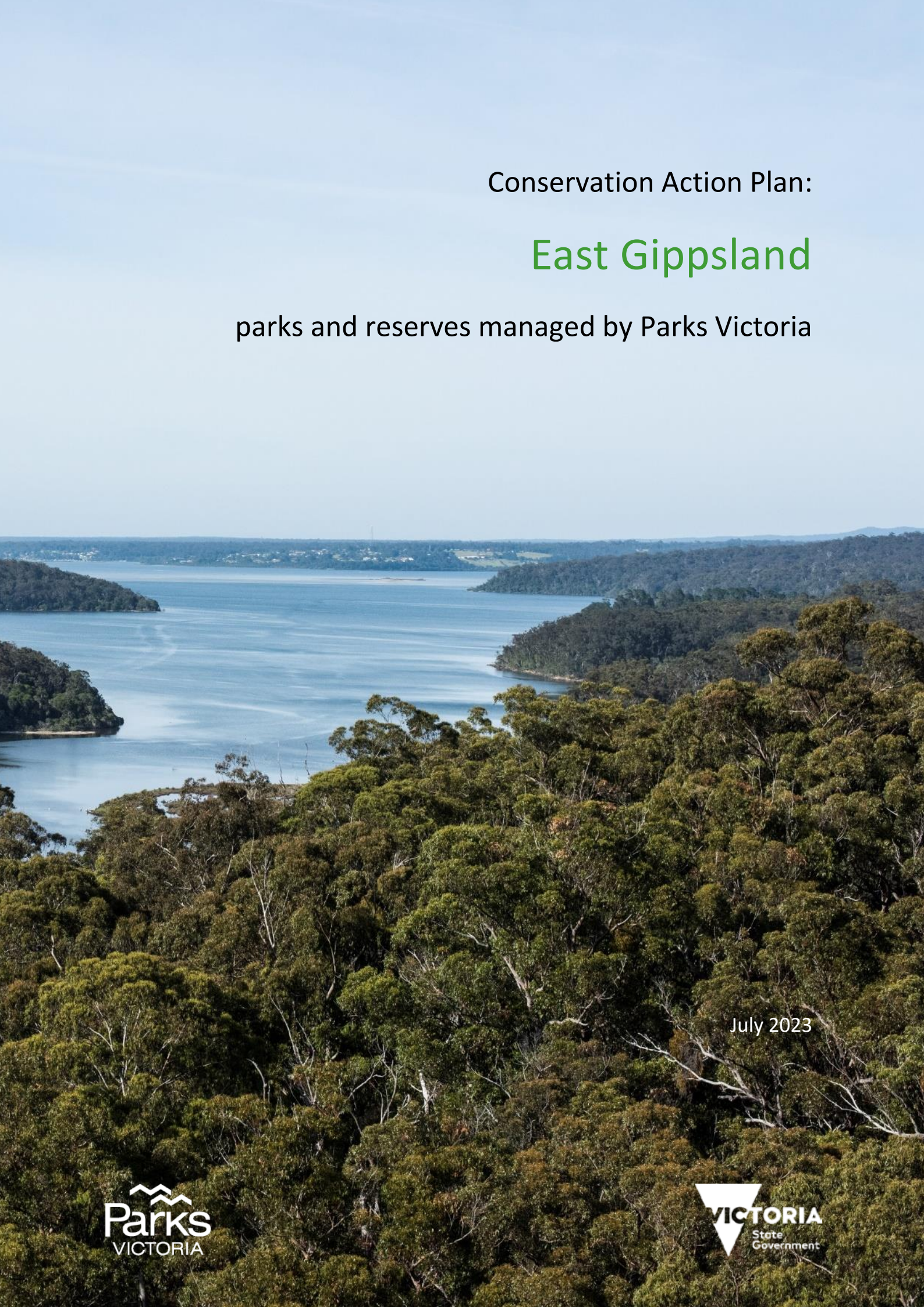
Conservation Action Plan:

East Gippsland

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.

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Cover: Croajingolong National Park pre-bushfire (David Paul, Museums Victoria)

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 East Gippsland 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 and adjacent resource extraction continue to have on this unique cultural landscape. This plan reinforces the strategic directions and objectives of the Gunaikurnai Land and Waters Aboriginal Corporation, the Registered Aboriginal Party in the western part of this landscape and is a starting place for conversations with Traditional Owners to the far east on the importance of the nature and wildlife of this Country.

Parks Victoria acknowledges, respects and works closely with Traditional Owners across what is now known as Victoria. We pay our respects to Elders past and present, and to emerging Aboriginal leaders.

The East Gippsland Conservation Action Plan focuses primarily on the first of Parks Victoria's three strategic themes:

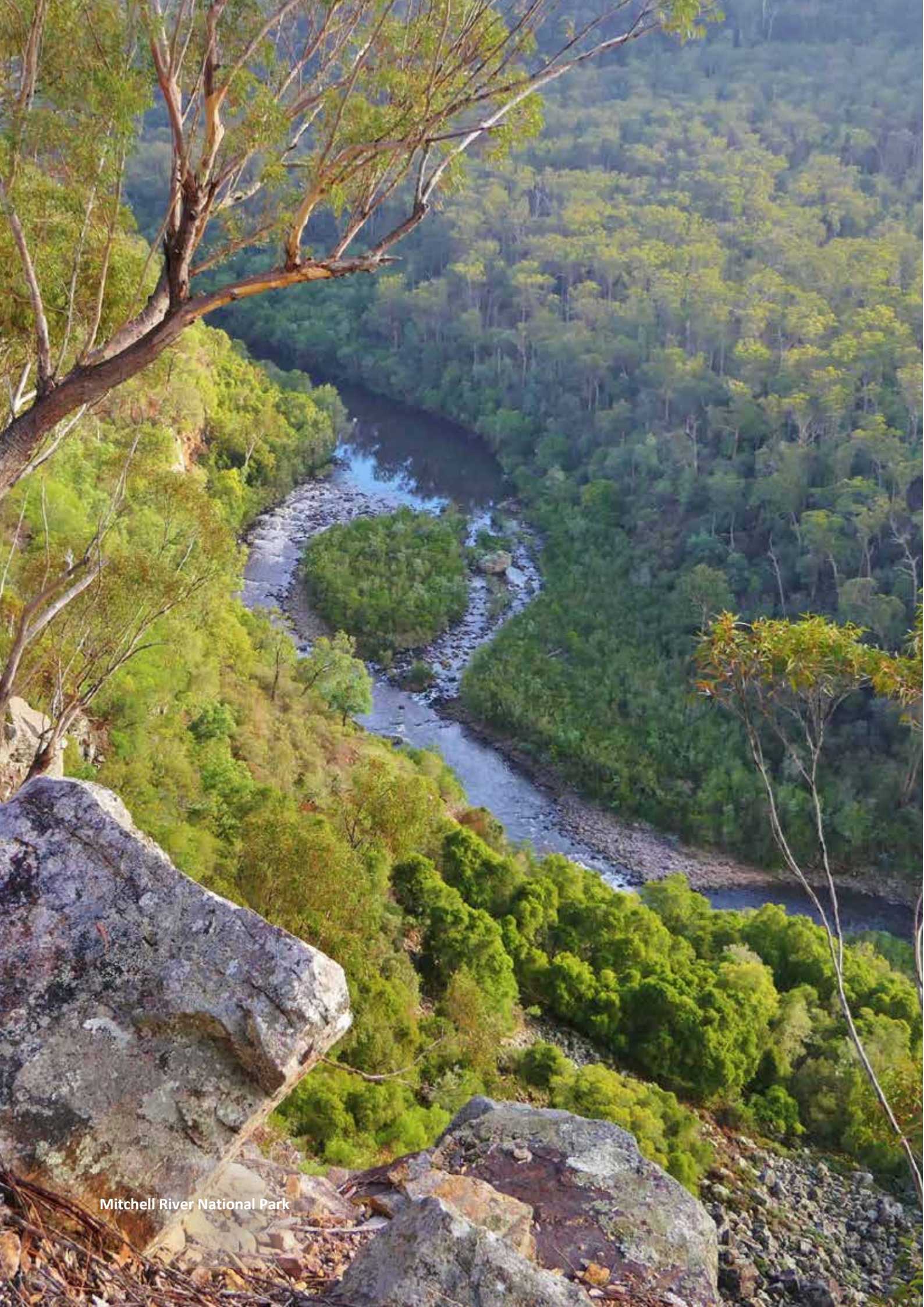
- Caring for Country
- Connecting People and Nature
- Contributing to Healthy, Livable Communities.

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 East Gippsland Parks Landscape.

Matthew Jackson
Chief Executive Officer
Parks Victoria



Mitchell River National Park

Managing Country Together

Cultural significance

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.

The western section of the East Gippsland Parks Landscape is within the traditional lands of the Gunaikurnai people, with legislated authority for the protection and management of their cultural heritage. The far east of Victoria is significant to the Bidwell-Maap Aboriginal Council, the Bidwell First Nations Clans Aboriginal Corporation, the Nindi-Ngujarn Ngarigo Monero Aboriginal Corporation, the Cann River Womens, Childrens Families Aboriginal Co-operative, the East Gippsland Aboriginal Aquaculture Co-operative, and the Ngarigo Nations Indigenous Corporation, who are traditionally and culturally associated with the area. Traditional Owners have been part of this landscape for tens of thousands of years. Some of their traditional areas are now parks and reserves, each of which is extremely important in maintaining their cultural connections.

The East Gippsland Parks Landscape remains rich in Aboriginal cultural heritage, both tangible sites and intangible heritage, closely linked to traditional stories and embedded in customary access to, and use of, Country. Careful modification of the environment using fire was an important land management tool, used to regenerate vegetation, attracting game species such as kangaroo and wallaby. It was also used to clear shrubs and tussocks allowing food plant species to thrive. Supporting the inclusion of traditional ecological knowledge in land management practices can assist in healing Country and achieving conservation outcomes, including through better understanding of environmental drivers such as cultural water flows and rekindling cultural burning practices. Where possible, traditional ecological knowledge has been taken into account in the plan, and opportunities to investigate and apply traditional ecological knowledge will be developed further in implementing the plan.

Joint management agreements

The Gunaikurnai and Victorian Government Joint Management Plan (GKTOLMB 2018) highlights the importance of strengthening respectful partnerships to manage and care for country together, particularly as management of public land evolves into joint management arrangements. The Gunaikurnai Land and Waters Aboriginal Corporation (GLaWAC) represents Traditional Owners from the Brataualung, Brayakaulung, Brabralung, Krauatungalung and Tatungalung family clans, and was recognised as the Registered Aboriginal Party in 2008 under the *Aboriginal Heritage Act 2006*. Fourteen parks and reserves are under joint management agreements with GLaWAC. Thirteen are currently jointly managed by GLaWAC and Parks Victoria. Five of these parks and reserves (Buchan Caves Reserve, Corringle Foreshore Reserve, Lake Tyers State Park, Mitchell River National Park and New Guinea Cave within the Snowy River National Park) form part of the East Gippsland Parks Landscape.

The Joint Management Plan (GKTOLMB 2018) highlights traditional connections to country and outlines Traditional Owner priorities for the coming years.

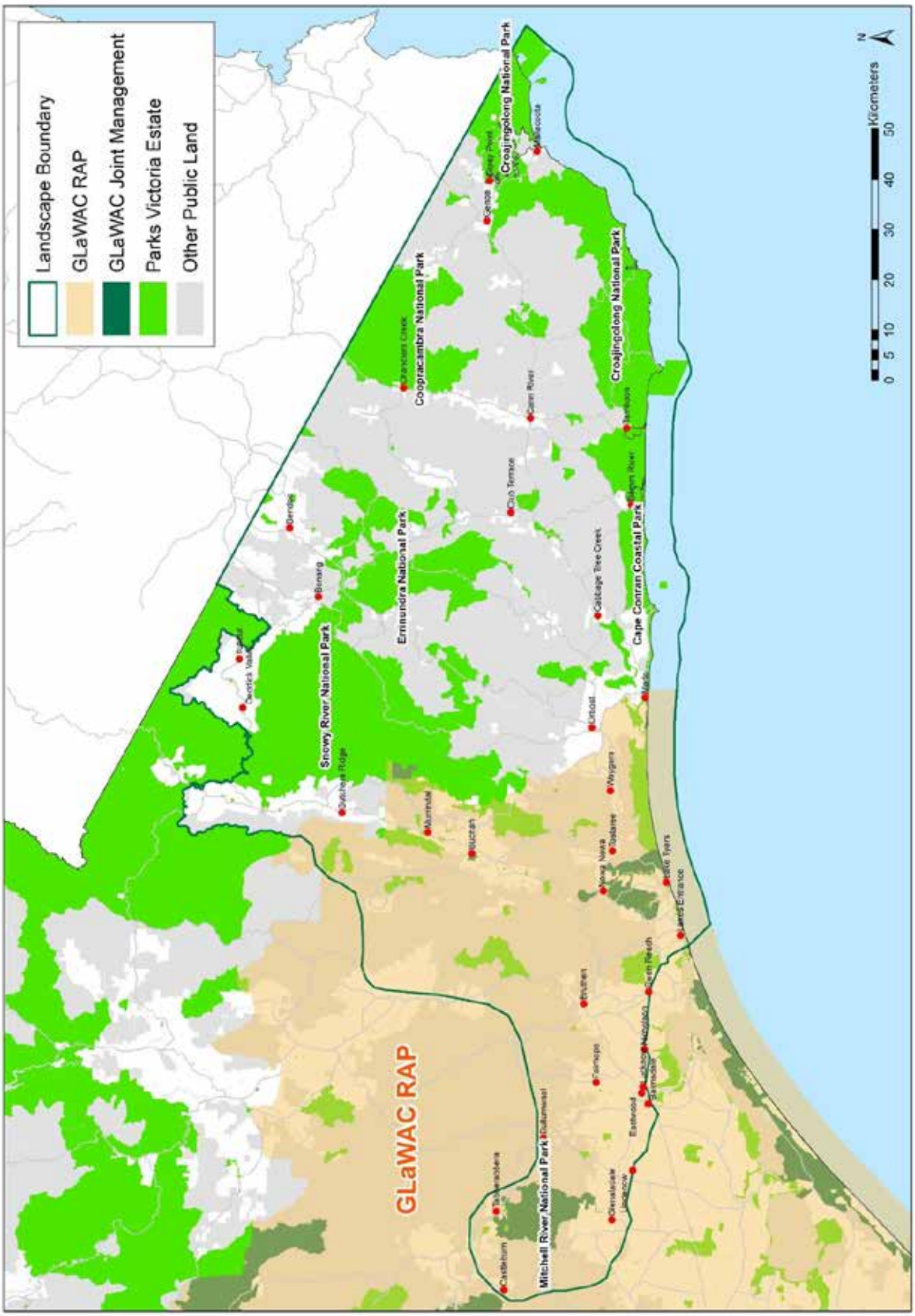


Figure 0.1 Intersection of the East Gippsland Parks Landscape with the Gunaikurnai Land and Waters Aboriginal Corporation (GLaWAC) Registered Aboriginal Party boundary and joint managed parks.

Contents

Summary

The East Gippsland Parks Landscape encompasses some of Victoria's most pristine parks and reserves, intact watersheds and remnant forests. These parks provide important habitat for native species, with Croajingolong National Park alone containing records for one quarter of all Australian bird species. The parks in the eastern section of the Parks Landscape, such as Coopracambra National Park, form some of the largest stretches of native vegetation in south-eastern Australia, joining with vast forested areas in New South Wales. This landscape includes parts of the Nadgee to Mallacoota Inlet Important Bird Area, containing isolated populations of the endangered Eastern Bristlebird.

East Gippsland experienced an unprecedented fire season in the summer of 2019/20. The fire-impacted area within the landscape boundary includes large areas of Snowy River, Croajingolong and Coopracambra National Parks, and many smaller reserves, which had a large percentage of their total park area burnt. Many of the threatened fauna species in the landscape are under increased pressure due to reduced food and suitable habitat caused by the fire, and increased risk of predation. Fire-sensitive flora species may struggle to recover while fire-dependant species may become more abundant as the landscape recovers. The total fire affected area within the East Gippsland Parks Landscape was 272 856 hectares (71%) across 60 state and national parks, reserves and protected areas managed by Parks Victoria. The focus of this Conservation Action Plan is to provide strategies to guide the restoration of this landscape in the post-fire period.

This Conservation Action Plan defines and prioritises conservation strategies for the East Gippsland 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 East Gippsland 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 First Peoples of Victoria to jointly manage parks and reserves in a culturally sensitive and ecologically beneficial 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. It is developing a robust agency-wide approach that provides a strong foundation for partnerships to grow and evolve, and become integrated with the way Parks Victoria 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.

Seven terrestrial and four marine conservation assets have been identified in the East Gippsland 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 over 15 years (improving, stable, declining), and sets the anticipated future condition of each key ecological attribute.

Using these measures, the overall condition of each asset has been assessed as follows:

- The Intertidal Reef conservation asset is in very good condition
- The Riverine Forest and Woodland, Estuarine and Coastal Wetland, Coastal (including islands), Soft Sediment, and Water Column (pelagic) conservation assets are in good condition
- The Heathland, Subalpine, and Subtidal Reef conservation assets are in fair condition
- The Dry Forest and Woodland conservation asset is in good condition in unburnt areas, but fair condition in burnt areas and the Wet Forest and Rainforest asset is in good condition in unburnt areas but poor condition in burnt areas.

The trends in condition for most assets are declining due to the effects of the 2019/20 bushfires, except in Riverine Forest and Woodland, Intertidal Reef, Soft Sediment and Water Column (pelagic), where asset condition is stable. The desired future status of the majority of assets is fair to good, but is dependent on the implementation of all the listed strategies.

Ten key threats 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 to assets and are therefore the priority threats considered in this plan. They are:

- Inappropriate fire regimes and management
- Alterations to natural hydrology and reduced water quality
- Terrestrial weeds and pathogens
- Competition and land degradation by herbivores
- Terrestrial predation
- Marine pests and overabundant species
- Human disturbance (visitor impacts and natural resource use)

The ability of species and ecosystems to persist in a changing climate will be determined by their capacity to adapt to those changes. Some conservation assets and the nested assets within them will be more resilient than others and be better able to withstand the impacts of climate change. Conservation strategies have been developed to mitigate threats, including the compounding effect of climate change, to improve the assets' capacity to adapt. The Wet Forest and Rainforest, Subalpine, Riverine Forest and Woodland, Intertidal Reef and Coastal assets are considered particularly vulnerable to the impacts of climate change, and specific adaptation strategies have been designed to maintain ecosystem function with altered composition, and maximise species persistence through managing in-situ refugia.

The following conservation strategies will be undertaken 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 fire ecology strategies with partners so that planned burns are conducted within an appropriate fire regime, improving habitat condition, increasing the extent of old and mid growth vegetation and protecting high value assets and areas from damage; meet conservation needs before, during and after bushfire.
- **Supporting partnerships to address threats to water-dependent assets** — support partners to improve water-dependent assets by maintaining and improving hydrological regimes and connectivity, and implement best practice measures to reduce the impact of introduced fish on aquatic vegetation and prey species.
- **Weed and pathogen control using a biosecurity approach** — manage weeds and pathogens 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 value locations.
- **Herbivore management** — targeted monitoring and control of deer, pigs, horses and goats at priority sites through integrated control methods to achieve acceptable herbivore densities and improve vegetation quality and intactness.

- **Ongoing control of introduced predators** — targeted control in high value locations to reduce predation pressure from foxes and monitoring of adjacent locations for future incursions of foxes and cats to support the persistence of key predation-sensitive species.
- **Managing marine pests and overabundant species** — targeted monitoring in priority locations to inform adaptive management programs to contain existing infestations and prevent new incursions of marine pests and overabundant native species.
- **Reducing the impacts of human disturbance** — undertake targeted communication and compliance activities to reduce the impacts of recreation, illegal activities and resource extraction and minimise the disturbance of terrestrial and marine assets.
- **Building climate resilience and refugia** — identify and prioritise fire and climate refugia to buffer species against the impacts of climate change, including future fire events, and mitigate the impacts of sea level rise on coastal assets.

For each strategy one or more results chains have been developed to help guide implementation and monitoring indicators. These chains test the ability of Parks Victoria management to achieve the conservation outcomes defined for each of the assets.

This version of the East Gippsland 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. In particular, there are opportunities to further explore and incorporate goals for healing Country into the goals described for conservation assets over the next five years. The Plan may also be reviewed in the event of a landscape scale perturbation such as bushfire, or significant changes to land tenure.

Croajingolong National Park, after bushfires

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 current joint 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 Park landscapes

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

1.3 Planning method

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

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

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

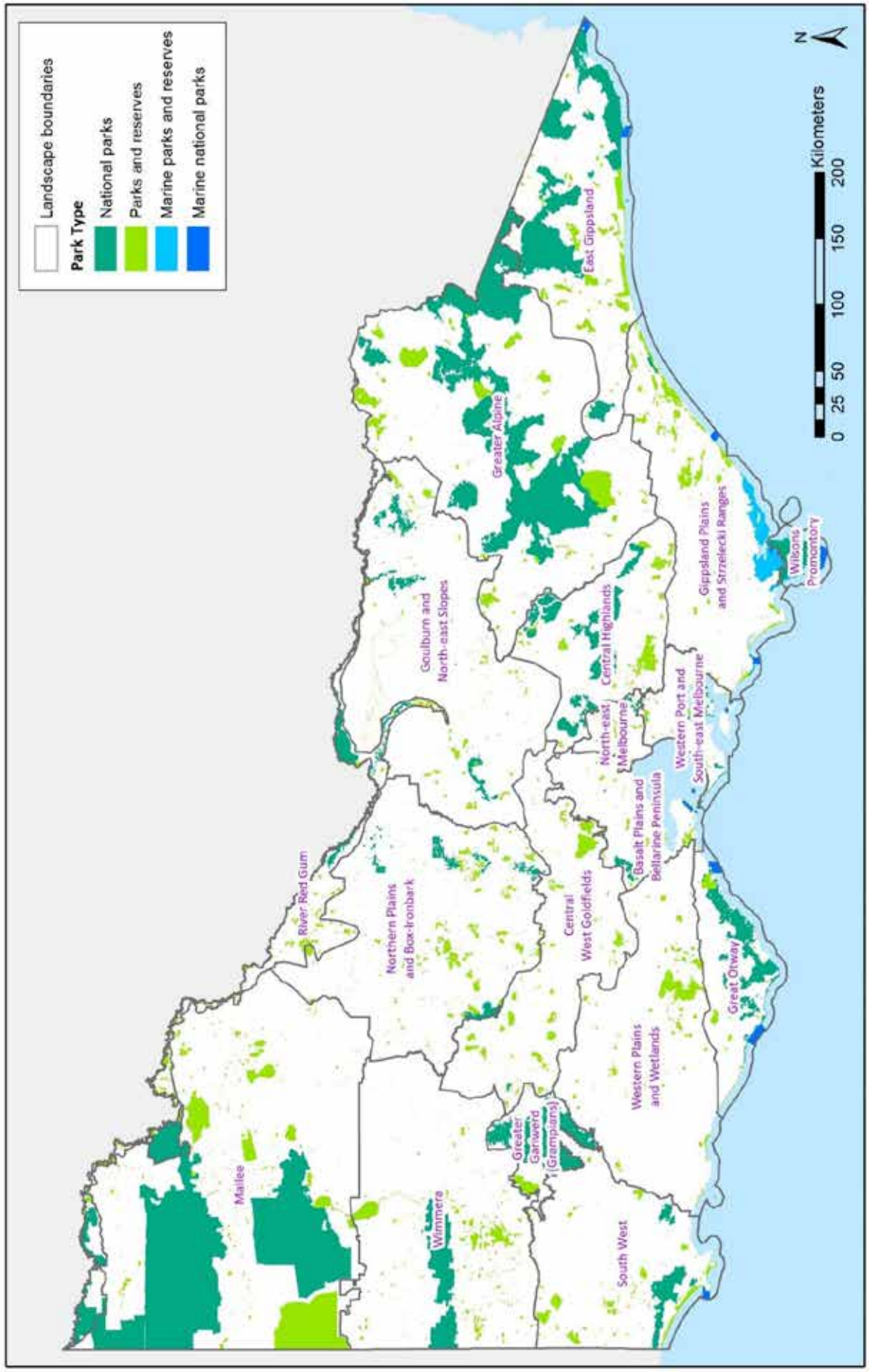


Figure 1.1 Parks Victoria's park landscapes.

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 ten 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 five 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.

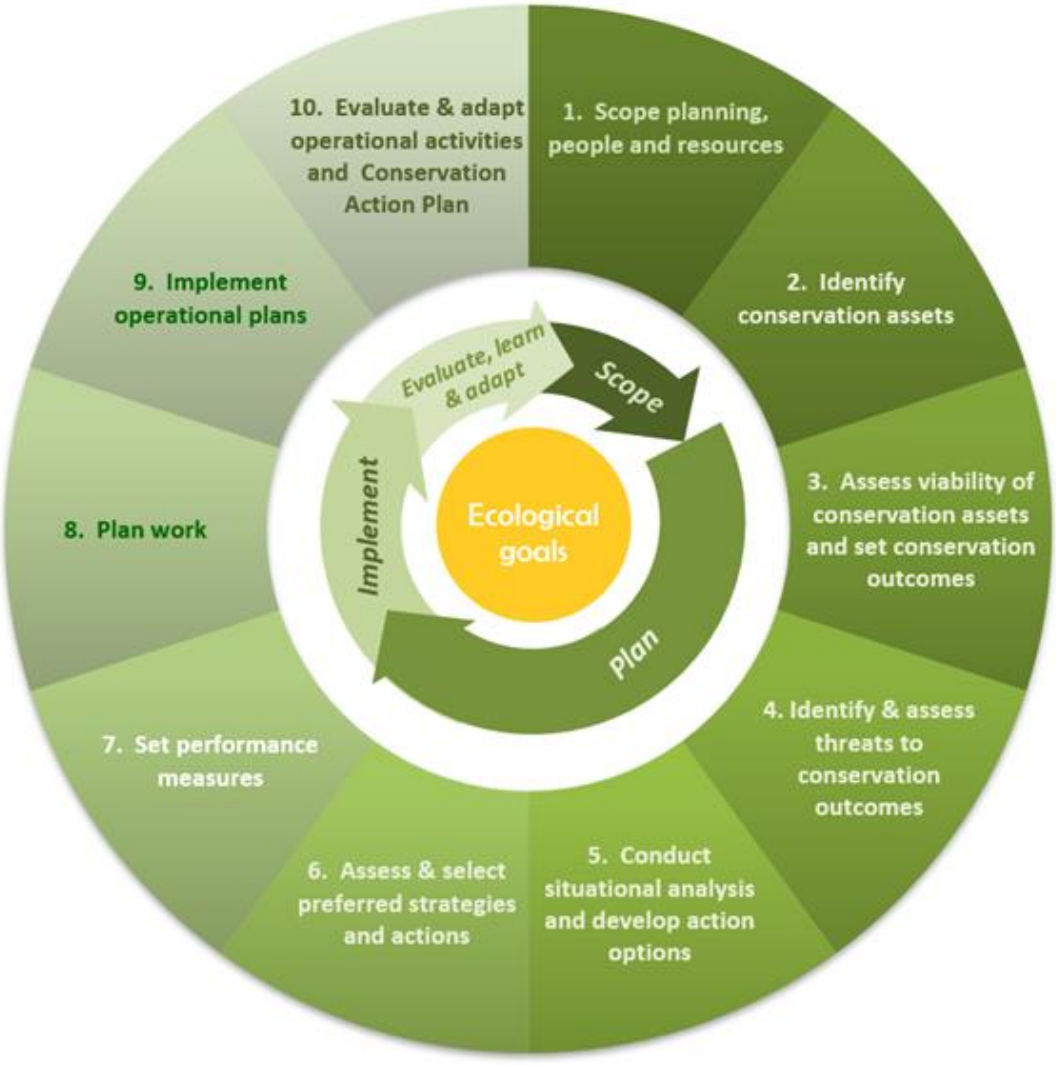


Figure 1.2 The 10-step conservation action planning process.

Commonly used terms and abbreviations

Bonn Convention	*The Convention on the Conservation of Migratory Species of Wild Animals* is an international agreement that aims to conserve migratory species within their migratory range.
CAMBA	China-Australia Migratory Bird Agreement
CMA	Catchment Management Authority. This landscape is within the East Gippsland Catchment.
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 Federal Department of the Environment and Energy.
EVC	An Ecological Vegetation Class, a vegetation classification system based on floristic species composition, structural features, and ecological traits of the community.
EVD	An Ecological Vegetation Division, is a vegetation classification grouping based on EVC's with similar requirements and tolerances for fire.
FFG	The Victorian *Flora and Fauna Guarantee Act 1988*, under which threatened species and communities can be listed for protection against potentially threatening processes.
IUCN	International Union for the Conservation of Nature
JAMBA	Japan-Australia Migratory Bird Agreement
ROKAMBA	Republic of Korea-Australia Migratory Bird Agreement

Cape Conran Coastal Park

Snowy River National Park

2 Scope

2.1 Geographic scope

This Conservation Action Plan covers parks and reserves managed by Parks Victoria which protect approximately 380 000 hectares of terrestrial and marine areas in the East Gippsland Parks Landscape (Figure 1.1). The planning area spans from Mitchell River National Park in the west, Snowy River National Park in the north and Croajingolong National Park in the south-east. The majority of this landscape is public land and it contains 96 parks and reserves, including 11 terrestrial parks (332 283 hectares) and three marine parks (8018 hectares) managed under the Victorian *National Parks Act* (see Appendix A for a full list of parks and reserves).

The East Gippsland Parks Landscape contains large tracts of continuous, high quality habitat that have significant cultural and ecological value. It includes five parks and reserves under joint management, and supports around 140 EPBC listed threatened flora and fauna species, at least 12 threatened ecological communities (EPBC or FFG listed), 16 wetlands of national or state significance, and 55 marine and migratory bird species listed under international conventions. The East Gippsland Parks Landscape also includes a number of parks and reserves that are important recreational and tourism destinations. The Parks Landscape is dominated by the East Gippsland Lowlands and East Gippsland Uplands, Highlands – Far East, and Monaro Tablelands bioregions, which comprise largely wet and dry forest.

Notable parks and reserves include:

Park/reserve name	Area (hectares)	IUCN Protected Areas Category
Snowy River National Park	114 674	2 – National Park
Croajingolong National Park	88 465	2 – National Park
Errinundra National Park	40 090	2 – National Park
Coopracambra National Park	38 491	2 – National Park
Mitchell River National Park*	14 386	2 – National Park
Cape Conran Coastal Park	11 576	3 – Natural Monument or Feature
Lake Tyers State Park*	8 693	3 – Natural Monument or Feature
Tara Range Park	7 614	3 – Natural Monument or Feature
Ewing Morass Wildlife Reserve	6 819	6 – Protected area with sustainable use of natural resources
Martins Creek N.C.R.	6 546	1a – Strict Nature Reserve
Mount Elizabeth N.C.R.	5 231	1a – Strict Nature Reserve
Colquhoun R.P.	3 452	Not an IUCN protected area
Dawson-Murrindal N.C.R.	3 193	1a – Strict Nature Reserve
Alfred National Park	3 021	2 – National Park
Brodribb F.R.	2 761	1a – Strict Nature Reserve
Cabbage Tree Creek F.R.	1 700	1a – Strict Nature Reserve
Mount Stewart N.C.R.	1 622	1a – Strict Nature Reserve
Lind National Park	1 359	2 – National Park
New Guinea Caves* (as part of the Snowy River National Park)	1 153	2 – National Park (Snowy River National Park)

Buchan Caves Reserve *	295	3 – Natural Monument or Feature
Corringle Foreshore Reserve* (as part of Marlo Coastal Reserve)	163	Not an IUCN protected area
Cape Howe Marine National Park	4 009	2 – National Park
Point Hicks Marine National Park	3 789	2 – National Park
Beware Reef Marine Sanctuary	220	2 – National Park

*These parks are jointly managed with the Gunaikurnai Land and Waters Aboriginal Corporation

2.2 Significant natural values

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

- Sixteen wetlands of national or state significance
- Nine vegetation communities of state significance (listed under the *Flora and Fauna Guarantee Act 1988* (Vic.))
- Four vegetation communities of federal significance (listed under the *Environment Protection and Biodiversity Conservation Act 1999* (C'wth))
- Current occurrence of ten nationally critically endangered flora and fauna species and 91 nationally endangered or vulnerable fauna and flora species. One hundred and fifty-one flora and fauna species are currently listed in under the *Flora and Fauna Guarantee Act*
- Fifty-five species listed under international conventions (JAMBA, CAMBA, ROKAMBA and Bonn) - Sperm Whale, Killer Whale, Humpback Whale, Southern Right Whale, Green Turtle and 50 migratory bird species.

The Victorian Biodiversity Atlas includes records of more than 3230 species from the East Gippsland Parks Landscape, including:

- 2517 plants and algae
- 98 mammals
- 24 amphibians
- 380 birds
- 60 reptiles
- 134 fish

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

2.3 Alignment with joint management agreements

Thirteen areas are currently jointly managed by Parks Victoria and Gunaikurnai Land and Waters Aboriginal Corporation (GLaWAC) across Victoria. Nine are covered by the Joint Management Plan (GKTOLMB 2018):

- Buchan Caves Reserve
- Corringle Foreshore Reserve
- Gippsland Lakes Coastal Park
- Gippsland Lakes Reserve (Raymond Island)
- Lake Tyers State Park
- Mitchell River National Park
- New Guinea Caves (within the Snowy River National Park)
- Tarra-Bulga National Park
- The Lakes National Park.

A further four areas have been included as part of an upgraded Settlement Package in 2022, with the Joint Management Plan to be updated to include these areas:

- Alpine National Park (part within Recognition and Settlement Agreement area)
- Baw Baw National Park
- Avon Wilderness Park
- Nooramunga Marine and Coastal Park.

A fourteenth reserve, The Knob Reserve, is jointly managed by GLaWAC, DEECA and GKTOLMB.

Five of the jointly managed parks and reserves listed above form part of the East Gippsland Parks Landscape: Buchan Caves Reserve, Corringle Foreshore Reserve, Lake Tyers State Park, Mitchell River National Park, and New Guinea Caves within the Snowy River National Park. GLaWAC are responsible for the delivery of actions and strategic directions from the joint management plans for these parks.

Some priority areas and actions relating to joint management in the East Gippsland Parks Landscape include:

- Undertaking cultural mapping of various parks and reserves
- Protecting and conserving parks and reserves through pest plant and animal control and managing threats to high value assets such as coastal saltmarsh and littoral rainforest
- Enacting strategies to limit the drying and warming impacts of climate change
- Managing visitor experiences and recreational activities in Mitchell River National Park
- Designating areas for Gunaikurnai community gatherings and camping
- Improvement in the capabilities of the joint management ranger team to undertake on-water operations
- Developing cultural business and training enterprises in tourism and education at Buchan Caves Reserve
- Increasing the role of Gunaikurnai people in the management of the Corringle Foreshore Reserve, with a view to eventually transferring full management responsibility
- Taking actions to better control off-road vehicle use and improve the road and track network in Lake Tyers State Park, reducing river access points, and developing sustainable use areas in the park such as playgrounds
- Better protection of the New Guinea Caves from damage from flooding and illegal visitor access
- Continuing and expanding programs to control invasive plants
- Implementing the GLaWAC Cultural Fire Strategy to ensure On Country burning is performed in a way that is culturally appropriate and effectively managed
- Collaboration with local residents and community groups in conserving the parks and reserves and providing visitor experiences.

2.4 Legislative and planning context

The management of land and water resources, cultural heritage, flora and fauna in the East Gippsland Parks Landscape is guided by many pieces of Federal and State legislation, as well as Victorian Government policies and priorities. This domestic legislation is also the instrument for implementing a number of Australia's international treaty obligations. Parks Victoria's management and planning context is broadly illustrated in Figure 2.1.

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

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

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 (1992), 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 East Gippsland Parks Landscape, 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.

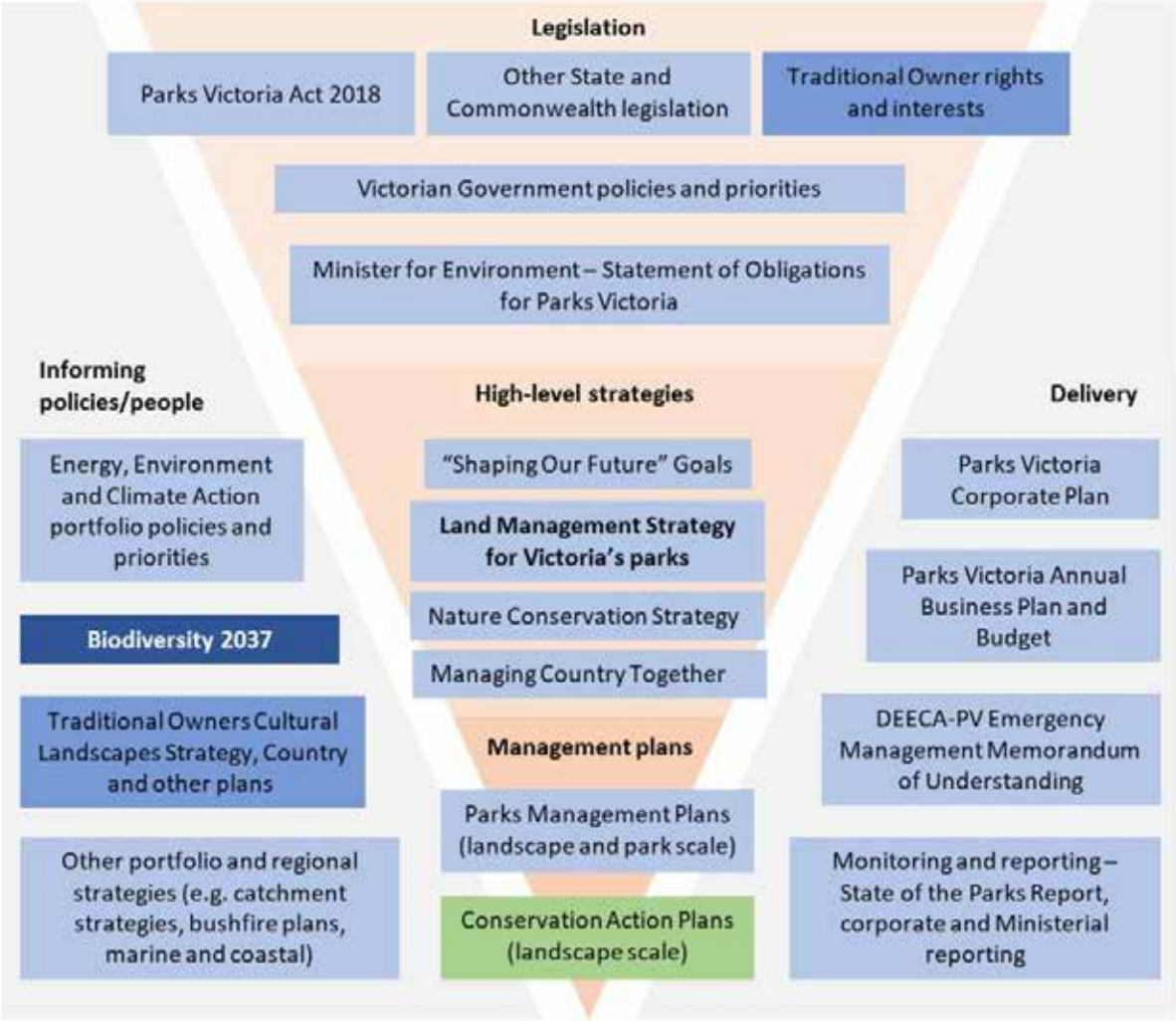


Figure 2.1 Parks Victoria's planning and management context

The East Gippsland Parks Landscape comprises a total of 96 parks and reserves (covering around 374 987 hectares), managed under various acts including the *National Parks Act 1975* and the *Crown Lands (Reserves) Act 1978*. The majority of the parks area is reserved and managed under the provisions of the *National Parks Act* (184 017 hectares), including Snowy River National Park, Croajingolong National Park, Errinundra National Park, Coopracambra National Park and three marine protected areas: Cape Howe and Point Hicks Marine National Parks and Beware Reef Marine Sanctuary.

Among areas managed under the *Crown Lands (Reserves) Act 1978*, the most significant for biodiversity conservation are Cape Conran Coastal Park, Martins Creek Nature Conservation Reserve, Cabbage Tree Creek Flora Reserve, Marlo Coastal Reserve and Bemm River Scenic Reserve.

Reference Areas have been set aside under the *Reference Areas Act 1978* (Vic) in Croajingolong National Park (four areas), Coopracambra National Park (four areas), Snowy River National Park (three areas), Errinundra National Park (two areas), and Mount Elizabeth Nature Conservation Reserve (one area).

The Arte, Bemm, Errinundra, Genoa, Goolengook, Mitchell, Snowy and Wonnangatta Rivers have each been proclaimed a Victorian Heritage River under the *Heritage Rivers Act 1992* (Vic.)

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 challenges posed by climate change. It sets the following goal: "Conserve nature in Victoria's parks in the face of unprecedented threats – through intensified action with partners, new techniques and increased community collaboration", and recognises the conservation action planning (CAP) process as the cornerstone for setting nature conservation directions.

Conservation action plans contribute to park management plans and provide a more detailed review of natural values and their condition. Conservation action plans also provide a more robust framework for evaluating the health of the landscape and include targeted goals based on condition of ecosystems which complement actions in the park management plans. Conservation action planning does not specifically address visitor management or cultural asset management, and as such, a conservation action plan does not constitute a plan of management in the context of Section 17(2)(d) of the *National Parks Act 1975* or a land management plan under Division 4 of the *Parks Victoria Act 2018*.

2.5 Alignment with other strategies and plans

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 2017b). This plan is consistent with a number of the priorities described in *Biodiversity 2037*, and will contribute to O*utcome 7: Victoria's biodiversity is protected and managed* through strategic and consistent threat management, and restoration of ecosystem functions (DELWP 2019).

Strategic Management Prospects

Information sources that have informed the preparation of this plan include the Victorian Government's *Protecting Victoria's Environment – Biodiversity 2037 Plan* (DELWP 2017b). Under *Biodiversity 2037*, the Strategic Management Prospects (SMP) tool is a component of the Department of Energy, Environment and Climate Action's *NatureKit* (DELWP 2021b). 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, and local or other knowledge where there are gaps in SMP.

Regional Catchment Strategies

This plan addresses a number of objectives and actions from the East Gippsland Catchment Management Authority (EGCMA) Regional Catchment Strategy (RCS), in relation to the following themes specific to Far East Gippsland:

- Coasts and Marine – managing estuary openings and protecting the biodiversity of marine national parks
- Water – protecting and restoring waterways and riparian zones
- Biodiversity – working with land managers across the region to address established and emerging invasive species and a focus on recovery from and resilience to bushfires
- Land – reducing erosion following bushfires and supporting communities to implement best practice soil management, including maintaining appropriate ground cover across agricultural land
- Communities – partnering with Traditional Owners to maintain the health of Far East Gippsland's landscapes and supporting community groups to become involved in natural resource management.

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

- Maintaining or improving the condition of high value subalpine, forest, marine and coastal environments
- Maintaining the health of waterways, particularly heritage and other priority rivers
- Monitoring and managing invasive species, including early detection and response
- Promoting awareness of the management of invasive plants and animals
- Managing recreational impacts on environmental and cultural values
- Supporting integrated future fire management planning
- Managing marine protected areas for invasive marine pests and urchin barrens.

East Gippsland Far East Eden Strategy

Elements of this plan have been developed to align with the East Gippsland Far East Eden Strategy, which contributes to the Weeds and Pests on Public Land program. These include objectives and priority weed treatment areas across the East Gippsland Parks Landscape. This plan contributes to the following objectives from the East Gippsland Far East Eden Strategy:

- Prevent the establishment of high-risk weeds at the early stages of invasion
- Contain the spread of localised infestations of high-risk weeds
- Reduce the spread of established weeds in identified key biodiversity asset areas
- Establish and maintain a coordinated cross agency approach to the management of weeds on public land.

Other information sources

Parks Victoria reports and management plans and other documents that directly assisted and informed the preparation of this plan can be found in the reference section at the end of this document.

Traditional ecological knowledge from the Gunaikurnai Joint Management Plan has been incorporated into the planning process, and future opportunities to investigate and apply traditional ecological knowledge will be developed further in subsequent iterations of the plan.

Feedback on this plan was invited from Traditional Owners of far east Gippsland, and Bidwell First Nations Clans Aboriginal Corporation directed Parks Victoria to the Bidwell Indigenous Land and Sea Ranger Program as a potential vehicle for implementing the Conservation Action Plan in the far east of this landscape. Indigenous Land and Sea Ranger groups work to protect and conserve Bidwell important ecosystems and cultural heritage on Country, and deliver negotiated work plans that reflect Traditional Owner, local community and Victorian Government priorities. Their activities include a wide range of

conservation services including cultural burns, feral animal and pest plant control, soil conservation, cultural heritage site protection and biodiversity monitoring as well as community engagement. Traditional Owners employed as Indigenous Land and Sea Rangers deliver conservation services that successfully combine traditional knowledge of Country and western science.

Parks Victoria will work with stakeholders to utilise other relevant plans and information to assist in implementing this and future plans.

2.6 Engagement

A series of conservation action planning workshops were held between 2020 and 2022 to support the planning process for the East Gippsland Parks Landscape plan. The success of the workshops drew from the great depth of knowledge and experience of participants, including staff from Parks Victoria, the Department of Energy, Environment and Climate Action, the East Gippsland Catchment Management Authority and the Gunaikurnai Land and Waters Aboriginal Corporation.

A draft of this plan was circulated in December 2022 to a wide array of stakeholders including relevant Landcare and Friends groups, with feedback received from Parks Victoria staff, DEECA, Birdlife Australia, Royal Botanic Gardens and Traditional Owners in far east Gippsland.

Gippsland Water Dragon

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 East Gippsland Parks Landscape:

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

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

The East Gippsland Parks Landscape features wet forest and rainforest, dry forest, riverine forest, woodland, heathland and subalpine through to coastal, intertidal and subtidal reefs and soft sediments, connected by rivers, wetlands and estuaries. The Parks Landscape includes old growth forests, extensive areas of untouched forests, wetlands of state and national significance, long stretches of protected coastline and rocky reefs supporting a diversity of marine species. The current condition of the conservation assets ranges from fair to very good. The implementation of this plan will improve the quality of habitat and its capacity to support flora and fauna populations.

Coastal areas in the East Gippsland Parks Landscape, including estuaries, are at risk from climate change impacts such as sea level rise, increased storm surges and changes to sand movement, and are currently rated in good or fair condition. Marine ecosystems within this landscape are already experiencing climate change impacts, particularly in relation to a strengthening Eastern Australian Current. Increasing sea surface temperatures are allowing some species such as the Black-spined Urchins to expand their range into Victorian waters, with consequent losses of native kelp forest within parks. As a consequence, these assets are now in fair to very good condition.

Dry Forest and Woodland, Wet Forest and Rainforest, Subalpine and Heathland assets have all been heavily affected, and are likely to be affected in the future by increased drying, warming and changes to the frequency, extent and severity of fire. Compounding drivers of condition often include invasive plants and animals and human disturbance. Similarly, riverine ecosystems are likely to be affected by reduced precipitation and reduction in water volume and connectivity. These assets are in poor to good condition.

The key aims of the plan are to maintain unburnt habitat as refugia for fauna and flora against future fire events, achieve appropriate fire regimes for dry forest and heathland ecosystems to improve growth stage distribution, reduce and regulate the impacts of human disturbance across marine and terrestrial environments, and undertake targeted control of pest plants and animals across the landscape. Where possible, riverine systems will be supported to increase water volume and connectivity.

In addition to the identification and protection of refugia, the management of other threats such as grazing pressure and weeds and pathogens will assist these systems to adapt to a changing climate. The management of ecological processes and threats, particularly fire regimes and the incursion of introduced predators, will promote the continuing health of these systems and support the persistence of local native flora and fauna.

Flying Duck Orchid

4 Conservation assets

The Parks Landscape is divided into eleven *conservation assets* (see 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.

Conservation Asset	Area (hectares)
Dry Forest and Woodland	185 426
Wet Forest and Rainforest	128 930
Heathland	30 336
Riverine Forest and Woodland	12 380
Subalpine	4119
Estuarine and Coastal Wetland	3059
Coastal (Including islands)	8254
Intertidal Reef	12
Subtidal Reef	1040
Soft Sediment	6962
Water Column (Pelagic) †	NA

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

Conservation asset description format

The following pages provide a description of each conservation asset within the 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 (KEAs), 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. An example is provided below.

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

Conservation outcome

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

Riparian	Current rating	Desired trend	Desired rating
By 2038, 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 Learning 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 of time 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)
Breeding success	Measure of the proportion of offspring that survive to maturity

Indicator	Description
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 Weight Range (mammals, 35-5500 g)
Demography	Identifies the age class of individuals as a surrogate measure of recruitment success over time (e.g. presence of young-of-year fish and turtles through to mature age; identification of eggs or fledgling birds in nesting colonies)
EVC Benchmark	EVC benchmarks relate to an EVC within a bioregion which has been developed to assess the vegetation quality of the EVC at the site scale in comparison to a 'benchmark' condition. These benchmarks have been developed to assess native vegetation and contain a subset of lists of species for each EVC in a bioregion
Extent	Area of cover of a particular species or functional group, attribute or area subjected to particular conditions (e.g. flooding, salinity)
Function	Ecological processes, such as nutrient-cycling, productivity, pollination, seed dispersal, predator–prey interactions, functional connectivity (including species movement, dispersal and metapopulation dynamics, and exchanges between ecosystems), phenology, disturbance regimes (e.g., fire and drought) and hydrological processes
Functional group	A group of species that share similar functional 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	Indicator of condition. 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 modification within a habitat. Assets with a high level of intactness will have less human and pest animal interference, and condition measures such as ecological structure, composition and function will be closer to benchmark.
Morphology	Measurement of the form, shape or structure of an organism
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 and in quantitative assessment of algae, seagrass, and sessile invertebrates in marine ecosystems
Recruitment	Process by which new individuals establish a population or add to an existing population
Representativeness	Compares the type and/or number of species, or presence of a particular representative indicator species, relative to a defined benchmark such as a functional group or EVC
Site occupancy	Presence of a particular species or functional group. 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/or abundance (e.g. 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 present at a particular location or across a landscape area

Indicator	Description
Structure	Physical organisation, such as structural connectivity, contiguity of natural habitat, vertical and horizontal spatial arrangement of the biota, substrate characteristics, or size- or age-class distributions
Vegetation quality	A measure of deviation from EVC benchmark condition, including vegetation composition, species richness and relative species abundance
Water quality	Measure of the level of nutrients, chemicals and sediment present in water

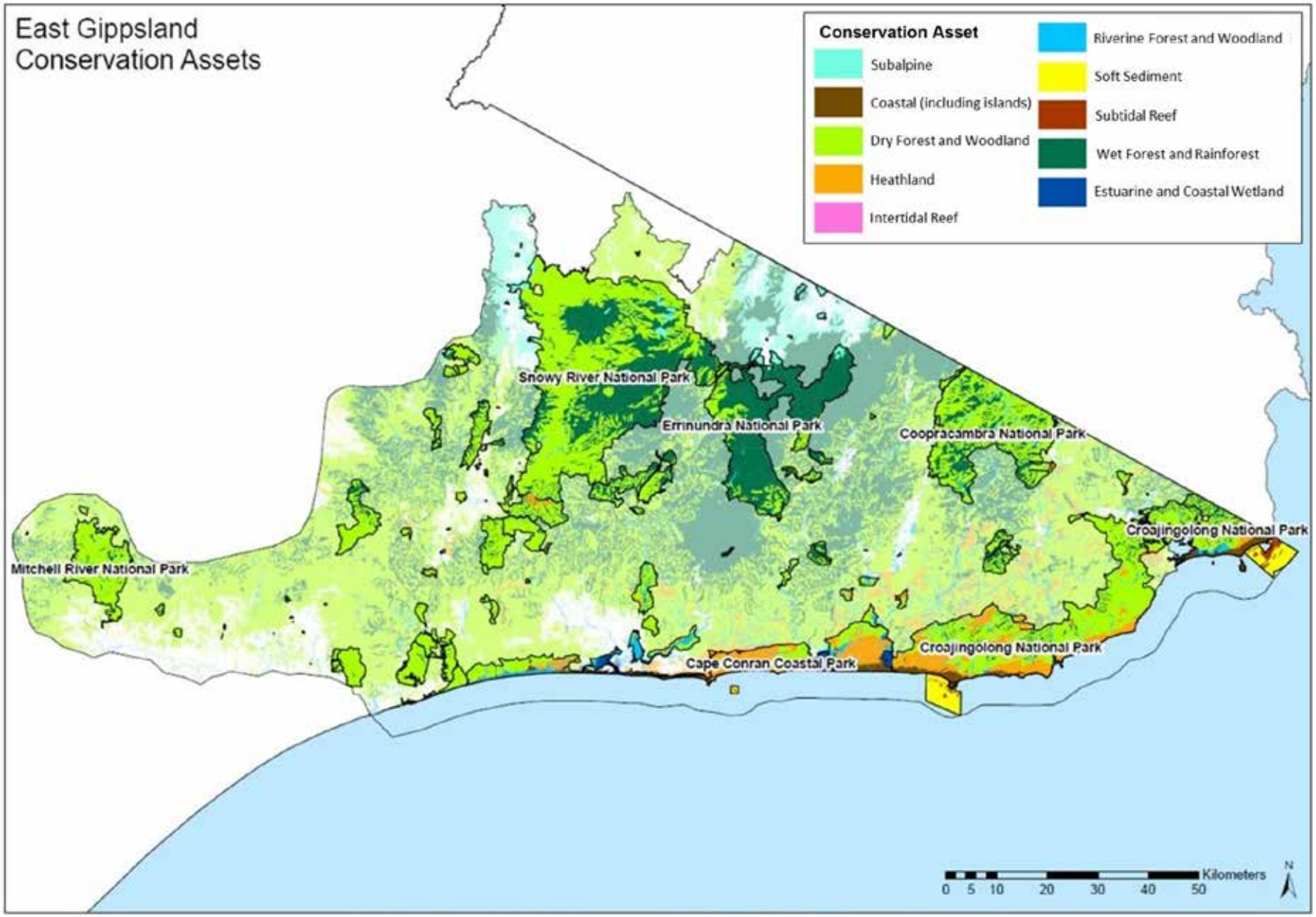


Figure 3.1 Conservation assets in the East Gippsland Parks Landscape. Crown land not managed by Parks Victoria is shown in lighter colours.

Dry Forest and Woodland

The Dry Forest and Woodland conservation asset is the largest within the East Gippsland Parks Landscape, totalling 185 426 hectares, or 49.8% of the parks area. More than half of the conservation asset falls within Snowy River National Park (59 721 hectares) and Croajingolong National Park (43 942 hectares). It is also the dominant asset (representing more than 90% of the park area) in Lake Tyers State Park, Colquhoun Regional Park, Mount Raymond Regional Park and several smaller bushland reserves. This conservation asset consists of 19 EVCs, however 90% of the asset comprises the Shrubby Dry Forest and Lowland Forest EVCs.

This asset occurs often in relatively high rainfall areas and on a range of geologies. It generally consists of medium to tall eucalypt and non-eucalypt species including Messmate Stringybark, Gippsland Peppermint, Yertchuk, Rough-barked Manna Gum, Black Wattle and Silver Banksia with an understory of well-developed shrubs, grasses and herbs. The asset also contains small pockets of the endangered Plains Grassy Forest EVC (the majority of which is in Mitchell River National Park), and a small patch of the Plains Grassy Woodland EVC in Bumberrah Bushland Reserve.

Dry Forest and Woodland provides important habitat for many native fauna species, including the Long-nosed Bandicoot, Long-footed Potoroo, Regent Honeyeater and Grey-headed Flying-fox. The dense cover of low growing vegetation often found in this landscape also provides critical habitat for the endangered Southern Brown Bandicoot.

The main drivers of condition in Dry Forest and Woodland include fire regimes, weed invasion, introduced predators and herbivores, and visitor impacts, both legal and illegal. Indicators of condition include weed cover, vegetation age-class distribution, floristic diversity and the presence of habitat features to provide cover for mammals, birds and herpetofauna. In recent years, fire has been the most critical driver within this system, with overall condition determined by the cumulative effect of fires of varying timing, intensity, frequency and extent. Frequent, low-intensity fires promote a higher diversity of grasses and herbaceous flora when burnt within the tolerable fire interval (TFI) of the species present. However, the larger, more severe and more frequent fires expected under climate change reduce the window of recovery for fire-sensitive flora species and habitat, and compound the effects of other threats such as pressure from introduced herbivores and weeds.

The 2019/20 fire season burnt approximately 70% or 130 788 hectares of the Dry Forest and Woodland asset within the Parks Landscape. Many small reserves had nearly all of their Dry Forest and Woodland

asset burnt. Of the larger reserves, Coopracambra National Park, Croajingolong National Park, Errinundra National Park and Snowy River National Park were most affected, having 98%, 97%, 96% and 83% respectively of their Dry Forest and Woodland area impacted. In total, 82% of this asset is currently below minimum Tolerable Fire Interval (TFI), including approximately 90% (84 359 hectares) of the Grassy/Heathy Dry Forest EVD (minimum TFI = 10-15 years) and 75% (56 122 hectares) of the Tall Mixed Forest EVD (minimum TFI = 8-25 years). Of the fire-affected area, 14% was burnt at very high severity (canopy burnt, > 20% canopy foliage consumed).

The condition of this asset is Fair in areas affected by the 2019/20 fire, and Good in unburnt areas such as Mitchell River National Park, Lake Tyers State Park, Ewing Morass Wildlife Reserve and Colquhoun Regional Park. Given the stark differences in condition across burnt and unburnt areas due to the 2019/20 fires, these two types of areas (landscape zones) have been considered separately in the Condition table below.

Overall condition of this asset is considered to be in decline.

Nested assets

Nested asset	Examples of components
Endangered EVC and Flora Species	Plains Grassy Forest (42.5 hectares), Plains Grassy Woodland (1.6 hectares) Maiden's Wattle†, Native Quince†, Dwarf Brunoniella†, Binung†, Leafless Tongue-orchid†*, Billygoat Daisy-bush†, Pointed Greenhood†, Rock Orchid†, Kerrawang†, Yawning Leek-orchid†, Slender Myoporum†, Maroon Leek-orchid†*, Yellow Hyacinth-orchid†, Winged Everlasting†, Hooker's Tussock-grass†, Snowy River Daisy†, Twiggy Lignum†, Viscid Daisy-bush†
Depleted EVC	Valley Grassy Forest (2816.6 hectares), Grassy Woodland (5477.7 hectares), Lowland Herb-rich Forest (603.2 hectares)
Threatened Fauna Species	Large Brown Tree Frog†, Giant Burrowing Frog†*, Eastern She-oak Skink†, Diamond Python†, Long-footed Potoroo†*, Brush-tailed Rock-wallaby†*, Spot-tailed Quoll†*, White-footed Dunnart†, Southern Brown Bandicoot†*, Lace Monitor†, Grey-headed Flying-fox†*
Threatened Bird Species	Glossy Black-Cockatoo†, Black Bittern†, Eastern Bristlebird†*, Regent Honeyeater†*, Swift Parrot†*, Powerful Owl†
Totemic Fauna Species	Superb Fairy Wren (Djeetgun), Southern Emu Wren (Yeerung), Yellow Tailed Black-Cockatoo (Nganak), Bell Miner (Cha-lurn), Southern Boobook (Wataty), Crimson Rosella (Wugug), Wedge Tailed Eagle (Kwarnamero), Emu (Miowera), Gang-gang Cockatoo (Karan)*, Brown Goshawk (Dadyel), Laughing Kookaburra (Koaurk), Superb Lyrebird (Wurraial), Spotted Quail-thrush (Turabinganang), Spot-tailed Quoll (Bindyulang)*, Bogong Moth
Totemic Flora Species	Sun Orchid, Tiger Orchid, Yam Daisy, Beard Heath, Coast Beard-heath, Hickory Wattle, Geebung†, Fairies' Aprons, Spiny-headed Mat-rush, Lilly Pilly, Austral Sarsaparilla, Clematis

†Listed as a threatened species under the *Fauna and Flora Guarantee Act 1988*

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

Condition

Key ecological attributes	Indicator	Landscape zone	Current condition	Current trend	KEA Goal	Strategy abbrev.
Vegetation structure and habitat features	Growth stage distribution Abundance of large trees	Burnt	Fair	↘	All growth stages are represented in appropriate proportions and current extent and condition of old growth forest is maintained	Fire Climate
		Unburnt	Good	↘		
Bird assemblages	Species richness and abundance, site occupancy	Burnt	Fair	↘	Diversity and richness remain at current levels and threatened species remain present across the landscape	Fire
		Unburnt	Good	→		
Ground-dwelling mammals	Species richness and abundance, site occupancy	Burnt	Fair	↘	Diversity and richness remain at current levels and predicted species (including Spot-tailed Quolls) will be regularly detected at priority sites	Fire Predation
		Unburnt	Good	→		
Vegetation quality	Weed cover and intactness	Burnt	Fair	↘	Weed cover is <5% at priority sites. Maintain floristic diversity within EVC benchmark.	Weeds
		Unburnt	Good	↘		
Orchid assemblage	Species richness and site occupancy	–	Unknown	Unknown	No reduction in known populations	Fire Herbivores

Conservation outcome

Dry Forest and Woodland	Landscape zone	Current condition	Desired trend	Desired condition
Over the 15 years to 2038, maintain or improve vegetation quality, structure, and growth stage distribution to support the occupancy and species richness of bird, mammal and orchid species.	Burnt	Fair	↗	Good
	Unburnt	Good	→	Good

Wet Forest and Rainforest

The Wet Forest and Rainforest conservation asset occurs in many of the East Gippsland parks and reserves, covering 128 930 hectares with the majority of this within the Snowy River National Park (51 534 hectares) and other significant areas in Errinundra National Park (34 317 hectares), Coopracambra National Park (15 038 hectares) and Croajingolong National Park (10 045 hectares). The majority of this conservation asset occurs as Damp Forest EVC (60%) and Wet Forest EVC (29%). These forest types occur on fertile loams and are dominated by tall eucalypts to thirty metres, over a medium to tall dense shrub layer of broad-leaved species. Wet Forest occurs in protected southern aspects or gullies, with a fern dominated ground layer. The lower strata of Damp Forest incorporates elements typical of Wet Forest mixed with elements from dry forest types, including herbs and grasses in the ground layer.

While the Closed-forest or Rainforest EVCs are less extensive (4800 hectares), they include significant representatives of the Warm Temperate Rainforest and Cool Temperate Rainforest EVCs (Rare), Gallery Rainforest and Dry Rainforest EVCs (Endangered), and the Coastal Vine-rich Forest EVC. Approximately 94% of Gallery Rainforest and Dry Rainforest EVCs in this landscape occur within the Mitchell River National Park. The Littoral Rainforest and Coastal Vine Thickets of Eastern Australia ecological community, which is listed as critically endangered under the EPBC Act, is distributed across the East Gippsland coast, with sites from Lake Tyers to Mallacoota. This community represents pockets of high value biodiversity, particularly where untouched by recent fire events, and is most related to the Coastal Vine-rich Forest EVC. These closed rainforest EVCs occur in fire-protected and often high rainfall sites, and are flammable only in very rare conditions (e.g. after extended droughts, as occurred in 2020). They typically comprise closed non-eucalypt forest canopy averaging twenty metres tall and are particularly sensitive to fire, with a minimum Tolerable Fire Interval of 80 years (Cheal 2010).

This conservation asset provides important habitat for a range of fauna. In particular, remnant old growth areas provide important hollow bearing trees utilised by species such as the Sooty Owl and Greater Glider. Threatened species such as the Long-nosed Potoroo, Long-footed Potoroo, Grey-headed Flying-fox, Spot-tailed Quoll and Powerful Owl are also present in this asset.

The drivers of condition in this asset are fire regime, weed invasion and pathogens, introduced predators and herbivores, and altered precipitation and hydrological regimes. Disturbance to the Wet Forest and Rainforest Asset promotes the invasion of weed species, particularly in closed canopy forests which would ordinarily be resistant to species invasion due to shading out of weeds and dense ground litter impeding the movement of pest animals. The composition of floristic communities within this asset is degraded by

introduced deer, while ground-dwelling species including small mammals and frogs are impacted by exotic predators and pathogens.

This asset is particularly sensitive to disturbance by fire, flooding and extreme weather. Increased temperature and extended droughts due to climate change are likely to increase the number of days with high fire danger and increase the frequency and intensity of wildfires. Altered rainfall and temperatures associated with climate change will reduce the area supporting suitable environments where Mountain Ash can grow (Lindenmayer 2016) and by 2070, climate predictions expect cool temperate rainforests to receive between 28 – 30 % less than their minimum annual rainfall requirements.

Approximately 78% of this asset (100 874 hectares) burnt during the 2019/20 bushfire season. Many small reserves had most of their Wet Forest and Rainforest asset burnt. Of the larger reserves, Coopracambra National Park, Croajingolong National Park, Errinundra National Park and Snowy River National Park were most affected having 97%, 93%, 88% and 83% respectively of their Wet Forest and Rainforest asset burnt. Over 3000 hectares of Wet Forest and Rainforest was burnt in Martins Creek Nature Conservation Reserve, which represents nearly 92% of the asset there. Approximately 90% of this asset is currently below minimum TFI, with the Moist Forest EVD (minimum TFI = 25 years) now having 93% (76 172 hectares) and the Tall Mist Forest EVD (minimum TFI = 80 years) having 86% (36 999 hectares) of its area below minimum TFI. Of the fire-affected area, 5% was burnt at very high severity (canopy burnt, > 20% canopy foliage consumed). Where fire-sensitive rainforest communities have been severely burnt they may never recover, particularly in the context of increasing bushfire frequency, shifting to a eucalypt dominated canopy. A particularly significant representative of Warm Temperate Rainforest at Martins Creek Nature Conservation Reserve is likely to have been lost in this way.

The condition of the Wet Forest and Rainforest in this landscape is driven by recent fire disturbance and is considered good in unburnt areas but poor in fire impacted areas. Given the stark differences in condition across burnt and unburnt areas due to the 2019/20 fires, these two types of areas (landscape zones) have been considered separately in the Condition table below.

The exclusion of fire from unburnt areas will support the forests to continue to provide habitat for species dependent on mature tall forest. Overall, this asset is in decline.

Nested assets

Nested asset	Examples of components
Endangered EVCs and Flora Species	Dry Rainforest (15 hectares), Dry Rainforest/ Warm Temperate Rainforest/ Gallery Rainforest/ Riparian Shrubland/ Riverine Escarpment Scrub/ Blackthorn Scrub Complex (151 hectares), Gallery Rainforest (9 hectares), Littoral Rainforest and Coastal Vine Thicket* Prince-of-Wales Feather-moss†, Orange-blossom Orchid†, Buff Hazelwood†, Swamp Sun-orchid†, Violet Nightshade†, Blue-tongue Greenhood*, Swamp Crane's-bill†
Threatened Fauna Species	Large Brown Tree Frog†*, Giant Burrowing Frog†*, Long-footed Potoroo†*, Spot-tailed Quoll†*, Greater Glider†*, Grey-headed Flying-fox†*, Powerful Owl†, Sooty Owl†
Endangered Invertebrate Species	Mallacoota Burrowing Crayfish†, Orbost Spiny Crayfish†
Totemic Fauna Species	Superb Fairy Wren (Djeetgun), Yellow Tailed Black-Cockatoo (Nganak), Bell Miner (Cha-lurn), Southern Boobook (Wataty), Crimson Rosella (Wugug), Wedge Tailed Eagle (Kwarnamero), Gang-gang Cockatoo (Karan)*, Laughing Kookaburra (Koaurk), Superb Lyrebird (Wurraial), Spot-tailed Quoll (Bindyulang)†*

Nested asset	Examples of components
Totemic Flora Species	Tiger Orchid, Yam Daisy, Fairies' Aprons, Spiny-headed Mat-rush, Austral Sarsaparilla, Clematis, Blackwood, Cherry Ballart, Lilly Pilly

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

Condition

Key ecological attributes	Indicator	Landscape zone	Current condition	Current trend	KEA Goal	Strategy abbrev.
Vegetation structure and habitat features	Growth stage distribution Number of hollow-bearing trees	Burnt	Poor	↘	Maintain current condition of age class distribution in unburnt areas and maintain abundance of hollow-bearing trees	Fire Climate
		Unburnt	Good	→		
Recruitment	Proportion of successful seedling germination	Burnt	Good	↘	Sufficient numbers of non-eucalypt seedlings are present to maintain structural components	Herbivores
		Unburnt	Fair	↘		
Rainforest area	Extent (ha)	-	Poor	↘	Maintain current extent of rainforest area	Fire Climate
Ground-dwelling mammals	Site occupancy	Burnt	Fair	→	All suitable habitat remains occupied by native ground-dwelling mammals	Fire Predation
		Unburnt	Good	→		
Arboreal mammals	Site occupancy	Burnt	Fair	↘	All suitable habitat remains occupied by native arboreal mammals	Fire Predation
		Unburnt	Good	→		
Bird assemblages	Species richness and abundance	Burnt	Fair	↘	Diversity and richness remain at current levels and threatened species remain present across the landscape	Fire
		Unburnt	Good	→		

Conservation outcome

Wet Forest and Rainforest	Landscape zone	Current condition	Desired trend	Desired condition
Over the 15 years to 2038, maintain or improve growth stage distribution, recruitment and extent of Wet Forest and Rainforest to support the occupancy of mammal and bird species and persistence of threatened flora communities.	Burnt	Poor	↗	Fair
	Unburnt	Good	→	Good

Heathland

The Heathland asset covers 30 336 hectares of the East Gippsland Parks Landscape, the vast majority of which falls within Croajingolong National Park (20 852 hectares) with another significant patch found in Cape Conran Coastal Park (6845 hectares). Banksia Woodland is the primary heathland EVC in the asset (23 451 hectares) and is characterised by open scrub to open woodland, ten metres tall on well-drained Quaternary and Tertiary sandy soils with an overstorey dominated by *Banksia serrata* and a shrub-rich understorey. The Wet Heathland EVC covers 5157 hectares and is described as a low, generally treeless heathland with the occasional emergent eucalypt present. It occurs on lower slopes, flats or depressions, which are infertile and subjected to prolonged water logging, and the understorey is often dominated by a range of sedges, grasses and shrubs.

The remaining EVCs, Clay Heathland, Coastal Sand Heathland and Sand Heathland, have a combined area of just 1728 hectares (6% of the Heathland asset). All three of these EVCs are considered rare or vulnerable. In particular, the Sand Heathland EVC has just 6.9 hectares remaining and is found entirely within Boggy Creek Nature Conservation Reserve. Notable threatened fauna species found in heathlands include the Long-nosed Potoroo, Southern Brown Bandicoot, Ground Parrot, Glossy Grass Skink, Martin's Toadlet, and threatened flora include Clustered Darwinia, Gippsland Banksia, Nadgee Springybark, Bonnet Orchid, and Leafless Tongue Orchid.

Drivers of condition in this asset include fire regimes and management, introduced predators and herbivores, weed invasion and pathogens, and alterations in hydrology regimes. The impact of climate change on East Gippsland Heathland is expected to alter plant production and life cycles leading to changes in species distribution and community structure. The changing climate will continue to exacerbate drought conditions and increase fire frequency in heathlands which may lead to overabundance of some shrub species while fire sensitive species will struggle.

The Heathland asset within the Parks Landscape had almost 90% of its area (26 987 hectares) burnt during the 2019/20 fire season. Around 96% of heathlands in Croajingolong National Park were burnt and 91% of heathlands in Cape Conran Coastal Park during the fires. While smaller in extent, large proportions of heathlands were also burnt in Snowy River National Park and Coopracambra National Park. Nearly the entire extent of this asset (~94%, or 28 476 hectares), made up entirely of the Heathland (sands) EVD is now below minimum TFI (minimum TFI = 8-15 years). Of the fire-affected area, 22% was burnt at very high severity (canopy burnt, > 20% canopy foliage consumed).

The Heathland asset is particularly susceptible to operational impacts of fire management which include the construction of fuel breaks. During the 2020/21 season, trenches were dug into heathland below the ground layer as fire can move under the surface smouldering for weeks, making it difficult to contain. These breaks in the soil and ground fuels can cause long-term or irreversible hydrological impacts to heathlands. The condition of the Heathland asset is Fair and is considered to be declining.

Nested assets

Nested asset	Examples of components
Threatened Bird Species	Ground Parrot†, Turquoise Parrot†
Threatened Fauna Species	Martin's Toadlet†, Southern Brown Bandicoot†*, Long-nosed Potoroo†*, Swamp Skink†, Green and Golden Bell Frog*, Diamond Python†, Smoky Mouse†* (presumed locally extinct)
Endangered Flora Species	Gippsland Banksia†, Bonnet Orchid†, Leafless Tongue-orchid†*, Clustered Darwinia†, Devious Bent-grass†, Lizard Orchid†
Totemic Fauna Species	Superb Fairy Wren (Djeetgun), Southern Emu Wren (Yeerung), Laughing Kookaburra (Koaurk), Green and Golden Bell Frog (Didjidlick)*
Totemic Flora Species	Sun Orchid, Coast Beard-heath, Fairies' Aprons, Spiny-headed Mat-rush, Lilly Pilly

†Listed as a threatened species under the *Fauna and Flora Guarantee Act 1988*

*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.
Vegetation structure and habitat features	Growth stage distribution Life form cover and composition (EVC benchmark)	Fair	↘	Establish and maintain a diversity of growth stages and over 80% of sampled sites have structural elements and composition at benchmark level	Fire Weeds
Vegetation quality	Extent of dieback	Good	→	No increase in dieback extent of key species	Weeds
Heathland ground-dwelling mammals	Species richness and site occupancy	Fair	↘	Increased occupancy of suitable habitat by ground-dwelling mammals	Fire Predation
Heathland bird assemblage	Species richness and site occupancy	Fair	↘	No decline in occupancy of suitable habitat from current levels	Fire Predation
	Ground Parrot abundance	Fair	↘	Maintain or improve the abundance of Ground Parrots within Heathland management units	Fire Predation
Threatened herpetofauna	Site occupancy	Fair	↘	Maintain the current distribution of threatened herpetofauna species	Fire Predation
Orchid assemblage	Species richness and site occupancy	Good	→	No decline in species richness, extent and abundance of key threatened orchid species	Fire Herbivores

Conservation outcome

Heathland	Current condition	Desired trend	Desired condition
By 2038, improve the growth stage distribution and Heathland vegetation quality to support the site occupancy and species richness of ground-dwelling mammals, birds, herpetofauna and orchids.	Fair		Good

Riverine Forest and Woodland

The Riverine Forest and Woodland conservation asset in the East Gippsland Parks Landscape is characterised by tall eucalypt forests along riverbanks and associated alluvial terraces and covers an area of 12 380 hectares. Over one third of the Riverine Forest and Woodland asset is located in the Croajingolong National Park (5237 hectares) with other significant patches found in Coopracambra National Park (1689 hectares), Cape Conran Coastal Reserve (883 hectares) and Snowy River National Park (824 hectares). The EVCs that make up this asset include Riparian Scrub/Swampy Riparian Woodland Complex (58%), Riparian Forest (38%), the rare Riparian Shrubland (4%) and two endangered EVCs: Swampy Riparian Woodland with 28 hectares located in Mount Elizabeth Nature Conservation Reserve, and Swamp Scrub, which has just 2.3 hectares remaining, almost entirely within Colquhoun Regional Park.

This asset occurs on fertile alluvium soils which are regularly inundated with water and are permanently moist. Eucalypts to thirty metres tall dominate the forest area with an open to sparse secondary tree layer of wattles and scattered dense patches of shrubs, ferns, grasses and herbs. Riparian EVCs can also be found in the heads of gullies leading into creeks and rivers, and can grow as dense shrubland where ground becomes rocky and as scrub along creeks and minor streams in floodplains at lower elevations.

The rivers and riverbanks support a vast range of invertebrates, providing a food source for other native fauna, including Platypus, Swamp Rat, Azure Kingfisher, Sacred Kingfisher, Yellow-bellied Water Skink and multiple frog and fish species. The Riverine Forest and Woodland asset also provides critical drought refuges in the East Gippsland Parks Landscape, supporting a range of flora and fauna values during drought periods.

This asset is particularly vulnerable to climate change impacts as increased temperature and lower annual rainfall will increase the severity of drought, leading to long term changes to the ecosystem. As droughts become more frequent and longer lasting, the conditions will change to favour more drought tolerant species and loss of aquatic flora and fauna, leading to a decrease in species diversity.

In addition, water harvesting from the upper Snowy River changes the timing, duration, frequency and volume of water flows, which reduces the presence and diversity of aquatic species. Following fires upstream, post-fire sedimentation and debris can increase turbidity, also impacting aquatic species. Other drivers of condition within this asset include introduced herbivores and predators, weed invasion and pathogens, fire regimes and human disturbances.

The 2019/20 fire season burnt through 65% of this asset within the Parks Landscape, a total of 9258 hectares. Around 94% of the Riverine Forest and Woodland asset in Coopracambra National Park was burnt,

and 91% in both Croajingolong National Park and Cape Conran Coastal Park. The Damp Scrub EVD currently has 76%, or 5480 hectares, of its area burnt below minimum TFI (minimum TFI = 15-20 years), and the Riparian (higher rainfall) EVD has almost 90%, or 4657 hectares, below minimum TFI (minimum TFI = 30 years). Of the fire-affected area, 15% was burnt at very high severity (canopy burnt, > 20% canopy foliage consumed).

The condition of the current Riverine Forest and Woodland asset is Good and considered stable.

Nested assets

Nested asset	Examples of components
Endangered EVC and Flora Species	Swamp Scrub (2 hectares) Deddick Blue-box†, Slender Lignum†, Genoa River Correa†*, Cotoneaster Pomaderris†*, Rock Orchid†, Hooker's Tussock-grass†, Leafless Tongue Orchid†*, Slender Mudgrass†
Depleted EVC	Riparian Forest (2275 hectares)
Threatened Fauna Species	Green and Golden Bell Frog*, Mallacoota Burrowing Crayfish†, Alpine Spiny Crayfish†, Orbost Spiny Crayfish†, East Gippsland Spiny Crayfish†, Variable Spiny Crayfish†, McDowall's Galaxias†, East Gippsland Galaxias†, Roundsnout Galaxias†, Empire Gudgeon†, Cox's Gudgeon, Grayling†*
Totemic Fauna Species	Superb Fairy Wren (Djeetgun), Southern Emu Wren (Yeerung), Yellow Tailed Black-Cockatoo (Nganak), Bell Miner (Cha-lurn), Southern Boobook (Wataty), Crimson Rosella (Wugug), Gang-gang Cockatoo (Karan)*, Laughing Kookaburra (Koaurk), Green and Golden Bell Frog (Didjidlick)*, Musk Duck†
Totemic Flora Species	Geebung†, Fairies' Aprons, Spiny-headed Mat-rush, Lilly Pilly, Clematis

†Listed as a threatened species under the *Fauna and Flora Guarantee Act 1988*

*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.
Vegetation structure and habitat features	Riparian zone connectivity Presence of large trees and dense shrub layer	Good	→	Maintain current extent of large trees and dense shrub layer, and minimise fragmentation to ensure connectivity to climate refugia	Fire Climate
Vegetation quality	Weed cover and intactness	Good	→	No increase in weediness from current levels and reduce disturbance from humans and pest animals	Herbivores Weeds
Aquatic habitat quality and complexity	Water quality (index of stream condition)	Fair	→	Improve water quality from current levels	Fire Water
	Presence of in-stream habitat features (snags, riffles, overhanging banks)	Very Good	→	Maintain the presence of in-stream habitat features and extent of in-stream habitat	Water
Amphibian assemblages	Species richness and abundance, site occupancy	Good	→	Maintain current frog diversity levels, with no loss of threatened species from known sites	Water
Fish assemblages	Species richness and presence of key functional groups	Very Good	→	Maintain the diversity and richness of functional groups (including Euryhaline)	Water
Invertebrate assemblages	Species richness and occupancy of key indicator species	Good	↘	Maintain or improve species richness and occupancy of key indicator species (including crayfish and freshwater mussels)	Water

Conservation outcome

Riverine Forest and Woodland	Current condition	Desired trend	Desired condition
Over the 15 years to 2038, maintain the connectivity and intactness of Riverine Forest and Woodland vegetation, water quality and in-stream habitat complexity to support the current species richness and abundance of amphibian, fish and invertebrate species.	Good	→	Good

Subalpine

The Subalpine Conservation Asset in the East Gippsland Parks Landscape covers an area of 4119 hectares and occurs in areas of high altitude confined to a small number of parks in the north of the landscape. Snowy River National Park contains the largest area of Subalpine landscape with just under 2000 hectares of mostly Montane Dry Woodland (EVC 36) with another significant extent found in Errinundra National Park (1032 hectares).

Montane Dry Woodland is the dominant EVC of the Subalpine asset, covering almost 80% of this asset across the landscape. It occurs on dry and exposed mid to upper slopes at montane elevations and ridges in high rainfall areas. The overstorey trees vary from an open forest to an open woodland to fifteen metres tall, depending on altitude, precipitation and frequency of fire, and the shrubby understorey is an unusual combination of species which can tolerate exposed montane conditions. Generally, the lower rainfall, less fertile geologies support a shrubby understorey with a lower overall species diversity. The ground layer is generally characterised by grass and herb cover and is usually dominated by tussock grasses.

The Sub-alpine Woodland and Montane Grassy Woodland EVCs also cover large areas in the landscape and smaller areas of Sub-alpine Treeless Vegetation, Montane Riparian Woodland and Montane Riparian Thicket are also present. These EVCs are considered Rare or Vulnerable. Threatened species that occur in the Subalpine zone include Rough Eyebright, Australian Anchor Plant, Swamp Crane's-bill and Alpine Rush, and the critically endangered Giant Burrowing Frog.

Landscapes at these altitudes are amongst the most sensitive to climate change and are being affected by these changes at a faster rate than other terrestrial habitats. Because of this, the number of good snow seasons, the average annual duration of snow cover and the average snow-covered area is expected to decline by up 40% by 2050. It is expected that water catchments in these areas will also receive less water each year as a result of the climate changing, with fewer days cold enough to produce snow which can later melt and contribute water downstream to Victoria’s reservoirs (Howe et al. 2005).

Subalpine asset condition is driven by changing fire regimes, introduced herbivores, climate change, weed invasion and pathogens, and altered hydrology regimes. The extensive bushfires from the 2019/20 season burnt a significant area of the asset in Snowy River National Park (89%), among several other parks. In total, just under 40% of the Subalpine conservation asset was burnt in these fires. Currently, 68% of this asset is below minimum TFI, including 68% of the High Altitude Shrubland/Woodland EVD, an area of 2796 hectares

(minimum TFI = 35-50 years). Of the fire-affected area, 15% was burnt at very high severity (canopy burnt, > 20% canopy foliage consumed).

Snow gums in the Subalpine Woodland and Montane Grassy Woodland EVCs are also at risk of severe and large-scale dieback as a consequence of infestation by a wood-boring longicorn beetle. The condition of the Subalpine conservation asset is Fair and is considered to be in decline.

Nested assets

Nested asset	Examples of components
Rare EVC	Sub-alpine Treeless Vegetation (53 hectares)
Endangered Flora Species	Rough Eyebright†, Australian Anchor Plant†, Swamp Crane's-bill†, Alpine Rush†
Threatened Fauna Species	Giant Burrowing Frog†*
Totemic Fauna Species	Laughing Kookaburra (Koaurk)
Totemic Flora Species	Yam Daisy, Spiny-headed Mat-rush

†Listed as a threatened species under the *Fauna and Flora Guarantee Act 1988*

*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.
Sub-alpine Treeless Vegetation EVC	Extent (ha)	Good	↘	Maintain the extent of the Sub-alpine Treeless Vegetation EVC above 50 ha	Fire Climate
Non-canopy flora	Life form cover and composition (EVC benchmark) % weed cover	Good	→	Maintain the proportion of non-canopy life forms within EVC benchmark, including low weediness	Weeds
	Intactness	Fair	↘	Reduce the disturbance of vegetation from large herbivores	Herbivores
Treed EVCs	Canopy cover	Fair	↘	Map/monitor the extent of canopy cover in treed EVCs and the transition of vegetation to other types	Weeds Climate

Conservation outcome

Subalpine	Current condition	Desired trend	Desired condition
Over the 15 years to 2038, maintain the extent of vulnerable EVCs, vegetation quality and canopy cover of Subalpine vegetation to support native fauna and flora as the climate changes.	Fair	→	Fair

Estuarine and Coastal Wetlands

The Estuarine and Coastal Wetlands conservation asset within the East Gippsland Parks Landscape covers a total of 3059 hectares and is the smallest of the terrestrial assets in the landscape. This asset includes freshwater coastal wetlands, saltmarsh and estuaries. Wetlands occur on seasonally or permanently moist or waterlogged soils, or along creeks, streams or flooded terraces, the majority of which fall within the Croajingolong National Park (44%) in this Parks Landscape. The dominant EVCs of the region are Wet Swale Herbland, Coastal Saltmarsh and Coastal Lagoon Wetland. This asset also contains 436 hectares of Fresh Water Body.

The Wet Swale Herbland EVC occurs almost entirely within Ewing Morass Wildlife Reserve (770 hectares) with one other small patch located in Lake Tyers State Park (8 hectares). This EVC occupies seasonally inundated dune swales forming between coastal dune barriers and hinterland hills and consists of a range of amphibious rushes, sedges and herbs. The Coastal Saltmarsh EVC covers several areas along the coastline, however, all of these are considered depleted. It is present in seven of this landscape's parks and reserves, most notably in Croajingolong National Park (368 hectares), Lake Corringle Wildlife Reserve (195 hectares) and Cape Conran Coastal Park (110 hectares). Coastal Saltmarsh occurs on and immediately above marine and estuarine tidal flats and contains distinct floristic communities in relation to the saline environment. Coastal Saltmarshes consist of a range of life forms including succulent herbs, low succulent shrubs, rushes and sedges.

This conservation asset contains many fauna species including native and migratory birds, as well as frogs, reptiles, small mammals and fish in freshwater bodies. This includes many EPBC-listed threatened and endangered species such as Eastern Bristlebird, Caspian Tern, Common Tern, Ground Parrot, Hooded Plover, Long-nosed Potoroo, Eastern Great Egret, Green and Golden Bell Frog, McDowall's Galaxias, East Gippsland Galaxias, Roundsnout Galaxias, Empire Gudgeon and Cox's Gudgeon. Also included in this asset are two vulnerable EVCs, Brackish Sedgeland, and Estuarine Wetland, and threatened flora species such as Slender Mud-grass, Woolly Waterlilly and Limestone Blue Wattle.

Freshwater aquatic ecosystems appear to have the highest proportion of species at risk of extinction by climate change, and lentic (still) and lotic (fast-flowing) ecosystems are considered the most sensitive to land use change, exotic species and climate change (Sala et al. 2000). A hotter and drier climate in the future may reduce many wetlands in size, convert some wetlands to dry land and shift one wetland type to another (Jin, Cant and Todd 2009). The number of invasive species is likely to increase in wetlands as a consequence

of climate change, resulting in many wetlands becoming suitable for breeding populations of various invasive species (Jin, Cant and Todd 2009).

The coastal wetlands and saltmarsh of East Gippsland are mostly barrier-built intermittently closed and open lakes and lagoons (Boon et al. 2015). Estuaries open and close naturally according to river and tidal flows, and rainfall. Sea level rise caused by climate change is expected to adversely affect coastal wetlands through altered tidal flows and increased frequency and severity of coastal storm surges (Jin, Cant and Todd 2009). This can increase salinisation and turbidity through sand movement, changing wetland topography and altering water quality. Coastal wetlands may disappear following coastal erosion, compounded by potential dieback of shoreline vegetation from increased salinity. Rising sea levels may also contribute to the retreat of wetlands and subsequent encroachment of the sea into other ecosystems.

The key drivers of condition in this asset include aquatic weed invasion, human disturbance (such as inappropriate visitor access), altered hydrology regimes, and introduced predators and herbivores. The condition of the Estuarine and Coastal Wetlands asset is Good and is considered to be in decline.

Nested assets

Nested asset	Examples of components
Migratory (incl. vagrant) and resident seabird and shorebird (foraging habitat)	Caspian Tern, Common Tern, Little Tern, Fairy Tern, Hooded Plover*, Eastern Curlew*, Lathams Snipe, Cattle Egret
Endangered EVC and Flora Species	Fringing Vegetation Slender Mudgrass†, Woolly Waterlilly†, Thick-lipped Spider-orchid*, Limestone Blue Wattle†*, King Greenhood†
Depleted EVC	Coastal Saltmarsh (773 hectares)
Threatened Native Fish and Amphibians	McDowall's Galaxias†, East Gippsland Galaxias†, Roundsnout Galaxias†, Empire Gudgeon†, Cox's Gudgeon†, Green and Golden Bell Frog*
Totemic Fauna Species	Pelican (Borun), Musk Duck (Tuk)†, Green and Golden Bell Frog (Didjidlick)*
Benthic fauna	Mussels, shellfish

†Listed as a threatened species under the *Fauna and Flora Guarantee Act 1988*

*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.
Function and connectivity	Water quality Fish movement and breeding	Good	↘	Maintain wetland connectivity regime with appropriate water quality to allow fish movement and breeding	Water Climate
Vegetation structure and composition	Life form cover and composition	Poor	↘	Maintain vegetation composition within EVC benchmark	Weeds
Bird assemblages	Species richness and abundance, site occupancy Tern presence	Good	→	Maintain species richness and site occupancy at current levels, with no loss in presence of terns	Predation Water
Estuarine fish assemblages	Species richness and abundance	Good	Unknown	Maintain current estuarine fish species diversity and abundance	Water
Benthic fauna assemblages	Species richness	Unknown	Unknown	Determine and maintain current benthic fauna species richness	Water

Conservation outcome

Estuarine and Saline Wetlands	Current condition	Desired trend	Desired condition
Over the 15 years to 2038, maintain the function and connectivity of waterways and vegetation quality to support the site occupancy and diversity of bird, fish, benthic fauna and other water-dependent vertebrates.	Good	→	Good

Coastal (including Islands)

The Coastal (including Islands) Conservation Asset in the East Gippsland Parks Landscape spans an area of 8254 hectares, 70% of which is located in Croajingolong National Park (5822 hectares). Cape Conran Coastal Park also has a significant extent of coastal asset (1076 hectares) with smaller patches also occurring in Ewing Morass Wildlife Reserve (770 hectares), Marlo Coastal Reserve (275 hectares), and Point Hicks Lighthouse Reserve (119 hectares). The remaining Coastal asset areas across the landscape are all less than 100 hectares in size.

EVCs within the coastal asset include Coast Banksia Woodland, which is found on secondary dunes and often dominated by a woodland overstorey of Saw Banksia (*Banksia integrifolia*) to 15 metres tall over a medium shrub layer and an understorey consisting of herbs and sedges. Coastal Dune Scrub / Coastal Dune Grassland Mosaic occupies the secondary dunes along ocean beaches and comprises scrub to 3 metres tall with occasional emergent trees that are subject to high levels of salt spray and continuous disturbance from onshore winds. Grasses and halophytes (succulents) that colonise the foredunes of ocean beaches are also present. Coastal sand dunes also cover a large area of the Coastal asset.

This asset supports a wide range of native mammal species as well as many native and migratory bird species. The Coastal EVCs contain breeding, roosting and foraging habitat for many threatened and/or migratory bird species including Caspian Tern, Fairy Tern, Short-tailed Shearwater, Ruddy Turnstone, Common Tern, Eastern Reef Egret, Hooded Plover and Eastern Curlew. Endangered native mammal species also found in this asset include Southern Brown Bandicoot, Spot-tailed Quoll, Long-nosed Potoroo and Long-footed Potoroo.

Islands within this landscape are important conservation areas for seabirds and marine mammals. These include Gabo Island with its population of Little Penguins, for which nesting has dramatically declined by 90% in the last nine years; Tulluberga Island, with Victoria's largest colony of White-faced Storm Petrels; and the Skerries, which are an important haul out for Australian Fur Seals in eastern Victoria. Islands can also provide important refugia for species that are threatened on the mainland, provided that threats such as pest animals, weeds and fire are adequately managed on those islands.

Drivers of condition within this asset include alterations to marine and coastal habitat, weed invasion and pathogens, introduced predators and herbivores, human disturbance, fire regimes, and competitive interactions. Climate change is expected to have a significant impact on the coastal areas of this Parks Landscape. Rising sea levels will bring significant change to the coastal zone in coming decades with many

coastal environments such as beaches, estuaries, intertidal rocky reefs, wetlands and low-lying islands likely to be most affected. The risk of beach loss, salinisation of wetlands and inundation of low-lying areas and reefs beyond their capacity to adapt must be considered in regional decision-making. Extreme weather events are also likely to become more intense with climate change, with larger and more damaging storm surges exacerbating these risks. These changes will have implications for the capacity of the built and natural environment to withstand and recover from impacts.

The 2019/20 fire season burnt a significant area of Coast Banksia Woodlands in Croajingolong National Park (> 2400 hectares). In total, approximately 35% of the Coastal asset throughout the East Gippsland Parks Landscape was burnt in these fires. Approximately 35%, or 2902 hectares, of this asset is currently below minimum TFI (minimum TFI = 5-25 years). Of the fire-affected area, 37% was burnt at very high severity (canopy burnt, > 20% canopy foliage consumed).

The condition of the Coastal (including Islands) asset is Good but is considered to be in decline.

Nested assets

Nested asset	Examples of components
Resident seabird and shorebird (foraging, roosting and breeding habitat)	Hooded Plover†*, Pied Oystercatcher, Little Penguin, Caspian Tern†
Migratory seabird and shorebird (foraging, roosting and breeding habitat)	Short-tailed Shearwater, Common Tern, Little Tern†, Fairy Tern†*, Ruddy Turnstone†, Eastern Reef Egret, Eastern Curlew†*
Depleted EVC and Endangered Flora Species	Coastal Dune Scrub/Coastal Dune Grassland Mosaic Slender Mud-grass, Viscid Daisy-bush
Threatened Bird Species	Eastern Bristlebird†*, Australasian Bittern†*
Totemic Fauna Species	Superb Fairy Wren (Djeetgun), Southern Emu Wren (Yeerung), Laughing Kookaburra (Koaurk)
Totemic Flora Species	Coast Beard-heath, Spiny-headed Mat-rush
Ground Dwelling Mammals	Dusky Antechinus, Agile Antechinus

†Listed as a threatened species under the *Fauna and Flora Guarantee Act 1988*

*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.
Migratory and resident shorebirds	Species richness and abundance Nesting site abundance for Little Tern, Fairy Tern and Little Penguin	Fair	↘	Maintain species richness and improve available habitat, including for Little Tern, Fairy Tern and Little Penguin	Predation Visitors
	Hooded Plover breeding success	Poor	↘	Establish good and increase current rates of Hooded Plover recruitment	
Critical weight range mammals	Species richness and abundance, site occupancy	Fair	↘	Increase occupancy from 2022 levels	Predation
Coast Banksia (*Banksia integrifolia*)	Growth stage distribution	Poor	↘	No decrease in the extent of mature vegetation, and adequate mix of age classes including recruitment post fire	Fire
Vegetation quality and composition	Extent (ha) % cover of weeds	Good	→	No more than 5% cover of introduced species and maintain current vegetation extent	Fire Weeds
Eastern Bristlebird	Distribution and abundance	Fair	→	Maintain current abundance and no loss in the number of sites occupied	Fire Predation
Seal breeding success	Seal pup numbers	Good	↗	Maintain current seal breeding success.	Condition

Conservation outcome

Coastal (including Islands)	Current condition	Desired trend	Desired condition
Over the 15 years to 2038, maintain the connectivity of coastal habitats, ensuring a mix of vegetation age classes is maintained, to support habitat for both migratory and resident seabirds and shorebirds, critical weight range mammals and endangered fauna and flora.	Good	→	Good

Intertidal Reef

The Intertidal Reef conservation asset is the smallest in the East Gippsland Parks Landscape at 11.6 hectares. It is found in all three Marine Protected Areas in the landscape (Cape Howe Marine National Park: 5.5 hectares; Beware Reef Marine Sanctuary: 3.8 hectares; Point Hicks Marine National Park, 2.3 hectares).

Intertidal Reefs support marine ecosystems between 0 to 2 metres below sea level and are regularly exposed to both marine and terrestrial conditions. Intertidal reefs are typically structured around boulders, rock and reef platforms, and support highly diverse ecosystems including brown algae dominated communities and macroinvertebrate communities. A diverse range of fish assemblages use intertidal reefs, and shorebirds such as the Sooty and Pied Oystercatchers and Ruddy Turnstone rely on them for both feeding and roosting.

Intertidal reefs in the Beware Reef Marine Sanctuary provide feeding areas for Pied Cormorants, and Little Penguins may also traverse the intertidal reef area. Habitat-forming species of invertebrates including the sea squirt *Pyura stolonifera*, barnacles and mussels, and algae such as Neptune's Necklace, form beds on the reef. Intertidal reefs also provide important seal haul out habitat at the Skerries and Beware Reef.

Drivers of condition in this asset include human disturbance, altered marine habitat (e.g. changed water quality and marine pollutants), predation by and competition with introduced marine pests, and climate change. The condition of Intertidal Reef within the East Gippsland Parks Landscape is currently considered to be Very Good, and is largely driven by interactions between water regimes, climate and history of use. The increase in extreme rainfall events that have been predicted in climate change models for the area (Clarke et al. 2019) may increase erosion and sediment transport, rapidly altering habitats. Further, climate related increases in tidal activity may raise sediment loads within the water column, smothering algae beds and decreasing light availability.

Nested assets

Nested asset	Examples of components
Sessile invertebrate communities	Mussels, barnacle, sea squirt/cunjevoi (*Pyura stolonifera*)
Migratory and resident shorebird (foraging and chick-rearing habitat)	Eastern Reef Egret, Sooty Oystercatcher, Pied Oystercatcher, Sandpipers, Ruddy Turnstone†, Hooded Plover†*
Seal haul out habitat	Australian Fur Seal, New Zealand Fur Seal
Algae Communities	Coralline Red Algae, Southern Bull Kelp, Neptune's Necklace

†Listed as a threatened species under the *Fauna and Flora Guarantee Act 1988*

*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.
Migratory and resident seabirds and shorebirds	Site occupancy and abundance	Good	→	Maintain Hooded Plover numbers at current levels	Predation Visitors
Fur seal colonies	Presence and abundance	Very Good	→	No decline in fur seal abundance and occupancy of haul-out habitat	Visitors
Sessile invertebrates	Mussel cover/ abundance	Very Good	→	Determine and maintain the current abundance of sessile invertebrates	Marine
Limpets	Size class distribution	Good	→	Determine and maintain the current distribution of limpet size classes	Marine

Conservation outcome

Intertidal Reef	Current condition	Desired trend	Desired condition
Over the 15 years to 2038, maintain the species richness and site occupancy of migratory and resident shorebirds, fur seals and the abundance of invertebrates in Intertidal Reef.	Very Good	→	Very Good

Subtidal Reef

The Subtidal Reef conservation asset is 1040 hectares and located largely within Cape Howe Marine National Park. Smaller parcels also occur within East Gippsland's two other Marine Protected Areas (146 hectares in Point Hicks Marine National Park and 14 hectares in Beware Reef Marine Sanctuary).

Subtidal Reefs are found deeper than two metres below sea level and include shallow (i.e. 2-20 metres) and deep reefs. They can be highly complex with gutters, arches, crevices and overhangs providing multiple sub-habitats for reef associated species. Macroalgae are abundant on sunlit Subtidal Reefs while sessile invertebrates such as ascidians, soft corals and sponges are typical of deeper Subtidal Reefs where there is insufficient light for photosynthesis. Subtidal Reefs support diverse invertebrate assemblages including seastars and urchins, crabs and rock lobsters, molluscs, marine worms and cnidarians. These, in turn, support diverse fish assemblages, including Morwong, Leatherjackets, Southern Hulafish and Blue-throat Wrasse.

Large brown algae known as kelp are a prominent biological component of Victorian shallow reefs, and can form extensive kelp forests, providing important habitats for many other organisms on the reef including fish, invertebrates and smaller algae. They are also some of the most productive ecosystems in the world with stands of seaweed producing 10-30 kg of plant material per square metre, making them important carbon sequestrators. On these reefs, the herbivorous Black-spined Urchin can remove all erect algae to create bare areas of reef called 'urchin barrens' (Williams et al. 2007).

The impact of urchins at Point Hicks Marine National Park is currently unknown, so the condition of subtidal reefs there requires investigation. Condition of the asset is considered Fair in the Cape Howe Marine National Park and Beware Reef Marine Sanctuary. Due to overgrazing by urchins, all subtidal reefs are in a declining condition across the asset. Most components of this asset are dependent on the health and abundance of macroalgae, the condition of which is affected by interactions between water regimes, climate, history of use and range-shifting species such as urchins.

Climate related increases in tidal activity and extreme rainfall events could increase sediment load within the water column, which may affect algae beds and decrease the light availability at lower depths of the reef. Drivers of condition within this asset include altered marine habitat (e.g. water quality and marine pollutants), illegal activity, range-shifting native species, extreme weather and human disturbance.

Nested assets

Nested asset	Examples of components
Brown macroalgae dominated beds	Common Kelp, Crayweed, *Cystophora sp., Sargassum sp.,* Southern Bull Kelp
Large mobile fish	Sharks, rays, Eastern Blue Groper
Mobile macroinvertebrates	Black-lip Abalone, Southern Rock Lobster, Eastern Rock Lobster, urchins, Maori Octopus, anemones
Sessile invertebrate communities	Sponges, ascidians, gorgonians, sea whips, corals
Giant Kelp ecological community	Giant Kelp and associated marine algae, reef fish and invertebrates

†Listed as a threatened species under the *Fauna and Flora Guarantee Act 1988*

*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.
Brown macroalgae	Species richness and % cover	Fair	↘	Improve and maintain the % cover and species richness of native brown macro-algae	Marine
	Urchin density (individuals per m^2)	Poor	↘	Maintain a maximum of 1-2 individuals per m^2	Marine
Large mobile fish	Species richness and abundance	Good	→	Maintain species richness and abundance of large mobile fish	Visitors Marine
Mobile macroinvertebrates	Abalone abundance Southern Rock Lobster abundance	Good	→	Maintain abalone above lower control limit (>100 per $200m^2$) and healthy Rock Lobster population.	Visitors Marine
Giant Kelp ecological community	Presence	Poor	↘	Maintain presence of Giant Kelp individuals where detected .	Marine

Conservation outcome

Subtidal Reef	Current condition	Desired trend	Desired condition
Over the 15 years to 2038, maintain and improve the productive dense stands of habitat-forming algae that provide cover and food in subtidal reef systems for a diversity of Subtidal Reef species.	Fair	↗	Good

Soft Sediment

The Soft Sediment is the largest of the marine assets in the East Gippsland landscape at 6962 hectares. It occurs almost exclusively in the two Marine National Parks, Cape Howe (3123 hectares) and Point Hicks (3640 hectares), with a small 200 hectare area at Beware Reef Marine Sanctuary.

Soft Sediment are intertidal and subtidal benthic areas characterised by sediment such as mud, silt, shell grit and sand. They are home to a wide range of organisms living on (birds, coral, stingrays), within (worms, clams) and between (organisms 45 µm – 1 mm in size) the sediment grains, and are crucial to primary production and nutrient cycling. Threatened avian species such as the Hooded Plover utilise the Soft Sediment asset for foraging, as do a number of other resident and migratory shorebirds.

The condition of Soft Sediment is considered Good. The overall health and condition of this asset is driven by key ecological processes including sediment and wrack deposition patterns, climate and seasonality, hydrodynamic processes (waves, currents and tides), nutrient cycling and trophic interactions. Impacts to the Soft Sediment asset due to climate change will include warming and decreases in ocean pH with changes in primary production, hydrology and extreme weather events. Fluctuations in prevailing current dynamics will affect soft sediment systems considerably, with soft sediment fauna being particularly sensitive to these changes.

The main drivers of condition within the Soft Sediment asset are extreme weather, pollution and human disturbance, illegal activity, introduced predators and climate change.

Nested assets

Nested asset	Examples of components
Migratory birds (foraging habitat)	Ruddy Turnstone†, Eastern Reef Egret
Seabird and shorebird (foraging habitat)	Hooded Plover†*, Fairy Tern†*, Little Tern†
Invertebrate communities	Crustaceans, amphipods, polychaetes and one cumacean family
Benthic/Demersal fish	Yellow Scad, Whiting (*Sillago sp.*), Flathead

†Listed as a threatened species under the *Fauna and Flora Guarantee Act 1988*

*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.
Intertidal benthic communities	Abundance and diversity of key species	Good	→	Abundance and diversity of key invertebrate species is maintained at or above levels outside parks	Marine
Subtidal benthic communities	Abundance and diversity of key species	Good	→	Abundance and diversity of key invertebrate species is maintained at or above levels outside parks	Marine
Resident and migratory seabirds and shorebirds	Site occupancy of Hooded Plovers Site occupancy of Little Terns and Fairy Terns	Fair	→	Maintain site occupancy of Hooded Plovers, Little Terns and Fairy Terns.	Predation Visitors
Habitat quality	Frequency of marine debris (pollution)	Good	→	Decrease in frequency of marine pollution	Visitors

Conservation outcome

Soft Sediment	Current condition	Desired trend	Desired condition
Over the 15 years to 2038, maintain natural sediment transport patterns and the structural integrity and composition of intertidal and subtidal soft sediments in order to support an abundant and diverse assemblage of fish and invertebrate communities.	Good	→	Good

Water Column (pelagic)

The Water Column (pelagic) asset incorporates non-vegetated zones of open water found above any subtidal areas. It is populated by a range of drifting planktonic species: phytoplankton such as diatoms are consumed by zooplankton including copepods, sea jellies, and ctenophores. Plankton are the food source for many filter-feeding fauna like bivalve molluscs, worms and ascidians. These species in turn are a major food source for fish, including Mullet, Snapper, Tailor, King George Whiting, Gummy Shark, School Shark and both the Southern and Common Saw Shark. Many intertidal and subtidal organisms spend the early stage of their life as part of the plankton community in the water column and oceanic currents assist the distribution of recruits back to intertidal and subtidal habitats.

Within this Parks Landscape, the open waters of the Water Column also provide habitat for pelagic marine mammals that feed upon fish and plankton, including cetaceans and pinnipeds. Good water quality is important for maintaining the health of these species, but also those associated with other ecosystems such as Soft Sediments and Subtidal Reefs.

Climate is an important driver of condition in the Water Column asset, specifically via changes to water temperature and wind conditions. These attributes influence the functional connectivity required by some migratory species and current dependent fauna, such as fish larvae, and are important for recruitment and food supply. Connectivity in the water column also depends on water quality and is influenced by pollutants that may create a toxic barrier to movement. The Water Column asset is influenced by adjacent land use and associated freshwater inputs as well as coastal erosion.

Drivers of condition in this asset include marine pest species, human disturbance and illegal activity, water quality and climate change. The condition of the Water Column asset is considered Good.

Nested assets

Nested asset	Examples of components
Large mobile fish	Sharks, Snapper, Yellowfin Tuna
Schooling fishes	Pilchards, Eastern Australian Salmon, Mullet
Transient marine mammals	Bottlenose Dolphin, Common Dolphin, Southern Right Whale†*, Humpback Whale†, Southern Elephant Seal*, New Zealand Fur Seal, Australian Fur Seal, Killer Whale
Migratory and resident seabird (foraging habitat)	Wandering Albatross†*, Shy Albatross†*, Yellow-Nosed Albatross, Fairy Prion*, Little Penguin, Caspian Tern†, White-bellied Sea Eagle†, Wedge-tail Shearwater, Short-tail Shearwater, White-faced Storm Petrel†, Crested Tern, Fairy Tern†*, Little Tern†
Planktonic communities	Phytoplankton (diatoms), zooplankton (copepods, sea jellies, ctenophores)
Water quality	Levels of nutrients, pollutants
Connectivity	Species functional connectivity (currents, temperature)
Reptiles	Leatherback Turtle†*

†Listed as a threatened species under the *Fauna and Flora Guarantee Act 1988*

*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.
Water quality	Nutrient levels, dissolved oxygen, chlorophyll A, turbidity, pH and salinity	Good	→	Maintain water quality measures within allowable levels according to the environment reference standard (EPA 2017) for Open Coasts (Gippsland)	Water
Large mobile fish	Species richness	Good	→	Maintain current species richness of large mobile fish.	Visitors

Conservation outcome

Water Column (pelagic)	Current condition	Desired trend	Desired condition
Over the 15 years to 2038, maintain the water quality of the Water Column asset and monitor the diversity of fish and seal breeding success.	Good	→	Good

Growling Grass Frog

5 Threats

Identifying priority threats to conservation outcomes

A broad range of key threats to the conservation assets of the East Gippsland 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 (Table 5.1) 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 persist and are functioning within acceptable bounds to maintain key species and threatened flora and fauna populations.

Identifying and addressing threats associated with climate change

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 for 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 movements in 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, and 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 for highly climate-vulnerable assets such as coastal, alpine and freshwater ecosystems, climate change will have a profound impact on the functioning of these ecosystems. For example, some wet forest types are likely to transition to a mix of species more drought and fire tolerant.

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 Victorian East 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:

> Increased average temperatures in all seasons; more hot days and warm spells with fewer frosts; reduced cool season rainfall and possible warm season changes in rainfall; increased intensity of extreme weather events; continued sea level rise and an increased height of extreme sea-level events; warming sea surface temperatures and alterations to ocean currents; and harsher fire-weather climate.

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 East Gippsland CAP, it may be used in planning responses for specific ecosystems within the landscape, or in periodic reviews of the CAP and its objectives.

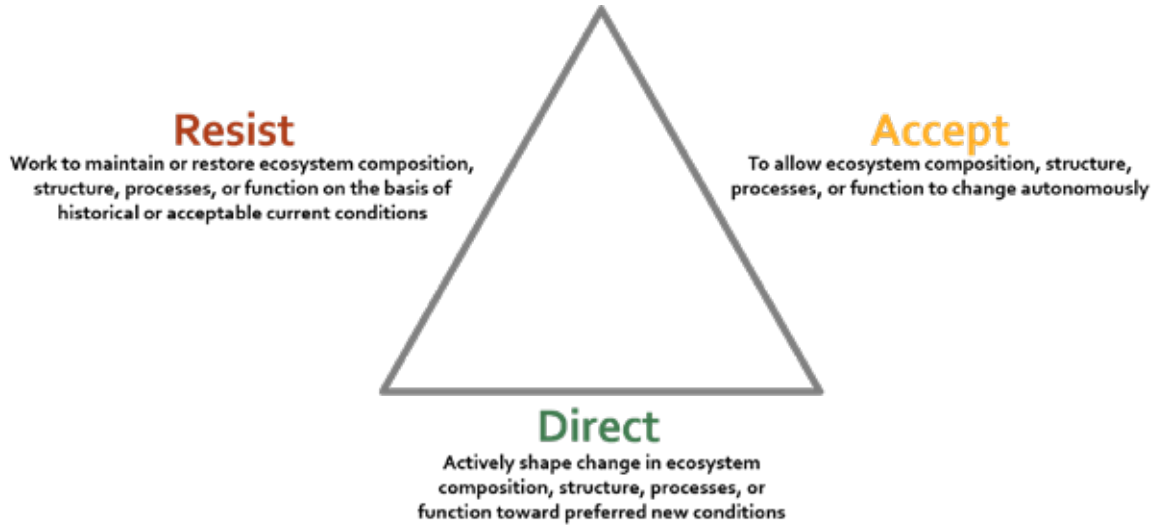


Figure 5.1 The RAD framework's three approaches for making management decisions for systems undergoing ecosystem transformation (USGS 2021)

Priority threatening processes

Of the threatening processes that were assessed in the East Gippsland 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 East Gippsland Parks Landscape and their risk rating

Threatening process	Threat agent(s) and impact	Dry Forest and Woodland	Wet Forest and Rainforest	Heathland	Riverine Forest and Woodland	Subalpine	Estuarine and Coastal Wetland	Coastal (including islands)	Intertidal Reef	Subtidal Reef	Soft Sediment	Water Column (pelagic)
Inappropriate fire regimes and management	Loss of old growth and mature vegetation, habitat and landscape transformation, loss or simplification of habitat structure and composition, and changes to soil chemistry are caused by too frequent, infrequent, or wrong severity, season and scale of fire.	High	Very High	Very High	High	Very High	Moderate	Moderate				
	Fire management activities (e.g. fire ignition, suppression, patching out, chemical, blacking out, new track construction, off-track driving, strategic fire breaks, fuel breaks) result in vegetation community loss, habitat transformation and loss of growth stages.	Very High	Moderate	High	Low	Low	Low	High				
Alteration to natural hydrology and precipitation regimes	Increased frequency/severity of droughts and floods cause dieback, ecosystem encroachment, poor water quality through low dissolved oxygen, algal blooms and habitat contraction.	High	Very High	Low	High	Low	High	Low				
	Harvesting or diversion of ground and surface water (both legal and illegal) causes loss of natural recruitment, changes in soil profile and canopy die-off.		High		Low		Low					
	Sedimentation as a result of human-induced disturbance (soil disturbance, land clearing, recreational activities, storm water run-off, dredging, natural resource extraction, fire, stream crossings) results in poor water quality, introduction of weeds and reduced marine water quality.				High		High					High
	Channelisation, desnagging, dredging, levy banks, dams, groynes, break waters, in-stream barriers and jetties modify aquatic systems. Illegal estuary openings can potentially lead to fish kill.				Low		Moderate					

Threatening process	Threat agent(s) and impact	Dry Forest and Woodland	Wet Forest and Rainforest	Heathland	Riverine Forest and Woodland	Subalpine	Estuarine and Coastal Wetland	Coastal (including islands)	Intertidal Reef	Subtidal Reef	Soft Sediment	Water Column (pelagic)
Invasion of terrestrial / aquatic habitats by weeds	Herbaceous perennial, woody and aquatic weeds, and overabundant and range-shifting native species cause ecosystem encroachment, recruitment loss, exclusion of native species, changes in extent, structure, composition, recruitment and quality, increased fuel loads, and reduced water quality.	High	High	Moderate	Very High	High	High	Very High				
Infection of native plants and animals	Pathogens - Viruses, bacterium or other micro-organism including fungus (e.g. Phytophthora, Myrtle rust, Chytrid fungus) reduce vegetation health and composition, causing dieback, and impact frog species.	High	High	High	Low	High	Low	Low				
Competition and land degradation by herbivores	Introduced herbivores, including deer, pigs, goats, horses and cattle, cause soil erosion, compaction and loss and alter and reduce vegetation biomass, structure, composition and recruitment through overgrazing, trampling and pugging.	High *VH in Rainshadow Woodlands	High	High	Very High	High	Very High	High			Moderate	
Predation	Decline in abundance of small mammal, reptile, bird, amphibian and invertebrate species due to fox, cat, dog, rodent and bird (gulls and ravens) predation. Penguins are also experiencing predation by seals.	Very High	Very High	Very High	High	Low	High	Very High			Very High	
Competitive interactions	Invasive and native range-shifting marine species such as Black-spined Urchins, New Zealand Screw Shell, New Zealand Sea Star, Japanese Kelp, European Fan Worm, European Shore Crab and the Northern Pacific Sea Star outcompete native species, reduce marine vegetation and result in urchin barrens.						Moderate		High	Very High	High	High
	Overabundant and range-shifting native fauna and introduced fauna including Little Raven, trout, Eastern Mosquitofish and Carp cause loss of fish assemblages and native bird species.				High			Moderate				

Threatening process	Threat agent(s) and impact	Dry Forest and Woodland	Wet Forest and Rainforest	Heathland	Riverine Forest and Woodland	Subalpine	Estuarine and Coastal Wetland	Coastal (including islands)	Intertidal Reef	Subtidal Reef	Soft Sediment	Water Column (pelagic)
Human disturbance and natural resource use	Legal and illegal natural resource extraction (e.g. mineral extraction, gravel, sand, firewood collection, logging, grazing licenses, hunting, fishing, bait collection) alters habitats, changes vegetation structure and composition, and reduces fish and invertebrate species populations.	High	Low	Low	Low	Moderate	Low	Low	Very High	Moderate	Low	Very High
	Habitat disturbance and degradation from legal and illegal recreation activities due to mountain biking, camping, motorbikes, 4WDs, off track walking, presence of humans or domestic animals e.g. dogs, horses, stock yards, hunting, prospecting/fossicking, major events/ functions and boating. Pollution can be caused by littering, recreation products such as fishing tackle, and noise.	High	Low	Low	High	Low	Moderate	High	Low	Low	Low	Low
Alterations to marine and coastal habitat	Changes to marine water quality caused by increased sea surface temperature, lower pH, changes/contamination of freshwater inputs from catchments result in ecosystem encroachment and habitat contraction.								High	Moderate	High	Moderate
	Marine pollution caused by vessel effluents, oil and chemical spills, ballast water, and plastics and netting from port and marina activities and commercial shipping and fishing impact ecosystem health.								High	Moderate	High	Moderate
	Sea level rise and increased severity and/or frequency of storm surge and wave action result in coastal erosion, altering habitat extent and type.							High	Low	Low	High	
Habitat fragmentation and disturbance	Habitat fragmentation and disturbance due to external sources (e.g. adjoining land use) which include inappropriate development, clearing, roads and tracks, strategic fuel breaks, levees and agriculture.	Low	Low	Low	Moderate	Low	Low	Low				

5.1 Inappropriate fire regimes and management

Threat description

Fire regimes

Fire is an important driver of ecosystem condition, with biodiversity and ecosystem health determined by the scale, intensity, frequency and timing of individual events and their pattern over longer timescales. Inappropriate fire regimes from bushfires pose a very high risk to Wet Forest and Rainforest, Heathland and Subalpine assets and a high risk for Dry Forest and Woodland and Riverine Forest and Woodland assets. Inappropriate planned burning regimes and associated fire management activities pose a very high risk to the health of the Dry Forest and Woodland asset, and a high risk to Heathland and Coastal assets. The threat of inappropriate fire regimes is widespread, affecting all parks that contain these assets.

The condition of the terrestrial assets in this landscape has been driven by the 2019/20 bushfires, and will likely continue to be impacted due to the high likelihood of recurrence in the next 15 years due to the effect of climate change on drivers such as drought and extreme weather events. Future climate projections predict an increasing prevalence of high fire risk conditions. Victoria is likely to experience longer fire seasons and, under a high emissions scenario, up to double the number of high fire danger days by 2050 (DELWP 2021c). The extent, frequency and severity of wildfires within this landscape is expected to increase with changing climate over the coming decades.

Increased fire frequency will reduce the persistence of fire-sensitive flora in the area, and repeat fires below the minimum Tolerable Fire Interval (TFI) for an ecosystem are likely to result in changes to the structure and composition of ecosystems and quality of habitat. This may include the loss of fire-sensitive overstorey species from closed rainforest communities or from coastal woodlands. High severity fire will increase the amount of canopy burnt, changing conditions for the growth of understorey plants and reducing cover available for fauna, as well as simplifying vegetation communities and reducing habitat connectivity.

Generally, fire will rarely burn into the damper ecosystems such as Wet Forest and Rainforest, Riverine Forest and Woodlands, and Estuarine and Coastal Wetland. However, bushfire in damp ecosystems may be increasingly likely due to the drying effects of climate change, as occurred under the extreme events of the 2019/20 bushfires. Reduction of riparian vegetation impacts water quality through sediment movement, instream coarse woody debris may be exposed during drought and burnt, and other key habitat features such as hollow bearing trees may be lost.

Fire can also be a contributing factor to the spread and impact of other biological threats in the landscape, and post-fire recovery of conservation assets is often hampered by pressures from additional threats such as weed invasion, terrestrial grazing and reduced water quality in freshwater and estuarine ecosystems. Fire may favour the expansion of exotic plant species such as Boneseed by triggering the germination of seed, or may facilitate the post-fire spread of pest species such as cats as habitat is opened up. Regenerating vegetation in the post-fire landscape may also be more susceptible to over-grazing, when both exotic and native fauna graze and browse heavily upon the remaining available vegetation and palatable new growth. In turn, this can reduce the capacity of fire-affected vegetation, habitat, and local populations of flora and fauna to recover. Native animals are also increasingly exposed to predators immediately post-fire where there is less shelter available until habitat recovers.

The 2019/20 bushfire season

In the summer of 2019/20, a bushfire of unprecedented extent and severity affected nearly 73% of the East Gippsland Parks Landscape. As of 2020, more than 80% of the landscape is considered to be below the minimum TFI of the vegetation present (Table 5.2). Large areas of East Gippsland therefore now comprise young or simple stands of vegetation and are missing mature growth to provide a balanced growth stage distribution, large trees and complex habitat.

Table 5.2 Area of each Conservation Asset currently below the minimum TFI.

Conservation Asset	Ecological Vegetation Division	Area burnt below TFI as of 2020	
		Hectares	Proportion
Subalpine	Alpine Treeless	31.9	60.7%
	High Altitude Shrubland/Woodland	2796.8	68.8%
Total		**2828.7**	**68.7%**
Coastal	Coastal	**2902.1**	**35.2%**
Dry Forest and Woodland	Foothills Forest	3364.1	90.9%
	Forby Forest	4179.7	62.8%
	Grassy/Heathy Dry Forest	84 359.6	90.1%
	Inland Plains Woodland	2.0	4.6%
	Ironbark/Box	528.0	100.0%
	Rocky Knoll	3431.9	56.8%
	Tall Mixed Forest	56 122.4	75.0%
Total		**151 987.7**	**82.0%**
Heathland	Heathland (sands)	**28 476.3**	**93.9%**
Riverine Forest and Woodland	Damp Scrub	5480.1	76.5%
	Riparian (higher rainfall)	4657.6	89.8%
Total		**10 137.7**	**82.1%**
Wet Forest and Rainforest	Closed-forest	3868.2	80.6%
	Moist Forest	76 172.4	93.6%
	Tall Mist Forest	36 999.5	86.6%
Total		**117 040.1**	**90.8%**
Estuarine and Coastal Wetland	Freshwater Wetland (ephemeral)	2.0	0.3%
	Freshwater Wetland (permanent)	268.1	24.8%
	Saline Wetland	165.6	13.8%
	Treed Swampy Wetland	28.0	100.0%
Total		463.7	15.0%
Grand Total		**313 836.3**	**83.7%**

A significant proportion of the area burnt in 2019/20 (12%) was burnt at very high severity (canopy burnt, > 20% canopy foliage consumed), which included 24 000 hectares of Dry Forest and Woodland and Wet Forest and Rainforest. While some level of canopy loss is normal, under current and future climate conditions, intense fire increasingly results in the mortality of fire-adapted resprouter species which maintain forest structure. Also, soil is being burnt at higher temperatures, with associated combustion and loss of soil carbon and other nutrients, and in extreme cases, fire may cause severe mineral alterations to the soil (SSA 2020).

Fire management activities

Fire management activities, such as creating track and control lines for planned burning and bushfire suppression and use of fire retardants, can damage habitat and sites of indigenous and European cultural heritage. Management vehicles can also introduce and spread pathogens such as Phytophthora and Myrtle Rust, as well as weeds. Using existing roads and tracks should limit the physical impacts of fire management, as well as the spread of pathogens and weeds.

Reintroduction of fire

While the reintroduction of fire to this landscape will prevent the simultaneous accumulation of fuel across large areas, it is also important to allow fire-affected ecosystems to recover. Fire management in the near future will have to balance asset protection, fuel accumulation, ecosystem stress, and the protection of unburnt refugia.

Threat objective(s)

By 2028, apply appropriate ecological fire regimes to fire-dependent ecosystems and exclude fire from Wet Forest and Rainforest and fire-sensitive high biodiversity value ecosystems. Reduce the negative impacts of other threats (e.g. weeds, pathogens, herbivores and predators) during and following fire.

This threat is addressed through the Conservation Strategy **6.1 Fire management for ecological health** and **6.8 Building climate resilience and refugia**.

5.2 Alterations to natural hydrology and reduced water quality

Threat description

The health of riparian, estuarine, freshwater and saline wetland systems, and all marine ecosystems is dependent on suitable hydrological regimes. These regimes include the rates with which water moves through watercourses, the timing, duration and frequency of flood events and the behaviour of coastal tides and ocean currents. Since European settlement, significant modifications to the watercourses, coast and lake systems of the East Gippsland Parks Landscape have changed the natural hydrology of freshwater and marine habitats. Low volume in water flow can reduce the connectivity of water systems across the landscape. Hydrological regimes are the primary driver of the composition and characteristics of the habitats they support. Changes in hydrology threaten the ecological integrity and values of these waterways, many of which are nationally significant.

Climate change impacts

Under future climate change predictions, south-east Victoria is likely to experience an increase in droughts, floods and other extreme weather events. This will result in overall drier conditions, particularly for wet forests and riparian systems, and will likely result in increased dieback, ecosystem transition or encroachment, algal blooms and habitat contraction. Water flow volume in river systems is likely to decrease, along with overall connectivity, reducing fish movement and the frequency of natural openings in estuaries with decreased freshwater input. Additionally, storm events can cause erosion and damage habitats, decreasing water quality. Coastal and estuarine environments will experience coastal erosion, altering habitat extent and type as storm surge frequency and intensity increases, exacerbated by sea level rise. Marine environments will experience increased sea surface temperatures, altered currents and changes to pH. Additionally, with the increase in frequency and intensity of fires, sediment, ash and fire retardant enter waterways, affecting water quality and impacting threatened fish and invertebrates.

Freshwater ecosystems

Although this landscape is comprised largely of contiguous public land, reduced water quality impacting aquatic ecosystems sometimes originates from private land. High rainfall events and storms may cause erosion and the washing of nutrients and sediments through the catchments and into waterways and wetlands, resulting in poor water quality further downstream in the Parks Victoria estate. Pollutants such

as biocides, fertilisers, oils, other chemicals and organic effluent originate from farmland and residential areas and spread via aquatic pathways such as waterways and drains upstream. Sediment also enters these ecosystems as a result of bushfires, storm events and erosion caused by historic clearing, urban developments and farming practices. Poor condition of waterways resulting from instream erosion, lack of riparian vegetation, and lack of wetlands to treat stormwater also contribute to sediment loads downstream. Erosion can also be caused by deer, horses and feral pigs pugging and wallowing in waterways.

Threats to waterways, such as introduced herbivores and the impacts of bushfires, can also affect aquatic fauna, including freshwater mussels which have an important role in maintaining ecosystem services in rivers. Threatened amphibian species are also at risk from the additional pressure of introduced herbivores and predators that seek out waterways as refugia after fire (DELWP 2022).

Marine and estuarine ecosystems

Water quality in marine environments is dependent on the level of nutrient loading and pollutants from terrestrial run-off entering via riparian freshwater ecosystems as well as the amount of sediment suspended in the water column. Nutrients enter via waterway discharge from catchments, seepage from unsewered townships, stormwater run-off from urban areas, and agricultural run-off. Sea level rise as a result of climate change can reduce the available area for coastal ecosystems to retreat and cause coastal erosion, adding to the stress of marine assets that experience increased turbidity.

Invasive freshwater fish

A compounding threat to East Gippsland's waterways is the presence of introduced fish species such as Carp and Brown Trout. While records generally show that Carp are not present east of the Snowy River, they are highly mobile and can spread quickly into new areas, as well as through release by humans, release of environmental water and flood events. Carp is listed as a 'noxious aquatic species' under the *Fisheries Act 1995* as they compete with native species for resources, increase turbidity through their foraging behaviour and destroy subaquatic vegetation that provides habitat for native species.

Trout are extremely widespread, occurring through many of the waterways of the East Gippsland Parks Landscape. Trout species prey on smaller fish, invertebrates and riverine frogs, including a number of threatened galaxiid species, mussels and crustaceans. Trout are not considered a noxious species and are often stocked in waterways for recreational fishing. As a result of the 2019/20 bushfires, trout became absent from some waterways in affected areas, and there remains interest from the community in restocking these waterways with trout for recreational purposes.

Other introduced fish species include Eastern Mosquitofish, which impacts amphibians and macroinvertebrates, and new and emerging pest species such as Oriental Weatherloach.

Threat objective(s)

By 2028, mitigate the impacts of altered hydrology and extreme weather events (flood, drought), and optimise freshwater or saltwater inputs to wetlands, improve water quality and restore natural hydrology and connectivity to freshwater, estuarine and marine habitats.

By 2028, reduce competition, predation and habitat degradation by invasive aquatic species.

This threat is addressed through the Conservation Strategy **6.2 Water management for conservation outcomes** and **6.8 Building climate resilience and refugia**.

5.3 Terrestrial weeds and pathogens

Threat description

Weeds and pathogens are a high threat to the terrestrial conservation assets in East Gippsland. Invasive plants are damaging to areas of native vegetation because they outcompete native plants, change vegetation structure and fire regimes, and alter ecosystem functions such as hydrological regimes and nutrient cycling. Many weeds colonise open or disturbed ground, which is created by vegetation removal, pest animal activity (such as herbivore movement), fire, and edge effects associated with vegetation fragmentation.

Diseases, fungi and parasites can affect the health of native species, reducing their ability to reproduce or survive. Threatened species with reduced and restricted populations due to other factors are particularly vulnerable to outbreaks of disease. Many invasive species are widespread across Australia and eradication is not feasible. Effective detection, monitoring and management of these species for asset protection is more feasible to limit their impacts.

Weed invasion

Weed material is dispersed by vectors including wind, water, vehicles, footwear, and animals (especially through bird droppings), and can escape from adjacent private properties. The source of these weeds may also be from established infestations on nearby land and close to townships, including home gardens, dumping of green waste in parks and reserves, and nurseries selling invasive plants. Detection of new infestations and broadscale control of weeds is challenging due to the extent and remoteness of much of the landscape, and access is likely to present a barrier to control, for example where infestations spread along remote river corridors.

Some conservation assets are more resilient to the invasion of weeds than others. For example, Estuarine and Coastal Wetland is made up of very specialised flora which can tolerate saline conditions that many invasive plants cannot survive, and Heathlands are resistant due to low nutrient levels. Conversely, the high rainfall and nutrient rich soils in wet forests and riparian areas provide ideal conditions for a wide range of weeds to invade. The threat of invasive plants is likely to have increased as a response to the widespread fire event in the 2019/20 season.

Wandering Tradescantia and Blackberry are highly invasive weeds that occur along riparian zones, and woody, transformative weeds such Boneseed and Bridal Creeper are changing the structure and function

of some parts of the Dry Forest and Woodland asset. Although weeds are found throughout Heathlands and Banksia Woodlands, the density is generally low. Weeds can be abundant in disturbed areas, but these infestations do not usually invade intact areas of vegetation. Weeds are a very high threat to the Coastal conservation asset, particularly in Cape Conran Coastal Park and Croajingolong National Park. Weeds such as African Boxthorn, Kikuyu Grass, Mirror Bush, Beach Daisy, Blue Periwinkle and White Arum-lily can become very dense in the understorey, significantly modifying the ecosystem.

Pathogens and diseases

Phytophthora dieback is caused by the pathogen *Phytophthora cinnamomi* (also called Cinnamon Fungus), an aggressive plant pathogen that affects the root systems of susceptible species, which can result in death. The fungus is spread on the shoes of hikers, on management and recreational vehicles and by animals moving through the landscape. For these reasons, effects of the fungus are often detected along tracks and roads. Heathy ecosystems are particularly affected by this fungus and it has spread throughout many coastal reserves across the landscape. The only effective technique to prevent the spread of the fungus is to restrict management activities and off-track access to remote areas (DEE 2018).

Myrtle rust affects trees and shrubs in the Myrtaceae family of plants which includes Australian natives like Bottle Brush, Tea Tree and Eucalypts. The fungus invades either via wounds on the outer bark or root contact with infected plants and causes deformed leaves, heavy defoliation of branches, reduced fertility, dieback, stunted growth, and plant death. This threat is exacerbated by damage caused during management activities (e.g. road and track construction and maintenance). A fungicide spray program can effectively reduce the levels of myrtle rust infection in plant nurseries and home gardens. However, this is not feasible for natural bushland settings, so it is critical to minimise the risk of its introduction or spread on items such as clothing, equipment, vehicles, machinery or plant material.

Chytrid fungus significantly impacts amphibian populations and is a widespread issue in this Parks Landscape. The fungus lives in water or soil and is thought to infect frogs when their skin comes into contact with water and soil that contains fungal spores, which can be easily spread through transport vectors such as shoes, equipment, pest animal species and even other frogs. The fungus has contributed to the decline and extinction of a number of Australian species including the endangered Growling Grass Frog. As with Phytophthora, the only effective technique to prevent spread is to restrict management activities and off-track access, and to maintain good hygiene when carrying out surveys in areas with susceptible frog species such as the Growling Grass Frog and Green and Golden Bell Frog.

All actions undertaken in this plan must consider the threat of disease and minimise the spread of pathogens by implementing a threat reduction approach to management activities such as fire management and roading works.

Threat objective(s)

By 2028, prevent the establishment of new and emerging weeds and pathogens, 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 Weed and pathogen control using a biosecurity approach**.

5.4 Competition and habitat degradation by herbivores

Threat description

Herbivores that graze and browse on native vegetation are a moderate threat to the terrestrial conservation assets, but impacts may be severe in certain locations or areas with delicate or rare EVCs. Overgrazing and browsing degrades vegetation by lowering native plant diversity, altering the structure, reducing the complexity of vegetation, contributing to loss of recruitment, and reducing habitat resilience to disturbance such as fire, all of which can have flow-on effects for fauna. Grazing can cause severe damage to populations of rare and threatened plants, notably threatened orchids such as the Maroon Leek-orchid and Leafless Tongue Orchid, as well as species that are highly palatable and preferred by grazers. Grazing animals are also known to cause erosion damage to cultural heritage sites, wetlands and waterways, contributing to soil loss and reducing soil quality.

Introduced herbivores

Sambar Deer and the less common Hog Deer are widespread throughout the East Gippsland Parks Landscape, impacting all the terrestrial assets as well as the Soft Sediment asset. Grazing, browsing and trampling by deer species causes major damage to native vegetation and they also degrade water quality of wetlands and waterways by pugging, excreting and wallowing in shallow waters. In coastal areas, they may also disturb and trample bird nesting sites. Sambar Deer are currently increasing their presence throughout Heathland areas of East Gippsland, and this increase has led to the creation of many new tracks which allow for the introduction and spread of other pest species into the area. Hog Deer are generally a coastal species, mostly confined to the Heathlands and Coastal areas of Ewing Morass and Cape Conran Coastal Park, and cause damage through rubbings and pugging of the marshlands. Other deer species, such as Fallow Deer, may be future threats to the East Gippsland landscape.

Feral pigs and goats can also be found in this landscape, mostly occurring in the Dry Forest and Woodland, Wet Forest and Rainforest, and Subalpine assets. Much like the introduced deer species, but in lower known densities, pigs and goats graze and trample native vegetation leading to severe damage and low plant diversity. While goats are not always present in large numbers, they can escape from farms and quickly establish, causing severe browsing damage and requiring extensive eradication effort. In some parks, pigs are a high priority for management despite their low numbers due to the presence of high biodiversity values and significant ecosystems such as Littoral Rainforest in sites that remained unburnt following the 2019/20 bushfires. Pigs appear to disperse quickly, sometimes along river corridors, and are

being detected 50-100 kilometres from known infestations. They also spread disease as they move through the landscape. Pigs, as omnivores, also have an impact as introduced predators.

Feral horses are a known threat to the critical habitats of many plants and animals and have been observed in Snowy River National Park, but are currently not widespread in the East Gippsland Parks Landscape. Specifically, small numbers of horses have been known to sporadically occur around the McKillops Bridge and Little River junction in Snowy River National Park. There is also a risk of future incursions of feral horses from the Nunniong State Forest into the Green Hills Nature Conservation Reserve, impacting significant natural values.

Feral cattle populations are few, generally arising when livestock from neighbouring farmlands escape and graze within the Parks Landscape. Some feral cattle are present in Mitchell River National Park.

The reduction in available habitat post fire concentrates pest animals into remnant areas of vegetation, where they occupy different ecological niches and negatively impact refugia in multiple ways. Erosion due to loss of stabilising vegetation is also a great concern, which is compounded by herbivore presence. In dry periods, access to fresh water increases pressure on water holes and freshwater systems.

Threat objective(s)

By 2028, reduce grazing, browsing and trampling impacts of native vegetation by deer, pigs, horses and goats at priority sites across the landscape.

This threat is addressed through the Conservation Strategy **6.4 Herbivore management**.

5.5 Terrestrial predation

Threat description

Predation due to European Foxes and stray or feral cats continues to cause decline in both the distribution and abundance of native fauna populations across the terrestrial conservation assets. Predation affects most small and medium-sized mammals, reptiles, amphibians and birds, exerting particular pressure on endangered species in the East Gippsland Parks Landscape such as Hooded Plovers, Southern Brown and Long-nosed Bandicoots and White-footed Dunnarts. Introduced predators can also spread unwanted weeds and pathogens.

Changes in the composition of native fauna populations can disrupt the function of food chains. Reduced numbers of native fauna 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.

During times of increased pressure, such as during or following drought, planned burning and bushfire, native animal populations can be very vulnerable to any additional threats such as predation. Bushfire and planned burning may decrease refuges for native fauna and increase access for predators, which may engage in prey switching post-fire. Interactions between fire and predation may be particularly acute for threatened native fauna or where large fires have burnt much or all of a park or reserve.

Predation is a major threat to the fauna dependent on the Coastal, Intertidal Reef and Soft Sediment conservation assets. Throughout these coastal areas across East Gippsland, predation by Black Rats and pet dogs (in addition to foxes and cats) causes decline in abundance of resident and migratory beach nesting shorebird species and may cause localised extirpation. Brown Rats and House Mice predate on bird eggs and nestlings on Gabo Island, which is recognised as an Important Bird and Biodiversity Area by BirdLife International, and an eradication strategy is currently being considered. Predation is the primary threat to the survival of heathland-dwelling small mammals such as Southern Brown Bandicoots, Long-nosed Potoroos and Smoky Mouse and in forest habitats, predators take animals including Long-footed Potoroos, Spot-tailed Quolls, White-footed Dunnarts, Southern Brown Bandicoots and Superb Lyrebirds.

In island habitats, the threat objective is eradication of predators and ongoing monitoring for re-incursion. On mainland areas, effective reduction of population densities relies on sufficient intensity and scale of control to reduce the impact on prey species and reduce the risk of reinvasion. Some predator control

programs on mainland areas are designed to focus on the protection of specific threatened species at a localised scale. However, as the East Gippsland Parks Landscape contains large contiguous areas of public land, it has been possible to apply a landscape-scale fox control program. Unfortunately, it has not been possible to achieve similar landscape-scale feral cat control programs due to challenges associated with current policy and legislation regulating feral cat control, the limited scope to control feral cats on private land and relatively limited knowledge and field experience in controlling feral cats in Victoria.

Dingos have a natural function as an apex predator, and there has been an increase in sightings of Dingo across the Coastal conservation asset since the 2019/20 bushfires. The roles of native predators such as Lace Monitors and birds of prey, as well as predators no longer present or in low numbers such as quolls, are poorly understood. Introduced predators are likely to modify the food chain and disrupt the behaviour of native predators. Building knowledge on both the role of native predators and the interactions between native and introduced predators will support the ongoing effective management of predation pressure and may aid the recovery of native predator species.

Threat objective(s)

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

This threat is addressed through the Conservation Strategy **6.5 Ongoing control of introduced predators**.

5.6 Marine pests and overabundant species

Threat description

Marine pests are a significant concern across Victoria's marine and coastal conservation assets; however, these are limited in East Gippsland due to a lack of recreational boating and commercial shipping movement compared with areas associated with commercial ports and high recreational boating.

There are limited known occurrences of introduced marine pests in the East Gippsland Parks Landscape, but these include the European Shore Crab and New Zealand Screw Shell which are both widespread. The impacts of these are not well understood. A number of marine pest species are present in adjacent waters, including the Gippsland Lakes and the warmer waters of the NSW coast.

Overabundant native marine species also behave like marine pests and impact marine habitats. Although sea urchins are native to many marine systems, the native Black-spined Urchin has become overabundant in eastern Victoria. They occur in densities that are altering the biomass of marine vegetation, causing denuded 'barrens' where they feed on seaweed. This significantly alters the ecosystem by limiting the food and cover available to some marine fauna, while also providing habitat opportunities for other species of marine fauna which would not usually occur at the site.

The current understanding of the relationship between the density of Black-spined Urchins and denudation of marine flora in Victoria is based on the population at Beware Reef MS, and other populations in NSW, but knowledge of the appropriate urchin density for different reef types remains unknown. A proxy, based on acceptable levels of density for the Purple Sea Urchin in the Port Philip Bay area can be used to determine levels of threat, maintenance and recovery requirements until more is known about the Black-spined Urchin. In Port Philip Bay, urchin densities of over eight per square metre are associated with the formation of urchin barrens, but as few as 3-4 per square metre is adequate in maintaining a barren once established (Graham et al. 2020). Urchin densities of less than two individuals per square metre are an indicative target density allowing for the re-establishment of subtidal vegetation.

Black-spined Urchin abundance and distribution is increasing due to the climate change-driven warming of ocean temperatures. The impacts of their grazing pressure are further compounded by the loss of kelp forests. These kelp forests play an important role in storing and sequestering carbon (Filbee-Dexter & Wernberg 2020), and release of carbon and increasing temperatures cause further loss of kelp.

Climate change impacts

Under future climate change predictions, increasing ocean temperatures will make marine protected areas more susceptible to invasive species by expanding their potential range. Due to the continuum of ocean current movement from the NSW coast, the marine parks of East Gippsland are likely to experience incursions of species from further north of the east coast as changing water temperatures facilitate their migration south. For example, the Gloomy Octopus is a top predator and may have cascading trophic impacts if it becomes widespread in Cape Howe Marine National Park.

Threat objective(s)

By 2028, monitor for, and where feasible, eradicate new and emerging marine pests, and reduce the density of Black-spined Urchins to improve the health of key ecological attributes of these systems.

This threat is addressed through the Conservation Strategy **6.6 Managing marine pests and overabundant species**.

5.7 Human disturbance (visitor impacts and natural resource use)

Threat description

The parks across the East Gippsland Parks Landscape provide excellent opportunities for nature-based recreation. Camping, fishing, hunting and driving are popular activities with both local and out of town tourists. Enjoyment of the parks must be balanced with conservation of plants and animals and the ecosystems they support, as both legal and illegal recreation can degrade natural and cultural assets.

Recreation

Motorised trail bike riding and four-wheel driving are widespread activities which are legal in designated areas. Riding and driving where it is prohibited causes damage to vegetation, soil crusts and sites of cultural significance, and disturbs wildlife. Mountain biking also causes damage in some areas.

Camping is popular in several areas along the East Gippsland coast. Cape Conran Coastal Park, Lake Tyers State Park and Croajingolong National Park in particular are subject to heavy visitor use in peak periods leading to impacts on vegetation and indigenous cultural sites in the narrow dune strip around campgrounds. Threats associated with camping include rubbish dumping, spread of weeds, firewood collection and escaped campfires becoming bushfires.

Another threat in coastal areas is off-leash dog walking on beaches. Unrestrained dogs disturb beach-nesting and wading birds, notably the vulnerable EPBC-listed Hooded Plover. High visitation and walking off-trail can also result in erosion and disturbance to coastal vegetation. Recreational watercrafts and diving cause similar disturbances in these areas, including damage to intertidal and subtidal reef habitats. Furthermore, rubbish and fishing gear that is not properly secured on watercrafts may wash up on the shoreline, creating litter on beaches.

Illegal Activity

Fishing and shellfish collection are not permitted in Marine National Parks or Marine Sanctuaries, which include Cape Howe, Point Hicks Marine National Parks and Beware Reef Marine Sanctuary. Fishing is permitted in areas adjacent to these marine protected areas (MPAs) but it is challenging to enforce penalties for overfishing and over collection, and these activities can still impact MPAs. Legal catch limits

and collection can potentially impact fish, shark and invertebrate populations, most notably in the Intertidal Reef and Water Column assets.

The Coastal asset is subject to moderate levels of illegal firewood removal which leads to loss of habitat and structural complexity. Off-track use and illegal track creation for motorbikes and 4WD are common in many parks particularly in the Dry Forest and Woodland and Subalpine conservation assets.

Illegal opening of waterways can cause fish kills and channel modification, as well as sedimentation and reduced water quality downstream.

Threat objective(s)

By 2028, effectively control the impacts visitors are having on the health of priority terrestrial conservation and cultural assets across the Parks Landscape.

By 2028, effectively control the impacts visitor are having on the health of priority marine conservation and cultural assets across the Parks Landscape.

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

Benedore River

Gabo Island

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 (version 1, DELWP 2021b) 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, the threshold (e.g. SMP 3) of cost-effectiveness is included. For example, 'SMP 3' indicates that a park contains areas of the top 3 values (or 98-100 on a scale of 0-100) of cost-effectiveness according to the SMP tool.

Where appropriate, adaptations to climate change have been considered in developing these strategies. These strategies will support the persistence of conservation assets in this 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, facilitating movement of communities or species, or maximising species persistence through managing in-situ or ex-situ refugia.

Strategies for this landscape have been developed considering a range of recognised climate adaptation strategies such as:

- **Ensuring connectivity** – such as ensuring connectivity of coastal vegetation by supporting the landward retreat of coast marsh.
- **Protecting key ecosystem features** – for example, protecting mangroves and seagrass beds which provide important fish nurseries and spawning areas.
- **Reducing non-climate stressors** – including controlling pest plants and animals which hinder the ability of ecosystems to withstand or adjust to changing climate.

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

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

Strategies prioritised and developed through this process are:

- Fire management for ecological health
- Supporting partnerships to address threats to water-dependent assets
- Weed and pathogen control using a biosecurity approach
- Herbivore management

- Ongoing control of introduced predators
- Managing marine pests and overabundant species
- Reducing the impacts of human disturbance
- Building climate resilience and refugia

Strategy description format

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

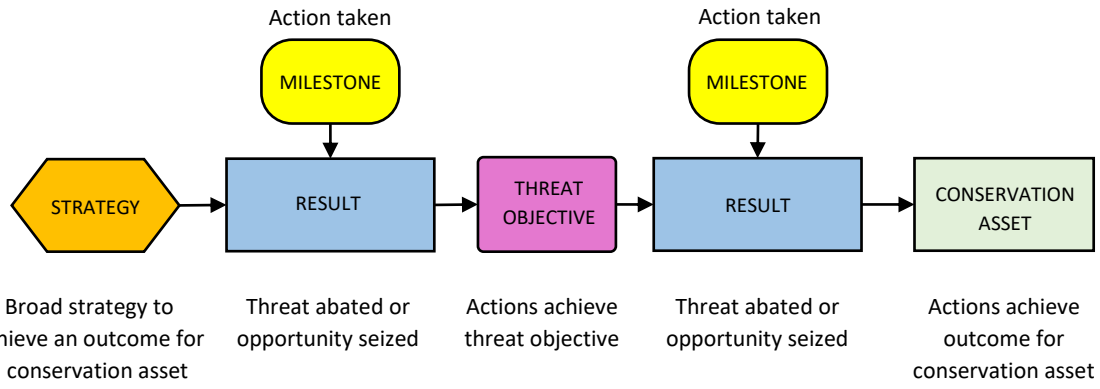
Conservation strategy

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

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

Results chain

Results chains have been developed for all conservation strategies. They express the relationship between the conservation strategy, identified threats and an improvement in the desired state of conservation assets, as well as the assumptions that underpin how we think a conservation strategy will contribute to maintaining one or more 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

This strategy aims to improve the ecological and cultural health of the East Gippsland Parks Landscape through managing bushfire and planned burning. Fire planning and management will be carried out in partnership with DEECA, and in consultation with the CFA, neighbours and the community. Cross tenure management is important to protect unburnt vegetation and reduce the severity of landscape-scale bushfires.

Parks Victoria will work with Traditional Owners to help implement cultural fire practices, where practical. For parks jointly managed with GLaWAC, this process will be informed by the GLaWAC Cultural Fire Strategy (GLaWAC 2021). 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.

It is important to acknowledge the impacts of the unprecedented 2019/20 bushfire season, and how this has changed fire planning and recovery approaches. The reintroduction of fire to a burnt landscape should take into account the cumulative effect of previous large fire events over the past 20 years.

Existing frameworks around managing planned fire, which include the Gippsland Bushfire Management Strategy and the Gippsland Joint Fuel Management Program (JFMP), give the highest priority to the protection of human life. The East Gippsland Conservation Action Plan strategy advocates for the protection of ecological values where these can be prioritised or traded off against other fire objectives, such as fuel management. The protection of human life is always the highest priority.

Fire management

Beyond asset protection zones, fire management programs will focus on maintaining vegetation within the appropriate fire regimes as defined by EVD requirements in the context of their fire history. As part of implementing an appropriate fire regime, Tolerable Fire Intervals (TFIs) will be used to measure fire frequency (return time) and vegetative growth stage analysis will measure spatial and temporal heterogeneity. The current approach for ‘return of fire’ in East Gippsland following the 2019/20 bushfires is to burn to prevent large areas of simultaneous fuel accumulation, sometimes despite vegetation not yet reaching minimum TFI. Parks Victoria will advocate for the return of fire in a manner that balances vegetation recovery in accordance with minimum TFI, especially in refuge vegetation, high value

ecosystems, important habitat for key species and other areas identified through potential future ecosystem resilience metrics.

Parks Victoria will develop a series of fire ecology strategies on selected high value, high risk or otherwise high priority landscape areas, in collaboration with DEECA and Traditional Owners. Priority areas will be identified by undertaking vulnerability assessments.

These fire ecology strategies will guide the implementation of Parks Victoria's approach to planned burning by identifying and mapping key refugia and high value vegetation and habitat, and in turn will inform future fire management plans and strategies such as Bushfire Management Strategies and Joint Fuel Management Programs. For fire-dependent ecosystems, such as Heathland and Dry Forest and Woodland, this will guide the implementation of appropriate ecological fire regimes. Planned burning should take into consideration total fire in the landscape and time since fire, to maintain and improve spatial and temporal heterogeneity, composition and structural diversity, and to improve habitat heath.

In areas such as Rainforest and Wet Forest, action will be taken to reduce the threat of bushfire and to avoid planned burns where possible. The retention of old growth vegetation in forest and woodland will be promoted by protecting old-growth areas from fire and identifying areas of mid growth stage to mature in the future.

Given the complexity of fire management in this landscape, the fire ecology strategies will need to carefully and explicitly define ecological fire objectives for East Gippsland, which will be guided by the following principles:

- Identify, map and avoid burning remaining areas of long unburnt vegetation in Dry Forest and Woodland and Wet Forest areas
- Improve the tools available to identify and prioritise high value species and habitats
- Protect priority species and ecological communities from impacts of planned burns and large-scale bushfires, including the potential use of planned burning for 'asset protection' for these nested assets
- Demonstrate evidence that there is a sufficient temporal and spatial buffer to high-value or previously burnt areas before organising planned burns
- Demonstrate evidence that there is sufficient suitable alternate habitat available that is accessible and recovered post-fire before reintroducing fire
- Provide on-ground evidence of habitat recolonisation post fire in addition to computer-based biodiversity assessment and values assessments before planned burning
- Plan and implement appropriate fire regimes in fire-dependent ecosystems
- Exclude fire from the Wet Forest and Rainforest conservation asset
- Increase the extent of long unburnt vegetation, particularly vegetation that has not recently breached its minimum TFI
- Balance burning recently burnt vegetation to reduce simultaneous fuel accumulation with allowing recovery to minimum TFI
- Monitor the effects of fire (both planned burning and bushfire) and subsequent post-fire recovery of flora and fauna, including interactions with and effects of other drivers and threats
- Minimise fire management activities in reference areas and other areas of high conservation significance
- Adhere to good hygiene protocols when undertaking fire management activities
- Undertake long-term landscape recovery programs with Traditional Owners following bushfire on Parks Victoria estate

An important element of this strategy is emphasis on the need to monitor, evaluate and report on planned burning to determine if and to what extent a burn has achieved ecological fire objectives. This adaptive management approach will mean that future burns can be planned to manage more effectively for ecological objectives, given the success or risks to success identified in previous burns. Parks Victoria will work with DEECA to bring an MER approach to fire management.

While decision making tools such as value inputs and values assessments using Species Recovery Overlays and High Value Ecological Areas provide some level of biodiversity value, they are limited to a handful of endangered but non-flagship species and generalised measures. Parks Victoria will identify landscape-scale values, paired with on-ground surveys to determine the priorities for protection of biodiversity values and any knowledge gaps through an environmental scan. Once key species, assets and habitats have been identified and assigned to an ecological outcome, this information can be made available to digital systems such as eMap and FireWeb to inform fire response and planning so that fire management can be proactive rather than reactive. It should be clear how to direct fire management or response activities to fulfil these objectives before, during and after bushfire.

When considering joint managed parks, Traditional Owners have identified that fire management is a priority for the following: Corringle Foreshore Reserve, New Guinea Caves II, Buchan Caves Reserve, Lake Tyers State Park, and Mitchell River National Park.

Fire recovery

Recovery activities after bushfire will be well-timed to support the rehabilitation of conservation assets and cultural sites. Monitoring and targeted research into fire effects and recovery will be an important component of fire recovery. As fires can trigger increases in weeds and pest animals, fire management will be carried out in conjunction with the strategies that address these threats.

Large proportions of the conservation assets within Snowy River National Park, Croajingolong National Park, Errinundra National Park, Coopracambra National Park and Cape Conran Coastal Park were affected by the 2019/20 bushfires. These areas should be a priority for ongoing fire recovery activities and monitoring of subsequent recovery of flora and fauna, including interactions of fire with, and effects of, other drivers and threats.

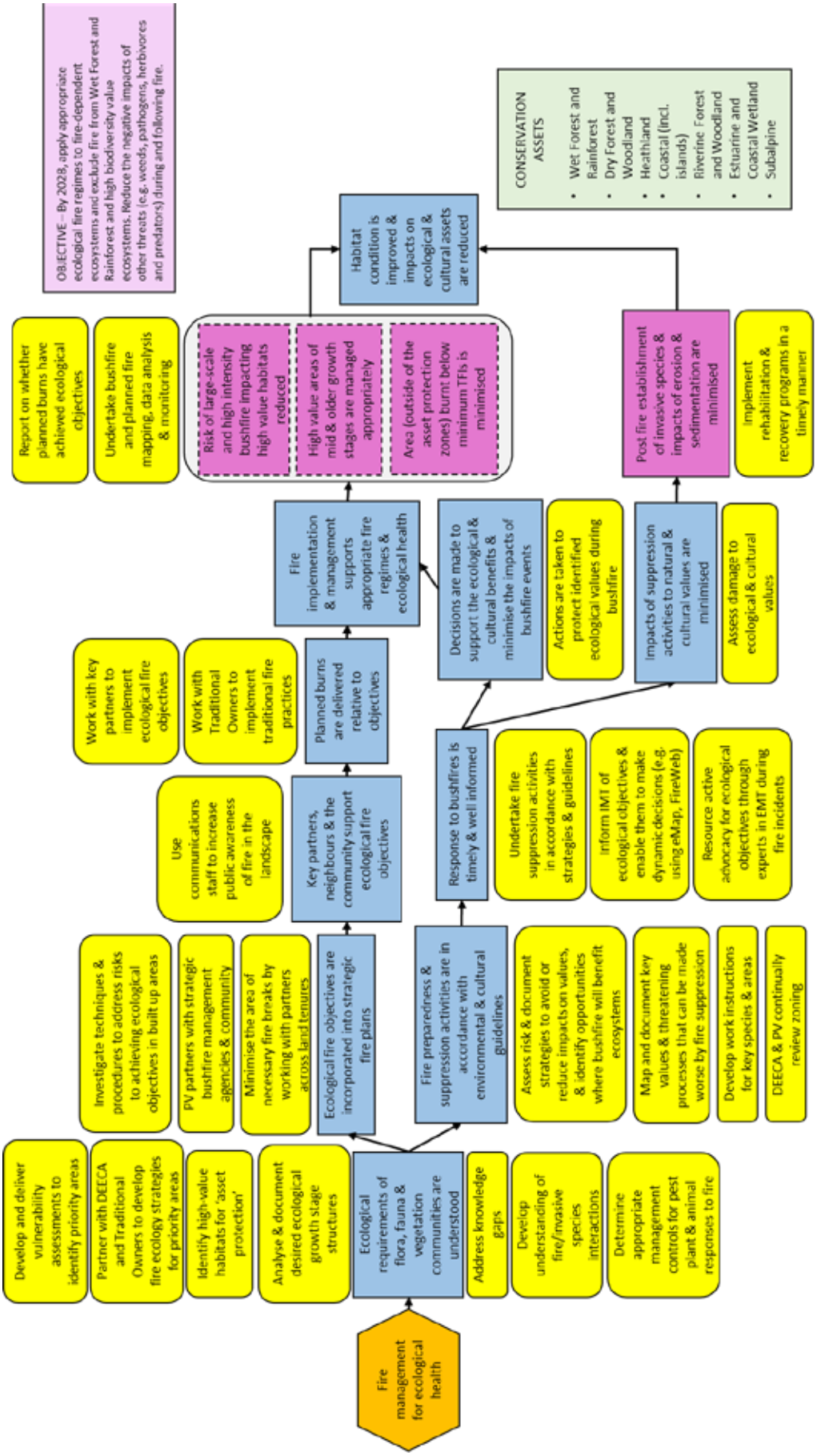
Conservation outcomes

Fire is excluded in high value, refuge, old growth and rainforest areas, and applied as necessary with appropriate monitoring and rehabilitation activities to fire-dependent ecosystems and to protect ecological values from future bushfires, improving habitat health, growth stage distribution and reducing the threat of pest plants and animals.

Strategy summary

With partners, fire ecology strategies are developed so that planned burns are conducted within an appropriate fire regime, improving habitat condition, increasing the extent of old and mid growth vegetation stages, protecting high value assets and areas from damage and facilitating adaptive management through post-fire monitoring and reporting. Park values are understood at a landscape scale to enable fire management and conservation needs to be met before, during and after bushfire.

Results chain



Implementation milestones

Result	Action
Ecological and cultural requirements of flora, fauna and vegetation communities are understood	• Develop and deliver vulnerability assessments to identify priority areas for fire ecology strategies • Partner with DEECA and Traditional Owners to develop fire ecology strategies for priority landscape areas • Work with Traditional Owners to determine where Parks Victoria's ecological objectives overlap with Traditional Owner cultural objectives • Identify high-value habitats for 'asset protection' including fire sensitive vegetation, critical habitat and wildlife refugia in priority areas • Analyse and document desired ecological growth stage structures • Address knowledge gaps to allow better implementation of sound, risk-mitigation based fire management, including ecosystem, habitat and species responses to fire • Develop understanding of fire/invasive species interactions • Determine appropriate management control for pest plant and 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 in built up areas • Parks Victoria partners with strategic bushfire management agencies and community • Minimise the area of necessary fire breaks by working with partners across land tenures
Key partners, neighbours and the community support ecological and cultural fire objectives	• Use communications staff to increase public awareness of fire in the landscape • In partnership with DEECA, CFA and Traditional Owners, engage with community about the purpose of ecological burns, what we are learning from them, how they help reduce the negative impacts of bushfires and the results

Planned burns are delivered in line with to objectives	• Work with key partners to implement ecological fire objectives
	  • Land and fire managers refer to fire ecology strategies to inform JFMP development and support decision on where and when and how to burn
	  • Ecological burns are scheduled, prioritised, resourced and implemented
	  • Consider and plan for potential post fire impacts (such as invasive species) during JFMP development and implementation
	• Work with Traditional Owners to implement traditional fire practices

Fire implementation and management supports appropriate fire regimes and ecological health	• Establish ongoing fire ecology monitoring plots in selected areas to measure ecosystem health and to assess and refine ecological fire regimes • Monitor the effects of non-burn fuel treatments
Fire preparedness and suppression activities are in accordance with environmental and cultural guidelines	• Assess risk and document strategies to avoid or reduce impacts in values, and identify opportunities where bushfire events will benefit ecosystems • Map and document key values and threatening processes that can be made worse by fire suppression

	• Develop work instructions for key species and areas • DEECA and Parks Victoria continually review zoning

Response to bushfires is timely and well informed	• Undertake fire suppression activities in accordance with strategies and guidelines
	• Inform IMT of ecological objectives and enable them to make dynamic decisions
	  • Ensure documented strategies are available to inform Incident Management Teams of ecological risks and objectives
	  • Use embedded systems such as eMap and FireWeb to inform IMT of ecological values
	• Resource active advocacy for ecological objectives through experts in EMT during fire incidents

Decisions are made to support the ecological and cultural benefits and minimise the impacts of bushfire events	• Actions are taken to protect identified ecological values during bushfire (e.g. translocate highly endangered isolated species) • Make local decisions that minimise impacts, such as placing mechanical breaks and fire retardants away from priority areas
Impacts of suppression activities to natural and cultural values are minimised	• Assess damage to ecological and cultural values

Risk of large scale and high intensity bushfire impacting high value habitats reduced
High value areas of mid and older growth stages are managed appropriately
Area (outside of the asset protection zones) burnt below minimum TFIs is minimised
	• Report on whether planned burns have achieved ecological objectives
	• Undertake bushfire and planned fire mapping, data analysis and monitoring
	  • Determine whether mitigations were effective
	  • Determine whether values were retained during the burn delivery
	  • Implement program level monitoring
	  • Use monitoring data to adapt management, to inform the most appropriate spatial and temporal growth stage distributions and ensure a continuous long-term supply of appropriately aged vegetation to support habitats, including sufficient high value areas of mid and older growth stages
	  • When competing objectives must be managed ensure that monitoring data supports the decision-making, e.g. some high value areas for threatened species may require active fire exclusion, contrary to risk-minimisation needs
	  • In the absence of monitoring data, other knowledge sources such as expert opinion or local knowledge may need to be used

Post fire establishment of invasive species and impacts of erosion and sedimentation are minimised	• Implement rehabilitation and recovery programs in a timely manner
	  • Ensure risks to impacted threatened species populations can be managed effectively, with assistance from partners
	  • Minimise post fire establishment or increase of established populations of invasive species and impacts of erosion and sedimentation

Habitat condition is improved and impacts on ecological and cultural assets are reduced	

6.2 Supporting partnerships to address threats to water-dependent assets

Water-dependent assets are marine and terrestrial systems that require permanent or periodic inundation to persist in the landscape, and are defined by connectivity and flow regimes that can include both periods of flow (provision of water) and periods of no flow (water withheld). The aim of this strategy is to improve the health of water-dependent assets by supporting partnerships and undertaking complementary actions to maximise the benefit of flows available to the environment. Increased health of these environments is likely to bolster the resilience of water-dependent assets and their ability to withstand climate change and extreme weather events.

Hydrology and connectivity

The water quality of the waterways in the East Gippsland Parks Landscape is relatively good, with low levels of nutrient and toxicant inputs from private land, as the majority of this landscape is comprised of public land. Most water quality impacts occur following fire, when sedimentation is high and fire retardant enters the river system. In addition to reduced water quality, altered hydrology and connectivity are the major risks to water-dependent assets. Upstream diversion of water compounded by a drying climate reduces waterway volume and connectivity between rivers, wetlands and estuaries.

Parks Victoria will work with the East Gippsland CMA, Traditional Owners and partners in identifying the water requirements for water-dependent assets and their priority locations across the landscape, and develop risk mitigation activities and complementary actions to maximise the outcomes of strategic water plans. This will involve engaging with the community on the impacts of nutrient and toxicant inputs to maintain current water quality levels, increase the quality of riparian vegetation through the control of pest plants and animals, and seeking opportunities to support Traditional Owners in achieving cultural flows with cultural and/or environmental benefits.

The Snowy River system contains multiple licensed levees, and there are three estuaries in the East Gippsland Parks Landscape that are manually opened by Parks Victoria under direction from the East Gippsland CMA. It is therefore important to use water management infrastructure to optimise flow regimes (either providing or withholding water) for rivers, estuaries and wetlands. Parks Victoria will work closely

with the CMA to ensure that the timing and release of water benefits aquatic values across the landscape, including managing the movement of pest fish.

Hydrological planning and assessment and riparian restoration will be a focus for the lower Snowy River, including Lake Curlip, Lake Corringle and Lake Watwat, which form a heavily regulated wetland system. Monitoring of water quality, volume and connectivity, as well as estuary condition, will be essential to evaluate the change in water inputs and the extent and quality of marine and freshwater habitats.

Managing introduced pest fish

Managing the threat of introduced fish will allow the regeneration of native aquatic flora and fauna species and improve water quality. Parks Victoria's general approach is to support and disseminate research on the impacts of introduced fish species on native species and ecosystems and work with partners to coordinate water management and other activities to minimise the impacts of pest species.

Parks Victoria will continue to support current research and partnerships to increase knowledge on effective Carp control techniques, which may include experimental exclusion plots and introducing barriers to movement, such as drying phases and effective water management. Future management of Carp may come under a national control plan, which would direct management of Carp in East Gippsland.

As trout are considered a recreational fishing species, a balanced management approach will be taken to reduce their impacts on native species while supporting the social and economic benefits valued by the community. Parks Victoria will engage with stakeholders to disseminate research and develop education campaigns about the impacts of trout on native species and advocate for the prevention of trout being stocked, released or reintroduced in high priority waterways upstream of the parks estate. Non-native fish species can only be released outside National and State Parks, Wilderness Parks, Natural Catchment Areas and Reference Areas, where there is also no risk to a threatened species or community (DEPI 2005).

Conservation outcomes

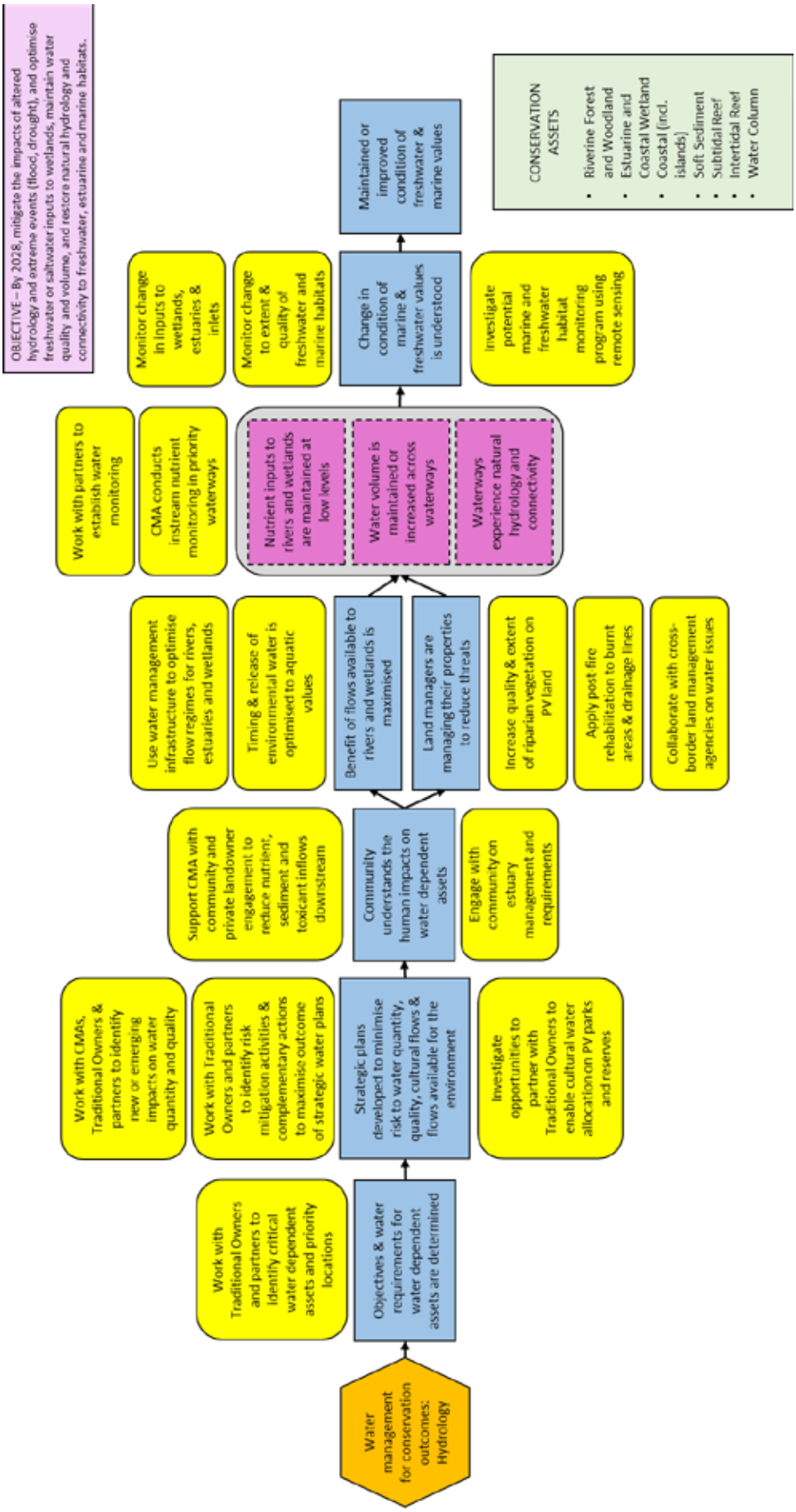
Improved flow and connectivity of river, wetland and estuary systems builds resilience in water-dependent assets. The impact of introduced fish on the habitat and native species of water-dependent assets is reduced, improving aquatic vegetation quality and native fish populations.

Strategy summary

Support partners to improve water-dependent assets by maintaining and improving hydrological regimes and connectivity, and implement best practice measures to reduce the impact of introduced fish on aquatic vegetation and prey species.

Results chains for this strategy have been developed separately for hydrology and pest fish.

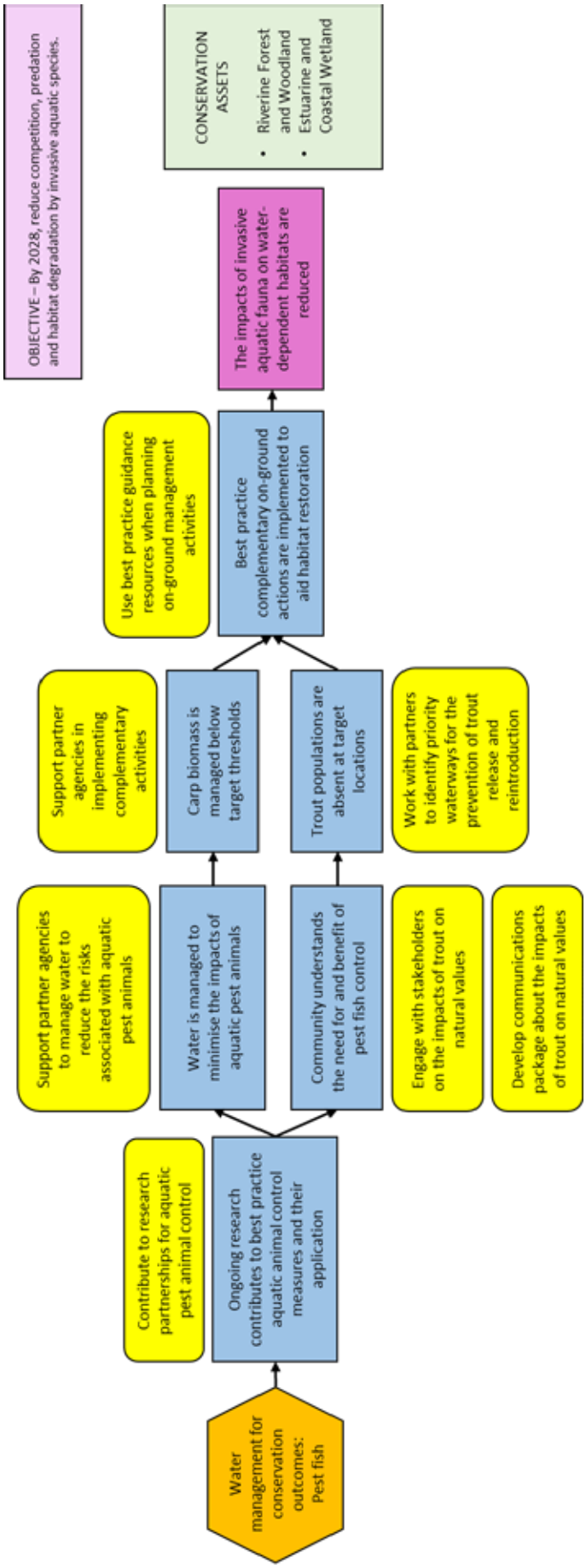
Results chain: Hydrology



Implementation milestones: Hydrology

Result	Action
Objectives and water requirements for water-dependent assets are determined	• Work with Traditional Owners and partners to identify critical water-dependent assets and priority locations
Strategic plans developed to minimise risk to water quantity, quality, cultural flows and flows available for the environment	• Work with CMA, Traditional Owners and partners to identify new or emerging impacts on water quantity and quality • Work with Traditional Owners and partners to identify risk mitigation activities and complementary actions to maximise outcome of strategic water plans • Work with Traditional Owner and CMA partners to investigate opportunities for enabling cultural water allocation on PV parks and reserves • Partner with Traditional Owners to nominate PV managed land as the land source for cultural water allocation where native title can't be used
Community understands the human impacts on water-dependent assets	• Support CMA with community and private landowner engagement to reduce nutrient, sediment and toxicant inflows downstream • Engage with community on estuary management and requirements
Benefit of flows available to rivers and wetlands is maximised	• Use water management infrastructures to optimise flow regimes for rivers, estuaries and wetlands • Timing and release of environmental water is optimised to aquatic values • Aquatic values include geomorphology of waterway channels, such as in-stream habitat
Land managers are managing their properties to reduce threats Cultural water is available for Traditional Owners	• Increase quality and extent of riparian vegetation on PV land • Increase habitat quality through pest plant and animal management activities
Water volume is maintained or increased across waterways Nutrient inputs to rivers and wetlands are maintained at low levels Waterways experience natural hydrology and connectivity	• Work with partners to establish water monitoring • CMA conducts instream nutrient monitoring in priority waterways
Change in condition of marine and freshwater values is understood	• Monitor change in inputs to wetlands, estuaries and inlets • Monitor change to extent and quality of freshwater and marine habitats • Investigate potential marine and freshwater habitat monitoring program using remote sensing
Maintained or improved condition of freshwater and marine values	

Results chain: Pest fish



Implementation milestones: Pest fish

Result	Action
Ongoing research contributes to best practice aquatic animal control measures and their application	• Contribute to research partnerships for aquatic pest animal control
Water is managed to minimise the impacts of aquatic pest animals	• Support partner agencies to manage water to reduce the risks associated with aquatic pest animals
Carp biomass is managed below target thresholds	• Support partner agencies in implementing complementary activities
Community understands the need for and benefit of pest fish control	• Engage with stakeholders on the impacts of trout on natural values • Develop communications package about the impacts of trout on natural values
Trout populations are absent at target locations	• Work with partners to identify priority waterways upstream of the parks estate for the prevention of trout release and reintroduction
Best practice complementary on-ground actions are implemented to aid habitat restoration	• Use best practice guidance resources when planning on-ground management activities
The impacts of invasive aquatic fauna on water-dependent habitats are reduced	

6.3 Weed and pathogen control using a biosecurity approach

This strategy provides a strategic framework for analysing and prioritising weed management at a Parks Landscape scale. It guides the management of weeds to reduce their spread, establishment and impact, and addresses the potential for pathogen spread through management activities. 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 East Gippsland Parks Landscape.

The strategy is guided by the overarching Invasive Plants and Animals Policy Framework (DPI 2010) that represents the Victorian Government's approach to managing existing and potential invasive species across Victoria. This framework sits within the context of the whole-of-government Biosecurity Strategy for Victoria (DPI 2009). Priorities for management have been determined using a methodology which aims to prioritise management of the highest risk species in the highest value parks. Table 6.2 lists priority weeds in parks that have been selected based on SMP weed management cost-effectiveness value, State of the Parks reporting, previous weed management activities, weed risk ratings and staff validation. The current priority for management is eradicating occurrences of new and emerging species which are eradicable and not yet well established. Where possible, weed control will be undertaken in partnership with the East Gippsland Catchment Management Authority, Traditional Owners, DEECA, local councils and neighbouring landholders.

It is important to note that weed species and priorities for management are likely to change over the next five years as recovery following the 2019/20 bushfires alters community composition. The current focus may be on weed species that have taken advantage of decreased canopy and competition post fire, outcompeting native species.

Level of infestation using the biosecurity approach

A biosecurity approach to weed management is a Victorian Government standard for identifying the threat of an invasive species and undertaking an assessment of its relative risk to determine an appropriate intervention. There are four general management responses to controlling weeds: prevention, eradication, containment and asset protection, and these terms have meanings that can be applied at different scales.

The management responses to weeds in this strategy are defined based on their current extent and the level of risk they present to conservation values at the park scale in East Gippsland. Described below are

the general management responses to weeds, the control objective of each response and the predominant examples of species in the East Gippsland Parks Landscape subject to each management response.

Prevention

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

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

Eradication of new and emerging weeds

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

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

This group includes species such as Cape Ivy in some coastal areas and White Arum-lily in riparian environments. It is important to recognise and follow reporting protocols for newly detected infestations, to ensure that management response is timely.

Containment

Containment is an ongoing maintenance approach to manage the spread of established weeds. Containment is used when a species is not considered feasibly eradicable in the short-medium term, however a strategy establishing containment lines and constricting the containment area over time may have a long-term eradication goal. Management tracks, ridgelines and other landscape features are useful in defining containment boundaries. This group includes Blackberry in dry, wet and riverine forested areas and Sea Spurge in coastal areas.

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.

In the East Gippsland Parks Landscape, remnant vegetation, locally rare species, endangered plants and communities such as Littoral Rainforest, heritage-listed rivers such as Mitchell River, and internationally botanically significant areas such as Mount Elizabeth are a significant priority for asset protection.

Weed species indicative of this group include Wandering Tradescantia in a number of parks and reserves and thistles in the Dry Forest and Woodland conservation asset. Because widespread control is not feasible, the objective for these species is to reduce their abundance and to prevent invasion into priority areas.

As many of the reserves in this landscape are large and remote, not all infestations are known. Annual surveillance in remote areas will be key in comprehensively managing this threat. Parks with known significant biodiversity values should be prioritised for weed surveillance and treatment.

Monitoring and collaboration

Monitoring sites will be set up at priority locations to ensure that weed control activities are effectively meeting conservation outcomes. Long-term monitoring programs will demonstrate the progress of weed control programs and justify their ongoing funding through communicated benefits.

Recently, the East Gippsland Far East Eden Strategy has been developed through the Biodiversity Bushfire Response and Recovery program to detect and control high risk weed species that threaten biodiversity values in accordance with *Biodiversity 2037* outcomes (DELWP 2017b). The Eden Strategy also contributes to the aim of the Weeds and Pests on Public Land program. The spatial scope of the Far East Eden Strategy contains the East Gippsland Parks Landscape, and Parks Victoria will work in collaboration with other land managers to deliver the Strategy in alignment with the priorities identified in the East Gippsland Parks Landscape strategy to manage weeds and pathogens. This approach also includes surveillance, control and monitoring of priority weed treatment areas.

When considering joint managed parks, Traditional Owners have identified that management of weeds is a priority for the following: New Guinea Caves II, Corringle Foreshore Reserve, Lake Tyers State Park, Mitchell River National Park and Buchan Caves Reserve.

Conservation outcomes

In partnership with neighbours and other agencies, priority areas are managed for high threat weeds and pathogens, protecting conservation assets from new and emerging weeds and maintaining or restoring vegetation structure and habitat quality.

Strategy summary

Weeds and pathogens are managed 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 value locations.

Table 6.2 Priority weed management for the East Gippsland Parks Landscape. SMP ratings (top 3, 10 or 20) are given for each park for the highest cost-effectiveness value for weed management within the park.

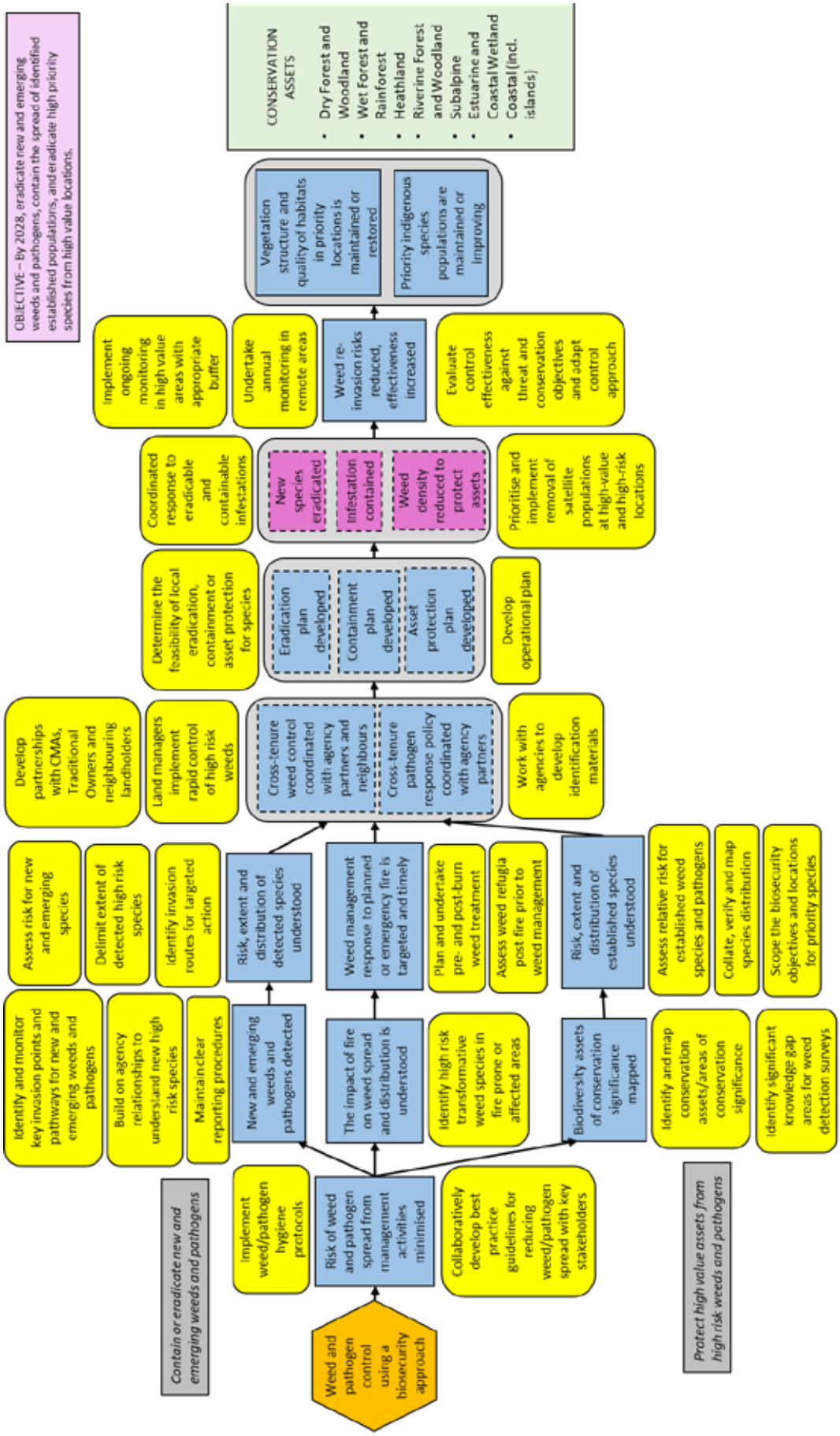
Location	Conservation Assets*	Control objective	Weed species
Alfred NP (SMP 20)	Wet Forest & Rainforest, Dry Forest & Woodland	Prevention	Taiwan Lily
		Eradication	Loquat
		Asset Protection	Blackberry
Brodribb FR (SMP 10)	Dry Forest & Woodland, Wet Forest & Rainforest, Riverine Forest & Woodland, Heathland	Asset Protection	Banana Passionfruit, Blackberry, Maseira Winter-cherry, Wandering Tradescantia
Buchan Caves Reserve† (SMP 20)	Dry Forest & Woodland	Asset Protection	Horehound, Thistle
Cann River BR (SMP 10)	Riverine Forest & Woodland	Asset Protection	White Arum-lily, Blackberry, Cape Ivy (Ivy Groundsel), Holly, Red-ink Weed, Scotch Thistle, Wandering Tradescantia, Willow
Cape Conran CP (SMP 3)	Dry Forest & Woodland, Riverine Forest & Woodland, Heathland, Coastal (incl. islands)	Prevention	Panic Veldt-grass
		Eradication	White Arum-lily
		Containment	Common Dipogon
		Asset Protection	Blackberry, Sea Spurge
Coopracambra NP (SMP 3)	Wet Forest & Rainforest, Dry Forest & Woodland, Riverine Forest & Woodland	Prevention	Japanese Honeysuckle, St John's Wort
		Eradication	Blue Periwinkle, Willow
		Containment	African Lovegrass, Common Soapwort, Fireweed, Radiata Pine, Sweet Briar, Viper's Bugloss
		Asset Protection	Blackberry, Red-ink Weed, Scotch Thistle, Wandering Tradescantia
Croajingolong NP (SMP 3)	Dry Forest & Woodland, Wet Forest & Rainforest, Heathland, Estuarine & Coastal Wetland, Riverine Forest & Woodland, Coastal (incl. islands)	Prevention	Madeira Vine
		Eradication	One-leaf Cape-tulip, Beach Daisy (Coast Capeweed), Tree Lupin
		Containment	Asparagus Fern, African Boxthorn, Black Nightshade, Blackberry, Blue Periwinkle, Boneseed, Bridal Creeper, Cape Gooseberry, Cape Ivy (Ivy Groundsel), Coastal Gladiolus, Common Dipogon, Fleabane, Mirror Bush, Scotch Thistle, White Arum-lily
		Asset Protection	Red-ink Weed, African Fireweed, Sea Spurge
Errinundra NP (SMP 10)	Wet Forest & Rainforest, Dry Forest & Woodland, Subalpine	Prevention	English Broom, Tutsan, Wandering Tradescantia
		Asset Protection	Blackberry, Scotch Thistle
Ewing Morass WR (SMP 3)	Dry Forest & Woodland, Riverine Forest & Woodland, Heathland, Coastal (incl. islands)	Containment	Thistle
		Asset Protection	Blackberry, Sea Spurge, Ragwort
Gabo Island LR (SMP 3)	Coastal (incl. islands)	Eradication	African Boxthorn, Mirror Bush
		Containment	Blackberry
		Asset Protection	Kikuyu, Thistle, Common Dipogon

Location	Conservation Assets*	Control objective	Weed species
Green Hills NCR (SMP 20)	Dry Forest & Woodland, Wet Forest & Rainforest	Asset Protection	Blackberry, Sweet Briar
Lake Corringle WR/ Corringle FR† (SMP 3)	Estuarine & Coastal Wetland, Coastal (incl. islands), Riverine Forest & Woodland	Eradication	White Arum-lily, Blue Periwinkle, Bridal Creeper, Cape Ivy (Ivy Groundsel), Common Dipogon, Sea Spurge, Wandering Tradescantia
		Containment	Blackberry
		Asset Protection	Kikuyu
Lake Curlip WR (SMP 3)	Riverine Forest & Woodland	Containment	Blackberry, Kikuyu
		Asset Protection	Blue Periwinkle
Lake Tyers SP† (SMP 3)	Dry Forest & Woodland, Riverine Forest & Woodland	Eradication	Boneseed, Ragwort
		Containment	African Boxthorn, Blackberry, Blue Periwinkle, Bridal Creeper, Cape Ivy (Ivy Groundsel), Scotch Thistle, Sea Spurge
		Asset Protection	Common Dipogon
Lind NP (SMP 10)	Wet Forest & Rainforest, Dry Forest & Woodland	Prevention	Flax-leaved Broom
		Containment	Blackberry
		Asset Protection	Thistle
Martins Creek NCR (SMP 20)	Dry Forest & Woodland, Wet Forest & Rainforest, Subalpine	Containment	Blackberry
		Asset Protection	Honeysuckle, Tutsan, Wandering Tradescantia
Mitchell River NP† (SMP 10)	Dry Forest & Woodland, Wet Forest & Rainforest	Prevention	Ox-eye Daisy
		Eradication	African Boxthorn, Cape Ivy (Ivy Groundsel), Chilean Cestrum, Willow
		Containment	Blue Periwinkle, Horehound, Ox-eye Daisy, Paterson's Curse, St John's Wort
		Asset Protection	Blackberry, Ragwort, Wandering Tradescantia
Mount Elizabeth NCR (SMP 10)	Dry Forest & Woodland, Wet Forest & Rainforest	Asset Protection	Blackberry, Blue Periwinkle, Cape Ivy (Ivy Groundsel), Wandering Tradescantia, White Poplar, White Willow
Mount Raymond RP (SMP 10)	Dry Forest & Woodland	Eradication	Blackberry
Point Hicks LR (SMP 3)	Coastal (incl. islands)	Eradication	Cape Wattle, One-leaf Cape-tulip, Spearmint
		Containment	African Boxthorn, Blackberry, Sea Spurge, White Arum-lily
Snowy River NP (SMP 3)	Dry Forest & Woodland, Wet Forest & Rainforest, Riverine Forest & Woodland, Subalpine	Containment	Basket Willow, Blue Periwinkle, Bugloss, St John's Wort
		Asset Protection	Bathurst Burr, Blackberry, Californian Poppy, Castor Oil Plant, Great Mullein, Hemlock, Paterson's Curse, Thorn-apple, Tutsan, Wandering Tradescantia, Willow

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

† Joint Managed Parks

Results chain



Implementation milestones

Result	Action

Risk of weed and pathogen spread from management activities is minimised	• Implement weed/pathogen 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/pathogen spread with key stakeholders

The impact of fire on weed spread and distribution is understood	• Identify high risk transformative weed species in fire prone or affected areas
Weed management response to planned or emergency fire is targeted and timely	• Plan and undertake pre- and post-burn weed treatment • Assess weeds as potential refugia post-fire prior to weed management
Contain or eradicate new and emerging weeds and pathogens	
New and emerging weeds and pathogens detected	• Identify and monitor key invasion points and pathways for new and emerging weeds and pathogens • Build on agency relationships to understand new high-risk species • Maintain clear reporting procedures • Determine and increase staff awareness on reporting pathways for new infestations based on weed classification
Risk, extent and distribution of detected new and emerging species understood	• Assess risk for new and emerging species • Delimit extent of detected high risk species • Identify invasion routes for targeted action
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 to determine treatment priorities • Identify significant knowledge gap areas for weed detection surveys
Risk, extent and distribution of established species understood	• Assess relative risk for established weed species and pathogens • Collate, verify and map species distribution • Scope the biosecurity objectives and locations for priority species • Coordinate management activities with existing biocontrol nursery sites to maintain biocontrol source populations and comparison control sites
Cross-tenure weed control coordinated with agency partners and neighbours Cross-tenure pathogen response policy coordinated with agency partners	• Develop partnerships with CMAs, Traditional Owners and neighbouring landholders • Land managers implement rapid control of high-risk weeds • Weed control is encouraged upstream along known river infestation routes • Work with agencies to develop identification materials
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 Infestation contained Weed density reduced to protect assets	• Coordinated response to eradicable and containable infestations • Prioritise and implement removal of satellite populations at high-value and high-risk locations

Result	Action
Weed re-invasion risks reduced, effectiveness of weed control increased	• Implement ongoing monitoring in high value areas with appropriate buffer • Undertake annual monitoring in remote 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 Herbivore management

The aim of herbivore management is to increase the health of habitats for native flora and fauna and the health of waterways in the Parks Landscape. A number of exotic grazing and browsing species will be managed concurrently to reduce competition with native animals and degradation to conservation and cultural assets.

Grazing and browsing management

The East Gippsland Parks Landscape contains many large and remote parks and reserves, and thus it is not feasible to control introduced grazing and browsing animals across the entire landscape. Following the 2019/20 bushfires, significant effort was undertaken to reduce the threat of herbivores to aid post-fire recovery in the landscape through both aerial and ground-based control methods. In the current environment, management activities should focus on maintaining herbivore control in line with the current program scope and identifying additional priority areas.

Significant areas of habitat that are being degraded by grazing, or associated impacts such as trampling and wallowing, will be identified and prioritised for herbivore control works. Parks and reserves that contain unburnt or remnant vegetation and high value species and ecosystems such as Littoral Rainforest are a focus for herbivore control (e.g. Lake Tyers State Park, Alfred National Park, Lind National Park, Mount Elizabeth Nature Conservation Reserve, Mount Stewart Nature Conservation Reserve). Priority areas may also include woodlands with heavily grazed shrub layers and sites with significant orchid populations. Habitat where new populations of introduced herbivores are establishing will also be targeted for control.

The greatest barrier to control is the accessibility of the landscape. The remoteness of the larger parks in this landscape makes access difficult and increases the cost of control operations. For example, poor mobile coverage reduces the ability to use remotely triggered traps for controlling pigs. This has led to an increasing reliance on aerial shooting for these areas. However, prioritising resources for aerial shooting reduces the capacity to use other control methods, so part of this strategy involves using a range of methods and trialing new methods. This includes building capacity in volunteer hunting programs for deer. eDNA techniques may also be useful in detecting pest species in less actively monitored or high value areas to respond rapidly to new incursions. For horses, monitoring for incursions should be regularly undertaken in areas adjacent to where feral horse populations are known to occur.

Initially, data will be collected about herbivore habitat use, movement patterns and understanding the source and sink populations to determine pathways used to enter parks. This information will be used to increase the effectiveness of herbivore control in significant areas and identify neighbours that Parks Victoria will partner with. In particular, there is a need for better understanding of seasonal movement and behaviour of pigs regarding their dispersal and distribution. Establishing base data for their population extent and undertaking ongoing monitoring across the landscape will inform future control. Pigs are a priority for control in Ewing Morass Wildlife Reserve, where they are having significant effects on aquatic systems. Sustained monitoring outside of identified infestations is critical, as pigs are often detected many kilometres from known infestations, including movement across the border from NSW.

A combination of integrated control methods will be used to control deer, pigs, horses and goats, including building community awareness of impacts, engaging volunteer hunters, using specialist contractors and targeting surveillance and control efforts to high conservation value areas. Ongoing monitoring is required, particularly in Mitchell River National Park, to determine the presence and spread of goats, which are mostly escapees from neighbouring properties.

When considering joint managed parks, Traditional Owners have identified that herbivore management is a priority for the following: Lake Tyers State Park, Mitchell River National Park, Corringle Foreshore Reserve and Buchan Caves Reserve.

Communication

Public cooperation is essential for successful herbivore management. Deer are considered valued game species by hunters but an unwanted pest by many landowners, so particular care must be taken when communicating the need for and benefits of deer management. Neighbouring landowners and other agencies will be consulted to determine the impact and behaviour of herbivore species. The logistics and rationale for control works will be communicated with relevant land managers, who will be encouraged to partner in the works. More broadly, the public will be made aware of the benefit of herbivore management and informed of restricted visitor access to areas where control is being carried out.

Conservation outcomes

Disturbance to vegetation through grazing, browsing and trampling is reduced across the landscape, allowing the improvement of ground storey flora and the persistence of orchids and other endangered species.

Strategy summary

Targeted monitoring and control of deer, pigs, horses and goats at priority sites through integrated control methods to achieve acceptable herbivore densities, and improve vegetation quality and intactness.

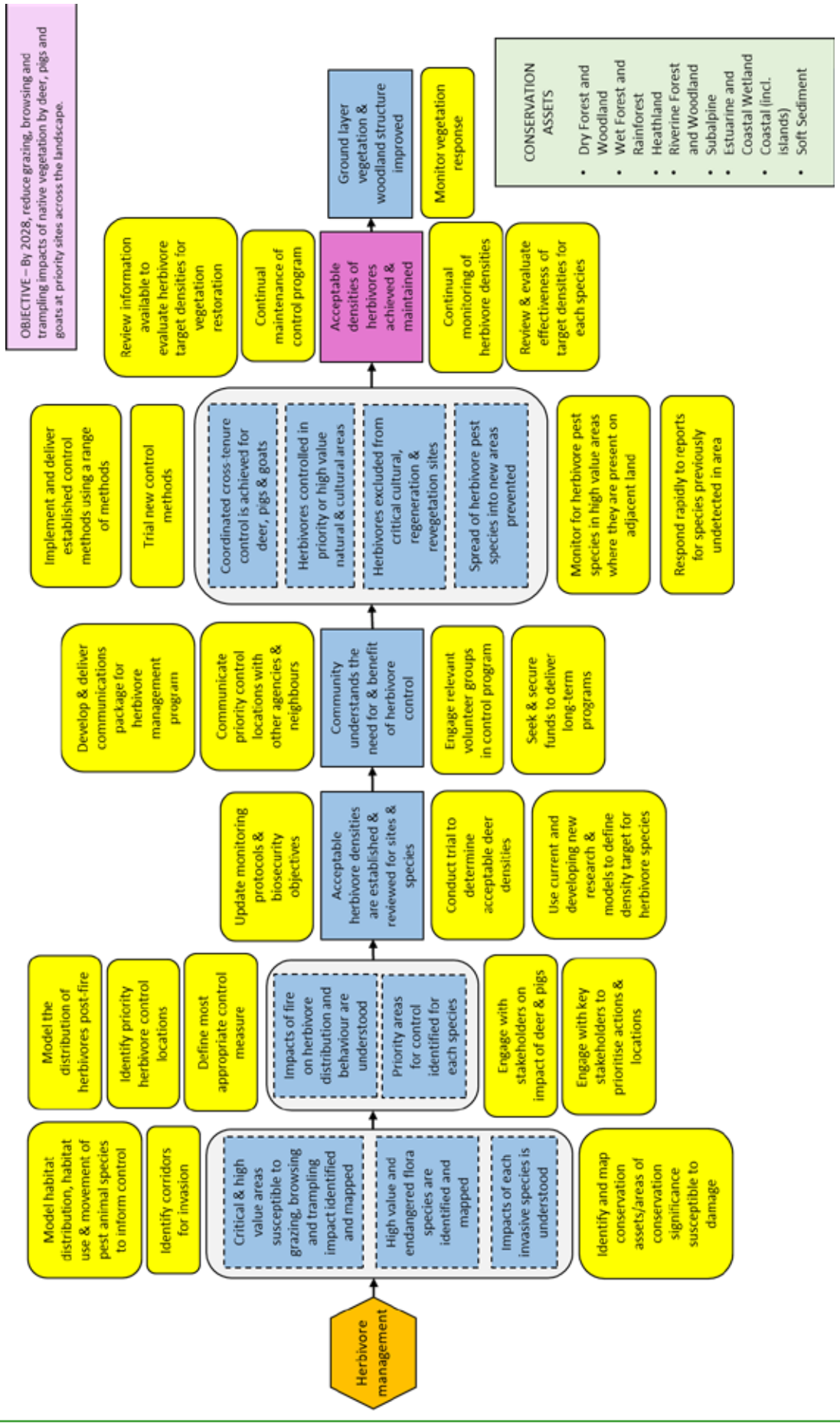
Table 6.3 Priority herbivore management for the East Gippsland Parks Landscape.

Target species	Conservation Assets*	Treatment type	Priority	Location
Deer	Dry Forest & Woodland, Wet Forest & Rainforest, Coastal, Subalpine, Riverine Forest & Woodland, Estuarine & Coastal Wetland, Heathland	Lethal control, volunteer hunting	SMP 3	Alfred NP, Cabbage Tree Creek FR, Cape Conran CP, Colquhoun RP, Coopracambra NP, Croajingolong NP, Errinundra NP, Ewing Morass WR, Gabo Island LR, Lake Curlip WR, Lake Tyers SP†, Lind NP, Mount Elizabeth NCR, Snowy River NP
			SMP 10	Lake Corringle WR, Mitchell River NP†, Mount Stewart NCR
			SMP 20	Buchan Caves Reserve†
			-	Marlo Coastal Reserve (Corringle Foreshore Reserve)†
Pigs	Dry Forest & Woodland, Wet Forest & Rainforest, Subalpine, Riverine Forest & Woodland, Estuarine & Coastal Wetland	Sustained monitoring, lethal control	SMP 3	Colquhoun RP, Coopracambra NP, Lake Tyers SP†, Snowy River NP, Tara Range Park
			SMP 10	Croajingolong NP
			-	Deddick River SR, Errinundra NP, Ewing Morass WR, Goodwin Creek WR, Mount Stewart NCR
Goats	Dry Forest & Woodland	Sustained monitoring, community management	SMP 3	Snowy River NP
			SMP 10	Colquhoun RP
			-	Mitchell River NP†
Horses	Dry Forest & Woodland	Sustained monitoring, lethal control	SMP 3	Snowy River NP
			-	Mount Stewart NCR

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

† Joint Managed Parks

Results chain



Implementation milestones

Result	Action
Distribution of critical and high value areas susceptible to grazing, browsing and trampling impacts are understood Distribution of high value and endangered flora species are understood Impacts of each invasive species is understood	• Model the habitat distribution, habitat use and movement of pest animal species to inform control • Improve understanding of pig movement and distribution • Identify corridors for invasion • Identify and map conservation assets/areas of conservation significance susceptible to damage from introduced herbivores, including Littoral Rainforest to determine treatment priorities
Impacts of fire on herbivore distribution and behaviour are understood Priority areas for control are known for each species	• Model the distribution of herbivores post-fire • Identify priority herbivore control locations • Define the most appropriate control measures • Engage with stakeholders on the impacts of deer and pigs
Acceptable herbivore densities are determined for sites and species	• Update monitoring protocols and biosecurity objectives • Conduct trials to determine acceptable deer densities • Use current and developing new research and models to define density targets for herbivore species
Community understands the need for and the benefit of herbivore control	• Develop and deliver a communications package for herbivore management program • Communicate priority control locations with other agencies and neighbours • Engage relevant volunteer groups in control program • Seek and secure funds to deliver long-term programs
Coordinated cross-tenure control is achieved for deer, pigs and goats Herbivores are controlled in priority or high value natural and cultural areas Herbivores are excluded from critical cultural, regeneration and revegetation sites The spread of herbivore pest species into new areas is prevented	• Implement and deliver established control methods using a range of methods • Trial new control methods • Monitor for herbivore pest species on high value areas where they are present on adjacent land • Respond rapidly to reports of species previously undetected in an area
Acceptable densities of herbivores are achieved and maintained	• Review information available to evaluate herbivore target densities for vegetation restoration • Continual maintenance of control program • Continual monitoring of herbivore densities • Review and evaluate the effectiveness of target densities for each species
Ground layer vegetation and woodland structure is improved	• Monitor vegetation response

6.5 Ongoing control of introduced predators

The ongoing control of introduced predators will support vulnerable native animal species to persist, increase in numbers and recolonize suitable habitat in the East Gippsland Parks Landscape.

Predator control

This strategy provides direction for ongoing control of introduced predators based on predation-sensitive values, which continues the work of the current Southern Ark fox control program and may broaden the scope of management beyond its current footprint. The existing Southern Ark program covers one million hectares of public land east of the Snowy River and has been running since 2005. It has so far been very successful at reducing fox numbers to very low levels. However, it but may have resulted in an increase in feral cat numbers due to lack of competition and areas outside the program scope may have experienced increased fox activity. Following the 2019/20 bushfires, the program was expanded by over 106 000 hectares, including Colquhoun Regional Park to reduce the compounding pressure of predation on native prey species that had survived the fires. Fox occupancy was not affected by fire severity across the program footprint, but Long-footed Potoroo site occupancy dropped when foxes were also present (Robley et al. 2022).

The focus of this strategy is to determine gaps in the existing program and how best to expand its footprint, such as using river corridors to expand access into remote areas not accessible by tracks, or using existing aerial monitoring programs to identify areas of concern with sighting data assisting the mapping of fox distributions. In order to identify gaps in priority locations, species records, surveys and habitat suitability models will be used to prioritise locations that are not currently part of the program, such as those containing vulnerable native species (e.g. Hooded Plovers, Southern Brown Bandicoots, Long-nosed Bandicoots, White-footed Dunnarts and a range of reptile and amphibian species). This includes identifying additional refugia and remnant vegetation, including weed species, where vegetation recovery post fire in 2019/20 is slow or has suffered compounding threats (e.g. herbivore density increasing in remnant patches). Threatened species may have moved into more remote areas of refugia post fire, so updated mapping of refugia to target areas of high value is crucial. Predator control will target areas with populations of vulnerable species or suitable habitat that is currently unoccupied due to high predation pressure.

Control programs aimed at reducing numbers of one predator species are often associated with increasing numbers of another predator. Integrated control of key predator species needs to be carried out to support populations of prey species. Unfortunately, control of feral cats remains an ongoing issue, made complicated by policy and legislative regulation, limited effectiveness and non-specificity of baiting and trapping, and the risk of bait being taken by dingoes, Lace Monitors and quolls, or dogs and housecats if placed near human settlements.

The ecological roles of wild dogs and dingoes are not well understood, and control of canines is typically undertaken for the purpose of livestock protection. The exception is Snowy River National Park, including the Little River Gorge, where wild dogs have previously been controlled to protect the endangered Brush-tailed Rock Wallaby. Recently, control of wild dogs here has been scaled back to protect dingoes. It will be necessary to undertake further research into the impacts of these predators and the relative importance of the ecological values of dingoes.

Black rats are having a significant effect on coastal environments, but can only be controlled effectively on islands. An eradication strategy has been outlined for Gabo Island involving aerial baiting, but is dependent on managing factors such as the cattle also present. Feral pigs can also have a role as introduced predators but the control of feral pigs has been considered with other introduced herbivore species in section 6.4.

To achieve an effective reduction in introduced predators, control will be carried out with joint management partners and other agencies, and neighbouring landowners beyond park and reserve boundaries. This will be dependent on a strong community awareness approach to facilitate good neighbour programs.

Although a significant threat, predators are not the only cause of declines in prey species. The strategy will be implemented in close conjunction with other strategies that aim to improve the quality and extent of available habitat for fauna (fire management, managing grazing and browsing animals and identifying refugia). Predator control needs to be integrated with planned burning and bushfire recovery, as reduced availability of refuges for native fauna, increased access for predators, and prey-switching may occur.

Monitoring and research

To better understand the ecological roles of wild dogs, dingoes and other native predators such as quolls, birds of prey and Lace Monitors, Parks Victoria will seek to support research investigating the roles native predators play in the healthy functioning of the East Gippsland Parks Landscape, and the interaction of wild dog presence on mid-range mammal densities. Native bird species are also a predation threat to endangered bird species, such as Australian Ravens which predate on Hooded Plovers, and Silver Gulls which predate on Little Terns and Fairy Terns. The extent and impact of this predation and possible solutions need to be investigated.

Parks Victoria will also seek the support of key agencies to develop alternative approaches to feral cat control, which may include a trial program of targeted cat control in remote areas, such as Croajingolong National Park, Cape Conran Coastal Park and the Little River Gorge in Snowy River National Park. Further cat management in areas close to human habitation will need to be paired with public and community education.

To evaluate the success of predator control, a number of native prey species will be selected and monitored as indicators of predation pressure, both inside and outside of the management area. High biodiversity, high value reserves such as Mount Stewart Nature Conservation Reserve and Green Hills Nature Conservation Reserve are currently believed to have a low density of foxes, but require ongoing monitoring to manage incursions. The presence and activity of introduced predators will also be monitored and control programs adapted accordingly.

If predation pressure is sufficiently reduced and other causes of species decline are understood and manageable, Parks Victoria will investigate the option of reintroducing locally extinct or endangered species, as wildlife corridors that currently remain will be insufficient to facilitate natural recolonisation.

When considering joint managed parks, Traditional Owners have identified that management of introduced predators is a priority for the following: Lake Tyers State Park and Mitchell River National Park.

Conservation outcomes

Predation pressure by introduced predators is reduced and populations of native species persist or increase in abundance in suitable habitat.

Strategy summary

Targeted control in high value locations to reduce predation pressure from foxes and monitoring of adjacent locations for future incursions of foxes and cats to support the persistence of key predation-sensitive species.

Table 6.4 Priority predator management in the East Gippsland Parks Landscape.

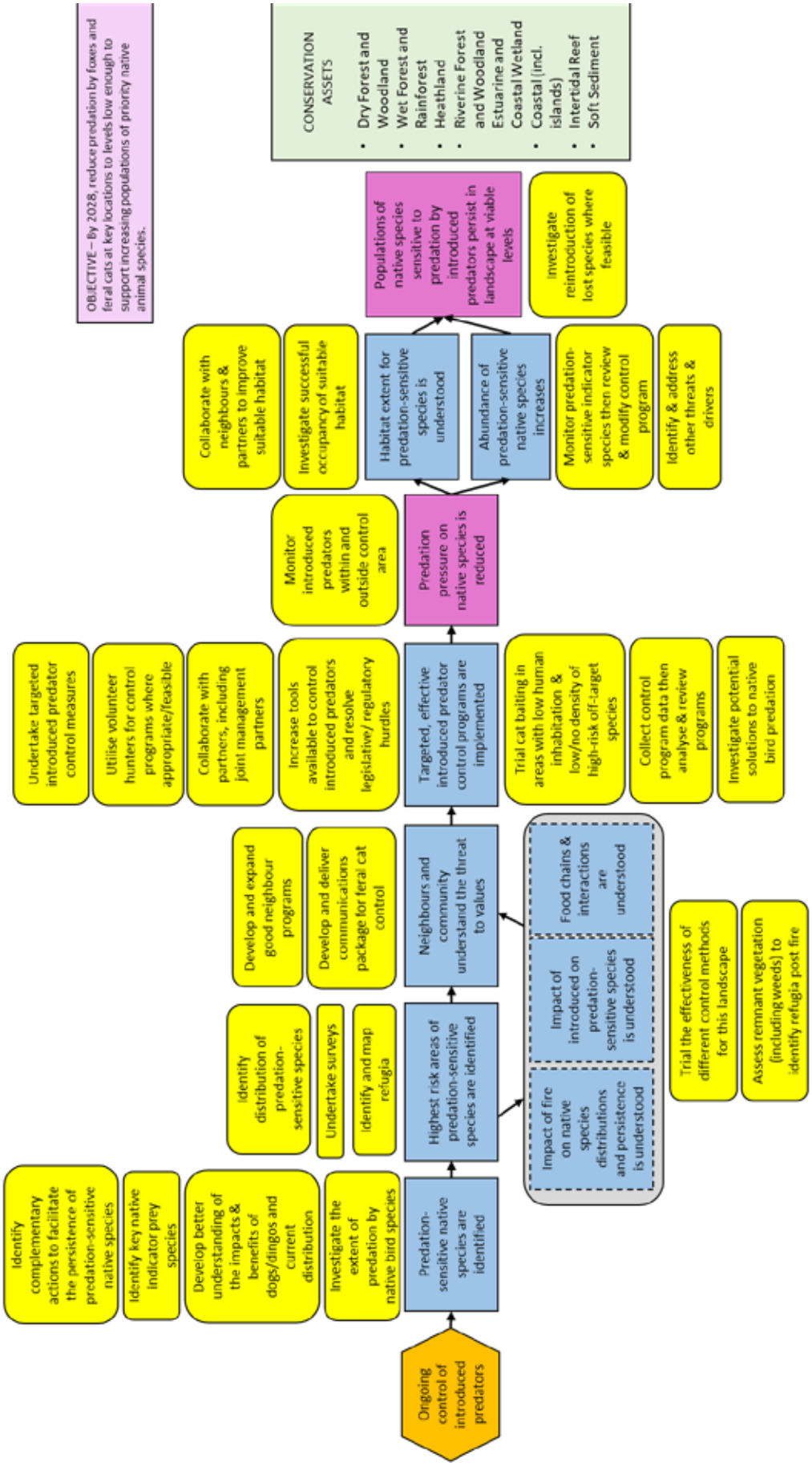
Target species	Control actions	Conservation Assets*	Priority	Locations
Fox	Lethal control, sustained monitoring	Soft Sediment, Intertidal Reef, Wet Forest & Rainforest, Coastal, Dry Forest & Woodland, Riverine Forest & Woodland, Estuarine & Coastal Wetland, Heathland	SMP 3	Alfred NP**, Cabbage Tree Creek FR**, Cape Conran CP**, Croajingolong NP**, Ewing Morass WR**, Lake Tyers SP†
			SMP 10	Brodribb FR**, Colquhoun RP, Coopracambra NP**, Errinundra NP**, Lind NP**, Martins Creek NCR**, Snowy River NP**
			SMP 20	Mitchell River NP†, Green Hills NCR
			-	Mount Stewart NCR, Lakes Entrance – Lake Tyers CR (Red Bluff)
Cat	Baiting trial	Wet Forest & Rainforest, Coastal, Dry Forest & Woodland, Riverine Forest & Woodland, Estuarine & Coastal Wetland, Heathland	SMP 3	Croajingolong NP, Cape Conran CP
Black rat	Lethal control, sustained monitoring	Soft Sediment, Intertidal Reef, Coastal	NA	Gabo Island LR
Dog	Surveillance	Wet Forest & Rainforest	NA	Snowy River NP

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

** Parks currently covered under the Southern Ark program managed by Parks Victoria

† Joint Managed Parks

Results chain



Implementation milestones

Result	Action
Predation-sensitive native species are identified	• Identify key native indicator prey species • Identify complementary actions to facilitate the persistence of predation-sensitive native species (e.g. habitat restoration) • Develop better understanding of the impacts and benefits of dogs and dingoes and their current distribution • Investigate extent of predation by native bird species such as ravens and gulls on endangered bird species
Highest risk areas of predation-sensitive species are identified	• Identify the distribution of predation-sensitive species • Undertake surveys • Identify and map refugia
Impact of fire on native species distribution and persistence is 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 • Assess remnant vegetation (including weeds) to identify refugia post fire
Neighbours and community understand the threat to values	• Develop and expand good neighbour programs • Develop and deliver a communications package for feral cat control
Introduced predator control programs are targeted and effective	• Undertake targeted predator control measures • Utilise volunteer hunters for control programs where appropriate/feasible • Collaborate with partners, including joint management partners • Increase the tools available to control introduced predators and resolve legislative/regulatory hurdles • Trial cat baiting in areas with low human inhabitation and low density or absence of native high-risk off-target species • Collect control program data, then analyse and review programs • Investigate potential solutions to native bird predation
Predation pressure on native species is reduced	• Monitor introduced predators within and outside control area
Habitat extent for predation-sensitive species is understood	• Collaborate with neighbours and partners to improve suitable habitat • Investigate successful occupancy of suitable habitat
Abundance of predation-sensitive species increases	• 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 where feasible, assuming sufficient reduction in predation pressure and other factors causing decline

6.6 Managing marine pests and overabundant species

The aim of marine pest and overabundant species management is to increase the health of marine habitats for native species. A number of invasive and range-shifting species will be managed to reduce predation of and competition with native species and degradation of conservation assets, with a focus on the ongoing issue of overabundant urchins.

Preventing and managing new infestations

Because marine invasive species can arrive in new areas on the hulls of boats and fishing equipment, and in the bilge and ballast water of larger vessels, increasing public awareness of marine pests and good boat and equipment hygiene practices is essential. Parks Victoria will work with partner agencies to support the promotion of boat hygiene regulations, and will assist in the development or review of regulations to prevent the spread of pests. Continuing to work with partners to ensure that ballast water is not discharged in priority areas will also result in a decrease in the likelihood of the establishment of new marine pest populations.

Continual monitoring of the marine environment is required to identify and respond to new outbreaks of marine pests before they become established. A number of pest species are known to occur in the Gippsland Lakes and monitoring in the Beware Reef Marine Sanctuary should be informed by these potential threat species. Similarly, incursions of pest species may come from the coast of NSW, particularly as warm waters driven by ocean currents from NSW facilitate migration into Victoria. Monitoring and surveillance in Cape Howe Marine National Park will be critical to identify incursions early and respond rapidly before marine pests become established. Parks Victoria will work with partners to carry out surveillance for marine pests. Sufficient sites will be identified in order to establish a strong monitoring program that is likely to detect new infestations from both suspected invasive species and unknown exotic species. Rapid Health Assessments in marine protected areas will increase marine pest distribution data.

Managing existing infestations

Once established, pest populations are very difficult to reduce or eliminate, and the same is true of the overabundant native Black-spined Urchin. The priority for managing marine pests is to contain existing populations or manage their impacts on assets. Understanding the current distribution of these species is essential for planning and implementing management for containment and asset protection. Increased

community awareness of marine pests will also allow members of the public to report sightings of marine pest species, adding spatial distribution data.

In areas where overabundant marine species act like marine pests, such as the Black-spined Urchin in Cape Howe Marine National Park, adaptive management programs will be undertaken with the aim of developing long term strategies to protect habitats. Further research is required to determine to what extent urchin barrens are a natural part of the ecosystem, which may be true for some reefs based on research undertaken in NSW, and may apply to reefs in Cape Howe Marine National Park. While it remains feasible to control urchins across Beware Reef Marine Sanctuary, the size and depth of Cape Howe Marine National Park makes control difficult. Parks Victoria will develop a decision pathway tool for assessing the feasibility and desirability of urchin control in specific parks or areas, and, if desired, the best course of action for urchin management based on extent and density of urchin populations and the condition of reef habitat. Targeted monitoring programs will assess the impacts of existing populations and management will be carried out where the decision pathway tool determines it is desirable and feasible to do so.

It is anticipated that Traditional Owners will be involved in the management of coastal areas and Sea Country, and indigenous marine rangers will be involved in management actions to control marine pest species.

Conservation outcomes

New infestations of marine pests are reduced, and marine pests have a minimal impact on marine ecosystems in marine protected areas. Existing incursion of marine pests and overabundant native species are managed, where feasible and appropriate, to minimise impacts so that native marine species recolonise and marine diversity is maximised.

Strategy summary

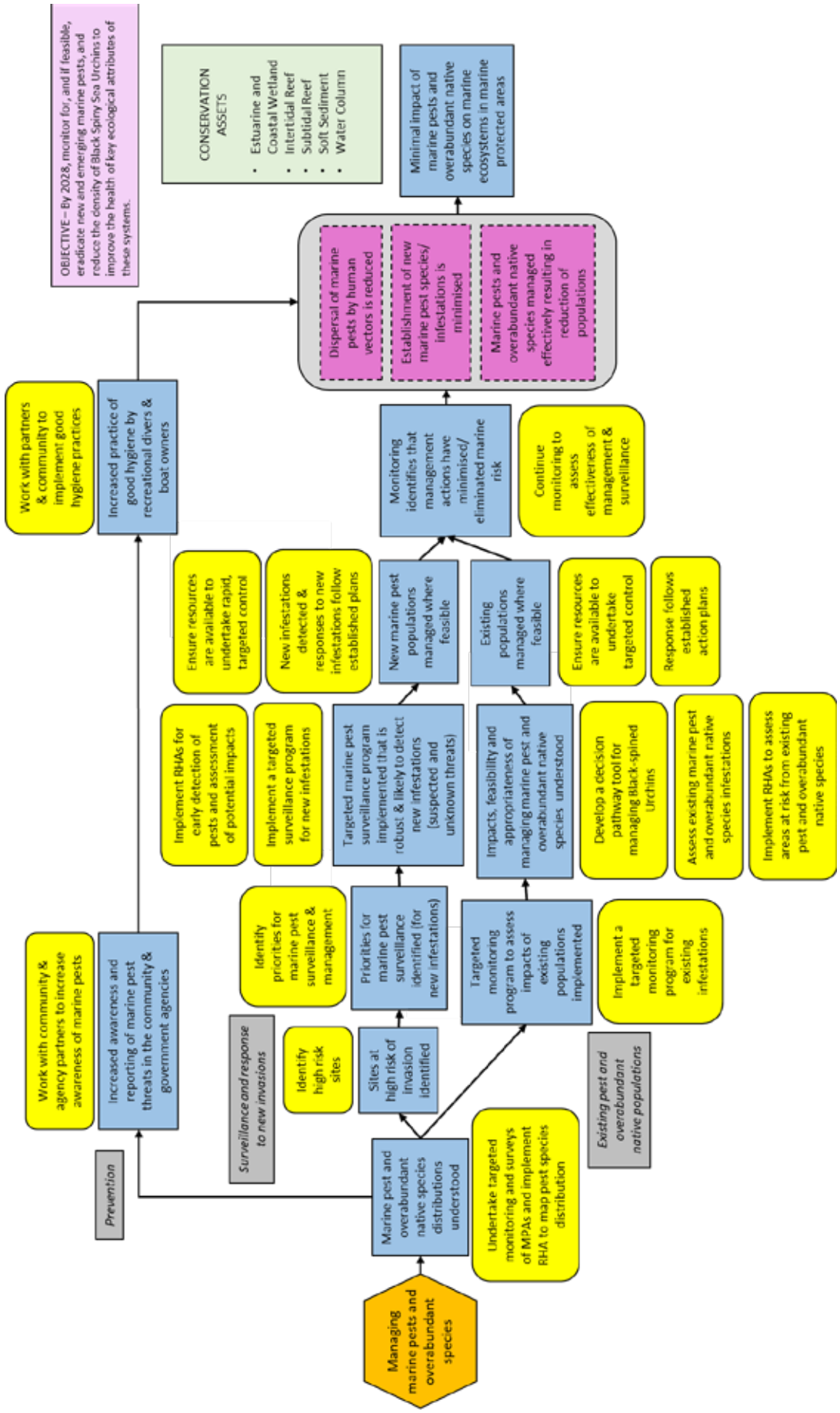
Targeted monitoring and pathway assessment in priority locations to inform adaptive management programs to contain existing infestations and prevent new invasions of marine pest and overabundant native species.

Table 6.7 Priority marine pest and overabundant species management areas in the East Gippsland Parks Landscape.

Target species	Action type	Priority locations	Conservation Assets*	Priority
Black-spined Urchin	Monitoring, pathway assessment, adaptive management	Beware Reef MS, Cape Howe MNP, Point Hicks MNP	Intertidal Reef, Subtidal Reef	High
New Zealand Sea Star	Monitoring, adaptive management	Beware Reef MS, Cape Conran CP, Cape Howe MNP	Soft Sediment, Intertidal Reef	Low
New Zealand Screw Shell	Monitoring, adaptive management	Beware Reef MS, Cape Howe MNP, Point Hicks MNP	Soft Sediment, Intertidal Reef	Low
Japanese Kelp	Monitoring (prevention)	Beware Reef MS, Cape Howe MNP	Soft Sediment, Intertidal Reef	Low
European Fan Worm	Monitoring (prevention)	Beware Reef MS	Intertidal Reef, Subtidal Reef	Low
Northern Pacific Sea Star	Monitoring (prevention)	Cape Howe MNP	Intertidal Reef, Subtidal Reef	Low
European Shore Crab	Monitoring, adaptive management	Croajingolong NP	Estuarine & Saline Wetland	Low
Gloomy Octopus	Monitoring (potential threat)	Cape Howe MNP	Subtidal Reef	Low

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

Results chain



Implementation milestones

Result	Action
Marine pest and overabundant native species distributions are understood	• Undertake targeted monitoring and surveys of Marine Protected Areas (MPAs) to map pest species distribution
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 to new invasions	
Sites at high risk of invasion are identified	• Identify high risk sites
Priorities for marine pest surveillance are identified (for new infestations)	• 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 • Implement Rapid Health Assessments (RHA) for early detection of pests and assessment of potential impacts
New marine pest populations are managed where feasible	• Ensure resources are available to undertake rapid, targeted control • New infestations are detected and responses to new infestations follow established plans
Existing pest and overabundant native populations	
Monitoring program to assess impacts of existing populations is targeted	• Implement a targeted monitoring program for existing infestations
Impacts, feasibility and appropriateness of managing marine pest and overabundant native species understood	• Develop a decision pathway tool for managing Black-spined Urchins • Assess existing marine pest and overabundant native species infestations • Implement Rapid Health Assessments to assess areas at risk from existing pest and overabundant native species
Existing populations managed where feasible	• Ensure resources are available to undertake targeted control • Response follows established action plans
Monitoring identifies that management actions have minimised/eliminated marine risk	• Continue monitoring to assess effectiveness of management and surveillance
Dispersal of marine pests by human vectors is reduced Establishment of new marine pest species/infestations is minimised Marine pest and overabundant native species managed effectively, resulting in reduction of populations	
Minimal impact of marine pests and overabundant native species on marine ecosystems in marine protected areas	

6.7 Reducing the impacts of human disturbance

The aim of this strategy is to encourage the public to enjoy nature-based tourism activities and take pride in the marine and terrestrial reserve system, while reducing the impacts of illegal activities. Threats to natural and cultural values from visitors include illegal vehicle access which can spread weeds and propagules and damage native vegetation, firewood collection, illegal camping which can cause bushfires, illegal hunting and fishing, dumping of litter, poaching, or disturbing wildlife and damaging habitats through high or inappropriate visitor presence.

Communication

In order to efficiently direct communication and compliance work, Parks Victoria will first identify areas of high impact illegal activity and the groups that use them. The channels and methods of communication will be tailored accordingly. Public awareness of harvest, collection and camping restrictions and the penalties that apply for infringements will be increased by working with user groups and partner agencies (such as the Victorian Game Management Authority and Victorian Fisheries Authority) in the Parks Landscape. The conservation and cultural values of the Parks Landscape, as well as the consequences of unregulated collection and off-target take will also be communicated, encouraging responsible behaviour and fostering community ownership of local reserves.

Targeted education around precluding the sharing of locations of endangered, rare or vulnerable species on social media will protect these species from widespread attention, which can lead to disturbance and poaching, including species such as orchids, tree ferns, cabbage tree palms, grass trees and various reptiles and amphibians for private collections. Similarly, education around the impacts of cairn building, and wildlife photographers, bird watchers and other enthusiasts who may flip rocks or visit vulnerable areas to observe fauna will minimise habitat disruption while encouraging park users to take pride in the park and reserve system.

The development and/or promotion of minimal impact guidelines for visitors using marine and coastal areas will increase awareness and understanding of both environmental values and permissible activities. Additional environmental messaging will be added to boating guides to reduce the incidence of marine debris, the disturbance of wildlife and boating and diving impacts. In some cases, the clarification of park boundaries may be required to adequately enforce appropriate activities within them (e.g. Point Hicks Marine National Park).

Compliance

Parks Victoria will work closely with DEECA, Game Management Authority, Victorian Fisheries Authority and Victoria Police to enforce park rules and regulations around collecting, harvesting and hunting natural resources. Compliance activities will be prioritised in areas of significant natural value with high infringement rates, and aligned with the priority activities and focus areas from the Eastern Region Compliance Plan, including fishing regulations, off road driving, and firewood collection.

The illegal opening of estuaries, undertaken by often concerned locals, is a large issue with potentially catastrophic impacts, such as algal blooms, fish kills and reduced water quality. Parks Victoria will work with the East Gippsland Catchment Management Authority to promote the actions of both agencies in managing estuary openings and educate the community on the importance of careful estuary management and the impacts of poorly timed openings. Increased staff presence may also increase public trust in estuary management.

It is important to encourage Parks Victoria staff to submit incident reports which will inform priority areas for targeted compliance, and increase community perception of enforcement risk. As the East Gippsland Parks Landscape contains many large and remote parks and reserves, the extent of the impacts of human disturbance, either through recreational or illegal activities, is often unknown. Additional monitoring is therefore required to better understand the distribution and impacts of the activities listed in the priority table below.

When considering joint managed parks, Traditional Owners have identified that management of human disturbance is a priority for the following: New Guinea Caves II, Lake Tyers State Park, Mitchell River National Park, Buchan Caves Reserve and Corringle Foreshore Reserve.

Conservation outcomes

The impacts of permissible and illegal activities on priority terrestrial and marine areas are minimised and permissible resource extraction is sustainable, reducing disturbance of habitat and species.

Strategy summary

Undertake targeted communication and compliance activities to reduce the impacts of recreation, illegal activities and resource extraction and minimise the disturbance of terrestrial and marine assets.

Results chains for this strategy have been developed separately for terrestrial and marine conservation assets.

Table 6.6 Priority areas for managing human impacts in terrestrial and marine assets in the East Gippsland Parks Landscape.

Impact managed	Conservation Assets*	Management action	Priority locations	Priority
Disturbance of cultural sites and removal of artifacts (Aboriginal and European)	Dry Forest & Woodland, Riverine Forest & Woodland, Wet Forest & Rainforest, Heathland	Compliance, education, signage	Croajingolong NP, Gabo Island LR, Lake Tyers SP†, Lind NP, Mitchell River NP†, Point Hicks LR, Snowy River NP, Coopracambra NP, Cape Conran CP, Buchan Caves Reserve†	High

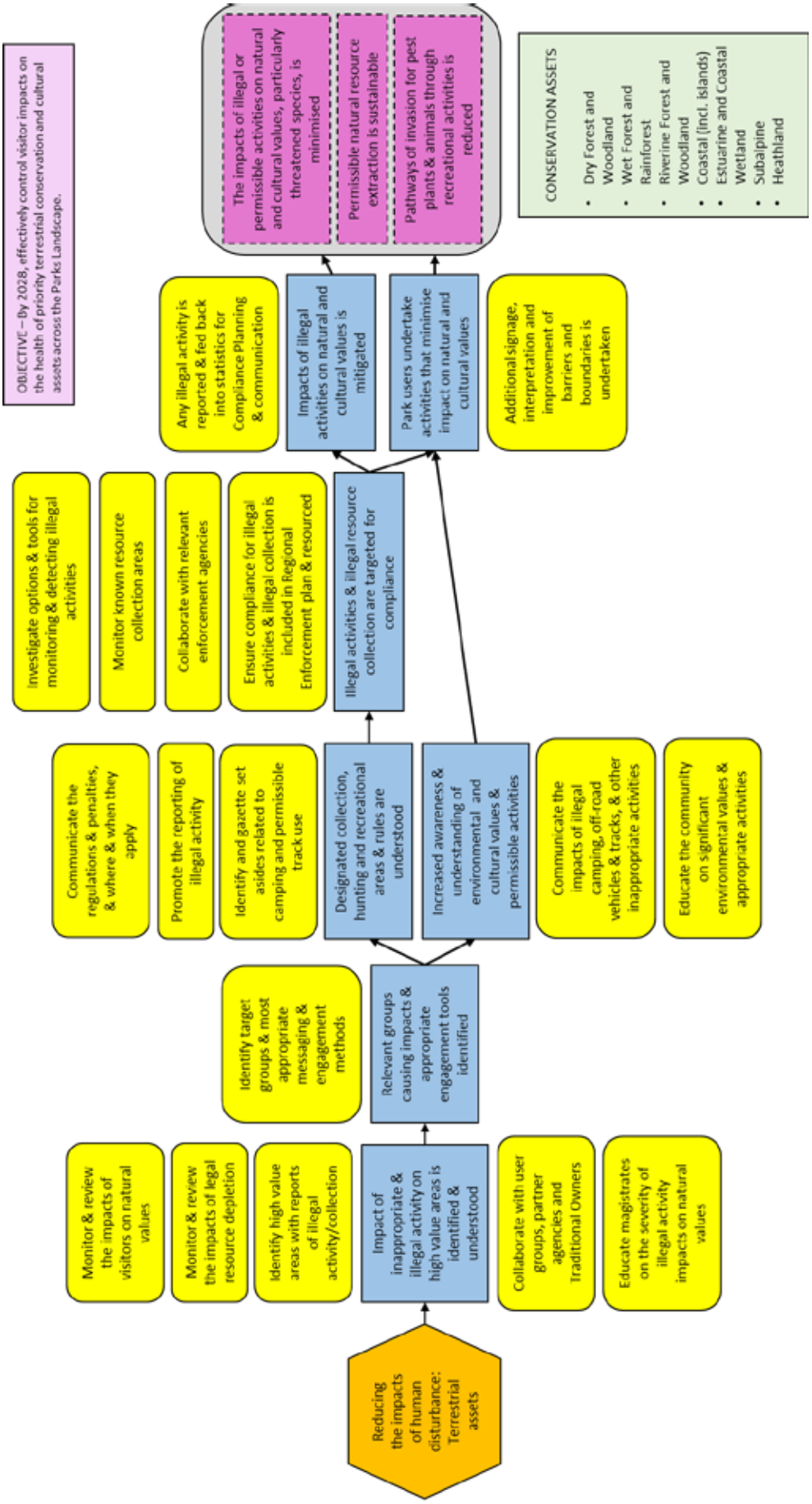
Impact managed	Conservation Assets*	Management action	Priority locations	Priority
Illegal poaching	Dry Forest & Woodland, Heathland, Riverine Forest & Woodland	Compliance, monitoring	Croajingolong NP	High
Domestic dogs	Coastal (including islands), Dry Forest & Woodland, Wet Forest & Rainforest	Compliance, education, signage	Gabo Island LR, Cape Conran CP, Snowy River NP, Mitchell River NP†, Croajingolong NP, Peachtree Creek Reserve, Lake Tyers SP†, Ewing Morass WR	High
Litter and pollution	Coastal (including islands), Dry Forest & Woodland, Wet Forest & Rainforest, Riverine Forest & Woodland	Compliance, community/school programs, incident reports	Gabo Island Lighthouse Reserve, Snowy River NP, Lake Tyers SP†, Peachtree Creek Reserve, Croajingolong NP, Point Hicks LR, Coopracambra NP, Cape Conran CP, Alfred NP, Lind NP	High
Firewood collection and timber harvesting	Dry Forest & Woodland, Wet Forest & Rainforest, Coastal (including islands)	Compliance, signage, incident reports	Lake Tyers SP†, Mount Elizabeth NCR, Mitchell River NP†, Snowy River NP, Croajingolong NP	High
Illegal hunting	Dry Forest & Woodland, Wet Forest & Rainforest, Subalpine	Compliance, incident reports	Errinundra NP, Snowy River NP, Mitchell River NP†, Croajingolong NP, Ewing Morass WR, Bendoc NCR, Cape Conran CP	Med
Illegal/ inappropriate camping activities (campsites/ campfires)	Coastal (including islands, Riverine Forest & Woodland, Dry Forest & Woodland, Wet Forest & Rainforest, Subalpine	Compliance, education, visitor management	Mount Elizabeth NCR, Cape Conran CP, Snowy River NP, Lake Corringle WR, Lake Tyers SP†, Croajingolong NP, Coopracambra NP, Mitchell River NP†, Ewing Morass WR, Peachtree Creek Reserve	Med
Disturbance of wildlife (photography and enthusiasts)	Dry Forest & Woodland, Wet Forest & Rainforest, Riverine Forest & Woodland, Heathland, Coastal (including islands)	Signage, targeted community education	Mitchell River NP†, Lake Tyers SP†, Croajingolong NP, Snowy River NP	Med
Illegal opening of waterways	Estuarine & Coastal Wetland	Compliance, education, planning, staff presence	Lake Tyers SP†, Marlo Coastal Reserve†, Croajingolong NP, Cape Conran CP, Lake Corringle WR, Lake Curlip WR	Med
Adjacent land clearing and agriculture	Riverine Forest & Woodland, Dry Forest & Woodland, Wet Forest & Rainforest	Boundary clarification, compliance, planning	Croajingolong NP, Lind NP, Coopracambra NP, Bendoc NCR, Cape Conran CP, Alfred NP, Snowy River NP	Med

Impact managed	Conservation Assets*	Management action	Priority locations	Priority
Off road vehicles, tracks and visitors	Dry Forest & Woodland, Wet Forest & Rainforest, Riverine Forest & Woodland, Subalpine, Coastal (including islands), Heathland	Targeted education, physical barriers, compliance, incident reports	Lake Corringle WR, Lake Tyers SP†, Mount Elizabeth NCR, Snowy River NP, Croajingolong NP, Cape Conran CP, Mitchell River NP†, Errinundra NP, Ewing Morass WR, Coopracambra NP	Med
High or inappropriate visitor presence (high visitor density)	Coastal (including islands), Riverine Forest & Woodland, Dry Forest & Woodland, Wet Forest & Rainforest	Event permit compliance, signage, planning, visitor management	Buchan Caves Reserve†, Coopracambra NP, Errinundra NP, Lake Tyers SP†, Mitchell River NP†, Mount Elizabeth NCR, Gabo Island LR, Croajingolong NP, Peachtree Creek Reserve, Cape Conran CP	Low
Illegal fishing and bait collection	Estuarine & Coastal Wetland, Coastal (including islands)	Signage, education	Croajingolong NP, Lake Tyers SP†, Gabo Island LR, Cape Conran CP, Peachtree Creek Reserve, Point Hicks LR	Low
Abalone and shellfish poaching	Intertidal Reef, Subtidal Reef	Compliance, education, monitoring	Beware Reef MS, Cape Howe MNP, Point Hicks MNP	High
Illegal and adjacent fishing	Intertidal Reef, Subtidal Reef, Water Column (pelagic)	Compliance, education, monitoring	Cape Howe MNP, Point Hicks MNP, Beware Reef MS	High
Litter and pollution	Soft Sediment, Intertidal Reef, Subtidal Reef, Water Column (pelagic)	Compliance, education, response preparedness	Cape Howe MNP, Point Hicks MNP	High
Boating and diving	Intertidal Reef, Subtidal Reef	Compliance, visitor management	Beware Reef MS	Med
High/inappropriate visitor presence (wildlife disturbance)	Soft Sediment, Intertidal Reef	Visitor management, education	Beware Reef MS, Cape Howe MNP	Med

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

† Joint Managed Parks

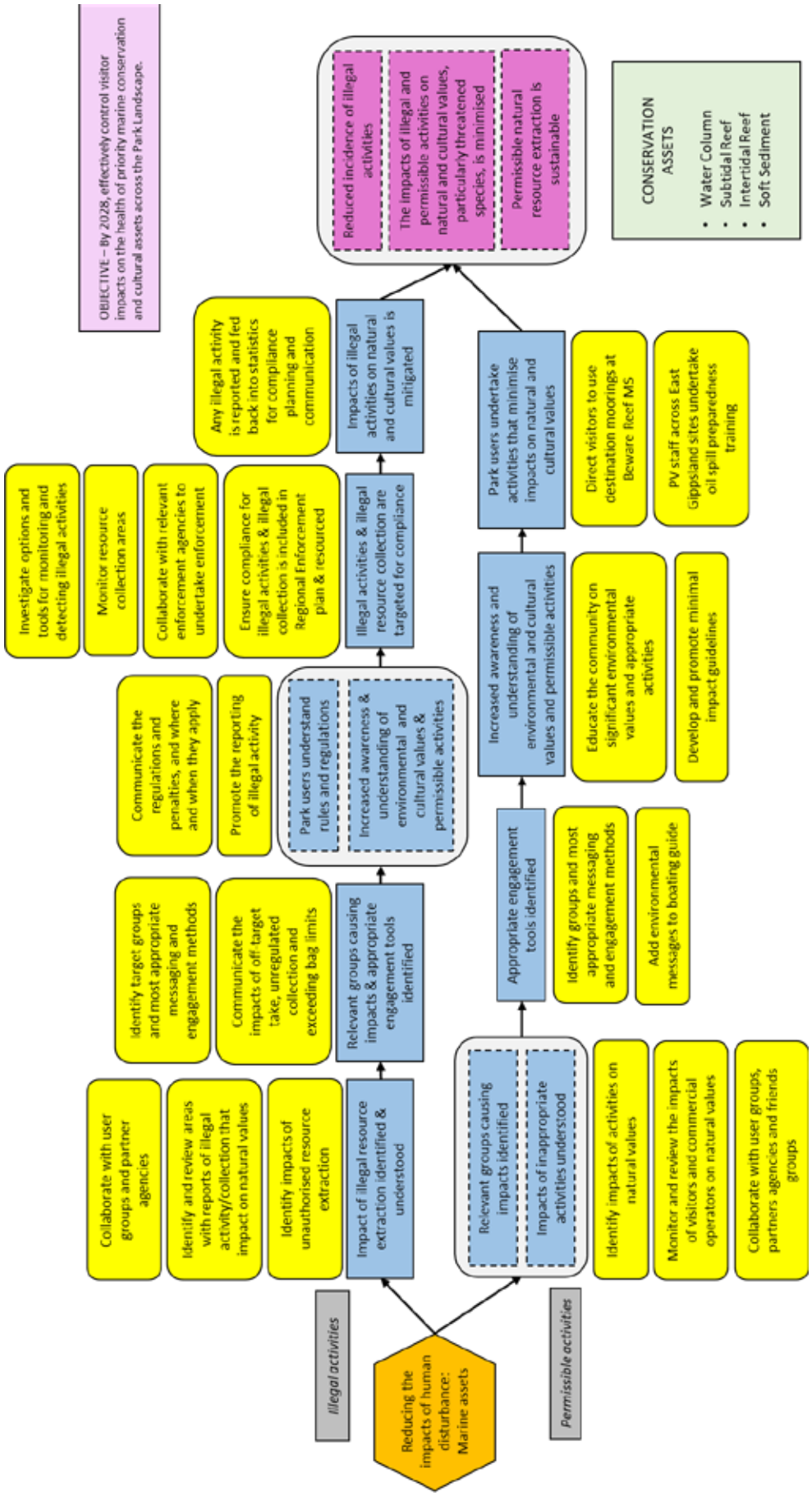
Results chain: Terrestrial assets



Implementation milestones: Terrestrial assets

Result	Action
Impact of inappropriate and illegal activity on high value areas is identified and understood	• Monitor and review the impacts of visitors on natural and cultural values • Monitor and review the impacts of legal resource depletion • Identify high value areas with reports of illegal activity/collection • Collaborate with user groups, partner agencies and Traditional Owners • Educate magistrates on the severity of illegal activity impacts on natural values
Relevant groups causing impacts and appropriate engagement tools identified	• Identify target groups and most appropriate messaging and engagement methods • Identify specific society/community or social media groups who may be key engagement points
Designated collection, hunting and recreational areas and rules are understood	• Communicate the regulations and penalties, and where and when they apply • Promote the reporting of illegal activity • Encourage staff to submit incident reports • Identify and gazette set asides related to camping and permissible track use
Illegal activities and illegal resource collection are targeted for compliance	• Investigate options and tools for monitoring and detecting illegal activities • Monitor known resource collection areas • Collaborate with relevant enforcement agencies • Ensure compliance for illegal activities and illegal collection is included in the Regional Enforcement Plan and resourced
Impacts of illegal activities on natural and cultural values is mitigated	• Any illegal activity is reported and fed back into statistics for Compliance Planning and communication
Increased awareness and understanding of environmental and cultural values and permissible activities	• Communicate the impacts of illegal camping, off-road vehicles and tracks and other inappropriate activities • Educate the community on significant environmental values and appropriate activities
Park users undertake activities that minimise impact on natural and cultural values	• Additional signage, interpretation and improvement of barriers and boundaries is undertaken
The impacts of illegal or permissible activities on natural and cultural values, particularly threatened species, is minimised Permissible natural resource extraction is sustainable Pathways of invasion for pest plants and animals through recreational activities is reduced	

Results chain: Marine assets



Implementation milestones: Marine assets

Result	Action
Illegal activities	
Impact of illegal resource extraction identified and understood	• Collaborate with user groups and partner agencies • Identify and review areas with reports of illegal activity/collection that impact on natural values • Identify impacts of unauthorised resource extraction
Relevant groups causing impacts and appropriate engagement tools identified	• Identify target groups and most appropriate messaging and engagement methods • Communicate the impacts of off-target take, unregulated collection and exceeding bag limits
Park users understand rules and regulations Increased awareness and understanding of environmental and cultural values and permissible activities	• Communicate the regulations and penalties, and where and when they apply • Promote the reporting of illegal activity • Encourage staff to submit incident reports
Illegal activities and illegal resource collection are targeted for compliance	• Investigate options and tools for monitoring and detecting illegal activities • Monitor resource collection areas • Collaborate with relevant enforcement agencies to undertake enforcement • Ensure compliance for illegal activities and illegal collection is included in Regional Enforcement Plan and resourced
Impacts of illegal activities on natural and cultural 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 groups and most appropriate messaging and engagement methods • Add environmental messages to boating guide
Increased awareness and understanding of environmental and cultural values and permissible activities	• Educate the community on significant environmental values and appropriate activities • Develop and/or promote minimal impact guidelines
Park users undertake activities that minimise impacts on natural and cultural values	• Direct visitors to use destination moorings at Beware Reef MS • PV staff across East Gippsland sites undertake oil spill preparedness training • Traditional Owners are provided with opportunities for oil spill preparedness training
Reduced incidence of illegal activities The impacts of illegal and permissible activities on natural and cultural values, particularly threatened species, is minimised Permissible natural resource extraction is sustainable	

6.8 Building climate resilience and refugia

Climate change will have widespread impacts across all conservation assets, including an increased intensity, frequency and extent of fire, increased incidence of flooding and extreme weather events, increased drying and reduced precipitation, decreasing surface runoff and groundwater recharge, reduced snow cover and associated meltwater contributing to water catchments, sea level rise, coastal flooding and erosion, reduced water volume and quality, reduced hydrological connectivity, increased saltwater intrusion upstream and ocean acidification. To give species and ecosystems the best chance, we need to reduce the other pressures acting on them through the Conservation Strategies that improve or maintain their condition against compounding threats such as introduced predators and herbivores, weed invasion and human disturbances. Coordinated action across these strategies will increase the resilience of both terrestrial and water-dependent assets to climate change. More specific actions can be undertaken to address sea level rise, and to identify and protect both fire refugia and climate refugia.

Sea level rise

Reserves and habitats most vulnerable to sea level rise and storm surge will be identified using predictive modelling. Vulnerable areas are likely to include freshwater systems at risk of saltwater inundation, estuaries that will experience changes to fresh and saltwater inputs through both flooding and storm surge and other coastal assets that may be subject to innundation or erosion.

Saltmarsh and mangrove ecosystems may need to retreat inland with sea level rise. Restoring the natural hydrology of aquatic systems, where possible, would allow the migration of species inland. Estuaries may be particularly affected by climate change as openings may be blocked more frequently due to a lack of freshwater input, changing the depth and frequency of inundation of estuarine habitat.

Monitoring the condition of estuaries such as the Mueller and Thurra River estuaries is important to detect changes to flow and inundation regimes and determine species vulnerable to disturbance. This will identify areas where managing the margins of estuaries will allow species to shift or migrate to new areas during periods of longer inundation. Opportunities to mitigate the rate of change as these systems adapt will be investigated as a priority.

Fire refugia

Fire refugia are areas that remain unburnt following fire or have been minimally affected by fire and retain much or all of their pre-fire characteristics (Meddens et al. 2018). Fire refugia therefore often contain late succession species or growth stages and can occur due to both natural factors (topography, moisture level, natural fuel level) or human-mediated factors (firebreaks, roads, human-determined fuel level). However, fire refugia can also occur due to unpredictable shifts in weather or fire behaviour during a fire event and are thus not restricted to gullies and valley bottoms. Refugia provide shelter for species during fire, are a source of food and shelter following fire, and support population reestablishment in the long-term as the surrounding vegetation recovers. Refugia are a crucial element of ecosystem resilience as they buffer ecosystems from the impacts of climate change by allowing species to persist, migrate or adapt to changes in the environment or disturbance regimes (Meddens et al. 2018). Post-fire reconnaissance in East Gippsland demonstrated that unburnt vegetation was crucial to the persistence of arboreal mammals and forest owls and should be protected from future fire.

In south-east Australia, fire refugia in the past have been more likely to occur with increased fuel moisture, in gullies, on pole-facing aspects and in closed forests, but occurred rarely under severe fire weather regardless of other features (Collins et al. 2019). Under climate change, increasing drought conditions and severe fire weather means that fire refugia are increasingly unlikely to occur without human intervention both before and during fire.

Fire refugia that survive only a single fire event may be considered ephemeral refugia rather than persistent refugia that survive multiple fire events (Meddens et al. 2018). Current fire refugia will be identified to plan their protection through future fire events, creating persistent fire refugia with late succession features. Planning can also be undertaken to protect future or potential fire refugia that can be identified based on topography, presence of firebreaks, aspect and previous fire history. This refers to areas that may have been burnt in the 2019/20 bushfires but could reasonably be expected to escape being burnt in future if given adequate protection. While fire refugia are not entirely predictable, it is possible to identify potential refugia and take steps to increase the likelihood of these areas becoming refugia during future fire events. The identification of fire refugia, both current and potential, should also take into account the needs of refugia-associated species, which are those that have relied on refugia during past fire events for survival and protection, species for which a large proportion of suitable habitat has been burnt, and species that are restricted to current refugia or generally live in fire-sensitive vegetation.

Climate refugia

Climate refugia are areas that buffer species from environmental changes that occur due to climate change, such as increasing temperatures and reduced precipitation. This may describe pockets or islands that retain their abiotic characteristics despite change in the surrounding environment. Climate refugia may overlap with fire refugia, but may not be apparent in the absence of fire. For example, the main drivers of greater glider habitat suitability in eastern Victoria have been shown to be climatic aridity and heat stress (Wagner et al. 2020), which highlights the necessity of identifying and mapping the size and connectivity of habitat patches with appropriate bioclimatic characteristics. Increases in warming and drying will also disproportionately affect temperature- or moisture-dependent species such as reptiles and amphibians, as their physiological niche shrinks or migrates.

Wet forest communities may be the most likely candidates for climate refugia, but are also the most vulnerable to fire as they contain fire-sensitive species, are less likely to recover quickly following fire, and experienced a greater proportion of high-severity fire during the 2019/20 bushfire season than dry forest communities (Collins et al. 2021). It is important to identify and protect climate refugia from future fire events, which will cause them to also become fire refugia. If climate refugia are destroyed or affected by fire, climate refugia may be restricted to only what is also naturally occurring fire refugia.

Building resilience and refugia will be guided by the following principles:

- Support and empower Traditional Owners to restore cultural practices in land management across the cultural landscape
- Reduce fire, both planned and unplanned, in previously burnt areas to allow for groundwater recharge
- Identify and map the distributions of refugia-associated species
- Identify the climatic attributes that influence habitat suitability for fauna
- Identify and map current fire refugia and climate refugia and where they intersect
- Evaluate the use of current refugia by refugia-associated species
- Evaluate threats to existing refugia and identify management actions to protect and enhance them
- Plan and identify methods for protection of climate refugia from future fire events
- Identify potential fire refugia and plan protection from future fire events
- Prioritise fire and climate refugia for conservation efforts across other Conservation Strategies

A preliminary list of fauna species of most concern is given in Table 6.8, selected based on the proportion of their habitat or population that was affected by the 2019/20 bushfires (given by Legge et al. 2022) with at minimum 50% of their records occurring within the East Gippsland Parks Landscape. These species may or may not be considered refugia-associated species, and this does not represent an exhaustive list of species that should be considered under this strategy.

Table 6.8 Terrestrial fauna species of most concern under climate change in the East Gippsland Parks Landscape.

Species	Scientific name	Species	Scientific name
Mammals		**Birds**	
Brush-tailed Rock Wallaby	*Petrogale penicillata*	Black-faced Monarch	*Monarcha melanopsis*
Eastern Broad-nosed Bat	*Scotorepens orion*	Eastern Bristlebird	*Dasyornis brachypterus*
Long-footed Potoroo	*Potorous longipes*	Eastern Ground Parrot	*Pezoporus wallicus wallicus*
Long-nosed Bandicoot	*Perameles nasuta*	Glossy Black Cockatoo	*Calyptorhynchus lathami lathami*
Yellow-bellied Glider	*Petaurus australis*	Spectacled Monarch	*Symposiachrus trivirgatus*
Reptiles		Wonga Pidgeon	*Leucosarcia melanoleuca*
Eastern She-oak Skink	*Cyclodomorphus michaeli*	**Amphibians**	
Yellow-bellied Water Skink	*Eulamprus heatwolei*	Blue Mountains Tree Frog	*Litoria citropa*
Aquatic fauna		Dendy's Toadlet	*Pseudophryne dendyi*
Cann Galaxia	*Galaxias sp. 17 'Cann'*	Giant Burrowing Frog	*Heleioporus australiacus*
Cann Spiny Crayfish	*Euastacus sp. 2*	Green and Golden Bell Frog	*Litoria aurea*
Claytons Spiny Crayfish	*Euastacus claytoni*	Haswell's Froglet	*Paracrinia haswelli*
East Gippsland Galaxias	*Galaxias aequipinnis*	Leaf Green Tree Frog	*Litoria phyllochroa*
East Gippsland Spiny Crayfish	*Euastacus bidawalus*	Martin's Toadlet	*Uperoleia martini*
McDowall's Galaxias	*Galaxias mcdowalli*	Pobblebonk Frog	*Limnodynastes dumerilii inularis*
Orbost Spiny Crayfish	*Euastacus diversus*	Southern Barred Frog	*Mixophyes balbus*
Roundsnout Galaxias	*Galaxias terenasus*	Tyler's Toadlet	*Uperoleia tyleri*
Variable Spiny Crayfish	*Euastacus yanga*	Large Brown Tree Frog	*Litoria littlejohni*
Yalmy Galaxias	*Galaxias sp. nov. 'Yalmy'*		

Due to their extremely limited distributions, the abovenamed aquatic species are at the greatest risk of extinction, requiring the general protection of their habitat from other stressors, as well as identifying any 'cool' pockets of refuge habitat and investigating the feasibility of and planning for ex-situ conservation

measures (Whiterod et al. 2022). Additional aquatic species such as freshwater mussels are likely to be considered species of concern under climate change in this landscape.

Following the 2019/20 bushfires, an assessment of 126 threatened flora species was conducted to determine their persistence and post-fire recovery, the majority of which fall into the East Gippsland Parks Landscape. One hundred and eight species were found to be successfully regenerating post-fire from either seedlings or resprouts, and the remaining 18 species were not found at the time of the assessment at the sites visited. Fire should be prevented at sites with populations of threatened flora species, particularly fire-sensitive species until a growth-stage has been reached to allow regeneration (DELWP 2022).

A preliminary list of terrestrial flora species of most concern is given in Table 6.9, selected based on the proportion of their habitat or population that was affected by the 2019/20 bushfires (>50% of their range map burnt, given by Gallagher et al. 2021) with at minimum 50% of their records occurring within the East Gippsland Parks Landscape. This does not represent an exhaustive list of species that should be considered under this strategy.

Table 6.9 Terrestrial flora species of most concern under climate change in the East Gippsland Parks Landscape.

Species	Scientific name	Species	Scientific name
Flora			
Bantam Bush-pea	*Pultenaea parrisiae*	Net-veined Wattle	*Acacia subtilinervis*
Bent Pomaderris	*Pomaderris sericea*	Pink Mountain-correa	*Correa lawrenceana var. cordifolia*
Betka Bottlebrush	*Callistemon kenmorrisonii*	Pungent Spider-orchid	*Caladenia osmera*
Blackfellows' Hemp	*Androcalva rossii*	River Beard-heath	*Leucopogon riparius*
Bower Wattle	*Acacia subporosa*	Rock Daisy	*Brachyscome petrophila*
Buchan Pomaderris	*Pomaderris buchanensis*	Short-leaf Geebung	*Persoonia brevifolia*
Climbing Bent-grass	*Deyeuxia ramosa*	Slender Leek-orchid	*Prasophyllum parviflorum*
Clustered Darwinia	*Darwinia camptostylis*	Smooth Tea-tree	*Leptospermum glabrescens*
Colquhoun Grevillea	*Grevillea celata*	Snowy River Daisy	*Brachyscome riparia*
Dainty Bitter-cress	*Cardamine tryssa*	Snowy River Phebalium	*Phebalium glandulosum subsp. riparium*
Dwarf Zieria	*Zieria littoralis*	Snowy River Pomaderris	*Pomaderris oblongifolia*
Erect Violet	*Hybanthus vernonii subsp. vernonii*	Snowy River Westringia	*Westringia cremnophila*
Errinundra Pepper	*Tasmannia xerophila subsp. robusta*	Star Xanthosia	*Xanthosia stellata*
Forest Leek-orchid	*Prasophyllum sylvestre*	Swamp Sun-orchid	*Thelymitra incurva*
Forrester's Bottlebrush	*Callistemon forresterae*	Tall Plume-grass	*Dichelachne robusta*
Genoa Grevillea	*Grevillea parvula*	Tiny Spyridium	*Spyridium cinereum*
Genoa River Correa	*Correa lawrenceana var. genoensis*	Tullach Ard Grevillea	*Grevillea polychroma*
Genoa Spider-orchid	*Caladenia ancylosa*	Twin-flower Tea-tree	*Leptospermum emarginatum*
Gippsland Banksia	*Banksia croajingolensis*	Upright Pomaderris	*Pomaderris virgata*
Granite Grevillea	*Grevillea neurophylla subsp. fluviatilis*	Veined Pomaderris	*Pomaderris costata*
Heath Spider-orchid	*Caladenia peisleyi*	Violet Nightshade	*Solanum silvestre*
Kybean Wattle	*Acacia kybeanensis*	Wiry Wallaby-grass	*Plinthanthesis paradoxa*
Leafless Tongue-orchid	*Cryptostylis hunteriana*	Wombargo Wattle	*Acacia tabula*
Monaro Spider-orchid	*Caladenia oreophila*	Woolly Wattle	*Acacia lanigera var. gracilipes*

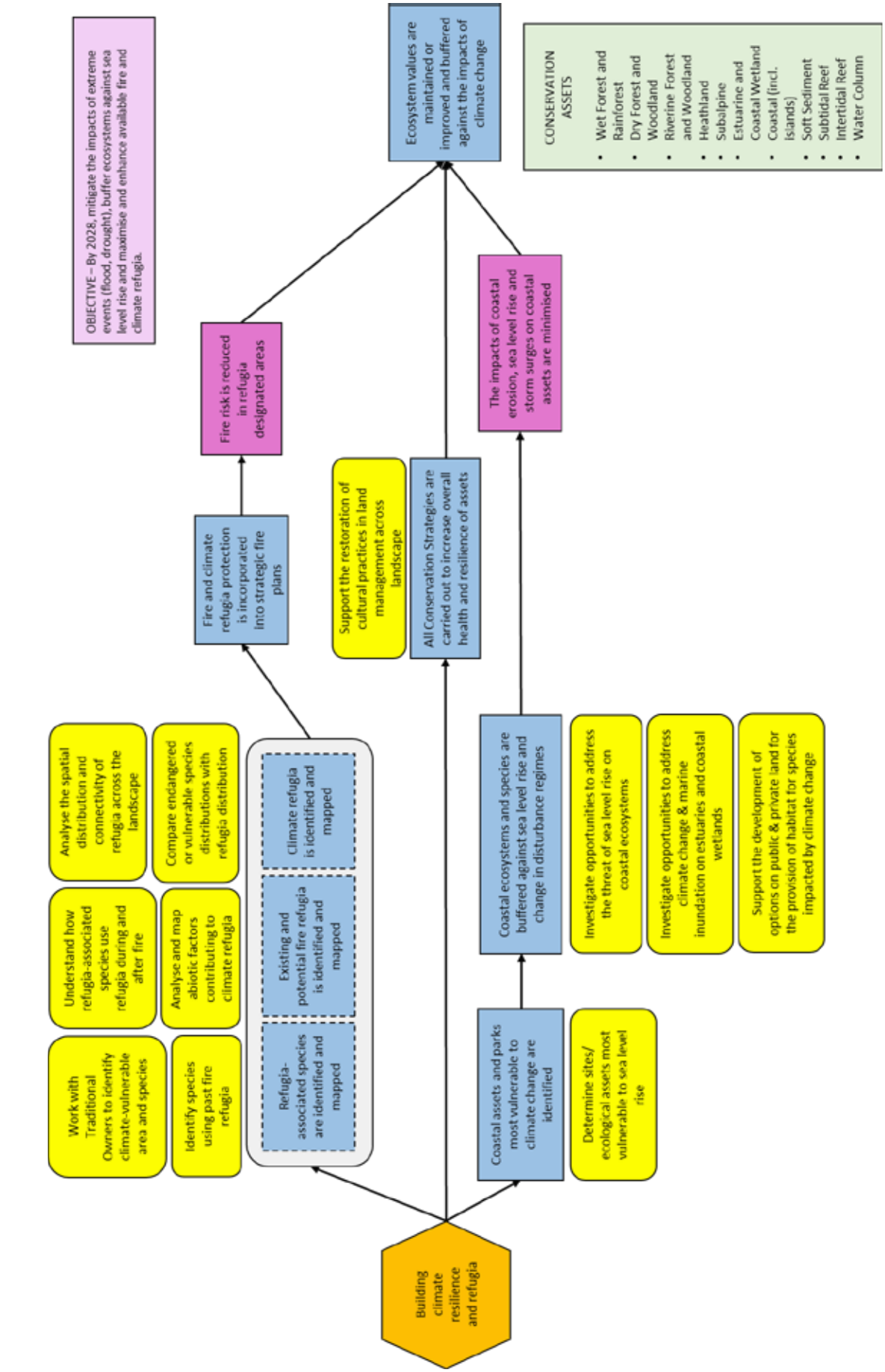
Conservation outcomes

The risk of negative impacts from increased drying, warming and fire extent and severity is reduced in areas recognised as refugia, and the impacts of storm surge and sea level rise on estuaries are mitigated where possible and other coastal habitats where landward migration can be facilitated. The condition of all conservation assets is improved to increase resilience against extreme weather events and other impacts of climate change.

Strategy summary

Identify and prioritise fire and climate refugia to buffer species against the impacts of climate change, including future fire events, and mitigate the impacts of sea level rise on coastal assets.

Results chain



Implementation milestones

Result	Action
All Conservation Strategies are carried out to increase overall health and resilience of assets	• Support the restoration of cultural practices in land management across the landscape
Fire and climate refugia	
Refugia-associated species are identified and mapped Existing and potential fire refugia is identified and mapped Climate refugia is identified and mapped	• Work with Traditional Owners to identify climate-vulnerable areas and species • Identify species that used past fire refugia as refugia associated species • Understand how refugia-associated species use refugia during and after fire • Analyse and map biotic and abiotic factors contributing to climate refugia, including topography, fire history, composition and structure, and spatial configuration in the landscape • Analyse the spatial distribution and connectivity of refugia across the landscape • Compare endangered or vulnerable species distributions with refugia distribution
Fire and climate refugia protection is incorporated into strategic fire plans	
Fire risk is reduced in refugia designated areas	
Sea level rise	
Assets and parks most vulnerable to climate change are identified	• Determine sites/ecological assets most vulnerable to sea level rise
Coastal ecosystems and species are buffered against sea level rise and change in disturbance regime	• Investigate opportunities to address the threat of sea level rise on coastal ecosystems • Investigate opportunities to address climate change and marine inundation on estuaries and coastal wetlands • Support the development of options on public and private land for the provision of habitat for species impacted by climate change
The impacts of coastal erosion, sea level rise and storm surges on coastal assets are minimised	
Ecosystem values are maintained or improved and buffered against the impacts of climate change	

Buchan Caves Reserve

Yellow-tailed Black Cockatoo

7 Measuring performance

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

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

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

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

7.1 Interim performance measures

The following performance measures, developed in collaboration with experts in this field, provide a useful starting point for developing a Monitoring, Evaluation and Learning Plan for the East Gippsland 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 East Gippsland 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 • Development and use of fire ecology strategies • Frequency of engagement with bushfire management agencies (e.g. DEECA) and the community • Timeliness of bushfire recovery and rehabilitation programs • Number of fire ecology monitoring plots established and monitored	• Number of planned burns that have achieved ecological objectives • 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 desirable growth-stage distributions • Effectiveness (extent and type) of rehabilitation implemented after fire events • Loss of high-value locations of threatened or culturally important species	• Age-class structure of canopy species • Spatial and temporal vegetation growth stage structure • Flora species composition • Extent of vegetation • Occupancy of key vertebrate species

Activity measures	Threat measures	Outcome measures
WATER		
STRATEGY: 6.2 Supporting partnerships to address threats to water-dependent assets **THREAT ADDRESSED: 5.2 Alterations to natural hydrology and reduced water quality**		
• Critical water-dependent assets and impacts on water identified • Number of collaborations with user groups and partner agencies • Engagement effort with partners • Monitoring of water inputs and extent and quality of freshwater and marine habitat undertaken/supported • Number of research partnerships • Priority waterways identified with pest fish control implemented	• Water quality and stream nutrient levels • Water volume and connectivity • Abundance of pest fish • Abundance of trout in priority waterways	• Extent and quality of riparian vegetation • Condition of wetlands and estuaries • Waterbird diversity and abundance • Fish movement and species richness • Species richness of frogs • Freshwater invertebrate diversity and abundance • Water quality and volume
WEEDS		
STRATEGY: 6.3 Weed and pathogen control using a biosecurity approach **THREAT ADDRESSED: 5.3 Terrestrial weeds and pathogens**		
• Map of key invasion points, areas of conservation significance and weed species distributions prepared • Treatment of new / emerging weeds (species, area treated, person-days) • Surveillance effort for new / emerging weeds (species, area treated, person-days) • Percentage of high priority locations with control activities undertaken • Area of priority weeds treated (species, area treated, person-days)	• Number of new weed infestations identified • Number of newly identified weed infestations eradicated • Change in extent, density and cover of locally eradicable weeds • Change in extent, density and cover of weeds controlled for asset protection or containment	• Vegetation structure and composition at priority locations • Floristic diversity • Life form cover proportion
HERBIVORES		
STRATEGY: 6.4 Herbivore management **THREAT ADDRESSED: 5.4 Competition and habitat degradation by herbivores**		
• Number of pest animals with impacts, control methods, control levels and high-priority locations identified • Acceptable deer densities identified • Extent, frequency and method of control (number and species removed) • Percentage of priority locations where control activities are undertaken • Effectiveness of control (units of effort per target species) • Extent of monitoring in high value areas	• Relative herbivore density in areas of high value • Regularity of review of target herbivore densities	• Improved structure and composition of native vegetation communities • Intactness of vegetation • Orchid extent and abundance • Seedling recruitment

Activity measures	Threat measures	Outcome measures
PREDATION		
STRATEGY: 6.5 Ongoing control of introduced predators **THREAT ADDRESSED: 5.5 Terrestrial predation**		
• Map of high-priority at-risk native prey species distributions prepared • 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 • Small mammal detections at priority sites • Breeding success of Hooded Plovers and other beach-nesting birds
MARINE		
STRATEGY: 6.6 Managing marine pests and overabundant species **THREAT ADDRESSED: 5.6 Marine pests and overabundant species**		
• Number of person days of surveillance for pests and overabundant species • Number of partners engaged in marine hygiene practices • Area of established marine pest populations being actively managed • Hectares of marine parks surveyed for marine pests	• Change in extent/density of marine pest infestations (hectares, species) • Number of new 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 invasive species
VISITORS		
STRATEGY: 6.7 Reducing the impacts of human disturbance **THREAT ADDRESSED: 5.7 Human disturbance (visitor impacts and natural resource use)**		
• Number of compliance operations • Number of collaborations with user groups and partner agencies • Number of new communications around illegal activities and natural values • Monitoring effort in high value areas	• Reports of recreational damage on significant conservation values • Proportion of high-value conservation areas impacted by human activity • Proportion of high-value conservation areas impacted by resource extraction • Incidence of illegal activities	• Fledging success at key Hooded Plover breeding sites • Health of communities sensitive to trampling • Population health (abundance) of species subject to poaching • Stable populations of species subject to legal extraction
CLIMATE		
STRATEGY: 6.8 Building climate resilience and refugia **THREAT ADDRESSED: 5.1 Inappropriate fire regimes; 5.2 Alterations to natural hydrology and reduced water quality**		
• Sites and assets most vulnerable to sea level rise identified • Sites and asset most vulnerable to future fire and changing climate identified • Area assigned as fire or climate refugia	• Area of conservation assets vulnerable to hydrology changes/sea-level rise • Height/measure of sea level rise and extent of storm surge events • Residual fire risk in identified refugia	• Resilience to climate change of wetlands and estuaries • Persistence of species in areas inundated by sea level rise • Regrowth of fire-affected areas • Time since fire in refugia • Extent of refugia

7.2 Monitoring, Evaluation and Learning Plan

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

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

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

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

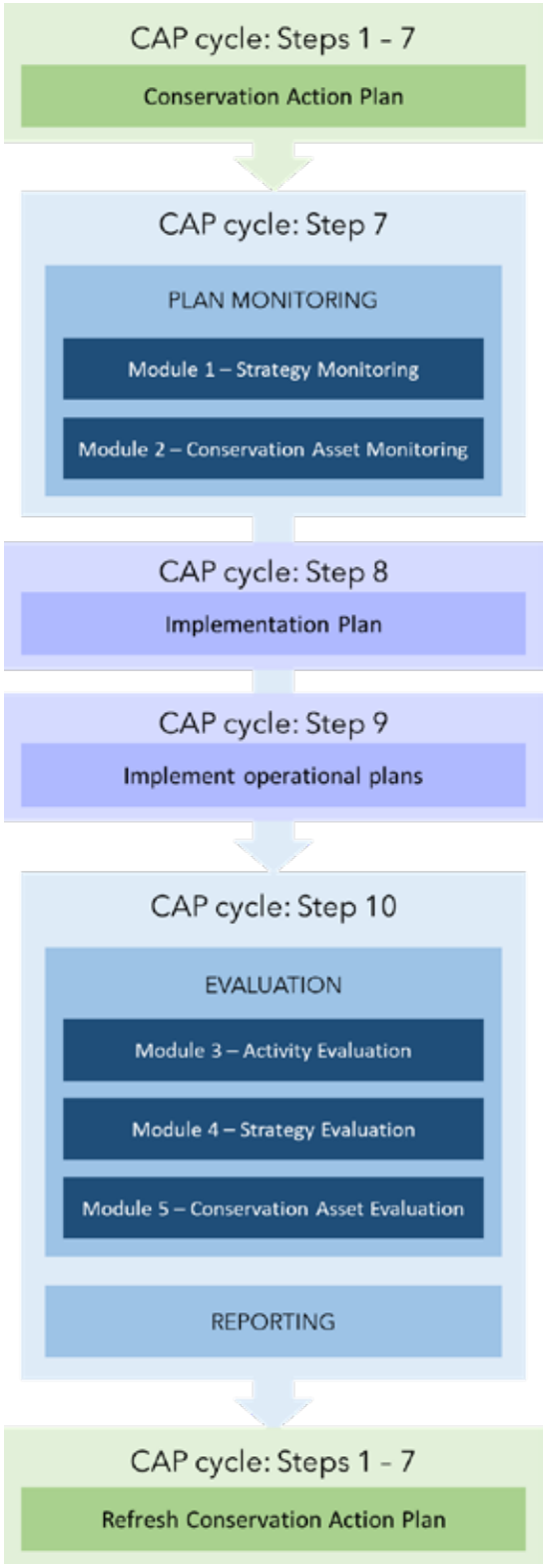
Figure 7.1 The logic framework for evaluating the effectiveness of CAP actions and their impacts.

The MEL process is organised according to the steps in the Conservation Action Planning cycle (Figure 1.2). The MEL process is structured in five modules, and each step and the modules it contains are summarised in Figure 7.2 below. A product of Step 7 in the CAP cycle is the MEL Plan, a module-based tabular data tool that will be used to:

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

At Step 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 onground 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 MEL process, makes recommendations for improvement and addressing knowledge gaps, and enables the revision or refreshing of the CAP.



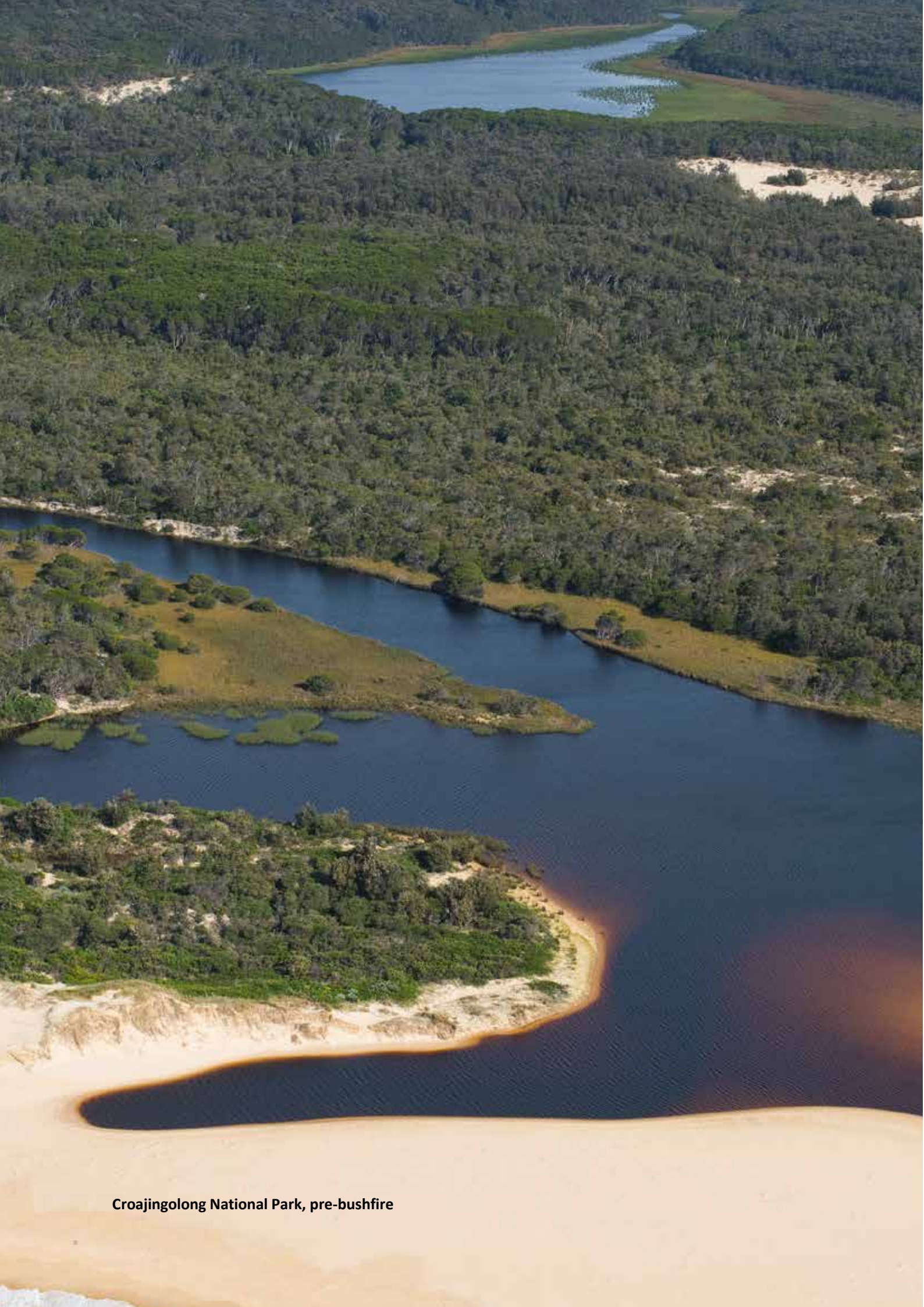
Step 7(a)
During the development of the CAP, interim performance measures are identified for key strategy results.

Step 7(b)
The MEL 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 CAP Evaluation and Learning 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.



Croajingolong National Park, pre-bushfire

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 onground threat mitigation or restoration treatments. Some prioritisation of onground 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 onground 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.

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 Protection of Aboriginal Cultural Heritage procedure*).

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 onground threat mitigation actions, monitoring actions, or foundational actions such as community engagement, research or policy change.

Detailed project planning will include consideration of logistic issues including access, potential impact on cultural heritage or natural values and operational safety, and may result in a refinement of resource requirements. Detailed project planning and procurement will be undertaken using standard procedures.

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 Learning Plan (Section 7.2) and in response to emerging issues. Revision of this Conservation Action Plan may lead to a restructure of conservation strategies, including the amendment of results chains and their underlying assumptions and a refinement of specific on-ground activities.

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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 East Gippsland Parks Landscape

Park name	Reserve type	Area (ha)
Alfred National Park	National Park - Schedule 2, National Parks Act	3021
Arte River F.R.	Nature Conservation Reserve - Flora Reserve	123
Bald Hills Road B.R.	Natural Features Reserve - Bushland Reserve	18
Bemm River S.R.	Natural Features Reserve - Scenic Reserve	621
Bendoc N.C.R.	Nature Conservation Reserve	233
Beware Reef M.S.	Marine Sanctuary – Schedule 8, National Parks Act	220
Bidwell E.A.	Education Area	355
Boggy Creek N.C.R.	Nature Conservation Reserve	265
Bonanza Gully H.A.	Historic Reserve	15
Brodribb F.R.	Nature Conservation Reserve - Flora Reserve	2761
Brodribb River F.F.R.	Nature Conservation Reserve - Flora and Fauna Reserve	46
Buchan (AT) Cave Reserve	Natural Features Reserve - Cave Reserve	294
Buchan B.R.	Natural Features Reserve - Bushland Reserve	18
Buchan Caves Reserve	Natural Features Reserve - Cave Reserve	2
Budgee Budgee B.R.	Natural Features Reserve - Bushland Reserve	10
Bumberrah B.R.	Natural Features Reserve - Bushland Reserve	1.5
Cabbage Tree Creek F.R.	Nature Conservation Reserve - Flora Reserve	1700
Cann River B.R.	Natural Features Reserve - Bushland Reserve	10
Cape Conran Coastal Park	Other Park - Schedule 3, National Parks Act	11 576
Cape Howe M.N.P	Marine National Park - Schedule 7, National Parks Act	4053
Cobon N.C.R.	Nature Conservation Reserve	665
Colquhoun R.P.	Regional Park - not scheduled under National Parks Act	3452
Combienbar River N.C.R.	Nature Conservation Reserve	602
Coopracambra National Park	National Park - Schedule 2, National Parks Act	38 491
Croajingolong National Park	National Park - Schedule 2, National Parks Act	88 466
Croajingolong N.P. (addition)	Other	27
Cutfinger E.A.	Education Area	316
Dawson-Murrindal N.C.R.	Nature Conservation Reserve	3193
Deddick River SS.R.	Natural Features Reserve - Streamside Reserve	35
Delegate River SS.R.	Natural Features Reserve - Streamside Reserve	5.5
Detarka B.R.	Natural Features Reserve - Bushland Reserve	12
Dicksons Cave Reserve	Natural Features Reserve - Cave Reserve	1.5
Errinundra National Park	National Park - Schedule 2, National Parks Act	40 090
Ewing Morass W.R.	Natural Features Reserve - Wildlife Reserve (hunting)	6819
Fairy Dell F.R.	Nature Conservation Reserve - Flora Reserve	66

Park name	Reserve type	Area (ha)
First and Second Islands F.R.	Nature Conservation Reserve - Flora Reserve	26
Gabo Island Lighthouse Reserve	Lighthouse Reserve	159
Golden Gully Machinery Site H.A.	Historic Reserve	65
Goodwin Creek B.R.	Natural Features Reserve - Bushland Reserve	9.5
Green Hills N.C.R.	Nature Conservation Reserve	517
Kanni F.R.	Nature Conservation Reserve - Flora Reserve	41
Lake Corringle W.R.	Natural Features Reserve - Wildlife Reserve (hunting)	926
Lake Curlip W.R.	Natural Features Reserve - Wildlife Reserve (hunting)	1037
Lake Tyers S.P.	State Park - Schedule 2B, National Parks Act	8693
Lakes Entrance – Lake Tyers C.R.	Coastal Reserve	165
Lind National Park	National Park - Schedule 2, National Parks Act	1359
Little Bog Creek F.F.R.	Nature Conservation Reserve - Flora and Fauna Reserve	346
Lower Cann River N.C.R.	Nature Conservation Reserve	445
Lower Errinundra N.C.R	Nature Conservation Reserve	354
Mallacoota B.R.	Natural Features Reserve - Bushland Reserve	29
Maramingo Creek F.R.	Nature Conservation Reserve - Flora Reserve	535
Marlo Coastal Reserve (contains Corringle Foreshore Reserve)	Coastal Reserve	584
Martins Creek N.C.R.	Nature Conservation Reserve	6546
Martins Creek S.R.	Natural Features Reserve - Scenic Reserve	93
Melwood E.A.	Education Area	232
Mitchell River National Park	National Park - Schedule 2, National Parks Act	14 386
Mossiface B.R.	Natural Features Reserve - Bushland Reserve	14
Mottle Range F.R.	Nature Conservation Reserve - Flora Reserve	165
Mount Bendock B.R.	Natural Features Reserve - Bushland Reserve	163
Mount Delegate S.R.	Natural Features Reserve - Scenic Reserve	293
Mount Elizabeth N.C.R.	Nature Conservation Reserve	5231
Mount Raymond R.P.	Regional Park - not scheduled under National Parks Act	755
Mount Stewart N.C.R.	Nature Conservation Reserve	1622
Mount Stewart N.F.S.R.	Natural Features Reserve - Natural Features and Scenic Reserve	312
Murrindal & Lilly Pilly Cave Reserve	Natural Features Reserve - Cave Reserve	95
Murrindal F.R.	Nature Conservation Reserve - Flora Reserve	229
Peach Tree Creek Reserve	Natural Features Reserve - Cave Reserve	3.9
Point Hicks Lighthouse Reserve	Lighthouse Reserve	141
Point Hicks Marine National Park	Marine National Park - Schedule 7, National Parks Act	3802
Potholes Cave Reserve	Natural Features Reserve - Cave Reserve	72

Park name	Reserve type	Area (ha)
Sardine Creek E.A.	Education Area	249
Sarsfield B.R.	Natural Features Reserve - Bushland Reserve	2.1
Serpentine Creek E.A.	Education Area	523
Sinnotts	Other	64
Snowy River National Park	National Park - Schedule 2, National Parks Act	114 674
St George Plain F.R.	Nature Conservation Reserve - Flora Reserve	408
Tabberabbera N.C.R.	Nature Conservation Reserve	191
Tambo B.R.	Natural Features Reserve - Bushland Reserve	1.8
Tara Range Park	Other Park - Schedule 3, National Parks Act	7618
The Gap S.R.	Natural Features Reserve - Scenic Reserve	409
The Glen F.R.	Nature Conservation Reserve - Flora Reserve	11
The Pyramids Cave Reserve	Natural Features Reserve - Cave Reserve	53
Thirty-Two Mile N.C.R.	Nature Conservation Reserve	513
Timbarra River South N.C.R.	Nature Conservation Reserve	1232
Tonghi Creek SS.R.	Natural Features Reserve - Streamside Reserve	9.7
Victoria Star Mine H.A.	Historic Reserve	40
W Tree Falls N.F.S.R.	Natural Features Reserve - Natural Features and Scenic Reserve	69
Wallagaraugh River SS.R.	Natural Features Reserve - Streamside Reserve	10
William Hunter F.R.	Nature Conservation Reserve - Flora Reserve	2.7
Wilsons Cave Reserve	Natural Features Reserve - Cave Reserve	5.8
Wingan River West N.C.R.	Nature Conservation Reserve	266
Wiseleigh B.R.	Natural Features Reserve - Bushland Reserve	8.4
Wombat Creek N.C.R.	Nature Conservation Reserve	688
Wood Point F.R.	Nature Conservation Reserve - Flora Reserve	47
Wulgulmerang Creek B.R.	Natural Features Reserve - Bushland Reserve	39
Wy Yung I17 B.R.	Natural Features Reserve - Bushland Reserve	208
Wy Yung I18 B.R.	Natural Features Reserve - Bushland Reserve	8.7
Wy Yung I19 B.R.	Natural Features Reserve - Bushland Reserve	23

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]
African Boxthorn	*Lycium ferocissimum*				Weed	High Risk
African Lovegrass	*Eragrostis curvula*				Weed	Very High Risk
Agile Antechinus	*Antechinus agilis*					
Alpine Rush	*Juncus brevibracteus*		Endangered			
Alpine Spiny Crayfish	*Eustacus crassus*		Endangered	Fire, Water, Visitors		
Asparagus Fern	*Asparagus scandens*				Weed	Very High Risk
Austral Sarsaparilla	*Smilax australis*					
Australasian Bittern	*Botaurus poiciloptilus*	Endangered	Critically endangered	Fire, Water, Predation		
Australian Anchor Plant	*Discaria pubescens*		Critically endangered	Fire, Weeds, Herbivores		
Australian Fur Seal	*Arctocephalus pusillus doriferus*					
Australian Gannet	*Morus serrator*					
Australian Raven	*Corvus coronoides*					
Azure Kingfisher	*Alcedo azurea*					
Banana Passionfruit	*Passiflora tarminiana*				Weed	Very High Risk
Bantam Bush-pea	*Pultenaea parrisiae*	Vulnerable				
Basket Willow	*Salix X rubens*					
Bathurst Burr	*Xanthium spinosum*				Weed	Medium Risk
Beach Daisy	*Arctotheca populifolia*				Weed	High Risk
Beard Heath	*Leucopogon spp.*					
Bell Miner	*Manorina melanophrys*					
Bent Pomaderris	*Pomaderris sericea*	Vulnerable	Critically endangered	Fire, Weeds		
Betka Bottlebrush	*Callistemon kenmorrisonii*	Vulnerable	Critically endangered	Fire		
Billygoat Daisy-bush	*Olearia curticoma*		Critically endangered			
Binung	*Christella dentata*		Critically endangered			
Black Bittern	*Ixobrychus flavicollis australis*		Endangered			
Black Nightshade	*Solanum nigrum s.l.*				Weed	Medium Risk
Black Rat	*Rattus rattus*				Introduced	
Black-spined Urchin	*Centrostephanus rodgersii*					
Black Wattle	*Acacia mearnsii*					
Blackberry	*Rubus fruticosus spp. agg.*				Weed	High Risk
Black-faced Monarch	*Monarcha melanopsis*					
Blackfellows' Hemp	*Androcalva rossii*		Critically endangered			
Black-lip Abalone	*Haliotis rubra*					
Blackwood	*Acacia melanoxylon*					
Blue Groper	*Achoerodus viridis*					

[2] EPBC = National status under the *Environment Protection and Biodiversity Conservation Act 1990*
FFG = Victorian status under the *Flora and Fauna Guarantee Act 1988*

[3] Priority actions specified in recovery plans (EPBC Act) or action statement 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]
Blue Mountains Tree Frog	*Litoria citropa*					
Blue Periwinkle	*Vinca major*				Weed	High Risk
Blue-throat Wrasse	*Notolabrus tetricus*					
Blue-tongue Greenhood	*Pterostylis oreophila*	Critically endangered				
Bogong Moth	*Agrotis infusa*					
Boneseed	*Chrysanthemoides monilifera*				Weed	High Risk
Bonnet Orchid	*Cryptostylis erecta*		Endangered			
Bottlenose Dolphin	*Tursiops truncatus*					
Bower Wattle	*Acacia subporosa*		Critically endangered			
Bridal Creeper	*Asparagus asparagoides*				Weed	High Risk
Brown Goshawk	*Accipiter fasciatus*					
Brown Rat	*Rattus norvegicus*				Introduced	
Brown Trout	*Salmo trutta*				Introduced	
Brush-tailed Rock-wallaby	*Petrogale penicillata*	Vulnerable	Critically endangered	Fire, Predation		
Buchan Pomaderris	*Pomaderris buchanensis*		Critically endangered			
Buff Hazelwood	*Symplocos thwaitesii*		Critically endangered	Fire, Weeds, Herbivores		
Bugloss	*Anchusa arvensis*				Weed	Medium Risk
Cabbage Tree Palm	*Livistona australis*		Critically endangered			
Californian Poppy	*Eschscholzia californica*				Weed	Moderately High Risk
Cann Galaxia	*Galaxias sp. 17 'Cann'*					
Cann Spiny Crayfish	*Euastacus sp. 2*					
Cape Gooseberry	*Physalis peruviana*				Weed	Moderately High Risk
Cape Ivy	*Delairea odorata*				Weed	Very High Risk
Cape Wattle	*Paraserianthes lophantha subsp. lophantha*				Weed	High Risk
Carp	*Cyprinus carpio*				Introduced	
Caspian Tern	*Hydroprogne caspia*		Vulnerable			
Castor Oil Plant	*Ricinus communis*				Weed	Moderately High Risk
Cat	*Felis catus*				Introduced	
Cattle	*Bos taurus*				Introduced	
Cattle Egret	*Ardea ibis*					
Cherry Ballart	*Exocarpos cupressiformis*					
Chilean Cestrum	*Cestrum parqui*				Weed	High Risk
Chytrid fungus	*Batrachochytrium dendrobatidis*				Disease	
Claytons Spiny Crayfish	*Euastacus claytoni*		Endangered			
Clematis	*Clematis spp.*					
Climbing Bent-grass	*Deyeuxia ramosa*		Vulnerable			
Clustered Darwinia	*Darwinia camptostylis*		Vulnerable			
Coast Beard-heath	*Leucopogon parviflorus*					
Coastal Gladiolus	*Gladiolus gueinzii*				Weed	Very High Risk
Colquhoun Grevilliea	*Grevillea celata*	Vulnerable	Critically endangered	Fire, 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]
Common Dipogon	*Dipogon lignosus*				Weed	Very High Risk
Common Dolphin	*Delphinus delphis*					
Common Kelp	*Ecklonia radiata*					
Common Saw Shark	*Pristiophorus cirratus*					
Common Soapwort	*Saponaria officinalis*				Weed	Moderately High Risk
Common Tern	*Sterna hirundo*					
Cotoneaster Pomaderris	*Pomaderris cotoneaster*	Endangered	Critically endangered	Fire, Weeds, Herbivores, Visitors		
Cox's Gudgeon	*Gobiomorphus coxii*		Endangered			
Crayweed	*Phyllospora comosa*					
Crimson Rosella	*Platycercus elegans*					
Dainty Bitter-cress	*Cardamine tryssa*		Critically endangered			
Deddick Blue-box	*Eucalyptus baueriana subsp. deddickensis*		Critically endangered			
Dendy's Toadlet	*Pseudophryne dendyi*					
Devious Bent-grass	*Deyeuxia decipiens*		Endangered			
Diamond Python	*Morelia spilota spilota*		Critically endangered	Fire, Predation, Visitors		
Dingo	*Canis lupus dingo*		Vulnerable	Fire, Predation		
Domestic Dog	*Canis lupus familiaris*				Introduced	
Dusky Antechinus	*Antechinus swainsonii*					
Dwarf Brunoniella	*Brunoniella pumilio*		Critically endangered			
Dwarf Zieria	*Zieria littoralis*		Critically endangered			
East Gippsland Galaxia	*Galaxias aequipinnis*		Critically endangered			
East Gippsland Spiny Crayfish	*Euastacus bidawalus*		Vulnerable			
Eastern Australian Salmon	*Arripis trutta*					
Eastern Bristlebird	*Dasyornis brachypterus*	Endangered	Critically endangered	Fire, Weeds, Predation, Herbivores, Visitors		
Eastern Broad-nosed Bat	*Scotorepens orion*					
Eastern Curlew	*Numenius madagascariensis*	Critically endangered	Critically endangered			
Eastern Great Egret	*Ardea modesta*		Vulnerable			
Eastern Mosquitofish	*Gambusia holbrooki*				Introduced	
Eastern Reef Egret	*Egretta sacra*					
Eastern Rock Lobster	*Sagmariasus verreauxi*					
Eastern She-oak Skink	*Cyclodomorphus michaeli*		Critically endangered	Fire, Predation		
Empire Gudgeon	*Hypseleotris compressa*		Critically endangered	Water, Visitors		
Emu	*Dromaius novaehollandiae*					
English Broom	*Cytisus scoparius*				Weed	High Risk
Erect Violet	*Hybanthus vernonii subsp. vernonii*		Vulnerable			

Common name	Scientific name	Values: Conservation status[2]		Relevant CAP strategy related to TSP Actions[3]	Threat: Risk rating	
		EPBC	FFG		Type	Rating[4]
Errinundra Pepper	*Tasmannia xerophila subsp. robusta*		Endangered			
European Fan Worm	*Sabella spallanzanii*				Introduced	
European Fox	*Vulpes vulpes*				Introduced	
European Shore Crab	*Carcinus maenas*				Introduced	
Fairies' Aprons	*Utricularia dichotoma s.s.*					
Fairy Prion	*Pachyptila turtur*	Vulnerable				
Fairy Tern	*Sternula nereis nereis*	Vulnerable	Critically endangered	Water, Predation, Visitors		
Fireweed	*Senecio spp.*				Weed	Very High Risk
Flathead	*Platycephalus spp.*					
Flax-leaved Broom	*Genista linifolia*				Weed	Very High Risk
Fleabane	*Erigeron spp.*				Weed	Moderately High Risk
Forest Leek-orchid	*Prasophyllum sylvestre*		Endangered			
Forrester's Bottlebrush	*Callistemon forresterae*	Vulnerable	Endangered	Weeds, Herbivores		
Gang-gang Cockatoo	*Callocephalon fimbriatum*	Endangered				
Geebung	*Persoonia spp.*		Endangered			
Genoa Grevillea	*Grevillea parvula*		Endangered			
Genoa River Correa	*Correa lawrenceana var. genoensis*	Endangered	Critically endangered	Fire, Weeds		
Genoa Spider-orchid	*Caladenia ancylosa*		Critically endangered			
Giant Burrowing Frog	*Heleioporus australiacus*	Vulnerable	Critically endangered	Fire		
Giant Kelp	*Macrocystis pyrifera*					
Gippsland Banksia	*Banksia croajingolensis*		Critically endangered			
Gippsland Peppermint	*Eucalyptus croajingolensis*					
Gloomy Octopus	*Octopus tetrichus*					
Glossy Black Cockatoo	*Calyptorhynchus lathami lathami*		Critically endangered	Fire, Visitors		
Glossy Grass Skink	*Pseudemoia rawlinsoni*		Endangered			
Goat	*Capra hircus*				Introduced	
Gorse	*Ulex europaeus*					
Granite Grevillea	*Grevillea neurophylla subsp. fluviatilis*		Endangered			
Grass Trees	*Xanthorrhoea spp.*					
Grayling	*Prototroctes maraena*	Vulnerable	Endangered	Water, Visitors		
Great Mullein	*Verbascum thapsus subsp. thapsus*				Weed	Medium Risk
Greater Crested Tern	*Thalasseus bergii*					
Greater Glider	*Petauroides volans*	Vulnerable	Vulnerable	Fire, Predation		
Green and Golden Bell Frog	*Litoria aurea*	Vulnerable				
Green Turtle	*Chelonia mydas*	Vulnerable		Water, Predation, Visitors, Climate		
Grey-headed Flying Fox	*Pteropus poliocephalus*	Vulnerable	Vulnerable	Visitors		
Ground Parrot	*Pezoporus wallicus wallicus*		Endangered			

Common name	Scientific name	Values: Conservation status[2]		Relevant CAP strategy related to TSP Actions[3]	Threat: Risk rating	
		EPBC	FFG		Type	Rating[4]
Growling Grass Frog	*Litoria raniformis*	Vulnerable	Vulnerable	Weeds, Predation		
Gummy Shark	*Mustelus antarcticus*					
Haswell's Froglet	*Paracrinia haswelli*					
Heath Spider-orchid	*Caladenia peisleyi*		Endangered			
Hemlock	*Conium maculatum*				Weed	Moderately High Risk
Hickory Wattle	*Acacia penninervis var. penninervis*		Vulnerable			
Hog Deer	*Axis porcinus*				Introduced	
Holly	*Ilex aquifolium*				Weed	Very High Risk
Honeysuckle	*Leycesteria formosa*				Weed	Very High Risk
Hooded Plover	*Thinornis cucullatus*	Vulnerable	Vulnerable	Predation, Visitors		
Hooker's Tussock-grass	*Poa hookeri*		Endangered			
Horehound	*Marrubium vulgare*				Weed	High Risk
Horse	*Equus caballus*				Introduced	
House Mouse	*Mus musculus*				Introduced	
Humpback Whale	*Megaptera novaeangliae*		Critically endangered	Visitors		
Japanese Honeysuckle	*Lonicera japonica*				Weed	Very High Risk
Japanese Kelp	*Undaria pinnatifida*					
Kerrawang	*Commersonia dasyphylla*		Critically endangered			
Kikuyu Grass	*Cenchrus clandestinus*				Weed	Very High Risk
Killer Whale	*Orcinus orca*					
King George Whiting	*Sillaginodes punctatus*					
King Greenhood	*Pterostylis baptistii*		Critically endangered			
Kybean Wattle	*Acacia kybeanensis*		Vulnerable			
Lace Monitor	*Varanus varius*		Endangered			
Large Brown Tree Frog	*Litoria littlejohni*	Vulnerable	Critically endangered	Fire, Weeds, Predation		
Latham's Snipe	*Gallinago hardwickii*					
Laughing Kookaburra	*Dacelo novaeguineae*					
Leaf Green Tree Frog	*Litoria phyllochroa*					
Leafless Tongue-orchid	*Cryptostylis hunteriana*	Vulnerable	Endangered			
Leatherback Turtle	*Dermochelys coriacea*	Endangered	Critically endangered	Water, Predation, Visitors, Climate		
Lilly Pilly	*Syzygium smithii*					
Limestone Blue Wattle	*Acacia caerulescens*	Vulnerable	Endangered	Weeds, Visitors		
Little Penguin	*Eudyptula minor*					
Little Raven	*Corvus mellori*					
Little Tern	*Sternula albifrons*		Critically endangered	Predation, Visitors		
Lizard Orchid	*Burnettia cuneata*		Endangered			
Long-footed Potoroo	*Potorous longipes*	Endangered	Endangered	Fire, Predation		
Long-nosed Bandicoot	*Perameles nasuta*					

Common name	Scientific name	Values: Conservation status[2]		Relevant CAP strategy related to TSP Actions[3]	Threat: Risk rating	
		EPBC	FFG		Type	Rating[4]
Long-nosed Potoroo	*Potorous tridactylus tridactylus*	Vulnerable	Vulnerable	Fire, Predation		
Loquat	*Eriobotrya japonica*				Weed	Moderately High Risk
Madeira Vine	*Anredera cordifolia*				Weed	High Risk
Madeira Winter-cherry	*Solanum pseudocapsicum*				Weed	High Risk
Maiden's Wattle	*Acacia maidenii*		Critically endangered	Fire, Weeds		
Mallacoota Burrowing Crayfish	*Engaeus mallacoota*		Critically endangered	Water, Visitors		
Maori Octopus	*Octopus maorum*					
Maroon Leek-orchid	*Prasophyllum frenchii*	Endangered	Endangered	Weeds, Herbivores, Visitors		
Martin's Toadlet	*Uperoleia martini*		Critically endangered	Weeds, Climate		
McDowall's Galaxia	*Galaxias mcdowalli*		Critically endangered			
Messmate Stringybark	*Eucalyptus obliqua*					
Mirror Bush	*Coprosma repens*				Weed	Very High Risk
Monaro Spider-orchid	*Caladenia oreophila*		Critically endangered			
Mountain Ash	*Eucalyptus regnans*					
Mullet	*Myxus spp.*					
Musk Duck	*Biziura lobata*		Vulnerable			
Myrtle Rust	*Austropuccinia psidii*				Disease	
Nadgee Stringybark	*Eucalyptus sp. aff. globoidea (East Gippsland)*					
Native Quince	*Alectryon subcinereus*		Critically endangered			
Neptune's Necklace	*Hormosira banksii*					
Net-veined Wattle	*Acacia subtilinervis*		Critically endangered			
New Zealand Fur Seal	*Arctocephalus forsteri*					
New Zealand Screw Shell	*Maoricolpus roseus*				Introduced	
New Zealand Sea Star	*Patiriella regulari*				Introduced	
Northern Pacific Sea Star	*Asterias amurensis*				Introduced	
One-leaf Cape-tulip	*Moraea flaccida*				Weed	High Risk
Orange-blossom Orchid	*Sarcochilus falcatus*		Critically endangered			
Orbost Spiny Crayfish	*Orbost Spiny Crayfish*		Endangered	Water		
Oriental Weatherloach	*Misgurnus anguillicaudatus*				Introduced	
Ox-eye Daisy	*Leucanthemum vulgare*				Weed	High Risk
Panic Veldt-grass	*Ehrharta erecta var. erecta*				Weed	Very High Risk
Paterson's Curse	*Echium plantagineum*				Weed	High Risk
Pelican	*Pelecanus conspicillatus*					
Pied Cormorant	*Phalacrocorax varius*					
Pied Oystercatcher	*Haematopus longirostris*					

Common name	Scientific name	Values: Conservation status[2]		Relevant CAP strategy related to TSP Actions[3]	Threat: Risk rating	
		EPBC	FFG		Type	Rating[4]
Pig	*Sus scrofa*				Introduced	
Pilchards	*Clupeidae spp.*					
Pink Mountain-correa	*Correa lawrenceana var. cordifolia*		Vulnerable			
Platypus	*Ornithorhynchus anatinus*					
Pobblebonk Frog	*Limnodynastes dumerilii inularis*					
Pointed Greenhood	*Pterostylis acuminata*		Endangered			
Powerful Owl	*Ninox strenua*		Vulnerable	Fire, Visitors		
Prince-of-Wales Feather-moss	*Leptodon smithii*		Critically endangered			
Pungent Spider-orchid	*Caladenia osmera*		Endangered			
Purple Sea Urchin	*Heliocidaris erythrogramma*					
Phythophthora	*Phytophthora cinnamomi*				Disease	
Radiata Pine	*Pinus radiata*				Weed	Very High Risk
Ragwort	*Senecio jacobaea*				Weed	Moderately High Risk
Red-ink Weed	*Phytolacca octandra*				Weed	High Risk
Regent Honeyeater	*Anthochaera phrygia*	Critically endangered	Critically endangered	Fire		
River Beard-heath	*Leucopogon riparius*					
Rock Daisy	*Brachyscome petrophila*					
Rock Orchid	*Thelychiton speciosus*		Critically endangered			
Rough Eyebright	*Euphrasia scabra*		Endangered	Fire, Weeds, Herbivores, Visitors		
Rough-barked Manna Gum	*Eucalyptus viminalis*					
Roundsnout Galaxia	*Galaxias terenasus*		Critically endangered			
Ruddy Turnstone	*Arenaria interpres*		Endangered			
Sambar Deer	*Rusa unicolor*				Introduced	
Saw Banksia	*Banksia serrata*					
School Shark	*Galeorhinus galeus*	Conservation dependent				
Scotch Thistle	*Onopordum acanthium subsp. acanthium*				Weed	Lower Risk
Sea Spurge	*Euphorbia paralias*				Weed	High Risk
Sea Squirt	*Pyura stolonifera*					
Short-leaf Geebung	*Persoonia brevifolia*		Critically endangered			
Short-tailed Shearwater	*Puffinus tenuirostris*					
Shy Albatross	*Thalassarche cauta*	Vulnerable	Endangered			
Silver Banksia	*Banksia marginata*					
Silver Gull	*Chroicocephalus novaehollandiae*					
Slender Leek-orchid	*Prasophyllum parviflorum*		Endangered			
Slender Lignum	*Muehlenbeckia gracillima*		Critically endangered			
Slender Mudgrass	*Pseudoraphis paradoxa*		Endangered			
Slender Myoporum	*Myoporum floribundum*		Endangered	Visitors		

Common name	Scientific name	Values: Conservation status[2]		Relevant CAP strategy related to TSP Actions[3]	Threat: Risk rating	
		EPBC	FFG		Type	Rating[4]
Smoky Mouse	*Pseudomys fumeus*	Endangered	Endangered	Fire, Weeds, Predation		
Smooth Tea-tree	*Leptospermum glabrescens*					
Snapper	*Chrysophrys auratus*					
Snow Gum	*Eucalyptus pauciflora*					
Snowy River Daisy	*Brachyscome riparia*		Endangered			
Snowy River Phebalium	*Phebalium glandulosum subsp. Riparium*		Vulnerable			
Snowy River Pomaderris	*Pomaderris oblongifolia*		Endangered			
Snowy River Westringia	*Westringia cremnophila*	Vulnerable	Endangered	Climate		
Sooty Owl	*Tyto tenebricosa tenebricosa*		Endangered	Fire, Visitors		
Sooty Oystercatcher	*Haematopus fuliginosus*					
Southern Barred Frog	*Mixophyes balbus*	Vulnerable	Critically endangered	Weeds, Predation, Visitors		
Southern Boobook	*Ninox novaeseelandiae*					
Southern Brown Bandicoot	*Isoodon obesulus obesulus*	Endangered	Endangered			
Southern Bull Kelp	*Durvillaea amantheia*					
Southern Elephant Seal	*Mirounga leonina*	Vulnerable		Visitors		
Southern Emu Wren	*Stipiturus malachurus*					
Southern Hulafish	*Trachinops caudimaculatus*					
Southern Right Whale	*Eubalaena australis*	Endangered	Endangered	Water, Visitors		
Southern Rock Lobster	*Jasus edwardsii*					
Southern Saw Shark	*Pristiophorus nudipinnis*					
Spearmint	*Mentha spicata*				Weed	Moderately High Risk
Spectacled Monarch	*Symposiachrus gouldii*					
Sperm Whale	*Physeter macrocephalus*					
Spiny-headed Mat-rush	*Lomandra longifolia*					
Spot-tailed Quoll	*Dasyurus maculatus maculatus*	Endangered	Endangered	Fire, Predation		
Spotted Quail Thrush	*Cinclosoma punctatum*					
St John's Wort	*Hypericum spp.*				Weed	High Risk
Star Xanthosia	*Xanthosia stellata*		Critically endangered			
Sun Orchid	*Thelymitra spp.*					
Superb Fairy Wren	*Malurus cyaneus*					
Superb Lyrebird	*Menura novaehollandiae*					
Swamp Crane's-bill	*Geranium neglectum*		Endangered			
Swamp Rat	*Rattus lutreolus*					
Swamp Skink	*Lissolepis coventryi*		Endangered			
Swamp Sun-orchid	*Thelymitra incurva*		Critically endangered			
Sweet Briar	*Rosa rubiginosa*				Weed	High Risk
Swift Parrot	*Lathamus discolor*	Critically endangered	Critically endangered	Fire, 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]
Tailor	*Pomatomus saltatrix*					
Taiwan Lily	*Lilium formosanum*				Weed	Moderately High Risk
Tall Plume-grass	*Dichelachne robusta*		Vulnerable			
Thick-lipped Spider-orchid	*Caladenia tessellata*	Vulnerable		Fire, Weeds, Herbivores, Visitors		
Thistle	*Carthamus spp.*				Weed	Lower Risk
Thorn-apple	*Datura spp.*				Weed	Moderately High Risk
Tiger Orchid	*Diuris sulphurea*					
Tiny Spyridium	*Spyridium cinereum*		Endangered			
Tree Lupin	*Lupinus arboreus*				Weed	Moderately High Risk
Tullach Ard Grevillea	*Grevillea polychroma*		Endangered			
Turquoise Parrot	*Neophema pulchella*		Vulnerable			
Tutsan	*Hypericum androsaemum*				Weed	High Risk
Twiggy Lignum	*Muehlenbeckia diclina*					
Twin-flower Tea-tree	*Leptospermum emarginatum*		Endangered			
Tyler's Toadlet	*Uperoleia tyleri*					
Upright Pomaderris	*Pomaderris virgata*		Critically endangered			
Variable Spiny Crayfish	*Euastacus yanga*		Endangered			
Veined Pomaderris	*Pomaderris costata*		Endangered			
Violet Nightshade	*Solanum silvestre*		Critically endangered			
Viper's Bugloss	*Echium vulgare*				Weed	Medium Risk
Viscid Daisy-bush	*Olearia viscosa*		Critically endangered			
Wandering Albatross	*Diomedea exulans*	Vulnerable	Critically endangered	Visitors		
Wandering Creeper	*Tradescantia fluminensis*					
Wedge Tailed Eagle	*Aquila audax*					
Wedge-tail Shearwater	*Puffinus pacificus*					
White Arum-lily	*Zantedeschia aethiopica*				Weed	Very High Risk
White Poplar	*Populus alba*				Weed	Medium Risk
White Willow	*Salix alba*				Weed	High Risk
White-bellied Sea Eagle	*Haliaeetus leucogaster*		Endangered	Visitors		
White-faced Storm Petrel	*Pelagodroma marina*		Endangered			
White-footed Dunnart	*Sminthopsis leucopus*		Vulnerable			
Whiting	*Sillago sp.*					
Willow	*Salix spp.*				Weed	Very High Risk
Winged Everlasting	*Ammobium alatum*		Critically endangered			
Wiry Wallaby-grass	*Plinthanthesis paradoxa*		Vulnerable			
Wombargo Wattle	*Acacia tabula*		Critically endangered			
Wonga Pidgeon	*Leucosarcia melanoleuca*					
Woolly Waterlilly	*Philydrum lanuginosum*		Endangered			

Common name	Scientific name	Values: Conservation status[2]		Relevant CAP strategy related to TSP Actions[3]	Threat: Risk rating	
		EPBC	FFG		Type	Rating[4]
Woolly Wattle	*Acacia lanigera var. gracilipes*		Vulnerable			
Yalmy Galaxia	*Galaxias sp. nov. 'Yalmy'*		Critically endangered			
Yam Daisy	*Microseris scapigera s.l.*					
Yawning Leek-orchid	*Prasophyllum chasmogamum*		Critically endangered			
Yellow Hyacinth-orchid	*Dipodium hamiltonianum*		Endangered	Herbivores		
Yellow Scad	*Trachurus novaezelandiae*					
Yellow-bellied Glider	*Petaurus australis*					
Yellow-bellied Water Skink	*Eulamprus heatwolei*					
Yellowfin Tuna	*Thunnus albacares*					
Yellow-nosed Albatross	*Thalassarche chlororhynchos*					
Yellow-tailed Black Cockatoo	*Calyptorhynchus funereus*					
Yertchuk	*Eucalyptus consideniana*					

Appendix C — Methodology for identifying conservation assets

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

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

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

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

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

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

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

Appendix D — Area and composition of conservation assets

Table C.1: Area of conservation assets

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

Conservation asset	EVD	EVC	Total (ha)
Dry Forest and Woodland	Ironbark / Box	Foothill Box Ironbark Forest	528.0
	Foothills Forest	Dry Valley Forest	180.7
		Shrubby Foothill Forest	607.9
		Valley Grassy Forest	2816.6
		Valley Slopes Dry Forest	93.8
		Foothills Forest EVD total	3699.2
	Forby Forest	Damp Sands Herb-rich Woodland	207.9
		Grassy Woodland	5477.7
		Lowland Herb-rich Forest	971.2
		Forby Forest EVD total	6656.9
	Grassy / Heathy / Dry Forest	Grassy Dry Forest	6446.0
		Heathy Dry Forest	779.4
		Shrubby Dry Forest	86 438.1
		Grassy / Heathy / Dry Forest EVD total	93 663.5
	Rocky Knoll	Blackthorn Scrub	2913.3
		River Escarpment Scrub	1556.8
		Rocky Outcrop Shrubland	1390.4
		Rocky Outcrop Shrubland / Rocky Outcrop Herbland Mosaic	176.5
		Rocky Knoll EVD total	6037.0
	Tall Mixed Forest (eastern)	Limestone Box Forest	2802.5
		Lowland Forest	71 994.7
		Tall Mixed Forest (eastern) EVD total	74 797.2
	Inland Plains Woodland	Plains Grassy Forest	42.5
		Plains Grassy Woodland	1.6
		Inland Plains Woodland EVD total	44.1
		Dry Forest and Woodlands total	**185 425.8**

Wet Forest and Rainforest	Moist Forest	Damp Forest	77 420.5
		Montane Damp Forest	426.7
		Shrubby Damp Forest	1766.6
		Tableland Damp Forest	1787.6
		Moist Forest EVD total	81 401.4
	Tall Mist Forest	Montane Wet Forest	8744.6
		Wet Forest	36 982.9
		Tall Mist EVD total	42 727.5
	Closed-forest	Coastal Vine-rich Forest	82.3
		Cool Temperate Rainforest	1281.1
		Cool Temperate Rainforest / Warm Temperate Rainforest Overlap	168.2
		Dry Rainforest	15.3
		Dry Rainforest / Warm Temperate Rainforest / Gallery Rainforest / Riparian Shrubland / Riverine Escarpment Scrub / Blackthorn Scrub Complex	151.6
		Gallery Rainforest	9.5
		Warm Temperate Rainforest	3092.9
		Closed Forest EVD total	4801.0
		Wet Forest and Rainforest Total	**128 929.8**
Heathland	Heathland (sands)	Banksia Woodland	23 450.9
		Clay Heathland	1105.0
		Coastal Sand Heath	616.3
		Sand Heath	6.9
		Wet Heathland	5157.4
		Heathland total	30 336.5
Riverine Forest and Woodland	Riparian (higher rainfall)	Riparian Forest	4673.0
		Riparian Shrubland	511.3
		Riparian (higher rainfall) EVD total	5184.3
	Damp Scrub	Riparian Scrub / Swampy Riparian Woodland Complex	7164.9
		Swamp Scrub	2.4
		Damp Scrub EVD total	7167.3

	Treed Swampy Wetland	Swampy Riparian Woodland	28.0
		Treed Swampy Wetland EVD total	28.30
		Riverine Forest and Woodland total	**12 379.9**
Subalpine	Alpine Treeless	Subalpine Treeless Vegetation	52.6
	High Altitude Shrubland / Woodland	Montane Dry Woodland	3205.7
		Montane Grassy Woodland	319.3
		Montane Riparian Thicket	4.5
		Montane Riparian Woodland	46.9
		Subalpine Woodland	489.8
		High Altitude Shrubland / Woodland EVD total	4066.1
		Subalpine total	**4118.7**
Estuarine and Coastal Wetland	Freshwater Wetland (ephemeral)	Wet Swale Herbland	778.1
	Freshwater Wetland (permanent)	Coastal Lagoon Wetland	645.0
		Water Body - Fresh	436.0
		Freshwater Wetland (permanent) EVD total	1081.0
	Saline Wetland	Brackish Sedgeland	194.5
		Coastal Saltmarsh	773.9
		Estuarine Wetland	231.0
		Saline Wetland EVD total	1199.4
		Estuarine and Coastal Wetland total	**3058.5**
Coastal (including Islands)	Coastal	Coast Banksia Woodland	3228.7
		Coastal Dune Scrub/Coastal Dune Grassland Mosaic	3100.5
		Coastal (including Islands) total	**6329.2**
Intertidal Reef			**11.6**
Subtidal Reef			**1040.4**
Soft Sediment			**6965.9**
Landscape total			**380 521.3**

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 characteristic of regionally appropriate historical benchmarks or other high-integrity reference states that support ecosystem and biodiversity persistence and are minimally impaired by threatening processes (IUCN 2022)

Appendix F — Risk assessment method

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

1 Identify threats to conservation outcomes

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

2 Classify threats

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

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

3 Develop threat management objectives

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

Table F.1: Scale definitions

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


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