns are delivered relative to objectives	• Work with key partners to implement ecological fire objectives • Work with TOs to build capability and implement traditional fire practices
Implementation of appropriate fire regimes supports ecological health	
Age classes structures are diversified. High value areas of mid and older growth stages are managed. Areas (outside the asset protection zone) burnt below minimum TFIs is minimised.	• Undertake bushfire mapping, data analysis and monitoring • Report on whether planned burns have achieved ecological objectives
Fire preparedness, prevention and suppression activities are in accordance with environmental and cultural guidelines	• Assess risk and document strategies to avoid or reduce fire impacts on key values and identify where bushfire will benefit ecosystems. • Identify threatening processes that can be made worse by fire prevention and suppression (weeds, pathogens and soil disturbance) and develop work instructions for key species and areas • DEECA and PV continually review fire management zoning

Result	Action
Response to bushfires is timely and well informed	• Undertake fire preparedness and suppression activities in accordance with strategies and guidelines • Ensure ecological objectives are available for IMTs to enable them to make informed decisions • Resource active advocacy for ecological objectives through experts in EMT during fire response and recovery
Impacts of suppression activities to natural and cultural values is minimised	• Actions are taken to protect identified ecological values during bushfire response • Assess damage to ecological and cultural values
Post-fire establishment of invasive species and impacts of erosion and sedimentation are minimised	• Implement rehabilitation and recovery programs in a timely manner Monitor weeds and pests post fire
Post fire establishment of invasive species & impacts of threatening processes is minimised	• Implement rehabilitation & recovery programs in a timely manner and according to guidelines and procedures
Habitat condition is improved & impacts on ecological & cultural assets are reduced	

6.2 Supporting partnerships to address hydrological threats to water-dependent assets

Conservation Outcomes

- Increased knowledge of hydrological requirements and impacts of climate change for priority lakes
- Improved water quality (reduced nutrients and sediments) inputs to priority lakes and wetlands and the marine environment
- Estuarine vegetation extent is maintained or improved, allowing for retreat inland where possible as the sea-level rises

Strategy

Water-dependent assets are terrestrial and marine systems that require permanent or periodic inundation to persist in the landscape. The purpose of this strategy is to increase the health of these environments by working with partners to reduce the threats of altered hydrology and poor water quality caused by water diversion, erosion, sedimentation and nutrient input. Reducing these stresses is likely to improve the ability of these environments to withstand the climate change impacts of warming, drying and extreme events.

Most of the catchment of the waters of the Western Plains and Wetlands Parks Landscape is on private land and the Corangamite Catchment Management Authority Glenelg Hopkins Catchment Management Authority (CMAs) are the statutory agencies responsible for floodplain management and environmental flows. This strategy will primarily involve Parks Victoria working as a partner with the CMAs and others, including DEECA, Birdlife Australia and Traditional Owners, to determine the water requirements and strategic directions for priority water-dependent assets including the Western District Lakes Ramsar site. This will include the use of vulnerability modelling to assess wetland futures and adaptation pathways to determine strategies to ensure that priority wetlands can adapt to an environment influenced by climate change.

Following the millennium drought, a report by EPA Victoria (Leahy et al. 2010) examining the impacts of climate change on the Western Districts Lakes, suggested that:

- Those lakes and wetlands that remain freshwater or have the potential to be returned to a fresher state are given priority for conservation efforts and managed accordingly.
- Detailed modelling of the hydrology of the other freshwater lakes should be able to indicate if any of these currently fresh lakes have moved or are likely to move into a drying phase.
- Investigating, through modelling, the feasibility of creating or maintaining smaller freshwater refuges along the input streams to some of these larger lakes, or of bunding off segments of the lakes, would be beneficial. Such refuges would have a greater chance of remaining fresh if they can be restricted in area (less evaporation) and could act as sources of recolonisation during periods of high inflow and lake filling.

An Adaptation Pathways process was tested by Corangamite CMA and RMIT (Bosomworth, et al., 2018) and identified a similar suite of potential and lower-risk adaptation actions including:

- Determine the habitat requirements of Corangamite Water Skink, in order to develop suitable habitat for translocating at risk populations due to climate change
- Use LiDAR and ground truthing to identify potential 'shade zones' and 'habitat pools' within waterways and wetlands to increase refugia potential under climate change
- Use LiDAR and ground truthing to identify potential wetlands to increase refugia potential
- Research potential of existing feeder waterways as potential water sources for high priority wetlands
- Define the need for and role of a captive population of Corangamite Water Skink and set objectives for captive management.

Management activities to address the effects of reduced rainfall (or other hydrology matters) are limited as there are few opportunities for augmenting inflows, except at Lake Corangamite (Corangamite Catchment Management Authority, 2014) where the management of the Woady Yallock Diversion Scheme has impacted on water levels in Lakes Corangamite, Terangpom, Milangil and Gnarpurt. Parks Victoria will work with CCMA to improve flows into Lake Corangamite, Martin and Cundare Pool to help manage climate change impacts and improve ecological outcomes.

For lakes where flows are across private property, Parks Victoria will work with DEECA and the CMAs to raise awareness, supported by compliance, to reduce of the impacts of dams, trenches and diversions on hydrological flows. Priority lakes are Western District Lakes Ramsar sites.

The complementary management of other threats to lakes and wetlands, including pest plant and animal control and removal of stock access, will improve resilience and allow wetlands to better adapt to changing water regimes resulting from climate change. Parks Victoria will work with partners to engage the community on climate change and human impacts to water-dependent assets, to encourage land managers to reduce impacts of nutrient input, sedimentation and erosion on lakes and wetlands. Parks Victoria will also work to improve water quality through weed control, herbivore management and restoration on reserved land fringing priority lakes and wetlands.

In coastal environments CMAs use a predictive water management system to guide whether or not to artificially open estuaries that they manage. This system considers the impact of opening an estuary on assets associated with the estuary, and on the threats created by either opening the estuary or leaving it closed. Guided by this system, Parks Victoria will work with the Glenelg Hopkins CMA to regulate the appropriate opening of estuaries that are under Parks Victoria management.

Parks Victoria will also use sea level rise projections to determine impacts on coastal wetlands from increased inundation and sea-level rise, and investigate opportunities to improve outcomes for these areas.

Parks Victoria will undertake a collaborative approach to improve water quality entering the Merri Marine Sanctuary. This will include input into strategies and plans that impact on water quality entering the sanctuary, e.g. regional catchment strategies, waste management strategies and raising awareness in the community of pollution impacts.

Strategy summary

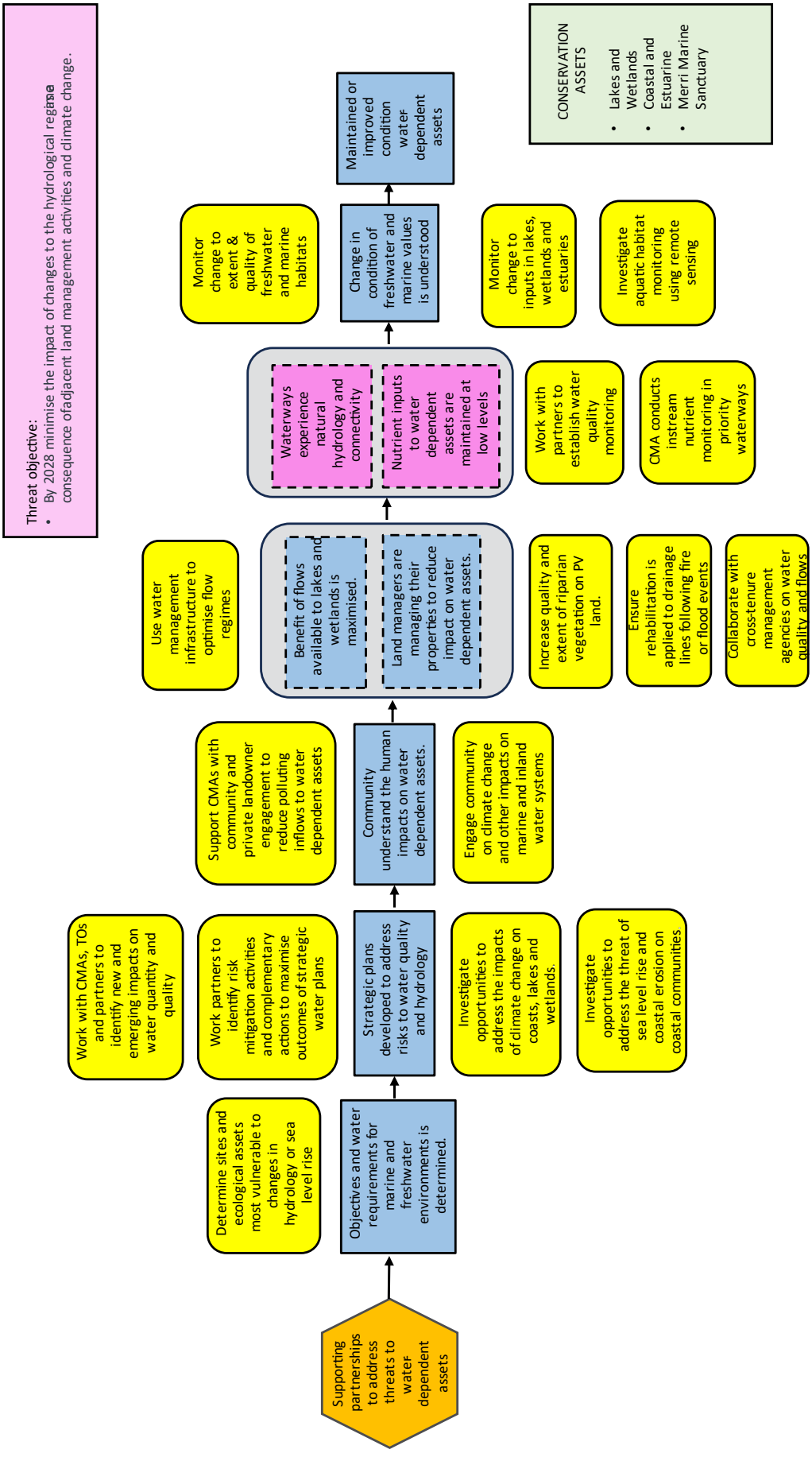
Communicate human impacts on water quality and hydrology and build partnerships with agencies and community to reduce pollutant input and improve flows to marine, saline and freshwater ecosystems.

Table 6.2 Priority water management areas in the Western Plains and Wetlands Parks Landscape

Action type	Priority area	Conservation Assets to benefit*
Hydrological assessment and planning	Western District Lakes Ramsar site, Nationally Important Wetlands	Wetlands and Waterbodies
Supporting partner agencies to reduce sediment and nutrient inflows	Western District Lakes Ramsar site, Nationally Important Wetlands, Merri Marine Sanctuary	Wetlands and Waterbodies Merri Marine Sanctuary
Supporting partner agencies in awareness supported by compliance to reduce off-site impacts to hydrological inputs	Western District Lakes Ramsar site, Beeac Swamp	Wetlands and Waterbodies
Work with CMAs to regulate appropriate opening of estuaries	Belfast CR, Eumeralla (Yambuk) CR	Coastal and Estuarine
Investigate protection of habitats subject to inundation	Belfast CR	Coastal and Estuarine

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

Results chain



Implementation milestones: Water management

Result	Action
Objectives and water requirements for marine and freshwater environments are determined	• Determine sites and ecological assets most vulnerable to changes in hydrology or sea level rise.
Strategic plans developed to minimise risk to water quality and hydrology	• Work with CMAs, Traditional Owners and partners to identify new or emerging impacts on water quality. • Work with partners to identify risk mitigation activities and complementary actions to maximise outcomes of strategic water plans. • Investigate opportunities to address the impacts of climate change on coasts, lakes and wetlands. • Investigate opportunities to address the threat of sea level rise and coastal erosion on coastal communities.
Community understands the human impacts on water dependent assets	• Engage community on climate change and other impacts on marine and inland water ecosystems. • Support CMAs with community and private landowner engagement to reduce nutrient, sediment and toxicant inflows to water dependent assets.
The benefit of flows available to lakes and wetlands is maximised. Land managers are managing their properties to reduce impacts on water dependent assets.	• Increase quality and extent of riparian vegetation on PV land. • Use water management infrastructure to optimise flow regimes. • Ensure rehabilitation is applied to drainage lines following fire or flood events. • Collaborate with cross-tenure land management agencies on water quality and flows.
Nutrient inputs to water dependent assts are maintained at low levels Waterways experience natural hydrology and connectivity	• Work with EPA, CMAs and community groups to establish water quality monitoring. • CMA conducts instream nutrient monitoring in priority waterways
Change in condition of freshwater and marine values is understood	• Monitor change in inputs to lakes, wetlands and estuaries • Monitor change to extent & quality off freshwater and marine habitats • Investigate potential marine and freshwater habitat monitoring program using remote sensing
Maintained or improved condition of water-dependent assets	

6.3 Environmental weed control using a biosecurity approach

Conservation outcomes

- Vegetation structure and quality of habitats in priority locations is maintained or restored
- Priority threatened species populations are maintained or improving

Strategy

This strategy provides a strategic framework for analysing and prioritising weed management at a landscape scale. It guides the management of weeds to reduce their spread, establishment and impact. The strategy focuses on species that have or are likely to have significant impacts on the health of conservation assets and ecological processes in the Western Plains and Wetlands Parks Landscape. It is guided by the overarching Invasive Plants and Animals Policy Framework that represents the Victorian Government's approach to managing existing and potential invasive species across the whole of Victoria. This framework sits within the context of the whole-of-government Biosecurity Strategy for Victoria.

Priorities for management have been determined using a methodology which aims to prioritise management of the highest risk species in the highest value parks. It also directs management effort according to the level of establishment of the species in the landscape, with priority given to eradicating occurrences of new and emerging species which are not yet well established. Where possible, weed control will be untaken in partnership with the Corangamite CMA, Glenelg-Hopkins CMA, DEECA, Traditional Owners and neighbouring landholders.

The future threat posed by weeds to the Western Plains and Wetlands Parks Landscape is likely to increase in response to changing climate, new and emerging weeds and the spread of existing species. Having in place strategies to not only reduce the potential for weed invasion but to also understand and react to invasions in a timely manner will reduce the likelihood of new and emerging weeds becoming issues in the future.

Level of infestation using the biosecurity approach

The Victorian Government biosecurity approach to pest plant management is a standard used to identify the threat of an invasive species and assess its relative risk in order to determine an appropriate intervention. There are four general management responses to controlling weeds: **prevention**, **eradication**, **containment** and **asset protection**, and these terms have meanings that can be applied at different scales. The management responses to weeds in this strategy are based on the current extent of species and the level of risk they present to conservation values at the park scale in the Parks Landscape. Described below are the management responses to weeds, the control objective of each response and the predominant examples of species in the landscape subject to control types.

Prevention

Prevention is a pre-emptive action to managing the risk of introducing 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 the most likely invasion points, which are often vehicle access and parking sites and locations 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 seed and spores and ensuring that appropriate site preparation.

Weed spread can also be prevented by avoiding poor weed management practices, such as the inappropriate selection, application and over-use of herbicides, and poor identification of target species (e.g. native Poa and Spear-grass tussocks accidentally killed under the guise of Serrated Tussock or Chilean Needle-grass control), an issue particularly prevalent in grasslands.

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 outlined below:

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

This group includes Bridal Creeper, Gorse, Boneseed, Toowoomba Canary Grass at Inverleigh Flora Reserve, Cocksfoot and African Boxthorn in the Western District Lakes Ramsar site and Sicilian Sea-Lavender, Tall Wheatgrass and African Boxthorn at Belfast Coastal Reserve. Effective eradication at the park/site scale is the objective for this group of weeds.

Containment

Containment is an ongoing maintenance approach to manage the spread of established weeds. Management tracks, ridgelines and other landscape features are useful in defining containment boundaries. 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. This group includes Toowoomba Canary Grass, Cape Weed, Spear Thistle at Black's Creek NCR.

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. Biological controls can assist with containment efforts for established weeds but are limited to species with an available control agent (biological controls are currently approved for Boneseed, Blackberry, Bridal Creeper, Gorse, Paterson's Curse, Horehound and Ragwort). 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. Species that are indicative of this group include Sweet Pittosporum, Italian Buckthorn and Blackberry in the Dry Forest and Woodlands, and Marram Grass and Sea Spurge in Coastal areas. Native weeds such as the over-proliferation of regenerating shrub and tree saplings that form a closed canopy layer, such as Prickly Moses, are included in this approach. Because widespread control is not feasible, the objective for these species is to reduce their abundance and to prevent invasion into priority areas.

Because of the large number of reserves in the landscape, not all infestations are known. Surveying these reserves for the presence of weed infestations is a priority in comprehensively managing this threat. Parks with known significant biodiversity values should be prioritised for pest plant surveillance.

Monitoring

Monitoring sites will be set up at priority locations to ensure that weed control activities are effectively meeting the conservation outcomes below.

Strategy summary

Control high risk species in high value locations, prioritising new and emergent species not yet established, but also preventing new weed introduction and minimising the spread of established species.

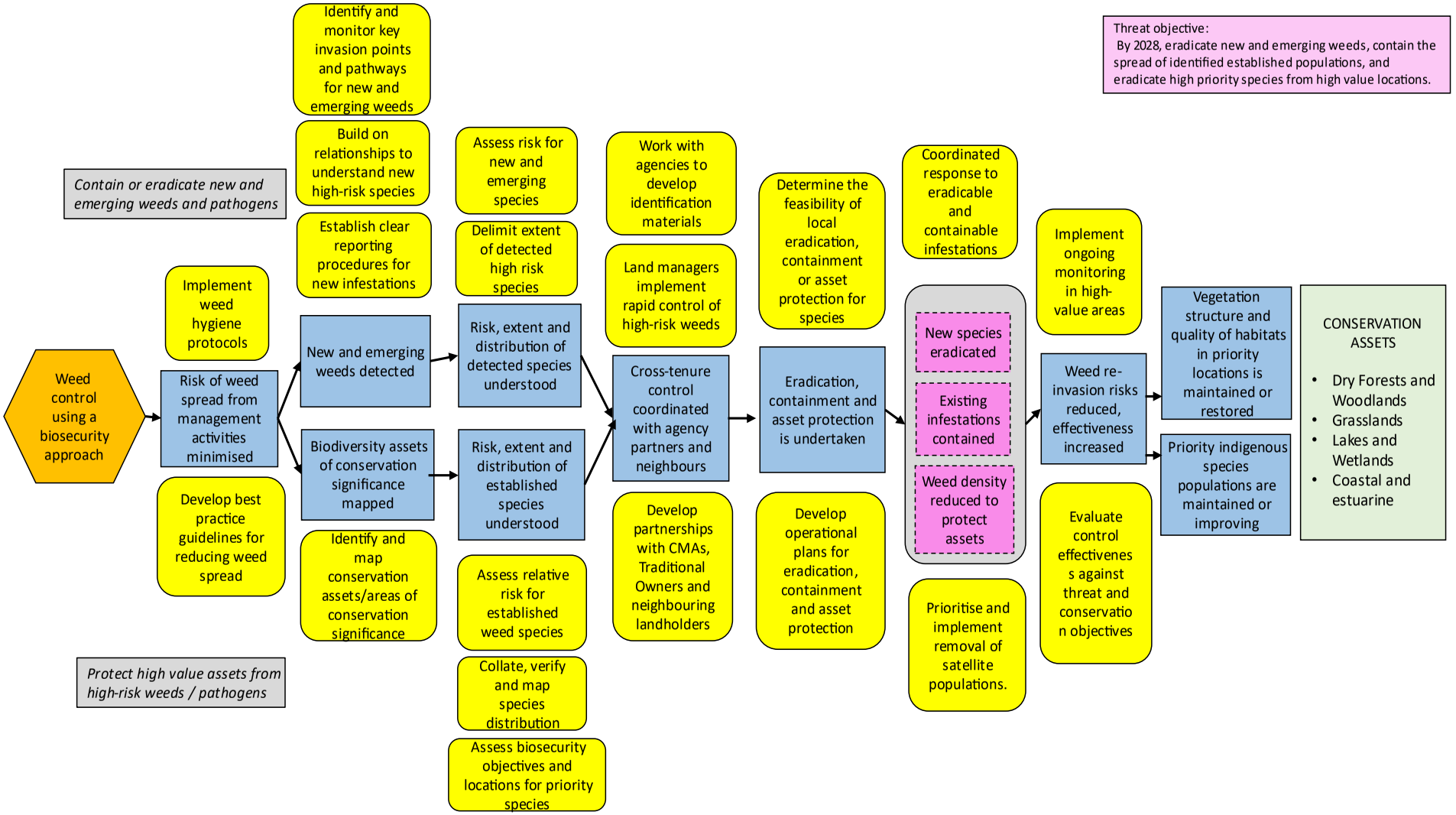
Table 6.3 Priority weed management areas in the Western Plains and Wetlands Parks Landscape

Priority location	Conservation Assets to benefit*	Action type	Species
Inverleigh (SMP 5)	Dry Forest and Woodland Grassland	Eradication	Bridal Creeper, Gorse, Boneseed, Toowoomba Canary Grass
		Containment	Serrated Tussock, Exotic Perennial Invasive grasses
		Asset Protection	Prickly Moses
Illabarook NCR	Dry Forest and Woodland	Asset Protection	Prickly Moses
Ramsar Lakes Particularly Lake Corangamite, Lake Gnarpurt, Lake Murdeduke and Lake Beeac	Lakes and Wetlands Dry Forest and Woodland	Eradication (site-based eradication where possible)	Cocksfoot, African Boxthorn
		Containment	Spear Thistle, Tall Wheatgrass, Toowoomba Canary-grass, Spiny Rush

Priority location	Conservation Assets to benefit*	Action type	Species
Belfast CR	Coastal and Estuarine	Eradication	Sicilian Sea-Lavender, Cape Beach Daisy
		Containment	Spiny Rush, Coast Wattle, Tall Wheat-grass
		Asset protection	Marram Grass, Sea Spurge, African Boxthorn
Cressy FR	Grassland	Eradication	Boxthorn, Gorse
		Containment	Toowoomba Canary Grass, Cape weed, Boxthorn
Mortlake Common	Dry Forest and Woodland Grassland	Containment	Gorse, Radiata Pine
		Asset Protection	Spiny Rush, Toowoomba Canary Grass, Sweet Vernal grass
Boonderoo NCR	Grassland	Containment	Serrated Tussock, Chilean Needle Grass, Toowoomba Canary Grass, Spear Thistle
Blacks Creek NCR	Grassland Dry Forest and Woodland	Eradication	Any exotic invasive perennial grasses
		Containment	Toowoomba Canary Grass, Cape Weed, Spear Thistle
Mt Mercer NCR	Grassland	Eradication	Gorse, Spiny Rush, Spear thistle, Paterson's Curse, Serrated Tussock, exotic invasive perennial grasses.
Lake Bolac LR	Grassland	Containment	Serrated Tussock
Cobra Killuc WR	Dry Forest and Woodland	Containment	Radiata Pine, Sugar Gum
		Asset Protection	Yorkshire Fog, Artichoke Thistle
Tower Hill	Dry Forest and Woodland Lakes and Wetlands	Containment	Mirror Bush, Cape Ivy, Montpellier Broom, African Boxthorn
		Asset Protection	Hemlock, Sweet Pittosporum, Italian Buckthorn
Dean Marr		Containment	Serrated tussock
Lake Colac	Lakes and Wetlands	Asset Protection	Phalaris, African boxthorn, cape weed,
Lough Calvert	Lakes and Wetlands	Asset Protection	Serrated Tussock, Spear Thistle, Spiny Rush, African Boxthorn
Dreeite NCR	Dry Forest and Woodland	Containment	African Boxthorn, Hemlock
		Asset Protection	Milk Thistle, Blackberry, Creeping Thistle
Lake Linlithgow and Bullrush Swamp LR	Lakes and Wetlands Grassland Dry Forest and Woodland	Containment	Tall Wheat Grass
		Asset Protection	Spear thistle, Spiny Rush, Horehound, Toowoomba Canary-grass

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

All are Biodiversity 2038 Priority locations for weed control


Threat objective:
By 2028, eradicate new and emerging weeds, contain the spread of identified established populations, and eradicate high priority species from high value locations.
Weed control using a biosecurity approach
Risk of weed spread from management activities minimised
Implement weed hygiene protocols
Develop best practice guidelines for reducing weed spread
Protect high value assets from high-risk weeds / pathogens
Contain or eradicate new and emerging weeds and pathogens
New and emerging weeds detected
Identify and monitor key invasion points and pathways for new and emerging weeds
Build on relationships to understand new high-risk species
Establish clear reporting procedures for new infestations
Biodiversity assets of conservation significance mapped
Identify and map conservation assets/areas of conservation significance
Risk, extent and distribution of detected species understood
Assess risk for new and emerging species
Delimit extent of detected high risk species
Risk, extent and distribution of established species understood
Assess relative risk for established weed species
Collate, verify and map species distribution
Assess biosecurity objectives and locations for priority species
Cross-tenure control coordinated with agency partners and neighbours
Work with agencies to develop identification materials
Land managers implement rapid control of high-risk weeds
Develop partnerships with CMAs, Traditional Owners and neighbouring landholders
Eradication, containment and asset protection is undertaken
Determine the feasibility of local eradication, containment or asset protection for species
Develop operational plans for eradication, containment and asset protection
New species eradicated
Existing infestations contained
Weed density reduced to protect assets
Coordinated response to eradicable and containable infestations
Prioritise and implement removal of satellite populations.
Weed re-invasion risks reduced, effectiveness increased
Implement ongoing monitoring in high-value areas
Evaluate control effectiveness against threat and conservation objectives
Vegetation structure and quality of habitats in priority locations is maintained or restored
Priority indigenous species populations are maintained or improving
CONSERVATION ASSETS
Dry Forests and Woodlands
Grasslands
Lakes and Wetlands
Coastal and estuarine

Implementation milestones

Result	Action

Risk of weed spread from management activities minimised	• Implement weed hygiene protocols
	  • Increase staff awareness of hygiene protocols for management activities such as moving machinery.
	  • Promote hygiene protocols for research permits or other non-management activities in high value areas.
	• Collaboratively develop best practice guidelines for reducing weed spread with key stakeholders.

Contain or eradicate new and emerging weeds and pathogens	
New and emerging weeds detected	• Identify and monitor key invasion points and pathways for new and emerging weeds. • Build on agency relationships to understand new high-risk species. • Establish clear reporting procedures for new infestations based on weed classification.
Risk, extent and distribution of detected species understood	• Assess risk for new and emerging species. • Delimit extent of detected high risk species.
Protect high value assets from high-risk weeds and pathogens	
Distribution of biodiversity assets of conservation significance understood	• Identify and map biodiversity assets/areas of conservation significance.
Risk, extent and distribution of established species understood	• Assess relative risk for established weed species. • Collate, verify and map species distribution. • Assess the biosecurity objectives and locations for priority species.
Cross-tenure control coordinated with agency partners and neighbours	• Develop partnerships with CMAs, Traditional Owners, and neighbouring landholders. • Work with agencies to develop identification materials. • Land managers implement rapid control of high-risk weeds.
Eradication, containment and asset protection is undertaken	• Determine the feasibility of local eradication, containment or asset protection for species. • Develop operational plans for eradication, containment and asset protection.
New species eradicated Existing infestations contained Weed density reduced to protect assets	• Coordinated response to eradicable and containable infestations. • Prioritise and implement removal of satellite populations.
Weed re-invasion risks reduced, effectiveness increased	• Implement ongoing monitoring in high values areas • Evaluate control effectiveness against threat and conservation objectives and adapt control approach.
Vegetation structure and quality of habitats in priority locations is maintained or restored Priority indigenous species populations are maintained or improving	

6.4 Terrestrial herbivore management

Conservation outcome

The improved structural and compositional diversity and viability of terrestrial conservation assets.

Strategy

This strategy will result in the effective control or management of exotic herbivores to reduce their grazing and browsing impacts, promote the successful regeneration of canopy species, increase the diversity of plants and animals, and improve overall vegetation cover and complexity.

Grazing and browsing issues are widespread and varied. The strategy identifies the priorities for action for exotic herbivore species that currently occur across the Parks landscape, and actions needed to prevent new incursions from becoming established populations. Targeting control activities at high-value sites where exotic herbivores are having the greatest impact will maximise conservation outcomes.

Landscape-scale management of grazers involves an integrated approach, including building community awareness, engagement of volunteer hunters, and the use of specialist contractors to reduce grazing and browsing pressure.

Parks Victoria will continue to carry out humane and safe rabbit control, partnering with reputable contractors and shooting organisations. New sites suitable for biological control release will also be investigated. Because population numbers can increase quickly when predators are removed from an area, rabbit control may need to be carried out in association with the introduced predator control strategy.

Deer numbers and their ecological impacts are not well understood. Although there are reliable reports of fallow deer in areas scattered throughout the landscape, comprehensive data on population status and the damage caused is lacking. An understanding of the problem would be assisted by a systematic assessment of deer populations across the entire Parks landscape, including habitat use, movement patterns, and the pathways used to enter parks.

Domestic cattle should be excluded from parks and reserves unless part of a management agreement to manage biomass.

Pigs and goats have been identified as emerging threats in some areas although they have likely been in the landscape for a long time. For pigs, coastal parks and the stony rises country in the south of the landscape are of concern, and for goats it is the grasslands and grassy woodlands in the east.

For all introduced herbivores, understanding their distribution and the areas of highest conservation value on which they are impacting is the first step. Priority should then be given to eradicating small, isolated populations in high conservation areas. Strategic Management Prospects identifies priority locations for control of introduced herbivores, these areas should be the basis of initial assessments for verification. Planning to achieve initial population reductions and the frequency of ongoing control or prevention of reinvasion is then required.

A combination of control methods may be applied to control exotic herbivores, including chemical, mechanical and ecological control. Exclusion fencing may be considered to protect small high-value areas. Building community awareness of impacts, engaging neighbours and other stakeholders and targeting control efforts to high conservation value areas will be key components of these programs. Where populations are small and there is a low probability of re-establishment, eradication will be the objective. As such management of reinvasion will also need to be considered when programs are developed. For populations where eradication is not feasible herbivore numbers should be kept at densities low enough for impacts to be minimised

Preventing or minimising the damage caused by the unauthorised encroachment of cattle requires the engagement of private landholders through a collaboration with DEECA, Greening Australia, and the CCMA.

Strategy summary

Implement effective and integrated control of key herbivores to improve the regeneration and structural diversity of conservation assets across the Western Plains and Wetlands landscape.

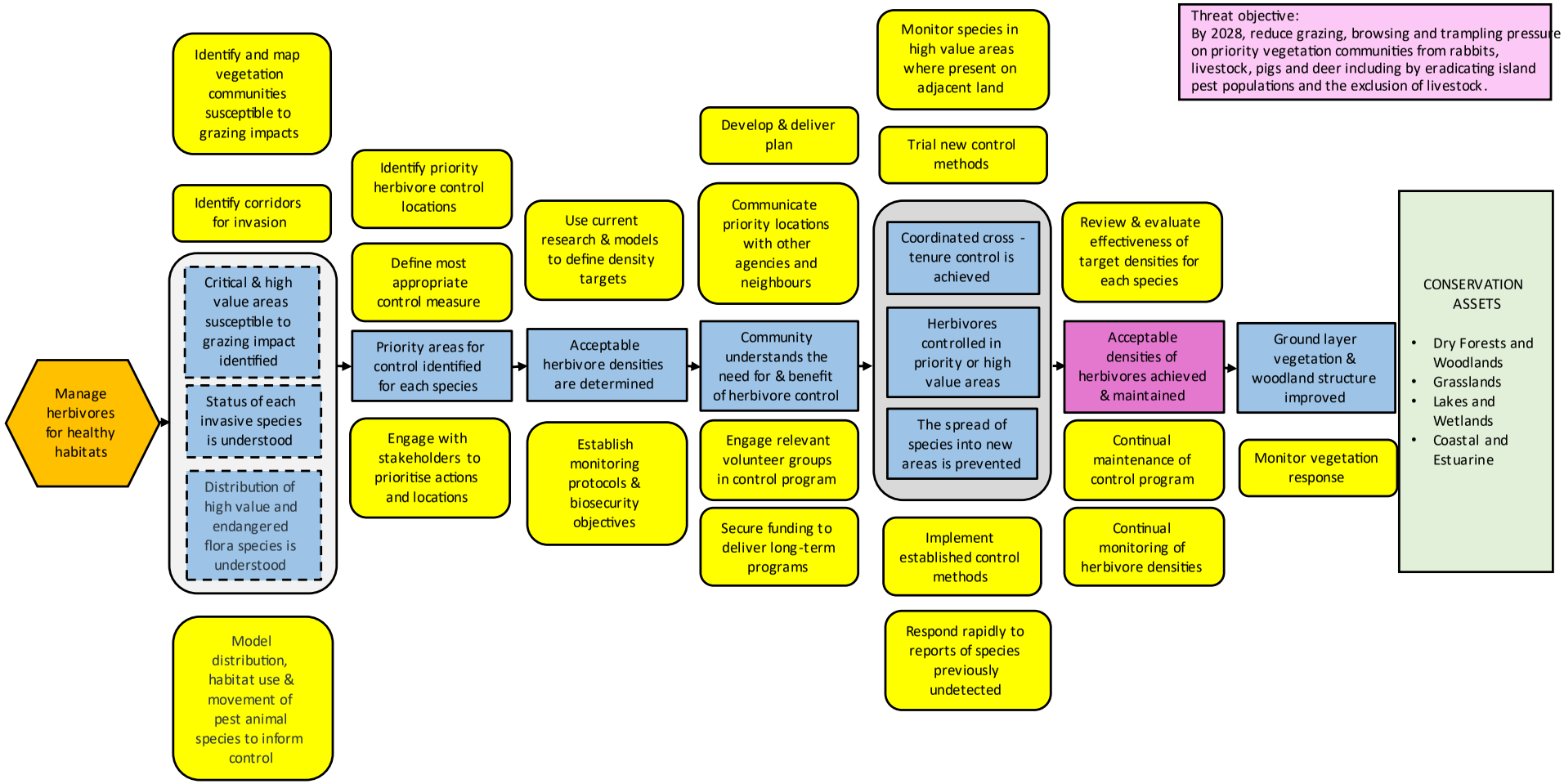
Table 6.4 Priority herbivore management areas in the Western Plains and Wetlands Parks Landscape

Locations	Conservation Assets to benefit*	Target Species	Priority
Belfast Coastal Reserve** Yambuk Coastal Reserve** Eumeralla (Yambuk) CR** Yambuk Wetlands NCR** Yambuk FFR**	Coastal and Estuarine	Pigs Fallow Deer Rabbits	SMP 5 SMP 20
Inverleigh FR **	Dry Forest and Woodland	Rabbits Goats	SMP 5
		Fallow Deer Cattle	SMP 20
Cobra Killuc WR** Mortlake Common NCR**	Dry Forest and Woodland Grassland	Deer Rabbits Cattle	SMP 20
Tower Hill WR**		Pigs Rabbits Cattle	SMP 20
Illabarook Grassland NCR		Cattle	SMP 20

Locations	Conservation Assets to benefit*	Target Species	Priority
WDL Ramsar Lakes**	Lakes and Wetlands	Pigs (Lake Corangamite)	SMP 5
		Rabbits Cattle	SMP 20
Lake Bullen Merri LR	Lakes and Wetlands	Pig	SMP 5
Lake Eyang WR Nerrin Nerrin Swamp WR, Lake Oundell WR, Salt Lake Streatham WR, Pink Lake WR, Blue Lake WR all**	Lakes and Wetlands Grassland	Fallow Deer Rabbit Cattle	SMP 20
Mt Mercer NCR** Boonderoo NCR**	Grasslands	Goats Rabbits	SMP 20
Blacks Creek NCR**	Dry Forest and Woodland Grassland	Rabbits Cattle	SMP 20
Lake Goldsmith WR	Grassland Lakes and Wetlands	Pigs	SMP 20

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

**Biodiversity 2037 priority areas for herbivore control


Threat objective:
By 2028, reduce grazing, browsing and trampling pressure on priority vegetation communities from rabbits, livestock, pigs and deer including by eradicating island pest populations and the exclusion of livestock.
Manage herbivores for healthy habitats
Identify and map vegetation communities susceptible to grazing impacts
Identify corridors for invasion
Critical & high value areas susceptible to grazing impact identified
Status of each invasive species is understood
Distribution of high value and endangered flora species is understood
Model distribution, habitat use & movement of pest animal species to inform control
Identify priority herbivore control locations
Define most appropriate control measure
Priority areas for control identified for each species
Engage with stakeholders to prioritise actions and locations
Use current research & models to define density targets
Acceptable herbivore densities are determined
Establish monitoring protocols & biosecurity objectives
Develop & deliver plan
Communicate priority locations with other agencies and neighbours
Community understands the need for & benefit of herbivore control
Engage relevant volunteer groups in control program
Secure funding to deliver long-term programs
Monitor species in high value areas where present on adjacent land
Trial new control methods
Coordinated cross - tenure control is achieved
Herbivores controlled in priority or high value areas
The spread of species into new areas is prevented
Implement established control methods
Respond rapidly to reports of species previously undetected
Review & evaluate effectiveness of target densities for each species
Acceptable densities of herbivores achieved & maintained
Continual maintenance of control program
Continual monitoring of herbivore densities
Ground layer vegetation & woodland structure improved
Monitor vegetation response
CONSERVATION ASSETS
Dry Forests and Woodlands
Grasslands
Lakes and Wetlands
Coastal and Estuarine

Implementation milestones

Result	Action
Distribution of critical and high-value areas susceptible to grazing impacts are identified Status of each invasive species is understood Distribution of high value and endangered flora species is understood	• Identify and map vegetation communities susceptible to grazing impacts. • Model distribution, habitat use & movement of pest animal species to inform control. • Identify corridors for invasion.
Priority areas for control are known for each species.	• Identify priority herbivore control locations. • Define most appropriate control measures. • Engage with key stakeholders to prioritise actions and locations.
Acceptable herbivore densities are determined	• Use current research and models to define density targets. • Establish monitoring protocols and biosecurity objectives.
Community understands the need for and benefit of herbivore control.	• Develop and deliver a communications plan. • Communicate priority locations with other agencies and neighbours. • Secure funding to deliver long-term programs. • Engage relevant volunteer groups in control program where feasible.
Coordinated cross-tenure control is achieved Herbivores are controlled in priority or high-value areas. The spread of species into new areas is prevented	• Implement established control methods. • Trial new control methods. • Monitor for species in high value areas where species are present on adjacent land. • Respond rapidly to reports of species previously undetected.
Acceptable densities of herbivores are achieved and maintained.	• Continual maintenance of control program. • Continual monitoring of herbivore densities. • Review and evaluate effectiveness of target densities for each species to improve vegetation condition.
Ground layer vegetation & woodland structure improved	• Monitor vegetation response.

6.5 Integrated management of grassy ecosystems

Conservation outcome

The improved structural and compositional diversity of grasslands and local persistence of associated threatened species.

Strategy

This strategy will result in the effective management of grasslands and grassland components of grassy woodlands to maintain their ecological condition, provide habitat for component species and promote recovery of threatened species through the appropriate management of biomass and reducing the impacts of invasive plants and other threats.

The grassy ecosystems of the Western Plains and Wetlands Park Landscape comprise a large portion of the two nationally listed critically endangered communities: *Natural Temperate Grassland of the Victorian Volcanic Plain* and *Grassy Eucalypt Woodland of the Victorian Volcanic Plain*. These ecosystems, which were formerly widespread across the Victorian Volcanic Plain, are now reduced to mostly small and degraded fragments. Less than 5 percent of the original extent remains and even less than this is in protected areas.

Despite this, fragmented and small grassy ecosystems provide habitat for some of the most threatened plants and animals nationally. Conserving these grassy ecosystems has been recognised as a high priority by the Federal Government and the Victorian Volcanic Plain is one of 20 priority places in the *Threatened Species Action Plan 2022 – 2032 (DCCEEW 2022).* These are key action areas that are fundamental to the recovery of threatened species and where the Australian Government will focus funding. The grassy ecosystems of the Western Plains and Wetlands Parks Landscape also protect 21 state or federally listed species. Two of these (Growling Grass-frog and Adamson's Blown Grass) are identified as priority species in the above plan.

Native grasslands are dynamic and require active annual management to maintain their ecological condition. As such, lack of management can cause a rapid decline in condition. Those grasslands that are in good condition or relatively intact should be managed to maintain or improve overall condition (keeping any impacts to individual threatened species to a minimum). Grasslands that may not be in good condition

may still provide habitat for threatened species and need to be managed with consideration for individual species requirements.

Grass biomass and grassland structure (grass height and grass density) are key drivers of vegetation and fauna dynamics in native grasslands (Morgan 2015). Generally, lowland Kangaroo Grass dominated Natural Temperate Grassland has suffered declines in condition because of a reduction in disturbance frequency, particularly fire, resulting in the accumulation of biomass and declines in inter-tussock space (Morgan 2015). There are three main tools for managing biomass in grassy ecosystems: ecological burning, manipulation of grazing regimes and mowing/slashing. Each of these techniques has a different effect on plant biomass, as well as on native and introduced plant species (Morgan 2015).

The use of fire to reduce biomass in grassy ecosystems, particularly in Kangaroo Grass dominated grasslands and grassy woodlands, has specific advantages over grazing and slashing in that it is less likely to spread weeds. Burning also precludes preferential grazing typical of livestock, is easier to respond to seasonal variations and is less resource intensive than grazing. Burning can also remove excessive regeneration of trees and shrub species or colonising woodland species such as Hedge Wattle.

Grazing can eliminate palatable grasses but also grassland daisies and other forbes that are vulnerable to grazing. Where fire is implemented in long-grazed sites, sensitive species may not return following the switch to burning. These sites may require reintroduction of species unless seed dispersal is possible from nearby sources.

To promote native plant diversity, burning in native grasslands should be implemented in mid to late summer or autumn as this period is outside the major growing season, but before the first autumn rains that can cause resprouting and seed germination (Morgan 2015). Sites with Striped Legless Lizards should be burnt once the ground is dry enough to form cracks for the lizards and other fauna to escape into. Grasslands should not be burnt uniformly, but with an aim to create a mosaic of burnt and unburnt patches to create structurally heterogeneous vegetation to form refugia for fauna species. Structurally heterogeneous grasslands (grasslands that contain a spatial mix of biomass density) will be more likely to support a diversity of species that have varying habitat requirements.

Sheep grazing has been used as a management tool on a number of reserves containing Plains Grasslands on the Victorian Volcanic Plain, e.g. Boonderoo NCR. However, grazing does result in more simplified grassland structure favouring grazing tolerant species. Grazing should only be applied and/or continued after careful consideration and is most useful when the species that requires biomass management are palatable and when the primary aim is to maintain the grass structure for fauna habitat (Morgan 2015).

If grazing is used for biomass management, then duration, intensity and timing are the key considerations. Intermittent grazing optimised to reduce seed set of annual weeds and avoiding flowering and seed set of threatened species is preferable. Species threatened by, or palatable to, stock include Spiny Peppercress, Basalt Peppercress, Salt-lake Tussock Grass, Clover Glycine and Small Milkwort. Liaising with Arthur Rylah Institute for Environmental Research in relation to their long-term grazing monitoring program for grassland conservation, would be beneficial in determining appropriate regimes. Supporting experimental studies on the long-term effects of fire regimes and different grazing strategies will assist with understanding possible future conditions and provide directions for management.

Invasive plants are widespread in grassy ecosystems in the Western Plains and Wetlands Landscape. Exotic stipoid grasses and large woody weeds can significantly alter grassland structure and composition by outcompeting and excluding native species (Robinson 2015). *Strategy 6.3 Environmental Weed Control using a Biosecurity Approach* outlines the biosecurity approach to weed management and those species to be controlled in the Western Plains and Wetlands Park Landscape grassy ecosystems.

Twenty-two threatened species listed on the FFG Act Threatened List occur within grassy ecosystems in the Western Plains and Wetlands Parks Landscape. Eight species are also listed under the EPBC Act and covered

by national recovery plans. For many of these species the records are up to 20 years old. Reassessment of important populations to determine their current condition should be undertake and, where confirmed, all threatened species should be protected and managed appropriately. The habitat requirements of identified threatened species will inform appropriate biomass management and identify threats such as grazing and invasive plants. Threatened species actions statements and national recovery plans can be referred to for specific species requirements.

Given the highly vulnerable and fragmented nature of grassy ecosystems within the Western Plains and Wetlands Park Landscape integrated management requires strong collaboration between Parks Victoria and Traditional Owners, DEECA, CCMA and GHCMA, as well as neighbouring landowners to ensure ongoing viability of this fragmented ecosystem at a landscape scale. Working with Traditional Owners to deliver cultural burning to meet biomass management objectives, collaboration with neighbours on weed control, and collaboration with agencies to implement management programs in high value focal areas as identified in the *Conservation Action Plan for the Victorian Volcanic Plain, Summary Report* (Koch & Wong, 2015) are all required.

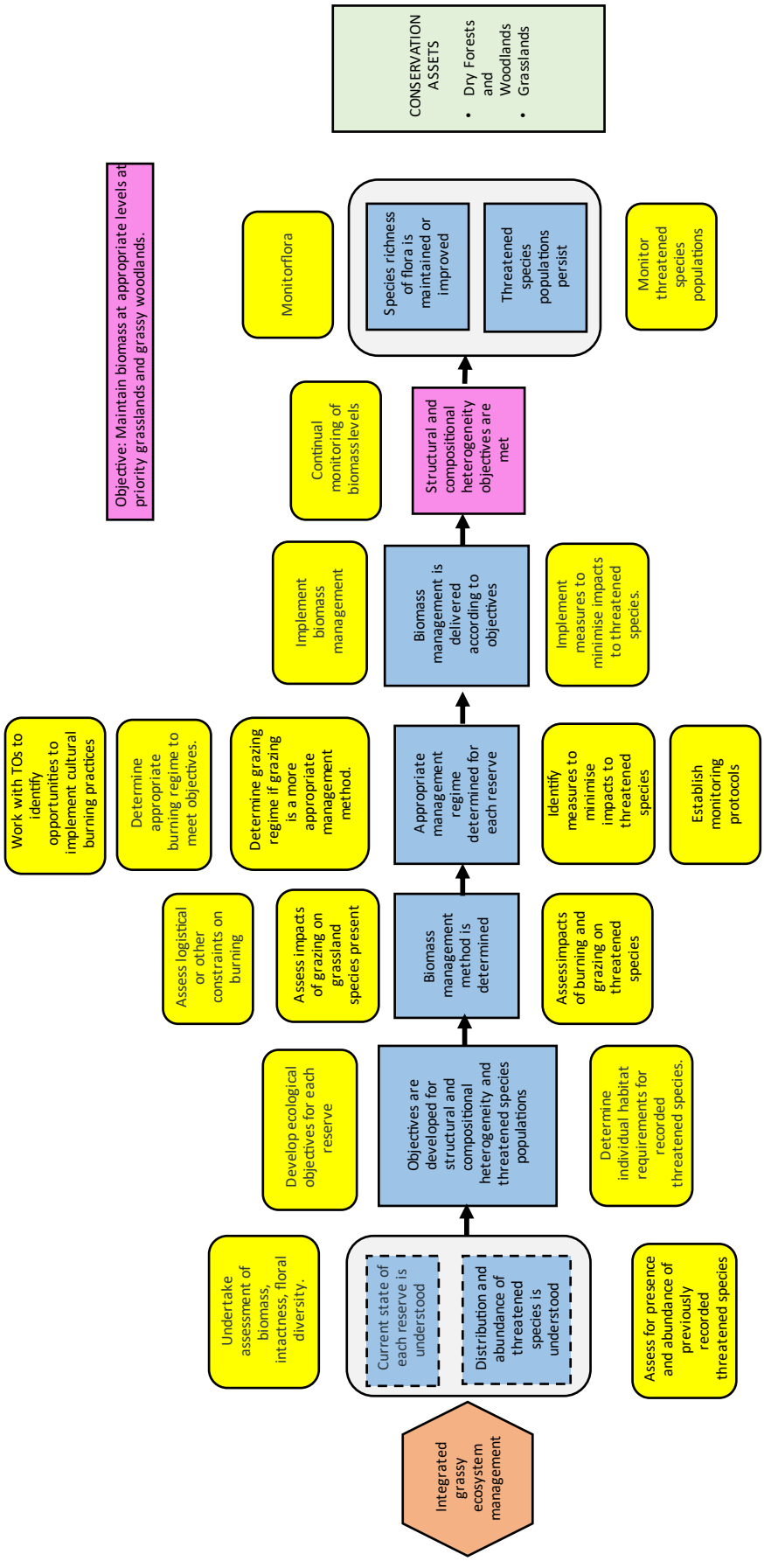
Strategy summary

Manage grasslands and grassland components of grassy woodlands to maintain their ecological condition, provide habitat for component species and promote recovery of threatened species through managing biomass and reducing the impacts of invasive plants and other threats.

Priority location	Threatened species	Key Actions	Values objective
Blacks Creek NCR	Striped Legless Lizard Spiny Rice-flower Small Milkwort	Control spread of invasive weeds Maintain biomass at appropriate levels taking into consideration impacts on threatened species	Maintain or improve the vegetation structure and floristic diversity. Confirm presence and assess and monitor populations of threatened species with the aim of maintaining self-generating populations
Inverleigh FR	Clover Glycine Hairy Tails	Control spread of invasive weeds Maintain biomass at appropriate levels taking into consideration impacts on threatened species	Maintain or improve the vegetation structure and floristic diversity. Confirm presence and assess and monitor populations of threatened species with the aim of maintaining self-generating populations
Illabarook Grassland FR	Tussock Skink Hairy tails	Control spread of invasive weeds Maintain biomass at appropriate levels taking into consideration impacts on threatened species	Maintain or improve the vegetation structure and floristic diversity. Confirm presence and assess and monitor populations of threatened species with the aim of maintaining self-generating populations
Cobra Killuc WR	Hairy Tails Clover Glycine Growling Grass Frog	Control spread of invasive weeds Maintain biomass at appropriate levels taking into consideration impacts on threatened species	Maintain or improve the vegetation structure and floristic diversity.

Priority location	Threatened species	Key Actions	Values objective
Cressy FR	Striped Legless Lizard Tussock Skink	Control spread of invasive weeds Maintain biomass at appropriate levels taking into consideration impacts on threatened species	Maintain or improve the vegetation structure and floristic diversity. Confirm presence and assess and monitor populations of threatened species with the aim of maintaining self-generating populations
Mount Mercer NCR	Small Milkwort Clover Glycine Small Scurf-pea Hairy Tails	Control spread of invasive weeds Maintain biomass at appropriate levels	Maintain or improve the vegetation structure and floristic diversity. Confirm presence and assess and monitor populations of threatened species with the aim of maintaining self-generating populations
Boonderoo NCR	Striped Legless Lizard	Control spread of invasive weeds Maintain biomass at appropriate levels	Maintain or improve the vegetation structure and floristic diversity. Confirm presence and assess and monitor populations of threatened species with the aim of maintaining self-generating populations
Lake Corangamite	Corangamite Water Skink Striped Legless Lizard Growling Grass Frog Spiny Peppercress Salt Lake Tussock Grass Salt Blown Grass	Reduce impact of stock grazing and encroachment on threatened species	Maintain or improve the vegetation structure and floristic diversity. Confirm presence and assess and monitor populations of threatened species with the aim of maintaining self-generating populations
Rossbridge WR	Spiny Peppercress Striped Legless Lizard	Reduce impacts of stock grazing on threatened species	Confirm presence and assess and monitor populations of threatened species with the aim of maintaining self-generating populations
Lake Goldsmith WR	Adamson's Blown Grass Salt-lake Tussock-grass Spiny Peppercress? Growling Grass Frog	Reduce impacts of grazing on threatened species	Confirm presence and assess and monitor populations of threatened species with the aim of maintaining self-generating populations

Results Chain



Implementation milestones

Result	Action
Current state of each grassland or grassy woodland reserve is understood Distribution and abundance of threatened species is understood	• Undertake assessment of biomass, intactness and flora diversity for each grassland and grassy woodland. • Assess for presence and abundance of previously recorded threatened species.
Objectives are developed for structural and compositional heterogeneity and threatened species populations	• Develop ecological objectives for each reserve. • Determine/understand individual habitat requirements for recorded threatened species.
Biomass management method is determined	• Assess logistical or other constraints on burning • Assess impacts of grazing on grassland species present • Assess impacts of burning and grazing on threatened species
Appropriate biomass management regime determined for each reserve	• Work with TOs to identify opportunities to implement cultural burning practices • Determine appropriate burning regime to meet objectives. • Determine grazing regime if grazing is a more appropriate management method. • Identify measures to minimise impacts to threatened species • Establish monitoring protocols
Biomass management is delivered according to objectives	• Implement biomass management • Implement measures to minimise impacts to threatened species.
Structural and compositional heterogeneity objectives are met	• Continual monitoring of biomass levels
Species richness of flora is maintained or improved Threatened species populations persist	• Monitor flora • Monitor threatened species

6.6 Control and monitoring of introduced predators to support resilient native fauna populations

Conservation outcome

Predation is reduced to levels low enough to support increasing populations of priority native animal species at priority locations.

Strategy

The control of introduced predators will support the persistence and increase of priority native fauna (such as waterbirds, shorebirds and small mammals) and their occurrence in the Western Plains and Wetlands Park landscape.

Due to the small size and very fragmented nature of parks and reserves in this landscape ongoing broadscale control is generally not feasible. Understanding the locations of threatened and priority fauna populations that are at risk of predation particularly is an essential first step in determining potential locations. The timing of predator control to have the most impact for example breeding seasons, migratory species presence, flocking sites or timing of other strategies alongside the feasibility of effective predator control in these locations at these times will determine priority areas.

Small reserves and narrow terrestrial margins around lakes and wetlands surrounded by freehold land can be subject to reinvasion and have limited effectiveness unless predator control is applied across the adjoining private land. A collaborative approach, working with neighbours and other natural resource managers will be essential in implementing any predator control programs to ensure predator control is effective. Targeting control (including feral cat control if available) to those areas where a collaborative approach is possible is an important step in managing predation pressure in the Western Plains and Wetlands Park Landscape.

Currently there are range of techniques used to manage fox populations including baiting, shooting, trapping and den fumigation. However, feral cat control is currently limited in Victoria to very labour-

intensive techniques, and additional methods are needed to support the effective control of predation pressure from cats in the Western Plains and Wetlands Landscape.

To ensure that the effectiveness of this strategy is maintained in the longer term, the presence and population sizes of introduced predators will need to be monitored in association with control programs with control reviewed regularly. Monitoring must also encompass target threatened species (including potential prey and competitor species) to ensure impacts to the fauna community structure and food webs can be managed if necessary. Working with other monitoring agencies with capacity for monitoring prey species outcomes to design control programs, such as of Birdlife Australia with respect to breeding success of beach-nesting birds (Hooded Plover), will assist in the evaluation of those programs.

Priority areas for predator control include:

- The Western District Lakes Ramsar site to protect breeding migratory and resident shorebirds,
- Targeted fox control around Hooded Plover populations at Belfast CR during breeding. Nesting season extends from August to Feb with the peak months Nov – Jan.
- Eumeralla (Yambuk) CR, Yambuk Wetlands and Yambuk FFR are Bio2037 Priority Locations for predator control to protect nesting and roosting shorebirds particularly Hooded Plovers.
- Tower Hill to protect small mammals (Southern brown Bandicoot, Swamp rat, Long-nosed bandicoot)

Fox control can lead to increased numbers of feral herbivores such as rabbits, so it is important to coordinate the control of both species where possible. The predator control strategy will also need to be implemented with other strategies that seek to improve the quality and extent of available habitat for fauna and reduce other threats to vulnerable species such as fire management, coastal protection and herbivore management.

Strategy summary

Implement targeted control of Red Foxes and Feral Cats at priority locations to support the persistence, movement and increase of threatened and migratory fauna species.

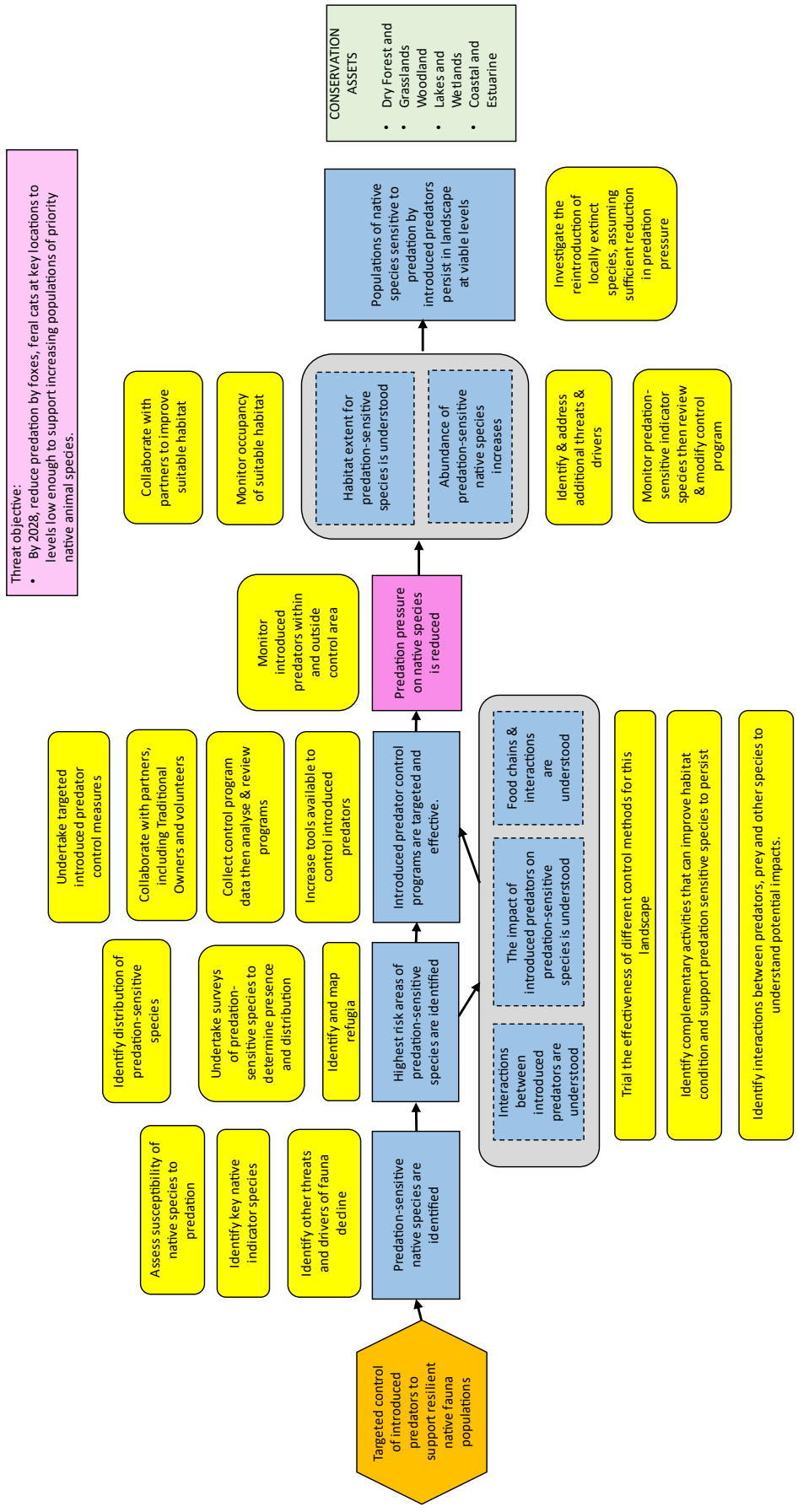
Table 6.6 Priority introduced predator (Fox/Cat) management areas in the Western Plains and Wetlands Parks Landscape

Priority Location	Conservation Assets to benefit*	Nested Assets	Priority
Eumeralla (Yambuk) CR** Yambuk Wetlands NCR** Yambuk FFR**	Coastal and Estuarine Dry Forest and Woodland Lakes and Wetlands	Shorebirds, waterbirds, beach-nesting birds	SMP 5
Belfast CR	Coastal and Estuarine	Shorebirds, waterbirds, beach-nesting birds	SMP 20
Tower Hill WR	Lakes and Wetlands Dry Forest and Woodlands	Feeding and roosting waterbirds, small mammals and reptiles	
Ramsar lakes	Lakes and Wetlands	Breeding resident and migratory shorebirds	SMP 20
Inverleigh FR	Dry Forest and Woodlands	Birds, reptiles	SMP 20

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

**Biodiversity 2037 Priority Area for predator control. (Naturekit2.0)

Results chain



Implementation milestones

Result	Activities
Predation-sensitive species are identified.	• Assess susceptibility of native species to predation • Identify key native indicator species • Identify other threats and drivers of fauna decline.
Highest risk areas for predation-sensitive species are identified.	• Identify distribution of predation-sensitive species. • Undertake surveys of predation-sensitive species to determine presence and distribution. • Identify and map refugia
The interactions between introduced predators are understood. The impact of introduced predators on predation-sensitive species is understood Food chains and interactions are understood	• Trial the effectiveness of different control methods for this landscape • Identify complementary activities that may improve habitat condition and support predation sensitive species to persist. • Identify interactions between predators, prey and other species to understand potential impacts (including prey switching).
Introduced predator control programs are targeted and effective	• Undertake targeted predator control measures • Collaborate with partners including Traditional Owners and volunteer groups. • Increase tools available to control introduced predators • Collect control program data and analyse and review programs.
Predation pressure on native species is reduced.	• Monitor introduced predators within and outside control area
Habitat extent for predation -sensitive species is understood Abundance of predation-sensitive species increases	• Collaborate with partners and neighbours to improve suitable habitat • Monitor occupancy of suitable habitat • Monitor predation-sensitive indicator species, then review and modify control program • Identify and address additional threats and drivers
Populations of native species sensitive to predation by introduced predators persist in the landscape at viable levels.	• Investigate the reintroduction of lost species, assuming sufficient reduction in predation pressure

6.7 Managing marine pests for healthy marine protected areas

Conservation outcomes

Marine pests will have a minimal impact on marine ecosystems in the Merri Marine Sanctuary.

Strategy

This strategy uses an integrated approach to prevent marine pests from spreading to, and becoming established in, marine and estuarine protected areas in the Western Plains and Wetlands Parks landscape. It involves continual monitoring of at-risk locations to identify and respond to new outbreaks of marine pests before they become established, as well as increasing public awareness of marine pests and good boat and equipment hygiene practices.

Preventing marine pests, such as Japanese Seaweed, and Northern Pacific Sea Star, from spreading and becoming established is a priority for the Merri Marine Sanctuary and estuarine areas. This will be achieved through ongoing surveillance of sufficient sites to enable the early detection of marine pests or overabundant native species. To increase the surveillance coverage Parks Victoria will work with community groups, researchers, licensed tour operators and contractors to include the identification of marine pests into their activities and to report any sightings.

Good boat and equipment hygiene practices will reduce the risk of marine invasive species being spread via boat hulls and fishing and diving equipment. This will be achieved through improved public awareness and implementation of boat cleaning protocols.

If pest incursions are detected and eradication is feasible, a coordinated rapid control response will be undertaken.

This strategy will ensure that marine assets continue to be maintained in very good condition. It will reduce the likelihood of marine pests establishing in the Parks landscape and ensure that the eradication of populations of new pests is rapid and targeted.

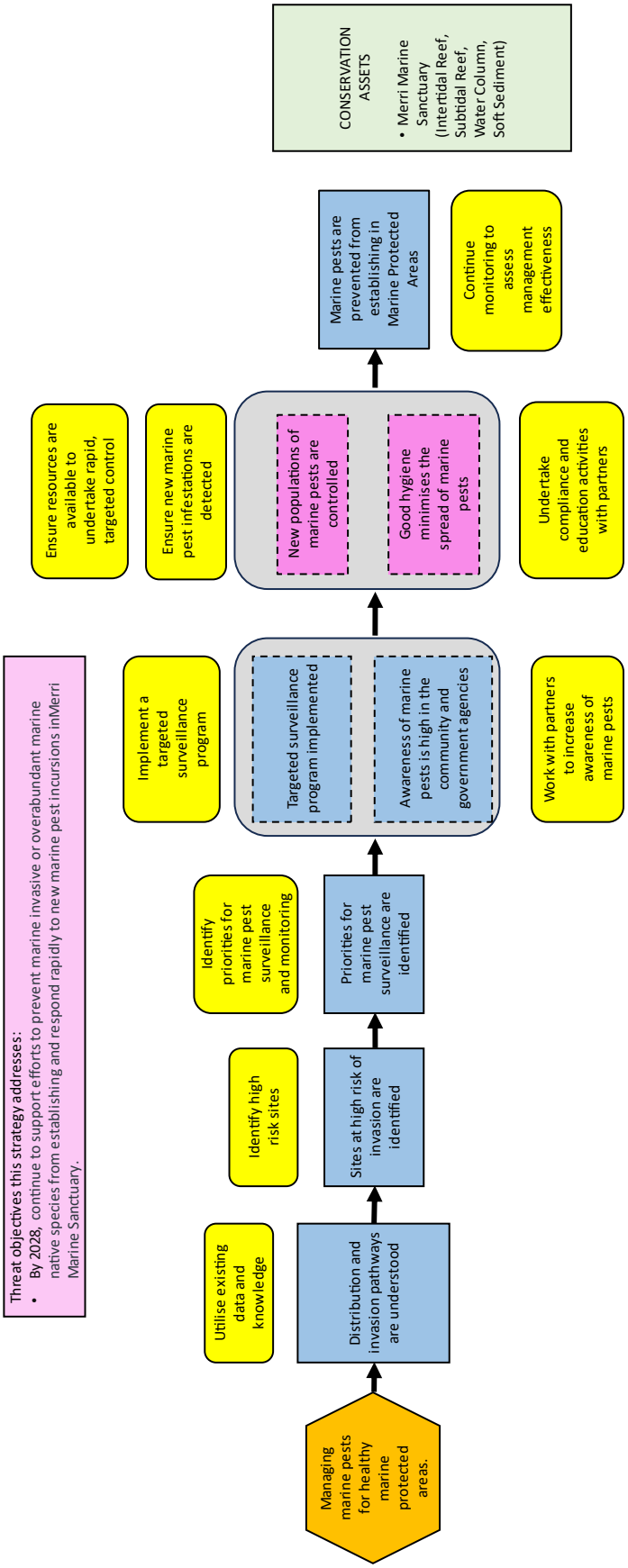
Strategy summary

To prevent the establishment (or to reduce impacts if eradication is not feasible) of marine pests in the Merri Marine Sanctuary and estuarine areas.

Table 6.7 Priority marine pest management areas in the Western Plains and Wetlands Parks Landscape

Target species	Action type	Conservation Assets to benefit*
Japanese Seaweed, Northern Pacific Sea star, European fan worm, other new and emerging species	Surveillance, monitoring Education and compliance	Subtidal Reef, Intertidal Reef, Soft Sediment

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


Threat objectives this strategy addresses:
• By 2028, continue to support efforts to prevent marine invasive or overabundant marine native species from establishing and respond rapidly to new marine pest incursions inMerri Marine Sanctuary.
Managing marine pests for healthy marine protected areas.
Distribution and invasion pathways are understood
Utilise existing data and knowledge
Sites at high risk of invasion are identified
Identify high risk sites
Priorities for marine pest surveillance are identified
Identify priorities for marine pest surveillance and monitoring
Targeted surveillance program implemented
Awareness of marine pests is high in the community and government agencies
Implement a targeted surveillance program
Work with partners to increase awareness of marine pests
New populations of marine pests are controlled
Good hygiene minimises the spread of marine pests
Ensure resources are available to undertake rapid, targeted control
Ensure new marine pest infestations are detected
Undertake compliance and education activities with partners
Marine pests are prevented from establishing in Marine Protected Areas
Continue monitoring to assess management effectiveness
CONSERVATION ASSETS
• Merri Marine Sanctuary (Intertidal Reef, Subtidal Reef, Water Column, Soft Sediment)

Implementation milestones

Result	Activities
Distribution and invasion pathways of potential marine pests are understood.	• Utilise existing data and knowledge to understand marine pest distribution and invasion pathways.
Prevention	
Increased awareness and reporting of marine pest threats in the community and government agencies	• Work with community and agency partners to increase awareness of marine pests • Encourage community to report sightings of marine pests
Increased practice of good hygiene by recreational divers and boat owners	• Work with partners and community to implement good hygiene practices •
Surveillance and response	
Sites at high risk of invasion are identified.	• Identify high risk sites by developing and running a risk assessment and modelling process, taking invasion pathways into account
Priorities for marine pest surveillance are identified.	• Identify priorities for marine pest surveillance and management.
Marine pest surveillance program is targeted, robust and likely to detect new infestations (suspected and unknown threats)	• Implement a targeted surveillance program for new infestations.
New marine pest populations are controlled	• Ensure that new marine pest infestations are detected, and responses to new infestations or species follow established action plans. • Ensure that resources are available to undertake rapid, targeted control.
Monitoring identifies that management actions have minimised/eliminated marine risk	• Continue monitoring to assess the effectiveness of management and surveillance
Minimal impact of marine pests and overabundant native species on marine ecosystems in marine protected areas	

6.8 Reducing the impacts of recreation, illegal activities and resource extraction on natural values

Conservation outcomes

Significant marine and terrestrial conservation values are protected through reduced impacts of permissible and illegal activities on priority areas.

Strategy

The aim of this strategy is to encourage the public to enjoy nature-based activities and take pride in the reserve system, while reducing the impacts on high conservation values.

Pressures from recreational activities and illegal activities impact terrestrial and marine ecosystems in the Western Plains and Wetlands Landscape. Human impacts on nature and the parks estate take many forms but can be classified into two broad categories: (i) visitation pressures including licensed activities and (ii) people behaving illegally, for example illegal fishing and shellfish poaching, off-track access by vehicles, horses and dogs, rubbish dumping and illegal cropping.

In high-use areas that have high environmental values, Parks Victoria will investigate solutions to reduce damage to sensitive habitats, while continuing to facilitate recreation. Together with ongoing monitoring, and collection of data on visitor numbers, types, activities, and illegal activities, this information will be used gauge the level of impact caused by park users. At these locations Parks Victoria will work together with other agencies and non-government organisations to reduce identified threats by developing communication tools and strategies that inform park uses of the presence of significant environmental assets and to encourage use of formal tracks and reduce off-track impacts.

A focus of this strategy will be coastal reserves, which are particularly vulnerable to damage by recreation that causes dune destabilisation, trampling of vegetation, and disturbance of beach-nesting birds. High value grassy woodland habitat subject to off-track impacts by vehicles will also be a priority. To support

this, Parks Victoria will close illegal access tracks, rehabilitate where possible and monitor impacts on beach nesting birds in conjunction with Birdlife Australia.

In the Merri Marine Sanctuary, Parks Victoria will work with partners to deliver education and compliance to ensure that recreational activities are undertaken in a manner that minimises risk to marine environments. This includes promotion of sanctuary boundaries and regulations and monitoring of target species.

Parks Victoria will work with key partners, including DEECA, Victorian Fisheries Authority and local government, to develop compliance activities to support education and communication activities. Compliance activities will be prioritised to targeted programs for the protection of shorebirds from the impacts of off-lead dog walking and marine areas to enforce regulations. Other areas of significant natural values with high numbers of offences will also be prioritised with focus areas from the Regional Compliance Plan.

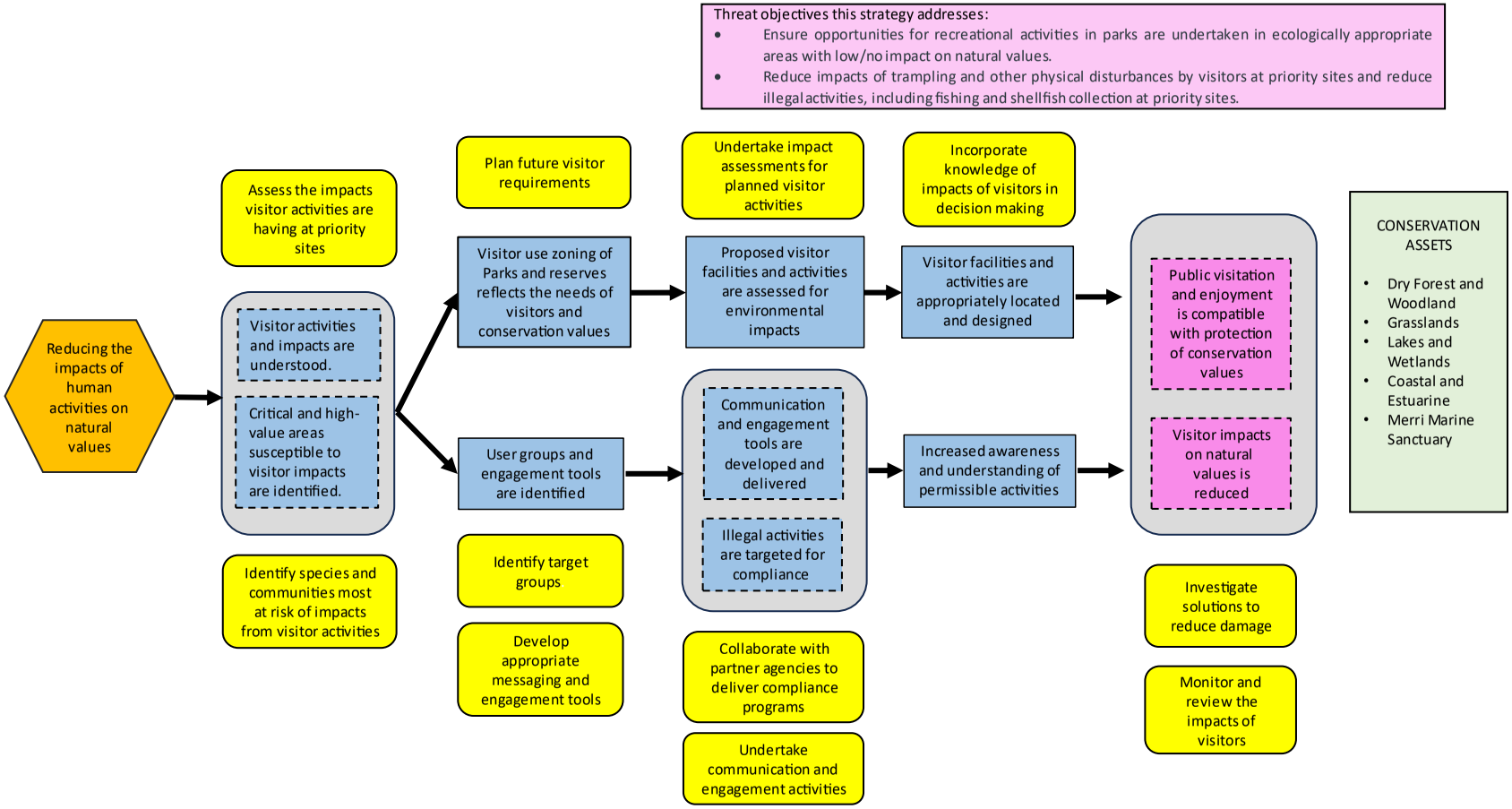
Licensed activities such as commercial horse training and horse-riding tour groups will be managed to reduce impacts on dunes, vegetation and vulnerable species through monitoring and enforcement of license provisions.

In priority wetlands including the Western District Lakes Ramsar Site, Parks Victoria will work with DEECA to investigate boundary encroachment issues including cropping and grazing.

Table 6.8 Priority human impact management areas for terrestrial/marine conservation assets in the Western Plains and Wetlands Landscape

Impact managed	Conservation Assets to benefit*	Priority locations
Illegal fishing	Marine	Merri Marine Sanctuary
Commercial horse training and licensed tour groups	Coastal and Estuarine	Belfast Coastal Reserve, Eumeralla (Yambuk) CR
Domestic dogs	Coastal and Estuarine	Belfast Coastal Reserve, Eumeralla (Yambuk) CR
Illegal access (off-track)	Coastal and Estuarine Dry Forest and Woodland	Belfast Coastal Reserve Inverleigh
Boundary encroachment Illegal grazing Illegal cropping	Lakes and Wetlands	Western District Lakes Ramsar Site

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


Threat objectives this strategy addresses:
Ensure opportunities for recreational activities in parks are undertaken in ecologically appropriate areas with low/no impact on natural values.
Reduce impacts of trampling and other physical disturbances by visitors at priority sites and reduce illegal activities, including fishing and shellfish collection at priority sites.
Reducing the impacts of human activities on natural values
Assess the impacts visitor activities are having at priority sites
Visitor activities and impacts are understood.
Critical and high-value areas susceptible to visitor impacts are identified.
Identify species and communities most at risk of impacts from visitor activities
Plan future visitor requirements
Visitor use zoning of Parks and reserves reflects the needs of visitors and conservation values
User groups and engagement tools are identified
Identify target groups
Develop appropriate messaging and engagement tools
Undertake impact assessments for planned visitor activities
Proposed visitor facilities and activities are assessed for environmental impacts
Communication and engagement tools are developed and delivered
Illegal activities are targeted for compliance
Collaborate with partner agencies to deliver compliance programs
Undertake communication and engagement activities
Incorporate knowledge of impacts of visitors in decision making
Visitor facilities and activities are appropriately located and designed
Increased awareness and understanding of permissible activities
Public visitation and enjoyment is compatible with protection of conservation values
Visitor impacts on natural values is reduced
Investigate solutions to reduce damage
Monitor and review the impacts of visitors
CONSERVATION ASSETS
Dry Forest and Woodland
Grasslands
Lakes and Wetlands
Coastal and Estuarine
Merri Marine Sanctuary

Implementation milestones

Result	Action
Illegal activities	
Impact of inappropriate and illegal activities identified and understood	• Monitor and review the impacts of visitors on natural and cultural values. • Identify and review high value areas with reports of illegal activity • Collaborate with user groups, partner agencies and Traditional Owners
Relevant groups causing impacts and appropriate engagement tools identified	• Identify target groups and most appropriate messaging and engagement methods
Rules and regulations are understood by park users Increased awareness and understanding of environmental values and permissible activities	• Communicate the impacts of illegal activities on priority habitats and species • Communicate the regulations and penalties, and where and when they apply • Promote the reporting of illegal activity
Illegal activities and illegal resource collection are targeted for compliance	• Investigate options and tools for monitoring and detecting illegal activities • Collaborate with relevant enforcement agencies • Monitor resource collection areas • Ensure compliance for illegal activities & illegal collection is included in Regional Enforcement plan & resourced
Impacts of illegal activities on biodiversity values is mitigated	• Any illegal activity is reported and fed back into statistics for compliance planning and communication
Permissible activities	
Relevant groups causing impacts identified Impacts of inappropriate activities understood	• Identify impacts of activities on natural values • Monitor and review the impacts of visitors and commercial operators on natural values • Collaborate with user groups, partner agencies and friends groups
Appropriate engagement tools identified	• Identify user groups and most appropriate messaging and engagement methods
Increased awareness and understanding of environmental values and permissible activities	• Educate the community on significant environmental values and appropriate activities • Develop and promote minimal impact statements
Park users undertake activities that minimise impacts on natural and cultural values	
Reduced incidence of illegal activities Permissible natural resource extraction is sustainable The impacts of permissible visitor activities on natural values, particularly threatened species, is minimised	

Lake Gnarpurt Lake Reserve

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 Reporting Plan for the Western Plains and Wetlands Parks Landscape (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 Western Plains and Wetlands Parks Landscape.

Activity measures	Threat measures	Outcome measures
FIRE		
STRATEGY: 6.1 Fire management for ecological health **THREAT ADDRESSED: 5.1 Inappropriate fire regimes and management**		
• Map of fire history, tolerable fire intervals and vegetation growth-stages prepared • Frequency of engagement with bushfire management agencies (e.g. DEECA) and the community • Timeliness of bushfire recovery and rehabilitation programs	• Extent and timing of all planned burning and bushfires • Percentage of the Parks Landscape burnt below the minimum tolerable fire intervals • Distribution of ecological growth stages of fire-prone ecosystems in the Parks Landscape • Deviation from the ideal growth-stage distributions (data only available for French Island) • Effectiveness (extent and type) of rehabilitation implemented after fire events	• Age-class structure of canopy species • Spatial and temporal vegetation growth stage structure • Flora species composition

Activity measures	Threat measures	Outcome measures
	• Loss of high-value locations of threatened or culturally important species	
WATER		
STRATEGY: 6.2 Supporting partnership to address threats to water-dependent assets **THREAT ADDRESSED: 5.2 Poor water quality inputs (freshwater,** saline **and marine) and altered hydrology**		
• Number of collaborations with user groups and partner agencies • Engagement effort with partners • Water quality monitoring undertaken/supported • Proportion of adjacent private landholders cooperating with Parks Victoria • Hectares of land purchased/protected under conservation covenant • Number of earthen structures (berms) removed	• Area of conservation assets vulnerable to hydrology changes/sea-level rise • Water quality and stream nutrient levels • Height/measure of sea level rise and extent of storm surge events • Hectares of coastal reserves permanently inundated by rising sea levels	• Extent and quality of riparian vegetation • Extent and health of seagrass, and saltmarsh • Condition of freshwater and marine wetlands • Waterbird diversity and abundance in the Western District Lakes Ramsar site • Resilience to climate change of freshwater, saline and estuarine wetlands • Hectares of restored tidal regimes • Hectares of saltmarsh regeneration
WEEDS		
STRATEGY: 6.3 Environmental weed control using a biosecurity approach **THREAT ADDRESSED: 5.3 Weed invasion**		
• Treatment of new and emerging weeds (species, area treated, person-days) • Surveillance effort for new and emerging weeds (species, area treated, person-days) • Percentage of high priority locations with control activities undertaken • Area of woody weeds treated (species, area treated, person-days) • Area of priority weeds treated (species, area treated, person-days) • Area of good neighbour weed projects	• Number of new weed infestations identified • Number of newly identified weed infestations eradicated • Change in extent and cover of locally eradicable weeds • Change in extent and cover of weeds controlled for asset protection or containment	• Vegetation structure and composition at priority locations
HERBIVORES		
STRATEGY: 6.4 Terrestrial herbivore management **THREAT ADDRESSED: 5.4 Terrestrial grazing, browsing and trampling**		
• Number of pest animals with impacts, control methods, control levels and high-priority locations identified • Extent, frequency and method of control (number and species removed) • Percentage of priority locations where control activities are undertaken	• Relative herbivore density in areas of high value	• Structure and composition of native vegetation communities

Activity measures	Threat measures	Outcome measures
• Effectiveness of control (units of effort per target species)		
GRASSLANDS		
STRATEGY: 6.5 Integrated grassy ecosystem management		
THREAT ADDRESSED: 5.5 Human mediated habitat degradation/loss		
• Extent, frequency and method of biomass control in grasslands	• Biomass levels in grassland reserves	• Population size of threatened species • Presence of threatened species • Grassland condition
PREDATION		
STRATEGY: 6.5 Sustained control and monitoring of introduced terrestrial predators to support resilient native fauna populations		
THREAT ADDRESSED: 5.5 Terrestrial predation		
• 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)	• 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
MARINE		
STRATEGY: 6.6 Managing marine pests for healthy marine protected areas		
THREAT ADDRESSED: 5.6 Marine predation and competition		
• 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) • New infestations removed • Number of new pest species/ infestations established	• Cover of habitat forming species in reef ecosystems and seagrass beds • Abundance and species richness of key gastropods and other macroinvertebrate groups • Absence of marine invasive species
VISITORS		
STRATEGY: 6.7 Reducing the impact of recreation, illegal activities and resource extraction on natural values		
THREAT ADDRESSED: 5.7 Human-mediated habitat degradation/loss		
• Number of compliance operations • Number of collaborations with user groups and partner agencies • Suitability assessments carried out at potential locations for emerging recreational activities • Number of new communications around illegal activities and marine natural values •	• Reports of recreational damage on significant conservation values in high-use parks • Proportion of high-value conservation areas impacted by human activity • Proportion of high-value conservation areas impacted by resource extraction • Incidence of illegal activities	• Breeding success at key Hooded Plover breeding sites • Health of communities sensitive to trampling • Population health (abundance) of marine species subject to poaching • Population stability of species subject to legal extraction • Utilisation of data provided by the Sea Search Program to ascertain species richness

7.2 Monitoring, evaluation and reporting plan

A Monitoring, Evaluation and Reporting (MER) 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 MER 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.

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

	Conservation Action Plan		
	Actions	**Threats**	**Assets**
	Were the actions carried out?	*Has the threat been mitigated?*	*Have 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? Were the indicators and targets appropriate?	Was monitoring sufficient? Were the indicators and targets appropriate?

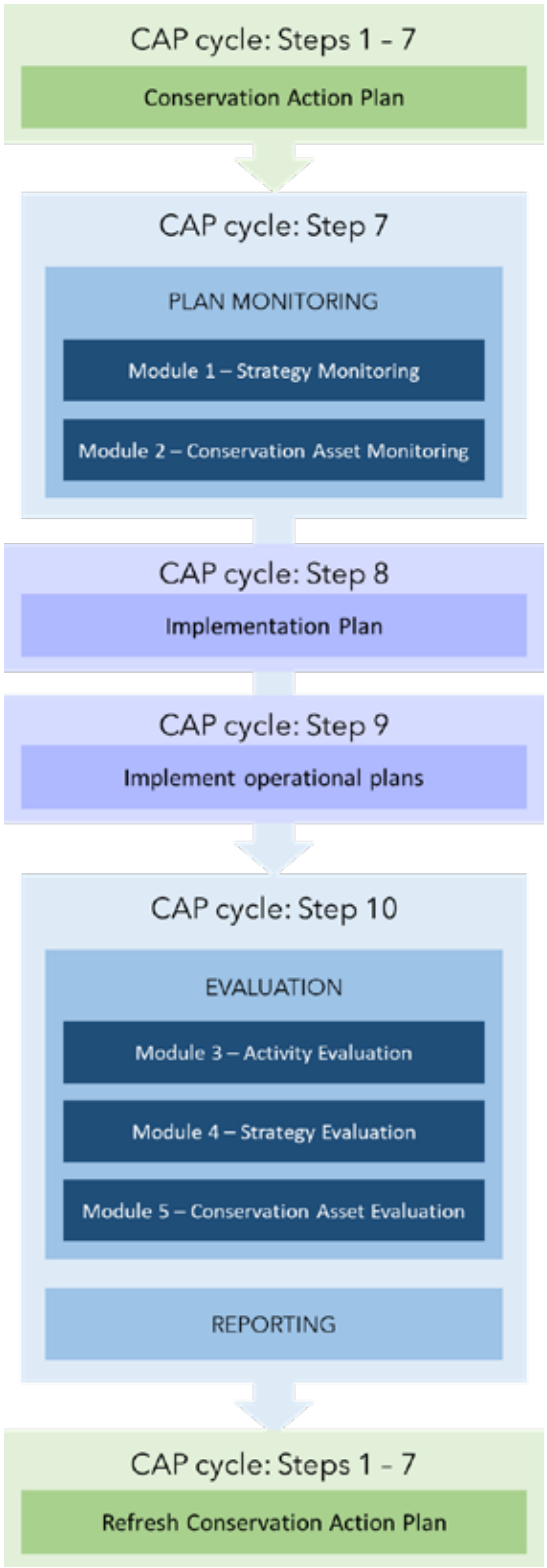
Fundamentally, the MER process aims to determine what was done, how well it was done, and if it had any effect on desired Key Ecological Attribute (KEA) goals and outcomes. This approach would also identify knowledge gaps, poor or inappropriate indicators, and gaps in the effectiveness of planning and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

The MER process is organised according to the steps in the Conservation Action Planning cycle (Figure 1.2). The MER 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 7 in the CAP cycle is the MER 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 8, 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 may be required to implement on-ground monitoring actions (Steps 8 & 9).

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



Step 7(a)
During the development of the CAP, interim performance measures are identified for key strategy results.

Step 7(b)
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 8 & 9
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 10
Both the CAP and its implementation are evaluated, and recommendations for improvement are provided 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.
Reporting - summary of findings and recommendations for improvement should be presented in a Summary CAP 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 Reporting for conservation action planning.

Blue Devil

Inverleigh Flora Reserve

8 Plan implementation

The 10-step conservation action planning process (Figure 1.2) describes the three final steps of the planning cycle as *Step 8 - Plan work*, *Step* 9 - Implement operational plans, and *Step 10 - Adapt the conservation action plan and operational activities*. Considerations associated with those implementation steps 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 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 Environment & Science Directorate. Parks Victoria will collaborate with Traditional Owners in seeking opportunities for funding where applicable.

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. 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 8: Plan work

Following on from the development of the Implementation Plan (8.1), and once the resources for prioritised actions identified in the Implementation Plan 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 on-ground 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.

Step 9: Implement operational plans

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

Step 10: Adapt the Conservation Action Plan and operational activities

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 Reporting 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.

Merri Marine Sanctuary

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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 Western Plains and Wetlands Parks Landscape

PV area codes used: SCH = Shipwreck Coast and Hinterland, CO = Colac Otway

Park/reserve name	Park/reserve type	IUCN categ.	Area (hectares)	PV Area	Directory of Important Wetlands
Bannockburn Bushland Reserve	Natural Features Reserve - Bushland Reserve	*IV*	10	Geelong	
Barwon River Streamside Reserve	Natural Features Reserve - Streamside Reserve	*III*	4	Geelong	
Beeac Swamp Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	68	CO	Yes
Belfast Coastal Reserve	Coastal Reserve		1718	SCH	
Black Lake Wildlife Reserve	Nature Conservation Reserve - Wildlife Reserve (no hunting)	*Ia*	83	Ballarat	
Blacks Creek Nature Conservation Reserve	Nature Conservation Reserve	*Ia*	241	Ballarat	
Blue Lake Wildlife Reserve	Natural Features Reserve - Wildlife Reserve (hunting)	*VI*	40	Ballarat	
Boonderoo Nature Conservation Reserve	Nature Conservation Reserve	*Ia*	186	Geelong	
Broadwater I90 Bushland Reserve	Natural Features Reserve - Bushland Reserve	*IV*	4	SCH	
Broadwater I91 Bushland Reserve	Natural Features Reserve - Bushland Reserve	*IV*	14	SCH	
Brucknell Creek Flora and Fauna Reserve	Nature Conservation Reserve - Flora and Fauna Reserve	*Ia*	6	SCH	
Bulldog Historic Area	Historic and Cultural Features Reserve		30	Ballarat	
Bungador Stoney Rises Nature Conservation Reserve	Nature Conservation Reserve	*Ia*	16	CO	
Bunnugal Wildlife Reserve	Natural Features Reserve - Wildlife Reserve (hunting)	*VI*	14	Grampians	
Cargerie I42 Bushland Reserve	Natural Features Reserve - Bushland Reserve	*IV*	49	Geelong	
Cargerie I43 Bushland Reserve	Natural Features Reserve - Bushland Reserve	*IV*	16	Geelong	
Cemetery Lake Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	20	CO	
Cobra Killuc Wildlife Reserve	Nature Conservation Reserve - Wildlife Reserve (no hunting)	*Ia*	638	SCH	
Cobrico Swamp Wildlife Reserve	Natural Features Reserve - Wildlife Reserve (hunting)	*VI*	13	SCH	
Cockajemmy Lakes Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	96	Grampians	
Cressy Flora Reserve	Nature Conservation Reserve - Flora Reserve	*Ia*	3	CO	
Cressy Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	25	CO	
Cressy Streamside Reserve	Natural Features Reserve - Streamside Reserve	*III*	8	Ballarat	
Cundare Lake Reserve	Natural Features Reserve - Lake Reserve	*NA*	79	CO	Yes

Park/reserve name	Park/reserve type	IUCN categ.	Area (hectares)	PV Area	Directory of Important Wetlands
Darlington Common Flora Reserve	Nature Conservation Reserve - Flora Reserve	*Ia*	53	SCH	
Dreeite Nature Conservation Reserve	Nature Conservation Reserve	*Ia*	97	CO	
Ecklin South Swamp Nature Conservation Reserve	Nature Conservation Reserve	*Ia*	34	SCH	
Eumeralla (Yambuk) Coastal Reserve	Coastal Reserve		944	SCH	
Fiery Creek Streamside Reserve	Natural Features Reserve - Streamside Reserve	*III*	36	Ballarat	
Floating Islands Flora and Fauna Reserve	Nature Conservation Reserve - Flora and Fauna Reserve	*Ia*	83	SCH	
Glenormiston Streamside Reserve	Natural Features Reserve - Streamside Reserve	*III*	2	SCH	
Goose Lagoon Wildlife Reserve	Natural Features Reserve - Wildlife Reserve (hunting)	*VI*	9	SCH	
Hopkins Falls Scenic Reserve	Natural Features Reserve - Scenic Reserve	*III*	2	SCH	
Hopkins River, Framlingham Streamside Reserve	Natural Features Reserve - Streamside Reserve	*III*	10	SCH	
Hopkins River, Wickliffe Streamside Reserve	Natural Features Reserve - Streamside Reserve	*III*	26	Grampians	
Hopkins River, Willaura Streamside Reserve	Natural Features Reserve - Streamside Reserve	*III*	49	Grampians	
Illabarook Grassland Flora Reserve	Nature Conservation Reserve - Flora Reserve	*Ia*	126	Ballarat	
Illabrook Rail Line Nature Conservation Reserve	Nature Conservation Reserve	*Ia*	22	Ballarat	
Inverleigh Flora Reserve	Nature Conservation Reserve - Flora Reserve	*Ia*	1050	Geelong	
Kooraweera Lakes Wildlife Reserve	Nature Conservation Reserve - Wildlife Reserve (no hunting)	*Ia*	346	SCH	Yes
Krause Swamp Wildlife Reserve	Nature Conservation Reserve - Wildlife Reserve	*Ia*	20	Glenelg	
Lady Julia Percy Island Wildlife Reserve	Nature Conservation Reserve - Wildlife Reserve (no hunting)	*Ia*	147	SCH	
Lake Aringa Wildlife Reserve	Nature Conservation Reserve - Wildlife Reserve (no hunting)	*Ia*	22	SCH	
Lake Barnie Buloke Wildlife Reserve	Natural Features Reserve - Wildlife Reserve (hunting)	*VI*	38	SCH	
Lake Beeac Wildlife Reserve	Nature Conservation Reserve - Wildlife Reserve (no hunting)	*Ia*	674	CO	Yes
Lake Bolac Highway Park	Natural Features Reserve - Highway Park	*III*	10	Ballarat	
Lake Bolac Lake Reserve	Natural Features Reserve - Lake Reserve		1460	Ballarat	
Lake Bookaar Wildlife Reserve	Natural Features Reserve - Wildlife Reserve (hunting)	*VI*	480	SCH	Yes
Lake Bulkil Narra Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	6	SCH	
Lake Bullen Merri Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	501	SCH	

Park/reserve name	Park/reserve type	IUCN categ.	Area (hectares)	PV Area	Directory of Important Wetlands
Lake Buninjon Wildlife Reserve	Natural Features Reserve - Wildlife Reserve (hunting)	*VI*	249	Grampians	Yes
Lake Burn Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	71	CO	
Lake Cockatoo Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	57	CO	
Lake Colac Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	2835	CO	
Lake Colongulac Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	1512	SCH	Yes
Lake Coradjil Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	52	SCH	Yes
Lake Coragulac Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	34	CO	
Lake Corangamite Lake Reserve	Natural Features Reserve - Lake Reserve		25211	SCH	Yes
Lake Cundare Wildlife Reserve	Nature Conservation Reserve - Wildlife Reserve (no hunting)	*Ia*	301	CO	Yes
Lake Dubban Wildlife Reserve	Natural Features Reserve - Wildlife Reserve (hunting)	*VI*	14	SC	
Lake Elingamite Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	377	SCH	
Lake Eyang Wildlife Reserve	Natural Features Reserve - Wildlife Reserve (hunting)	*VI*	130	SCH	
Lake Gherang Gherang Wildlife Reserve	Natural Features Reserve - Wildlife Reserve (hunting)	*VI*	114	SC	
Lake Gillear Wildlife Reserve	Natural Features Reserve - Wildlife Reserve (hunting)	*VI*	23	SCH	
Lake Gnalinegurk Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	24	CO	
Lake Gnarpurt Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	2514	SCH	Yes
Lake Gnotuk Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	229	SCH	
Lake Goldsmith Wildlife Reserve	Natural Features Reserve - Wildlife Reserve (hunting)	*VI*	924	Ballarat	
Lake Jollicum Wildlife Reserve	Natural Features Reserve - Wildlife Reserve (hunting)	*VI*	74	Ballarat	
Lake Kariah Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	147	SCH	
Lake Keilambete Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	354	SCH	
Lake Kennedy Wildlife Reserve	Natural Features Reserve - Wildlife Reserve (hunting)	*VI*	241	Glenelg	
Lake Koonangurt Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	22	SCH	
Lake Koreetnung Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	239	SCH	
Lake Kornong Wildlife Reserve	Natural Features Reserve - Wildlife Reserve (hunting)	*VI*	15	Ballarat	
Lake Linlithgow & Bullrush Swamp Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	1184	Glenelg	Yes
Lake Muirhead Wildlife Reserve	Natural Features Reserve - Wildlife Reserve (hunting)	*VI*	344	Grampians	Yes
Lake Mumblin Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	16	SCH	

Park/reserve name	Park/reserve type	IUCN categ.	Area (hectares)	PV Area	Directory of Important Wetlands
Lake Munderong Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	14	SCH	
Lake Murdeduke Wildlife Reserve	Natural Features Reserve - Wildlife Reserve (hunting)	*VI*	1495	SC	Yes
Lake Ondit Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	107	CO	
Lake Oundell Wildlife Reserve	Nature Conservation Reserve - Wildlife Reserve (no hunting)	*Ia*	86	Ballarat	
Lake Paracelmic Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	239	Ballarat	
Lake Peawick-Gorra Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	35	Grampians	
Lake Punpundal Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	36	SCH	
Lake Purdiguluc Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	88	CO	
Lake Purrumbete Wildlife Reserve	Nature Conservation Reserve - Wildlife Reserve (no hunting)	*Ia*	537	SCH	
Lake Rosine Wildlife Reserve	Nature Conservation Reserve - Wildlife Reserve (no hunting)	*Ia*	176	SCH	
Lake Struan Wildlife Reserve	Natural Features Reserve - Wildlife Reserve (hunting)	*VI*	51	SCH	
Lake Tatutong Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	30	SCH	
Lake Terang Goodwitch Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	15	SCH	
Lake Terangpom Wildlife Reserve	Nature Conservation Reserve - Wildlife Reserve (no hunting)	*Ia*	220	SCH	Yes
Lake Terrinallum Wildlife Reserve	Natural Features Reserve - Wildlife Reserve (hunting)	*VI*	189	SCH	
Lake Thurrumbong Wildlife Reserve	Natural Features Reserve - Wildlife Reserve (hunting)	*VI*	409	CO	Yes
Lake Tim Dunn Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	27	Grampians	
Lake Tooliorook Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	386	SCH	
Lake Weeranganuk Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	519	SCH	
Lake Weering Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	426	CO	
Lake Werowrap Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	36	CO	
Lake Wongan Wildlife Reserve	Natural Features Reserve - Wildlife Reserve (hunting)	*VI*	245	Ballarat	
Lakes Turangmoroke, Yuangmania and Gunjal Wildlife Reserve	Natural Features Reserve - Wildlife Reserve (hunting)	*VI*	165	Ballarat	
Logans Lake Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	296	SCH	
Lough Calvert Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	1980	CO	Yes
Maroona Streamside Reserve	Natural Features Reserve - Streamside Reserve	*III*	11	Grampians	

Park/reserve name	Park/reserve type	IUCN categ.	Area (hectares)	PV Area	Directory of Important Wetlands
Merri Marine Sanctuary	Marine Sanctuary - Schedule 8, National Parks Act	*II*	29	SCH	
Milangil Lake Wildlife Reserve	Nature Conservation Reserve - Wildlife Reserve (no hunting)	*Ia*	246	SCH	
Mirnee N49 Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	34	SC	
Mirnee N50 Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	34	SC	
Mortlake Common Flora Reserve	Nature Conservation Reserve - Flora Reserve	*Ia*	304	SCH	
Mortlake N16 Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	32	SCH	
Mortlake N17 Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	43	SCH	
Mount Fyans Wildlife Reserve	Nature Conservation Reserve - Wildlife Reserve (no hunting)	*Ia*	45	SCH	
Mount Mercer Nature Conservation Reserve	Nature Conservation Reserve	*Ia*	223	Ballarat	
Mount William Swamp (The Big Swamp) Wildlife Reserve	Natural Features Reserve - Wildlife Reserve (hunting)	*VI*	624	Grampians	Yes
Nalangil Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	49	CO	
Nerrin Nerrin Swamp Wildlife Reserve	Natural Features Reserve - Wildlife Reserve (hunting)	*VI*	290	Ballarat	Yes
Nullawarre Flora Reserve	Nature Conservation Reserve - Flora Reserve	*Ia*	1	SCH	
Ombersley Streamside Reserve	Natural Features Reserve - Streamside Reserve	*III*	6	CO/SC	
Ondit N39 Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	28	CO	
Ondit N43 Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	103	CO	
Ondit N45 Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	52	CO	
Picnic Lakes Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	83	Grampians	
Pink Lake Wildlife Reserve	Natural Features Reserve - Wildlife Reserve (hunting)	*VI*	44	Ballarat	Yes
Pomborneit North Nature Conservation Reserve	Nature Conservation Reserve	*Ia*	57	SCH	
Pretty Hill Flora Reserve	Nature Conservation Reserve - Flora Reserve	*Ia*	2	SCH	
Purrumbete North Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	25	SCH	
Rossbridge Wildlife Reserve	Nature Conservation Reserve - Wildlife Reserve (no hunting)	*Ia*	60	Grampians	
Round Lake Wildlife Reserve	Nature Conservation Reserve - Wildlife Reserve (no hunting)	*Ia*	70	SCH	
Salt Lake, Streatham Wildlife Reserve	Natural Features Reserve - Wildlife Reserve (hunting)	*VI*	102	Ballarat	
Salt Lake, Wongan Wildlife Reserve	Nature Conservation Reserve - Wildlife Reserve (no hunting)	*Ia*	24	Ballarat	

Park/reserve name	Park/reserve type	IUCN categ.	Area (hectares)	PV Area	Directory of Important Wetlands
Skipton Streamside Reserve	Natural Features Reserve - Streamside Reserve	*III*	2	SCH	
St Helens Flora Reserve	Nature Conservation Reserve - Flora Reserve	*Ia*	31	SCH	
Tabor (Buckley's) Swamp Wildlife Reserve	Natural Features Reserve - Wildlife Reserve (hunting)	*VI*	60	Glenelg	
Teesdale Sheoak Nature Conservation Reserve	Nature Conservation Reserve	*Ia*	4	Geelong	
Terrinallum N10 Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	12	SCH	
Terrinallum N9 Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	24	SCH	
The Green Swamp Wildlife Reserve	Natural Features Reserve - Wildlife Reserve (hunting)	*VI*	81	Grampians	
Towanway N5 Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	10	Grampians	
Towanway N6 Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	20	Grampians	
Tower Hill Wildlife Reserve	Natural Features Reserve - Wildlife Reserve (hunting)	*VI*	624	SCH	
Turkeeth N46 Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	50	CO	
Turkeeth N47 Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	12	CO	
Vite Vite Streamside Reserve	Natural Features Reserve - Streamside Reserve	*III*	3	SCH	
Walker Swamp Lake Reserve	Natural Features Reserve - Lake Reserve	*III*	30	Grampians	
Warracbarunah Lake Reserve	Natural Features Reserve - Lake Reserve	*NA*	78	CO	
Weering Lake Reserve	Natural Features Reserve - Lake Reserve	*NA*	12	CO	
Whites Lake Lake Reserve	Natural Features Reserve - Lake Reserve	*NA*	6	CO	
Woady Yallock River, Pitfield Streamside Reserve	Natural Features Reserve - Streamside Reserve	*III*	8	Ballarat	
Woolsthorpe Nature Conservation Reserve	Nature Conservation Reserve	*Ia*	32	SCH	
Yambuk Flora and Fauna Reserve	Nature Conservation Reserve - Flora and Fauna Reserve	*Ia*	147	SCH	
Yambuk Wetlands Nature Conservation Reserve	Nature Conservation Reserve	*Ia*	77	SCH	Yes
Yetmerone Swamp Wildlife Reserve	Nature Conservation Reserve - Wildlife Reserve (no hunting)	*Ia*	13	Glenelg	

Appendix B — Scientific names and conservation status of species

Common name	Scientific name	Values: Conservation status[2]		Relevant CAP strategy related to TSP Actions[3]	Threat: Risk rating	
		EPBC	FFG		Type	Rating[4]
Adamson's Blown grass	*Lachnagrostis adamsonii*	Endangered	Endangered	Weeds, Herbivores		
African Box Thorn	*Lycium ferocissimum*				Weed	High
African Love Grass	*Eragrostis curvula*				Weed	Very High Risk
Austral Salt Grass	*Distichlis distichophylla*					
Austral Seablite	*Suaeda australia*					
Australasian Bittern	*Botaurus poiciloptilus*	Endangered	Critically endangered	Water, Herbivores, Predation		
Australasian Shoveler	*Anas rhynchotis*		Vulnerable			
Australian Blackwood	*Acacia melanoxylon*					
Australian Fur Seal	*Arctocephalus pusillus doriferus*					
Australian Magpie	*Gymnorhina tibicen*					
Australian Pelican	*Pelecanus conspicillatus*					
Australian Raven	*Corvus coronoides*					
Australian Salmon	*Arripis trutta*					
Australian Salt-grass	*Distichlis distichophylla*					
Australian Shelduck	*Tadorna tadornoides*					
Australian Short-finned Eel	*Anguilla australis*					
Australian White Ibis	*Threskiornis moluccus*					
Australasian Gannet	*Morus serrator*					
Bar-tailed Godwit	*Limosa lapponica*	Vulnerable	Vulnerable			
Basalt Leek Orchid	*Prasophyllum viretrum*		Critically endangered			
Basalt Peppercress	*Lepidium hyssopifolium*	Endangered	Endangered	Weeds, Herbivores		
Beaded Glasswort	*Sarcocornia quinqueflora*					
Black Swan	*Cygnus atratus*					
Blackberry	*Rubus* hybrid				Weed	Very High Risk
Black-faced Cormorant	*Phalacrocorax fuscescens*					
Black-winged Stilt	*Himantopus himantopus*					
Blacklip Abalone	*Haliotis rubra*					
Blanket Weed	*Galenia pubescens*				Weed	Mod High Risk
Blue-billed Duck	*Oxyura australis*		Vulnerable			
Blue Devil	*Eryngium ovinum*					
Blue-throated Wrasse	*Notolabrus tetricus*					
Boneseed	*Chrysanthemoides monilifera*				Weed	High Risk

[2] EPBC = National status under the *Environment Protection and Biodiversity Conservation Act 1999*
FFG = Victorian status under the *Flora and Fauna Guarantee Act 1988*

[3] Priority actions specified under recovery plans (EPBC Act) or action statements or management plans (FFG Act)

[4] Weed Risk Rating from the 2022 Advisory List of Environmental Weeds in Victoria

Common name	Scientific name	Values: Conservation status[2]		Relevant CAP strategy related to TSP Actions[3]	Threat: Risk rating	
		EPBC	FFG		Type	Rating[4]
Bower Spinach	*Tetragonia implexicoma*					
Bridal Creeper	*Asparagus asparagoides*				Weed	High Risk
Brolga	*Grus rubicunda*		Endangered	Predators		
Brown Stringybark	*Eucalyptus baxteri*					
Brown-headed Honeyeater	*Melithreptus brevirostris*					
Bulbine Lily	*Bulbine bulbosa*					
Canary Grass	*Phalaris canariensis*				Weed	Very High Risk
Capeweed	*Arctotheca calendula*				Weed	Mod High Risk
Caspian Tern	*Hydroprogne caspia*					
Cartut Shell	*Dicathais orbita*					
Cat	*Felis catus*				Introduced	
Cattle	*Bos taurus*				Introduced	
Chestnut Teal	*Anas castanea*					
Chilean Needle-grass	*Nassella neesiana*				Weed	Very High Risk
Clover Glycine	*Glycine latrobeana*	Vulnerable	Vulnerable	Fire, Grasslands, Weeds, Herbivores		
Coast Beard-heath	*Leucopogon parviflorus*					
Coast Daisy-bush	*Olearia axillaris*					
Coast Stackhousia	*Stackhousia spathulata*					
Coast Wattle	*Acacia sophorae*				Weed	Very High Risk
Coastal Tea Tree	*Leptospermum laevigatum*				Weed	Very High Risk
Coast-tussock Grass	*Poa poiformis*					
Cocksfoot	*Dactylis glomerata*				Weed	High Risk
Common Duckweed	*Lemna minor*				Weed	Mod High Risk
Common Blown Grass	*Lachnagrostis filiformis*					
Common Spikerush	*Eleocharis palustrus*					
Common Wallaby Grass	*Austrodanthonia caespitosa*					
Corangamite Water Skink	*Eulamprus tympanum marnieae*	Endangered	Endangered	Water, Herbivores		
Crayweed	*Phyllospora comosa*					
Creeping Thistle	*Cirsium arvense var. arvense*				Weed	Medium Risk
Crested Shrike-tit	*Falcunculus frontatus*					
Curlew Sandpiper	*Calidris ferruginea*	Critically endangered	Critically endangered	Water, Visitors		
Cut-leaf Goodenia	*Goodenia pinnatifidia*					
Diamond Firetail	*Stagonopleura guttata*	Vulnerable	Vulnerable			
Domestic Dog	*Canis lupus familiaris*				Introduced	
Draughtboard Shark	*Cephaloscyllium laticeps*					
Drooping Sheoak	*Allocasuarina verticillata*					
Dusky Woodswallow	*Artamus cyanopterus*					

Common name	Scientific name	Values: Conservation status[2]		Relevant CAP strategy related to TSP Actions[3]	Threat: Risk rating	
		EPBC	FFG		Type	Rating[4]
Dwarf Spider-orchid	*Caladenia pumila*	Critically endangered	Critically endangered	Fire, Weeds, Herbivores, Visitors		
Eastern Barred Bandicoot	*Perameles gunnii*	Endangered	Endangered	Predators		
Eastern Jacky Winter	*Microeca fascinans*					
Eurasian Coot	*Fulica atra*					
European Fanworm	*Sabella spallanzanii*				Introduced	
Eastern Gray Kangaroo	*Macropus giganteus*					
European Rabbit	*Oryctolagus cuniculus*				Introduced	
Fairy Prion	*Pachyptila turtur*					
Fairy Tern	*Sternula nereis*	Vulnerable	Critically endangered	Predation, Visitors		
Fallow Deer	*Dama dama*				Introduced	
Fat-tailed Dunnart	*Sminthopsis crassicaudata*		Vulnerable	Fire, Grasslands, Weeds		
Featherheads	*Ptilotis macrocephalus*					
Flame Robin	*Petroica phoenicea*					
Fleshy Pratia	*Pratia irrigua*					
Floating Pondweed	*Potamogeton natans*					
Freckled Duck	*Stictonetta naevosa*		Endangered	Water, Visitors		
Gahnia	*Gahnia spp*					
Gang-gang Cockatoo	*Callocephalon fimbriatum*	Endangered	Endangered			
Giant Cuttlefish	*Sepia apama*					
Giant Kelp	*Macrocystis pyrifera*	Endangered		Water		
Giant Water-ribbon	*Cycnogeton procerum*					
Goat	*Capra hircus*				Introduced	
Golden Sun-moth	*Synemon plana*			Weeds, Grasslands		
Gorse	*Ulex europaeus*				Weed	High Risk
Great Cormorant	*Phalacrocorax carbo*					
Great Egret	*Ardea alba*		Endangered	Water		
Green Shore Crab	*Carcinus maenas*				Introduced	
Greenlip Abalone	*Haliotis laevigata*					
Grey Box	*Eucalyptus microcarpa*					
Grey Goshawk	*Accipiter novaehollandiae*		Endangered			
Growling Grass Frog	*Litoria raniformis*	Vulnerable	Vulnerable	Water		
Hairy Tails	*Ptilotus erubescens*		Critically endangered	Grasslands, Weeds		
Hemlock	*Conium maculatum*				Weed	Mod High Risk
Hooded Plover	*Thinornis rubricollis*	Vulnerable	Vulnerable	Predation, Visitors		
Horehound	*Marrubium vulgare*					High Risk
Italian Buckthorn	*Rhamnus alaternus*					Very High Risk
Japanese kelp	*Undaria pinnatifida*				Introduced	
Kangaroo Grass	*Themeda triandra*					
Koala	*Phascolarctos cinereus*					

Common name	Scientific name	Values: Conservation status[2]		Relevant CAP strategy related to TSP Actions[3]	Threat: Risk rating	
		EPBC	FFG		Type	Rating[4]
Leatherjacket	*Oligoplites saurus*					
Lemon Beauty Heads	*Calocephalus citreus*					
Limestone Spider-orchid	*Caladenia calcicol*	Vulnerable	Critically endangered	Weeds, Herbivores, Visitors		
Little Egret	*Egretta garzetta*		Endangered	Water, Visitors		
Little Penguin	*Eudyptula minor*					
Little Pied Cormorants	*Microcarbo melanoleucos*					
Magpie Goose	*Anseranas semipalmata*		Vulnerable			
Magpie Perch	*Cheilodactylus nigripes*					
Manna Gum	*Eucalyptus viminalis*					
Marram Grass	*Ammophila arenaria*				Weed	Mod High Risk
Matted Flax Lily	*Dianella amoena*	Endangered	Critically endangered	Weeds		
Mexican Feather Grass	*Nassella tenuissima*				Weed	Very High Risk
Milk Thistle	*Silybum marianum*				Weed	Medium Risk
Musk Duck	*Biziura lobata*		Vulnerable			
Narrow-leaf Peppermint	*Eucalyptus radiata*					
Northern Pacific Seastar	*Asterias amurensis*				Introduced	
Onion Weed	*Asphodelus fistulosus*				Weed	Medium Risk
Orange-Bellied Parrot	*Neophema chrysogaster*	Critically Endangered	Critically endangered		Water, Weeds	
Pacific Azolla	*Azolla filiculoides*					
Pacific Gull	*Larus pacificus*					
Paterson's Curse	*Echium plantagineum*				Weed	High RIsk
Pied Oystercatcher	*Haematopus longirostris*					
Pied Stilt	*Himantopus leucocephalus*					
Pig	*Sus scrofa*				Introduced	
Pink Bindweed	*Convulvulous angustisimus*					
Pink-eared Duck	*Malacorhynchus membranaceus*					
Pot-bellied Seahorse	*Hippocampus abdominalis*					
Prickfoot	*Eryngium vesiculosum*					
Prickly Moses	*Acacia verticillata*					
Prickly Tea-tree	*Leptospermum continentale*					
Purple-crowned Lorikeet	*Parvipsitta porphyrocephala*					
Purple Diuris	*Diuris punctata var. punctata*		Endangered	Weeds, Herbivores		
Pygmy Right Whale	*Caperea marginata*	Cetacean				
Quaking Grass	*Briza maxima*				Weed	Mod High Risk
Radiata Pine	*Pinus radiata*				Weed	Very high Risk

Common name	Scientific name	Values: Conservation status[2]		Relevant CAP strategy related to TSP Actions[3]	Threat: Risk rating	
		EPBC	FFG		Type	Rating[4]
Ragwort	*Senecio jacobaea*				Weed	Mod High Risk
Rakali	*Hydromys chrysogaster*					
Red Fox	*Vulpes vulpes*				Introduced	
Red-capped Plovers	*Charadrius ruficapillus*					
Red-necked Avocets	*Recurvirostra novaehollandiae*					
River Red Gum	*Eucalyptus camaldulensis*					
Round-leaf Wilsonia	*Wilsonia rotundifolia*					
Royal Spoonbill	*Platalea regia*					
Ruddy Turnstone	*Arenaria interpres*	Vulnerable	Endangered			
Running Marsh-flower	*Ornduffia reniformis*					
Rye Grass	*Lolium perenne*				Weed	Medium Risk
Salt-lake Tussock grass	*Poa sallacustris*	Vulnerable	Critically endangered	Weeds, Herbivores		
Sanderling	*Calidris alba*	Migratory		Water, Weeds		
Scarlet Robin	*Petroica boodang*					
Sea Lettuce	*Ulva lactuca*					
Sea Mullet	*Mugil cephalus*					
Sea Spurge	*Euphorbia paralias*				Weed	High Risk
Seaberry Saltbush	*Chenopodium candolleanum*					
Serrated Tussock	*Nassella trichotoma*				Weed	Very High Risk
Sharp-tailed Sandpiper	*Calidris acuminata*	Vulnerable		Water		
Sheoak	*Casuarina* spp.					
Short-tailed Shearwaters	*Puffinus tenuirostris*	Migratory				
Sicilian Sea-lavender	*Limonium hyblaeum*				Weed	Very High Risk
Sperm Whale	*Physeter macrocephalus*	Cetacean				
Silver Wattle	*Acacia dealbata*					
Small Milkwort	*Comesperma polygaloides*		Critically endangered	Fire, Weeds, Grasslands		
Small-leaved Clematis	*Clematis microphylla*					
Small River Buttercup	*Ranunculus amphitrichus*					
Soft Tig-rush	*Baumea Rubiginosa*					
South African Weed Orchid	*Disa bracteata*				Weed	Very High Risk
Southern Bent-wing Bat	*Miniopterus orianae bassanii*	Critically endangered	Critically endangered	Fire, Water		
Southern Brown Bandicoot	*Isoodon obesulus*	Endangered	Endangered	Predation, Weeds, Herbivores		
Southern Bull Kelp	*Durvillaea potatorum*					
Southern Eagle Ray	*Myliobatis tenuicaudatus*					
Spear-grass Tussock	*Austrostipa stipoides*					
Spear Thistle	*Cirsium vulgare*				Weed	Mod High Risk
Spiny Peppercress	*Lepidium aschersonii*	Vulnerable	Endangered	Water, Weeds, Herbivores		

Common name	Scientific name	Values: Conservation status[2]		Relevant CAP strategy related to TSP Actions[3]	Threat: Risk rating	
		EPBC	FFG		Type	Rating[4]
Spiny Rice-flower	*Pimelea spinescens subsp. spinescens*	Critically endgangered	Critically endangered	Fire, Weeds, Herbivores		
Spiny Rush	*Juncus acutus subs. acutus*				Weed	Medium Risk
Sticky Saw Sedge	*Lepidosperma viscidum*					
Straw-necked Ibis	*Threskiornis spinicollis*					
Stonewort	*Family: Characeae*					
Striped Legless Lizard	*Delma impar*	Vulnerable	Endangered	Fire, Weeds, Herbivores		
Sugar Gum	*Eucalyptus cladocalyx*				Weed	High Risk
Swamp Billy Buttons	*Craspedia variabilis*					
Swamp Fireweed	*Senecio psilocarpus*					
Swamp Gum	*Eucalyptus ovata*					
Swamp Paperbark	*Melaleuca ericifolia*					
Swamp Wallaby Grass	*Amphibromus nervosus*					
Sweep	*Scorpididae spp*					
Sweet Bursaria	*Bursaria spinosa*					
Sweet Pittosporum	*Pittosporum undulatum*				Weed	Very High Risk
Sweet Vernal Grass	*Anthoxanthum odoratum*				Weed	High RIsk
Swift Parrot	*Lathamus discolor*	Critically endangered	Critically endangered	Fire, Herbivores		
Tall Wheat Grass	*Thinopyrum ponticum*				Weed	Very High Risk
Texus Needlegrass	*Nasella leuchotricha*				Weed	Very High Risk
Toowoomba Canary Grass	*Phalaris aquatica*				Weed	High risk
Tree Violet	*Melicytus dentatus*					
Turban Shell	*Turbo undulatus*					
Tussock Skink	*Pseudemoia pagenstecheri*		Endangered			
Twining Glycine	*Glycine clandestina*					
Variegated Thistle	*Silybum marianum*				Weed	Medium Risk
Wallaby Grass	*Rytidosperma spp*					
Waratah Anemone	*Actinia tenebrosa*					
Water milfoil	*Myriophyllum crispatum*					
Water Primrose	*Ludwigia peruviana*				Weed	
Weeping Grass	*Microlaena stipoides*					
Woodland Leek-orchid	*Prasophyllum elatum*					
Western Gaping Leek-orchid	*Prasophyllum sp. Aff correctum (Mortlake)*					
Wild Oat	*Avena fatua*				Weed	High Risk
White Sunray	*Leucochrysum albicans*		Endangered	Fire, Weeds, Grasslands		
Yam Daisy (Myrnong)	*Microseris spp*					
Yarra Pygmy Perch			Vulnerable	Water		
Yellow Box	*Eucalyptus melliodora*					

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).

FOR LANDSCAPES WITH MPAs 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 Western Plains and Wetlands Parks Landscape.

Conservation Asset	EVD	EVC	Bioregion	Biodiversity Conservation status	Total (hectares)
Coastal (including Estuarine)	Coastal	Coastal Dune Scrub	Warrnambool Plain	Depleted	596.7
	Saline Wetland	Estuarine Wetland	Warrnambool Plain	Depleted	33.9
		Permanent Saline	Warrnambool Plain	NA	139.9
	Coastal (including Estuarine) total				**170.5**
Dry Forest and Woodlands	Foothills Forest	Valley Grassy Forest	Central Victorian Uplands	Vulnerable	42.0
			Victorian Volcanic Plain	Vulnerable	8.2
	Forby Forest	Damp Sands Herb-rich Woodland	Victorian Volcanic Plain	Vulnerable	93.3
			Warrnambool Plain	Endangered	34.8
		Damp Sands Herb-rich Woodland/Damp Heathland/Damp Heathy Woodland Mosaic	Warrnambool Plain	Endangered	9.3
		Damp Sands Herb-rich Woodland/Plains Swampy Woodland/Aquatic Herbland Mosaic	Warrnambool Plain	Endangered	16.5
		Grassy Woodland	Central Victorian Uplands	Endangered	126.6
			Victorian Volcanic Plain	Endangered	71.0
			Warrnambool Plain	Endangered	0.1
		Herb-rich Foothill Forest	Victorian Volcanic Plain	Vulnerable	7.3
	Grassy/Heathy Dry Forest	Sand Forest	Victorian Volcanic Plain	Endangered	1.5
	Inland Plains Woodland	Plains Grassy Woodland	Central Victorian Uplands	Endangered	2.0
			Dundas Tablelands	Endangered	685.0
			Victorian Volcanic Plain	Endangered	1148.4
			Warrnambool Plain	Endangered	0.1
	Western Plains Woodland	Basalt Shrubby Woodland	Victorian Volcanic Plain	Endangered	7.5
		Cinder Cone Woodland	Victorian Volcanic Plain	Endangered	314.9
		Plains Grassy Woodland/Stony Knoll Shrubland Mosaic	Victorian Volcanic Plain	Endangered	0.5
		Plains Swampy Woodland	Victorian Volcanic Plain	Endangered	1.7
		Scoria Cone Woodland	Victorian Volcanic Plain	Endangered	84.9
		Stony Knoll Shrubland/Plains Grassy Woodland/Plains Grassy Wetland Mosaic	Victorian Volcanic Plain	Endangered	32.6
		Stony Rises Woodland	Victorian Volcanic Plain	Vulnerable	340
	Damp Scrub	Stream Bank Shrubland	Central Victorian Uplands	Vulnerable	6.0
			Victorian Volcanic Plain	Endangered	7.5

	Riparian (higher rainfall)	Riparian Forest	Victorian Volcanic Plain	Vulnerable	3.4
	Riverine Woodland / Forest	Riparian Woodland	Central Victorian Uplands	Endangered	2.9
			Victorian Volcanic Plain	Endangered	0.4
		Riparian Woodland/Escarpment Shrubland Mosaic	Victorian Volcanic Plain	Endangered	1.7
	Treed Swampy Wetland	Creekline Grassy Woodland	Dundas Tablelands	Endangered	38.3
			Victorian Volcanic Plain	Endangered	3.3
		Swampy Riparian Woodland	Victorian Volcanic Plain	Endangered	0.2
	Dry Forest and Woodlands Total				**3092.6**
Grasslands	Basalt Grassland	Plains Grassland	Dundas Tablelands	Endangered	6.5
			Victorian Volcanic Plain	Endangered	661.5
		Plains Grassland/Plains Grassy Woodland Mosaic	Central Victorian Uplands	Endangered	0.3
			Dundas Tablelands	Endangered	1.1
			Victorian Volcanic Plain	Endangered	36.9
	Grasslands Total				706.3
Inland Waters and Wetlands	Freshwater (ephemeral)	Plains Grassy Wetland	Victorian Volcanic Plain	Endangered	9.3
		Plains Sedgy Wetland	Victorian Volcanic Plain	Endangered	31.4
	Freshwater Wetland (permanent)	Aquatic Herbland	Warrnambool Plain	Endangered	17.3
		Aquatic Herbland/Plains Sedgy Wetland Mosaic	Dundas Tablelands	Endangered	938.1
			Victorian Volcanic Plain	Endangered	888.3
		Freshwater Lake Aggregate	Victorian Volcanic Plain	Endangered	149.0
		Permanent Open Freshwater	Victorian Volcanic Plain	NA	290.0
		Shallow Freshwater Marsh	Dundas Tablelands	Vulnerable	6.3
			Victorian Volcanic Plain	Endangered	17.4
		Water Body - Fresh	Victorian Volcanic Plain	NA	2090.0
	Damp Scrub	Swamp Scrub	Victorian Volcanic Plain	Endangered	923.9
			Warrnambool Plain	Endangered	17.3
		Swamp Scrub/Aquatic Herbland Mosaic	Warrnambool Plain	Endangered	293.8
	Saline Wetland	Brackish Lake Aggregate	Victorian Volcanic Plain	Vulnerable	1085.4
		Brackish Wetland	Victorian Volcanic Plain	Endangered	2.0
		Saline Lake Aggregate	Dundas Tablelands	Least Concern	145.5
			Victorian Volcanic Plain	Least Concern	578.0
		Water body - salt	Dundas Tablelands	NA	214.6
			Victorian Volcanic Plain	NA	41378.2
			Warrnambool Plain	NA	0.2
	Inland Waters and Wetlands Total				**49 075.0**
Merri Marine Sanctuary					

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[5], 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. **Assess and rate the current and desired condition of the indicators for each key ecological attribute.** The next step in assessing 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.

[5] Defined as: the degree to which an ecosystem's observed structure, function and composition resemble those characteristics 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 wildfire)
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			IMPACT - CONSEQUENCE - ECOSYSTEM SCALE				
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.			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 measurable 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[6] ••• Impact events should be expected within the current year[7]	**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)**

[6] Incremental and cumulative impacts

[7] Impacts due to individual events

Appendix G — Biosecurity principles

Prevention

Prevention is a pre-emptive action to managing the risk of introducing weeds into the Parks Landscape and ensuring works or disturbance events do not provide an opportune environment for weed establishment. This is achieved by identifying the most likely invasion points, which are often vehicle access and parking sites and locations 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 seed and ensuring that appropriate site preparation and risk identification before planned disturbance events such as planned burning and environmental watering.

Eradication of new and emerging weeds

The initial part of the strategy is to ensure that resources are available to address the threat of new and emerging weeds before they can become established. Any new weed species identified within the Parks Landscape should be eradicated as a management priority and the area of infestation monitored for re-emergence. Once a species has become established, its potential for eradication becomes less feasible and more resource intensive.

DEECA have designed a decision-making framework to managing Weeds of Early Stages of Invasion (WESI). This framework will guide and support the management of new and emerging weeds. The WESI principles are based on a landscape approach to identifying new and emerging species. The process to address new and emerging weed threats should follow the six-step approach outlined in the Weeds of Early Stages of Invasion framework. Eradication is the objective for new and emerging weeds where feasible.

Containment

Containment is an ongoing maintenance approach to managing the spread of established weeds. Management tracks, ridgelines and other landscape features are useful in defining containment boundaries. 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.

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

This applies to weeds that are well established and widespread within the Parks Landscape. If a weed species presents a specific threat to a specific value, an asset protection approach to weed management may be undertaken. Examples of assets include riparian corridors, threatened species, cultural heritage sites, visitor sites and infrastructure. Asset protection will generally involve specifying a buffer around the asset and treating weeds within its perimeter. Biological controls can assist with containment for established weeds, but are limited to species with an available control agent.

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