

NATURE CONSERVATION STRATEGY

for parks and reserves
managed by
Parks Victoria

2021-2031



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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Front cover: Volunteers from the Field Naturalists Club of Victoria and staff from Parks Victoria check pitfall traps for reptiles and small mammals during fauna surveys in Annuello Flora and Fauna Reserve in 2019 (Kathryn Schneider).

Page 8: Great Cormorant, Mallacoota (David Paul, Museums Victoria); page 9: Rainbow Bee Eaters, Mitchell River NP (Grace Lewis, Museums Victoria); page 16: Yarra Ranges NP (PV); page 19: Murray Sunset NP (PV), Peron's Tree Frog, Sale Common (Rodney Start, Museums Victoria); Mount Buffalo NP (PV), Wilsons Promontory NP (PV), Flame Robins, Alpine NP (Heath Warwick, Museums Victoria), Weedy Seadragon (Museums Victoria), Grass-trees, Kinglake NP (PV); page 20: Burnt landscape, Martins Creek (Mark Norman); page 25: Burnt landscape, Croajingolong NP (Mark Norman), page 26: Black Summer fires, East Gippsland (Dale Appleton); page 27: Deer in Alpine NP (PV); page 29: The Choke, Murray River (Keith Ward); page 32: Eastern Water Dragon, Mitchell River NP (Mark Norman, Museums Victoria); page 33: Lake Albacutya (Kathryn Schneider), Outlet Creek, Wyperfeld NP (Kathryn Schneider); page 35: Hooded Plover, Mornington Peninsula NP (Beach-nesting Birds Program of BirdLife Australia); page 37: Bronzewing FFR burnt and unburnt (Kathryn Schneider); page 42: Grey-headed Flying Foxes, Yarra Bend Park (PV); page 44: Wilsons Promontory NP (PV); page 50: Warby-Ovens NP (Kagan Daanen-Vainisi); page 52: Mountain Creek Campsite, Alpine NP (PV); page 54: Duck Orchid, Croajingolong NP (Museums Victoria); page 57: Swordgrass Brown butterfly, Gippsland Lakes (Mark Norman, Museums Victoria). Back cover: Humpback Whale, off Cape Howe MNP (PV).

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Abbreviations

Bio2037	<i>Protecting Victoria's Environment – Biodiversity 2037 plan</i>
BOM	Bureau of Meteorology
CAP	Conservation Action Plan
CMA	Catchment Management Authority
DELWP	Department of Environment, Land, Water and Planning
GMA	Geometric Mean Abundance
ha	hectare
IUCN	International Union for the Conservation of Nature
MER	Monitoring, evaluation and reporting
LMS	Land Management Strategy
NCS	Nature Conservation Strategy
NP	National Park
PV	Parks Victoria
SDG	United Nations Sustainable Development Goal
SMP	Strategic Management Prospects
TFI	Tolerable Fire Interval
VTOCLS	Victorian Traditional Owners Cultural Landscapes Strategy

Victoria's Traditional Owners: recognition and working together

Parks Victoria recognises and respects the deep historical, physical and spiritual connections that Victoria's Traditional Owners have with the land, waters, plants and animals of their Country across the state.

At the time of European contact, Traditional Owner Nations had been maintaining their Country and natural resources for tens of thousands of years using long-held cultural practices. These practices encompassed land and water management across diverse landscapes and ecosystems. Plants and animals, fire and water were all actively managed for spiritual significance and values, health of Country and sustainable harvests.

The disruption, dislocation or attempted destruction of these societies and practices caused by European colonisation requires both acknowledgement and redress.

Through a range of legislative and strategic processes, Victoria's Traditional Owners and the Victorian state government are seeking this redress. This comes in the form of dialogue and agreements across self-determination, settlement, treaty and increasing formal recognition of Indigenous governance, Lore, customs and practices. The principles and objectives presented in the recently released *Victorian Traditional Owner Cultural Landscapes¹ Strategy* (VTOCLS, 2021) clearly articulate the expectations and aspirations of Victoria's Traditional Owners to lead and act in the protection, recovery and management of Country. The stated goals include much more active Traditional Owner leadership and participation in all areas of natural resource management.

The *Victorian Traditional Owner Cultural Landscapes Strategy* "frames Victorian Traditional Owner rights and interests and pathways for development in public forest and park planning and management" (p. 8), and in doing so:

- seeks the outcome that "Victorian Government policy, legislation and procedures enable and embed Traditional Owner knowledge and practice across all cultural landscapes" (p. 36), *and*
- "outlines a number of opportunities for collaboration and pilot programs that can develop, test and monitor both management outcomes and institutional relationships. The delivery of such projects should be a priority action arising out of the Cultural Landscape Strategy." (p. 54).

Parks Victoria, where invited and appropriate, welcomes the opportunities to join these Traditional Owner led processes and actions, and participate in knowledge sharing, collaborative arrangements and partnerships, shared practice and learnings, and involvement in networks, circles and/or groups.

We also fully support the strengthening of "two-way capacity" between Traditional Owners and Parks Victoria in the "application of Cultural Landscape Management on Country, To develop, manage and apply practice in contemporary settings" (p. 41). Across the organisation, Parks Victoria needs to build greater trust and relationships with Victoria's Traditional Owner Nations, to adapt, cede authority and increase cultural awareness, maturity and training. This includes that Parks Victoria's strategic and management planning processes (Land Management Strategy, Managing Country Together Framework, Park Management Plans and Conservation Action Planning) strongly align with the collective and individual strategies and plans of Traditional Owner Nations, including:

- Country Plans

¹ Cultural landscapes are defined as being "both material and symbolic and include Traditional Owner societies' unique worldview, ontology, history, institutions, practices and the networks of relationships between human and non-human animals, plants, ancestors, song lines, physical structures, trade routes and other significant cultural connections to Country." (VTOCLS, 2021, p. 55). Core to these cultural landscapes are the concepts of health of Country and recognition and respect for species, communities and practices of cultural significance.

- Joint Management Plans
- Strategies for cultural practices (e.g. cultural burning, cultural water, game, food and fibre)
- Sea Country strategies
- Biocultural² Diversity Strategy and
- Culturally valued species management plans.

The *Victorian Traditional Owner Cultural Landscapes Strategy* also stresses the need to develop collaborative pilots “to test institutional arrangements and practice development” (p. 41), and so that “learnings from such collaborative pilots are incorporated into government and Traditional Owner Corporations co-capacity” (p. 43). As a way to strengthen both relationships and capacity, Parks Victoria would fully welcome invitations to be a key partner on such pilots.

The nature conservation issues and actions presented here in the *Nature Conservation Strategy 2021-2031* (NCS) are Parks Victoria’s proposed approaches to many pressing threats to the health of Country and its plants and animals. It is presented as a starting point for shared conversations and actions with Victoria’s First Peoples, where strengths of Biocultural and western science knowledge and practices may be shared and applied to seek the best outcomes for nature, Country and community in challenging times.

Parks Victoria and its staff offer their deep respects to the Traditional Owners across Victoria, including our Aboriginal staff, and to elders, past, present and emerging.

² “Biocultural Knowledge, also known as Traditional Ecological Knowledge, incorporates the concept of biocultural diversity and encompasses the diversity of life in all its manifestations: biological, cultural and linguistic” (VTOCLS, 2021, p. 55).

Executive summary

The *Nature Conservation Strategy 2021-2031* (NCS) presented here sets out how Parks Victoria aims to conserve and protect nature on Victoria's parks estate. In presenting the strategy, we acknowledge and respect the rights and deep connection to Country of Victoria's Traditional Owners. The NCS is presented as a starting point for shared conversations and actions with Victoria's First Peoples and aims to better align with the expectations, aspirations, strategies and plans of Traditional Owner Nations for managing Country.

Parks contain the best of Victoria's natural riches and a dazzling array of animal and plant species, habitats, ecosystems, landscapes and seascapes. They are central to the cultures of Victoria's Traditional Owner Nations, our State's identity, our environmental systems, our leisure, our health and wellbeing, and our economy. However, we are facing unprecedented times and threats. Climate change is with us, here and now, and its impacts are intensifying. This was nowhere more evident than in the 2019-20 bushfire season with major loss of tall forests and rainforest, the death of countless animals and the destruction of their habitats. Although extraordinary, those conditions were no aberration: Victoria's climate is becoming hotter and drier with many more extreme fire danger days. Predictive models tell us that much more lies ahead. The changing climate will not only bring its own threats – it will make many existing threats worse. Invasive species, the legacy damage of earlier land uses, and increasing development and population pressures are likely to have greater impact as climate change puts more stress on our native flora and fauna and the ecosystems that support them.

Despite these mounting threats there is a way forward. Victorian nature has a future but it is at risk of major decline in health and condition, and potential losses of species and habitats. Our challenge is to minimise the losses and damage as far as possible by maximising the health and resilience of species and ecosystems, by responding rapidly with protection and restoration action when impacts do occur, and by giving nature its greatest capacity to survive, adapt and even thrive in unknown future states. The NCS 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.

The NCS provides direction to Parks Victoria staff, our key partners and all stakeholders on that path forward for the next ten years (2021-2031). It recognises that to meet the challenge ahead we need to greatly increase our protection and restoration action on the ground; we need to engage the public in conservation to involve all those with interests and skills to leverage our efforts; and we need to improve our capacities and preparations – in knowledge, planning and resourcing. Six broad strategies and related actions have been set out to achieve this:

- intensified action to combat rising threats
- new interventions to respond to major ecological change
- conservation flagships
- a connected and actively involved public
- capability to match the challenge
- ensuring park use is sustainable.

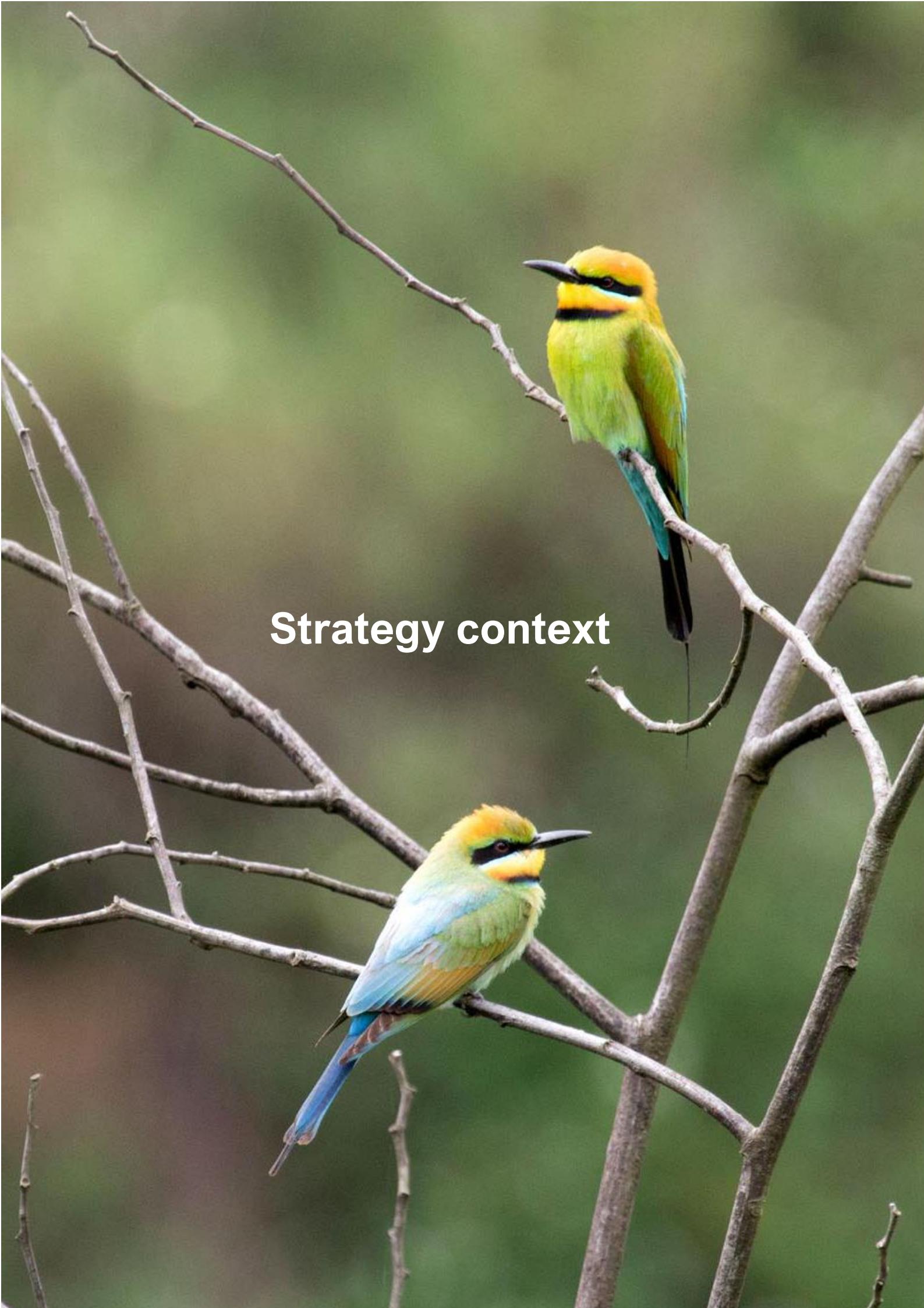
Outcomes are identified for each of the six strategies, and indicators and measures of progress will be further detailed in a subsequent implementation plan, aligned to measures and targets for *Protecting Victoria's Environment – Biodiversity 2037* (DELWP, 2017), the Victorian Government's statewide plan for biodiversity protection.

The *Nature Conservation Strategy 2021-2031* will be delivered in close collaboration with three key partners: Victoria's Traditional Owners, the Department of Environment, Land, Water and Planning (DELWP) and Victoria's Catchment Management Authorities. Parks Victoria will continue to build partnerships and collaborate with other government agencies, non-government organisations, and philanthropy, the university and research sector, citizen science and other community groups, the wider public and other visitors to achieve common objectives for the benefit of Victoria's rich natural estate.

How this Strategy is structured

The NCS uses a simple logic for the directions it sets out. Chapter 1 describes the *context* for the NCS including the operating environment, legislative obligations, government policy and the relationship to other plans. Chapter 2 briefly describes the *assets* that make up the natural riches in Victoria's parks system – plant and animal species, ecosystems, landscapes and marine environments. Chapter 3 identifies the major *threats* to those assets and provides examples that illustrate the impacts they are having on the health and condition of nature in our parks, particularly the current impacts and future risks from climate change. Chapter 4 forms the core of the NCS, setting out the *response* to the identified threats. It establishes desired *outcomes* for mitigating the threats, and the strategies and actions to achieve those outcomes. Chapter 5 outlines the outcome *measures* for evaluating the ultimate effectiveness of our nature conservation efforts.





Strategy context

1 Strategy context

1.1 Conservation is our mission

The first object of the *Parks Victoria Act 2018* requires Parks Victoria to:

protect, conserve and enhance Parks Victoria managed land³, including its natural and cultural values, for the benefit of the environment and current and future generations.

Under that Act and other legislative and international convention obligations Parks Victoria must protect and manage the parks estate, encompassing the best of Victoria's nature. In addition to its intrinsic value, conservation of nature on the parks estate also underpins the health and wellbeing of Victorians through providing ecosystem services, such as clean water, carbon storage, protection of coastal assets, and pollination services, as well as bringing significant mental health benefits.

In 2017, the Victorian state government released its biodiversity strategy, *Protecting Victoria's Environment – Biodiversity 2037* (DELWP, 2017). That strategy articulates the approaches required to support and protect Victoria's rich nature and flora and fauna. Its primary goals are:

- Victorians value nature
- Victoria's natural environment is healthy.

Parks Victoria is a central actor in both these goals, as the manager of the parks estate with a direct interface with around 100 million visitors annually. We are committed to pursuing these objectives and goals by working closely with Traditional Owners, the Department of Environment, Land, Water and Planning (DELWP), Catchment Management Authorities, other state and federal government agencies, non-government organisations, community groups and the public.

1.2 We all face an unprecedented challenge

Any large system of parks and reserves requires constant management action to deal with continuing threats and to remedy past damage. However, we now face an extraordinary challenge, posed by the clear and present dangers of accelerating climate change. The catastrophic fires and heat of the 2019-20 Australian Black Summer devastated many of our parks and reserves and drew global attention, but it was just the latest of numerous extreme bushfire seasons in Victoria and other states in recent times. Plant and animal populations and entire ecosystems are being stressed by increasing frequency of drought and extreme heat, with the added impacts of more severe bushfire seasons and more frequent extreme weather events such as storms, floods and extreme temperatures (hot and cold).

Dealing with the impacts of climate change is a formidable and unprecedented challenge in its own right, but it is exacerbated by other pressures on our natural environment including impacts of increasing pests and weeds, recent high population growth and expanding urban and coastal development. The COVID-19 pandemic has further disrupted the context in which we operate.

The future forms of nature across the parks estate may not necessarily end up reflecting the recent or older past, e.g. forests may transition to shrublands or open grassy woodlands. However, these transformations may be able to be managed in ways to ensure that nature is given its best chances to survive, adapt, evolve and even thrive, freed from those threats that can be managed.

³ The term 'land' is used in the Parks Victoria Act and this Strategy to include land, waterways and sea.

To be successful the NCS must confront this extraordinary context and the need for much more intensive, determined and consistent action. We will also need innovative interventions that in some cases depart from the conventional approaches of past park management. We will need to be able to respond rapidly to deal with great uncertainty and change, to protect and restore natural areas in increasingly critical conditions. Most importantly we will need to leverage Parks Victoria's own efforts by harnessing the passion, skills and resources of partners, stakeholders and the public working together to achieve clear and realistic objectives.

To this end the goal of the Strategy is:

Conserve nature in Victoria's parks in the face of unprecedented threats – through intensified action with partners, new techniques and increased community collaboration.

1.3 The legislative and policy context

The Parks Victoria *Nature Conservation Strategy 2021-2031* (NCS) is a ten-year program for preserving and managing the best of Victoria's natural assets as represented in the parks estate, in the context of the unprecedented challenges posed by climate change. Figure 1 presents the broader legislative, policy and planning framework in which the NCS sits.

The NCS supports the Victorian Government's commitment to Traditional Owner recognition, self-determination and governance, along with increased leadership and action in managing cultural landscapes and restoring health of Country. Parks Victoria is actively working to grow relationships and partnerships with Traditional Owners on restoring health of Country, recognising and aligning its strategies, processes and programs with the expectations and aspirations of Traditional Owners as expressed in the *Victorian Traditional Owners Cultural Landscapes Strategy* (VTOCLS, 2021), as well as in Country plans and strategies, Joint Management Plans, and specific strategies including *The Victorian Traditional Owner Cultural Fire Strategy* (The Victorian Traditional Owner Cultural Fire Knowledge Group, 2019) and *Traditional Owner Game Management Strategy* (Federation of Victorian Traditional Owner Corporations, 2021).

The strategy presented here is shaped by and aligns with other key policies and strategies: the *United Nations Sustainable Development Goals* (United Nations, 2015); *Australia's Strategy for Nature 2019-2030* (Commonwealth of Australia, 2019); the Victorian Government's statewide plan *Protecting Victoria's Environment: Biodiversity 2037* (DELWP, 2017), Parks Victoria's *Land Management Strategy* (PV, in prep.); and sectoral strategies for catchments, bushfire management, water and other partner's strategies. The Victorian Government has released *Victoria's Climate Change Strategy* (DELWP, 2021) and is developing a Climate Change Adaptation Action Plan for the Natural Environment System. Preliminary work on these documents have influenced the strategy presented here.

UN Sustainable Development Goals

The strategy directly addresses many of the recommendations and aspirations of the *United Nations Sustainable Development Goals* (SDG; United Nations, 2015), talking most directly to:

- Climate Action (SDG 13)
- Life below Water (SDG 14)
- Life on Land (SDG 15)
- Partnerships for the Goals (SDG 17)
- Clean Water and Sanitation (SDG 6)
- Good health and well-being (SDG3)
- Quality Education (SDG 4)
- Sustainable Cities and Communities (SDG 11)
- Responsible Consumption and Production (SDG 12)

Parks Victoria's Land Management Strategy and corporate strategy

The *Nature Conservation Strategy 2021-2031* sits under the umbrella of Parks Victoria's *Land Management Strategy* (LMS; PV, in prep.). The LMS is a requirement of the *Parks Victoria Act 2018* and sets directions

for all aspects of Parks Victoria's land management including partnerships, nature conservation, cultural heritage management and visitor management and services. The *Nature Conservation Strategy 2021-2031* primarily aligns with the first of the LMS outcomes: 'High value natural systems, cultural values and landscapes are protected and restored' and the theme 'Protecting Victoria's natural riches'. There are also important alignments to the LMS outcomes for climate change adaptation, managing Country with Traditional Owners, and building partnerships.

The NCS also aligns with all four strategic pillars of Parks Victoria's strategic plan – *Shaping our Future* (PV, 2013) – in particular, 'Caring for Country' and 'Connecting People and Nature'.

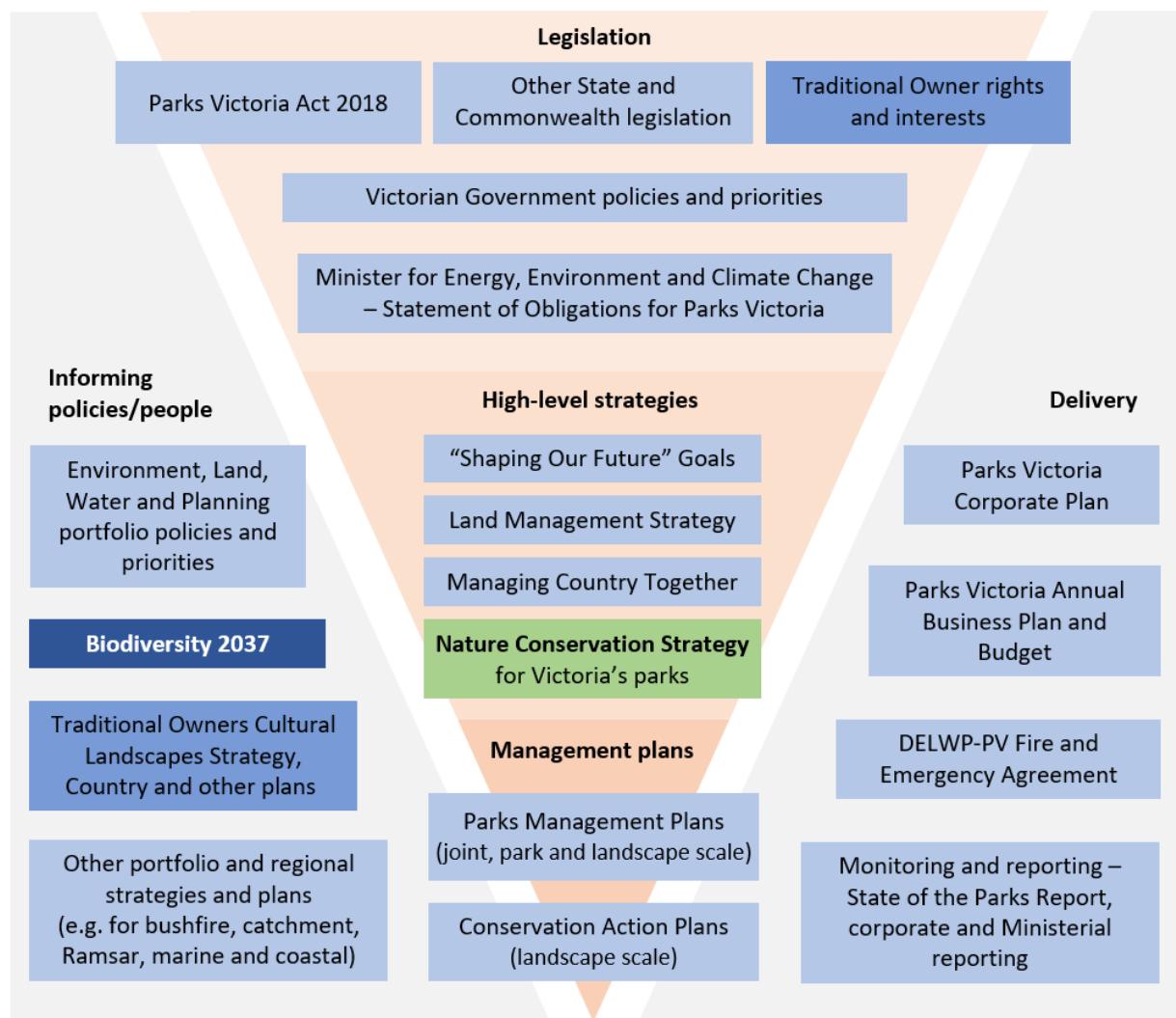


Figure 1: Parks Victoria's policy environment and the context for the strategy.

Bio2037 – the Victorian Government's plan for biodiversity conservation

The twenty-year plan, *Protecting Victoria's Environment – Biodiversity 2037* (Bio2037; DELWP, 2017), provides an important policy context for the NCS, including a resourcing and evaluation framework. Bio2037 sets out the broad priorities for biodiversity conservation across all Victorian land and water and across all sectors, public and private. It also establishes a common decision support process – 'Strategic Management Prospects' – to compare and rank the benefits to biodiversity of interventions to conserve the range of species occurring at a location. This process seeks to rank threat management priorities across Victoria, as well as making transparent the benefits of conservation investment in the high biodiversity values of parks compared to other choices.

Other strategies and plans

The NCS is informed by, and influences other key Parks Victoria strategies, plans and programs (see Figure 1) including *Managing Country Together Framework* (PV, 2019), *Aboriginal Cultural Heritage Plan 2020-2023* (PV, 2020), *Environmental Sustainability Plan 2020-21 to 2022-23* (PV, 2020), *Healthy Parks Healthy People Framework* (PV, 2020), *Volunteering in Parks Strategic Plan 2017 to 2021* (PV, 2017), *Parks Victoria Bushfire Management Strategic Directions 2021-2026* (PV, in prep.), *Learning For Nature Strategic Plan 2021-25* (PV, in prep) and *Enforcement Strategy 2021-2026* (PV, in prep.).

Parks Victoria delivers its programs through strong partnerships, due to the scale of the parks estate and its many conservation needs. Our key partners are Traditional Owners, the Department of Environment, Land, Water and Planning (DELWP), and its Arthur Rylah Institute, and Catchment Management Authorities. Other core collaborators include Melbourne Water, Zoos Victoria, Royal Botanic Gardens Victoria, Museums Victoria, conservation NGOs, the university sector, carbon sequestration organisations (including Greening Australia and Greenfleet) and major volunteer/member-based organisations (e.g. Friends groups, Conservation Volunteers Australia, Victorian National Parks Association, Earthwatch, Field Naturalists Club of Victoria, Sporting Shooters Association of Australia, Australian Deer Association, Field and Game Australia and many more).

1.4 Existing processes and tools for park conservation, planning and reporting

Parks Victoria's conservation programs are built on three key components: 1) knowledge acquisition/decision support; 2) conservation action planning; and 3) adaptive management processes for evaluation and iterative improvement.

Knowledge acquisition and decision support

Parks Victoria actively seeks the best-available knowledge across ecological, cultural, social and geospatial science areas to support decision making and effective on-ground programs, while aiming to work within an adaptive management framework. It does this using:

- in-house expertise (through Parks Victoria's Environment and Science division, regional Environment, Land and Water coordinators and planning officers, and operational delivery teams)
- capture, management and analysis of high-quality data using innovative and best-practice methods and tools
- targeted and collaborative research programs (through its Research Partners Panel)
- shared programs with DELWP and other land managers (e.g. CMAs)
- respectful dialogue, relationships and collaborations with Traditional Owners
- knowledge and decision support systems and tools, including the Victorian Biodiversity Atlas, Strategic Management Prospects, NatureKit and Environmental Information System
- external expert input, including through external technical advisory committees, reference groups and the Science and Management Effectiveness Advisory Committee
- community and stakeholder input.

Conservation Action Plans

Parks Victoria employs the formal Conservation Action Planning (CAP) process as the cornerstone for setting nature conservation directions, based on *Open Standards for the Practice of Conservation* (Conservation Measures Partners, 2020). Parks Victoria divides the state into 18 planning landscapes spanning land and sea, based on a combination of ecological attributes, land forms and administrative boundaries (Figure 2). This methodology uses a collaborative process to identify conservation priorities and develop strategies to address those priorities, drawing on Traditional Owner knowledge, climate change projections, conservation experience, scientific data and understanding (including use of DELWPs Strategic Management Prospects tool), local environmental and operational knowledge, and strategic thinking.

'Conservation assets' are characterised, threats assessed and ranked, actions identified and prioritised, and effectiveness measures proposed.

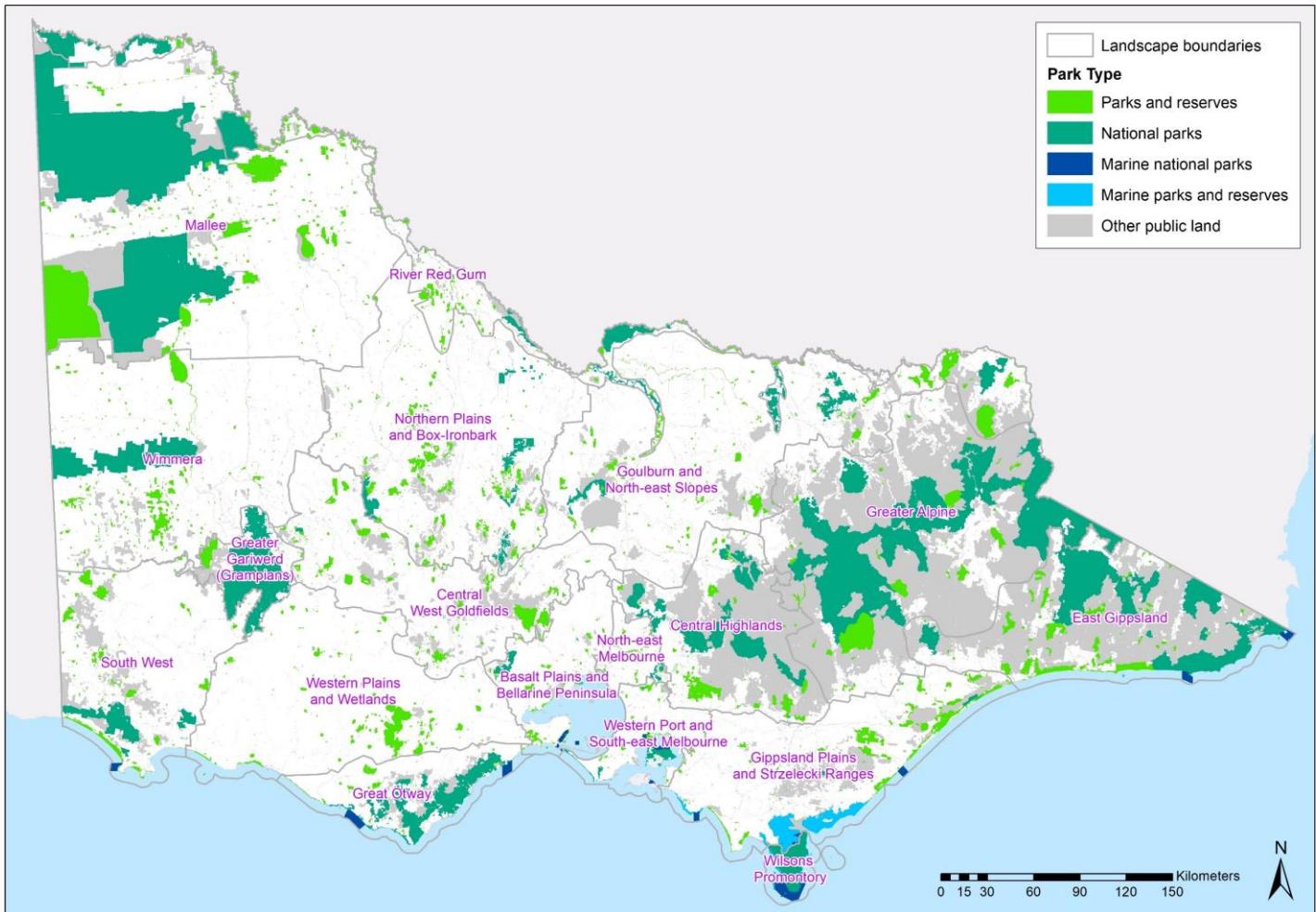


Figure 2: Parks Victoria's 18 planning landscapes.

Adaptive management cycle

Parks Victoria's planning and program delivery processes are based on the MERI adaptive management cycle (Monitoring, Evaluation, Reporting and Improvement). Monitoring and analyses of condition, status, manipulative experimental outcomes and other data sources are gathered, analysed, synthesised at different time and geographic scales (see break-out box). Findings and trends are reported and shared (including through Parks Victoria's *State of the Parks* reporting (see latest: PV, 2018) and the Commissioner for Environmental Sustainability's *State of the Environment report* (see latest: Commissioner for Environmental Sustainability, 2018)). These processes inform program design and on-ground actions to seek iterative improvement (see Figure 3). Partnerships such as one with the Australian Mathematical Sciences Institute provide statistical investigation of the most efficient and effective delivery of conservation operations, e.g. for urban kangaroo monitoring and management, or for optimal timing and techniques for effective (including cost-effective) weed control programs in the Alps and the Dandenong Ranges.

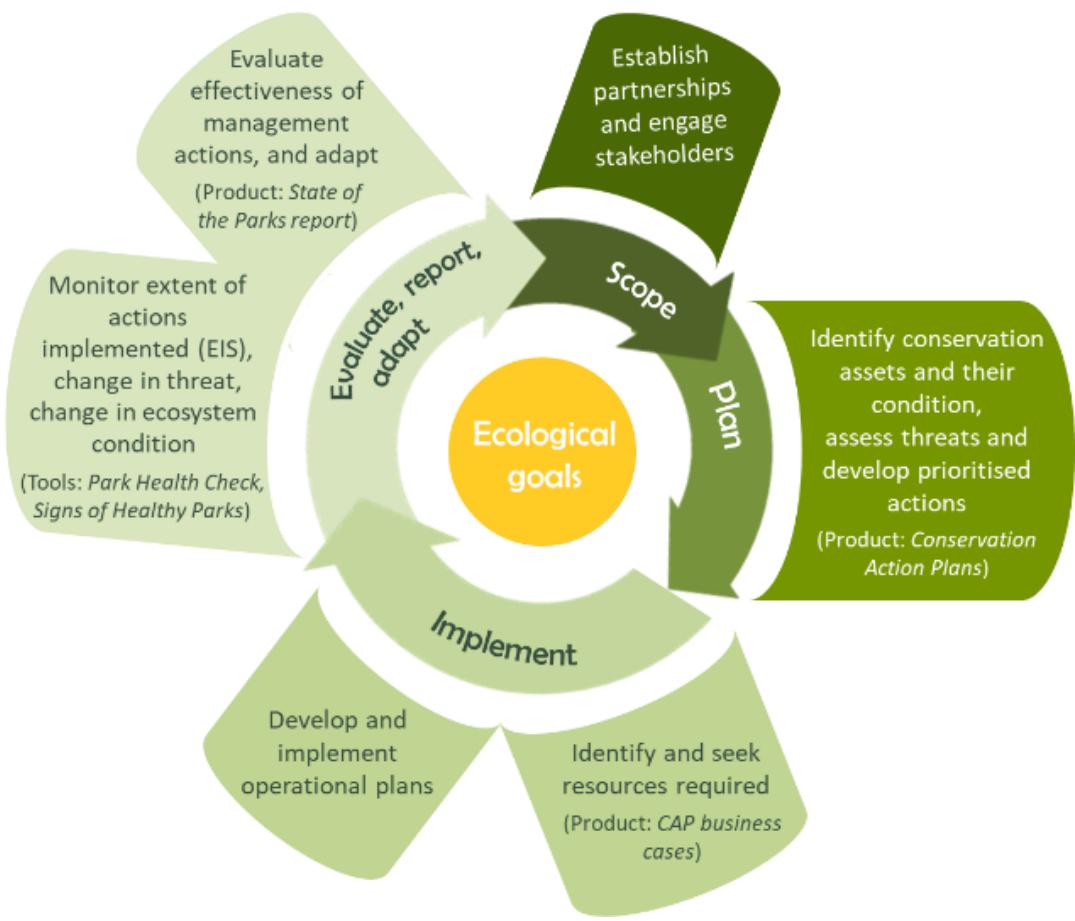


Figure 3: The relationship between the tools and products used in the application of the adaptive management cycle.

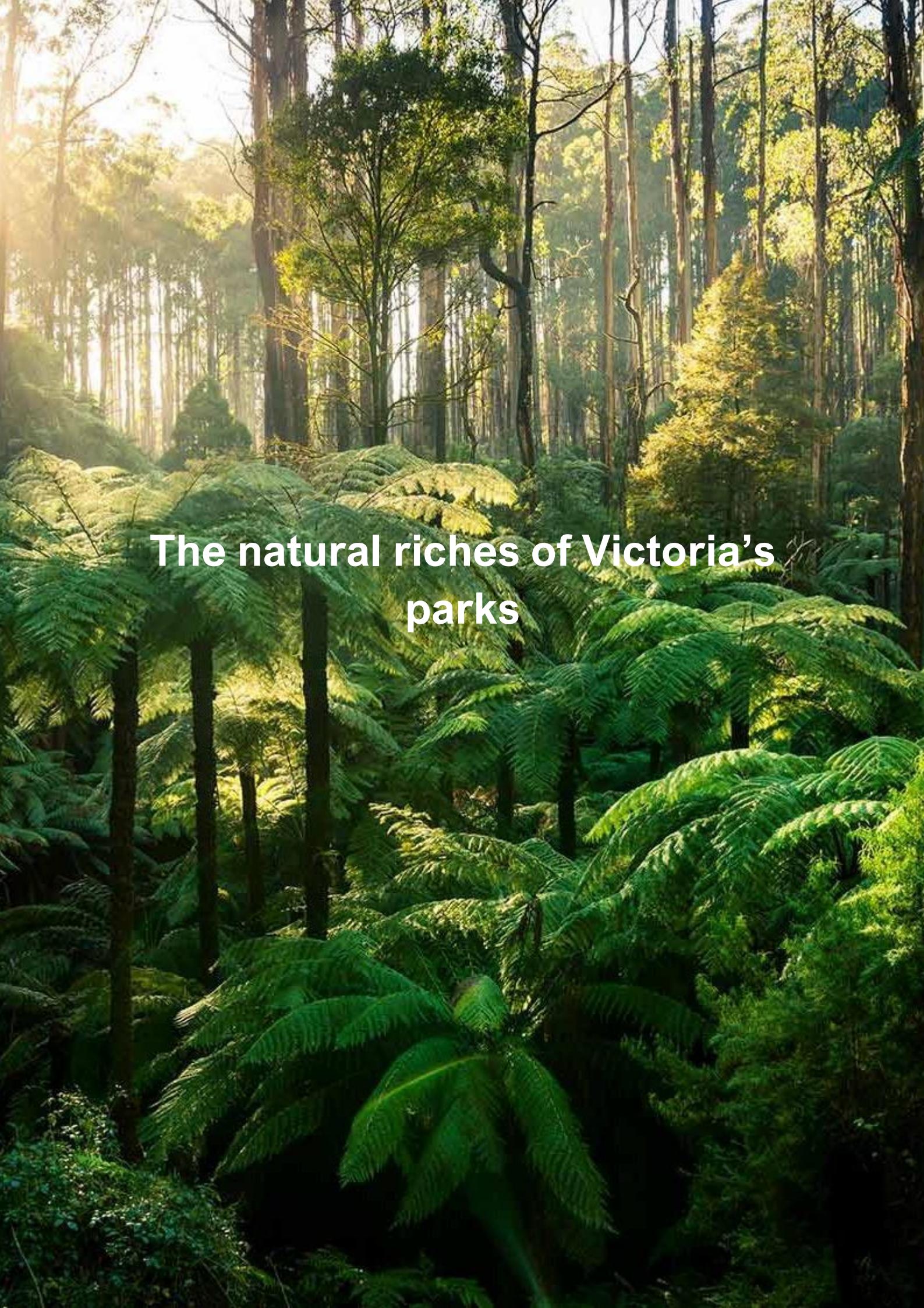
Parks Victoria uses four primary tools to assess, monitor and report nature conservation and other park values:

Park Health Check tools are two rapid assessment tools for terrestrial systems and marine systems that enable trained users to assess and score habitat/ecosystem health through a structured stepwise process across key environmental factors, including habitat condition, biodiversity status, pests, weeds, pollution, human impacts and management needs.

The **Signs of Healthy Parks Program** delivers targeted monitoring and assessment programs for key conservation areas (e.g. Alps and Mallee), including long-term monitoring programs and plots, and provides insights into long timescale and larger-area trends and program effectiveness.

The **State of the Parks program** uses the internationally recognised *Management Effectiveness Framework* (IUCN, 2000) from the IUCN World Commission on Protected Areas. It is a three-year whole-of-Victoria assessment of the extent to which park management goals are being met, and the current and emerging threats to important park values. It assesses 300 parks and reserves (encompassing 90% of the parks estate) and uses data from Parks Victoria and DELWP databases, on-ground or remote sensing monitoring programs, specialist opinion and, where empirical evidence is not available, expert observations and elicitation from park managers. Four 'areas of work' are considered: *Natural Values; Traditional Owner Cultural Values; Historic Heritage and Visitor Experience*.

The **Environmental Information System (EIS)** is used for collecting and reporting environmental management activities consistent with Victorian reporting standards. This foundational system captures data on weed, pest animal, and over-abundant native animal assessment and control, and habitat management actions, and is regularly augmented to improve its accessibility and utility. The EIS supports assessment of the efficiency of environmental management actions and informs planning of on-ground works activities. Its outputs are used in annual, end of year, state of the environment, and State of the Parks reporting.

A photograph of a lush forest. In the foreground, large, broad green fern fronds are visible. Behind them, a dense stand of tall, thin eucalyptus trees reaches towards the sky. Sunlight filters through the canopy, creating bright highlights and deep shadows. The overall atmosphere is one of natural beauty and tranquility.

The natural riches of Victoria's parks

2 The natural riches of Victoria's parks

2.1 The parks estate

Victoria's system of over 3,200 parks and reserves across land, waterways and sea, covers 18 per cent of the state and over four million hectares (Figure 4). These special places represent the best of Victoria's nature, wildlife habitats, both for natural and cultural values. They constitute the majority of Victoria's contribution to the National Reserve System, which is established to protect a 'comprehensive, adequate and representative' range of Australia's natural environments, and many protect the habitats of threatened species.

Most of these reserves were established to protect special natural assets based on their quality, significance, representativeness, rarity and/or vulnerability, with many of the first parks resulting from public advocacy and nomination. More recently, parks have been reserved by Government as an outcome of regional reviews undertaken by the Land Conservation Council and later by its successors, the Environment Conservation Council and the Victorian Environmental Assessment Council.

Various categories of parks and reserves make up the estate, including many under joint management arrangements with Traditional Owner Nations. Allowable uses and levels of protection vary across reserve types, including differences within parks through zoning and overlays such as Wilderness, Remote and Natural Areas, Special Protection Areas and Permitted Hunting Areas. The sheer number of reserves is significant, being more than triple the number in New South Wales. This scale brings significant conservation challenges.

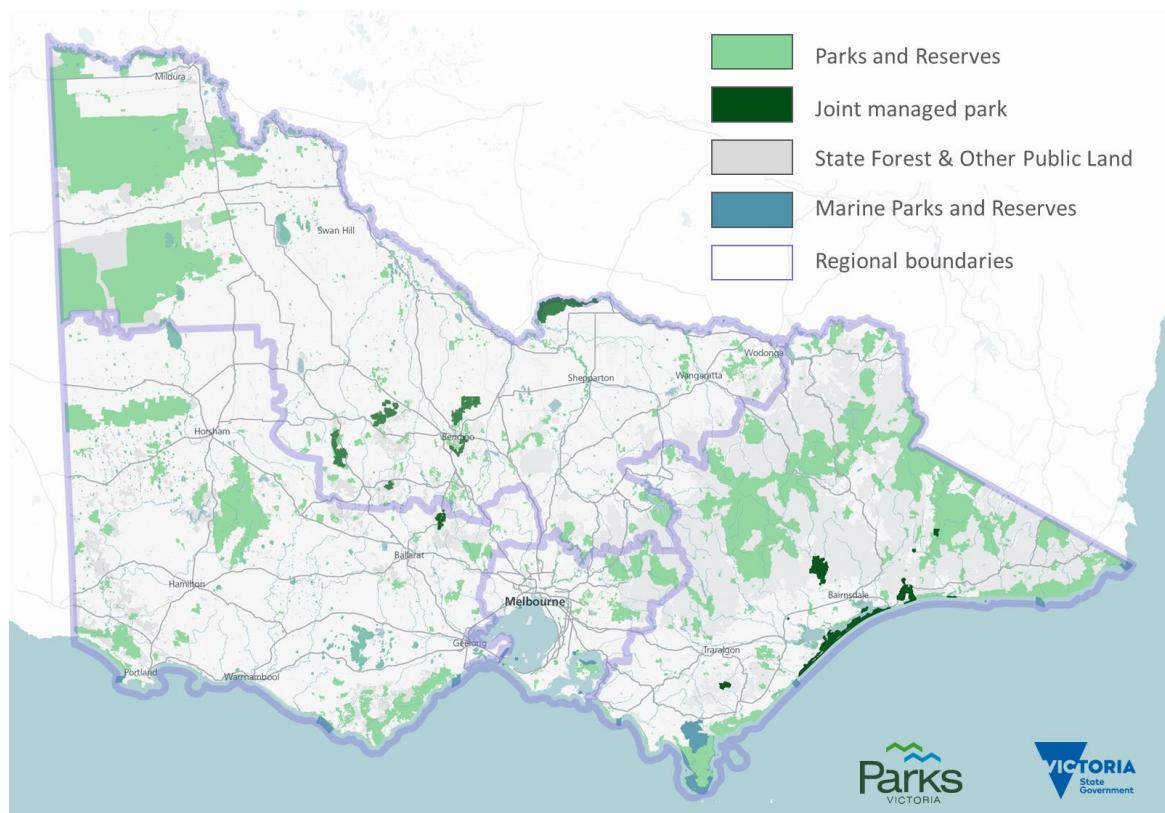


Figure 4: Victoria's parks and conservation reserves.

2.2 The best of Victoria's nature

The plants, animals and habitats of Victoria's land, waterways and seas date back millions of years. The diversity of places and species range from towering mountain forests, ancient cool temperate rainforests, to snow-covered alps, the red desert fringe, volcanic plain grasslands, major river systems, woodlands, heathlands and coastal lake systems (Figure 5). Our coasts and seas range from sandy beaches, saltmarshes and mangrove forests, to bays, inlets and offshore islands, seagrass meadows, kelp reefs and sponge gardens. From the top of the mountains to the bottom of the sea, Victoria is a stronghold for south-east Australian plant and animal species, many of which exist nowhere else in the world. Many of these species hold high cultural significance to Victorian Traditional Owners, including as totemic species.

With over 500 bird species, the relatively small state of Victoria has recorded a high proportion of the 800+ species found in Australia – attracting bird watchers from around the world. Iconic species range from emus, brougas, malleefowl and sea eagles, to lyrebirds, plains-wanderers, bee-eaters, migratory seabirds and a dazzling array of colourful parrots and honeyeaters. Victoria's mammals include both of the world's egg-laying mammal groups (platypuses and echidnas), a wide range of kangaroos and wallabies, possums in all shapes and sizes (from pygmy possums to Greater Gliders), a wide range of small predatory marsupials (quolls, antechinuses and dunnarts), fruit and insectivorous bats, and unique native rodents.

Victoria is home to 87 lizard species, from skinks and geckoes to goannas and dragons, including the iconic Blue-Tongue lizards, Painted Dragons found only in the mallee, Lace Monitors, and alpine specialist species, such as the Guthega Skink. Victoria's snakes, both venomous and non-venomous, come in a range of beautiful colours and patterns. Among them are copperheads, pythons, whip snakes and the Red-bellied Black snake. A vast array of different calls belong to Victoria's 30 frog species, from cricket-like chirps, barks and the distinctive 'bonk' of the Pobblebonk.

The cool temperate waters of Victoria's coasts are home to dolphins, seals, whales, Little Penguins, albatrosses and petrels, Leatherback Turtles and a myriad of cool-water fishes and other marine life, including the state's marine faunal emblem, the Weedy Seadragon.

The invertebrate life is equally rich, with world-famous Gippsland giant earthworms, glow-worms, a high diversity of moths, beetles and burrowing crayfishes, along with mass cave roosting of Bogong Moths and huge shallow-water moulting aggregations of Giant Spider Crabs.

When it comes to flora, Victoria is home to a wonderful diversity of vegetation, including towering Mountain Ash forests, spring wildflower blooms across heathlands, the Grampians and the Alps, coastal banksia groves, dry mallee country eucalypts, River Red-gums and Moira grass floodplain marshes, grasstree fields, Cabbage Fan-palms, and native grasslands. The diversity continues underwater with one of the highest seaweed diversities in the world, extensive kelp forests and sheltered seagrass meadows. Our orchids and fungi are world famous.

This diversity in such a small area is special. At least ninety percent of Victoria's 1,857 listed rare and threatened flora species and 306 listed rare and threatened terrestrial fauna species have been recorded in Victoria's parks network. A recent analysis (State of the Parks 2018; PV, 2018) of 300 of the state's larger and most significant parks and reserves found that parks provided at least 80 per cent of Victoria's suitable habitat for 516 of these threatened species.

Beyond their high cultural significance and intrinsic nature value (and right to exist in their own right), the vegetation, wildlife, landforms and waters of Victoria's parks provide those of us who live in south-eastern Australia with critical 'ecosystem services' that enable us to live healthy and productive lives. These include the purification of our water supplies, filtration of our air, regulation of the climate, pollination of agricultural crops, genetic diversity, flood mitigation and coastal protection. Nature also brings direct social, health and economic benefits to Victoria and its visitors. As a major tourism drawcard, Victorian nature is of particular value to regional communities and economies.



Figure 5: Natural diversity across Victoria. Left to right, top to bottom: Murray Sunset National Park; Peron's Tree Frog; Mount Buffalo National Park; Wilsons Promontory National Park; Flame Robins; Weedy Seadragon at Flinders pier; Grass-trees at Kinglake National Park.

An aerial photograph of a vast forest area that has been severely damaged by fire. The ground is a light brown color, indicating ash or dead vegetation. Numerous tree stumps are scattered across the landscape, many of which are blackened and twisted from the heat. The overall scene conveys a sense of environmental destruction and the scale of a major wildfire.

Unprecedented times and threats

3 Unprecedented times and threats

3.1 Climate change ‘changes everything’

The evidence is clear: climate change is not some possible future but is with us, here and now, visible in the existing meteorological observations for temperature, rainfall and extreme weather. Annual mean temperatures in Victoria have increased in the last 25 years (Figure 6 – top). Trends in rainfall are more variable than temperature trends but records show a long-term decline in rainfall of at least 20% across most of Victoria (Figure 6 – bottom).

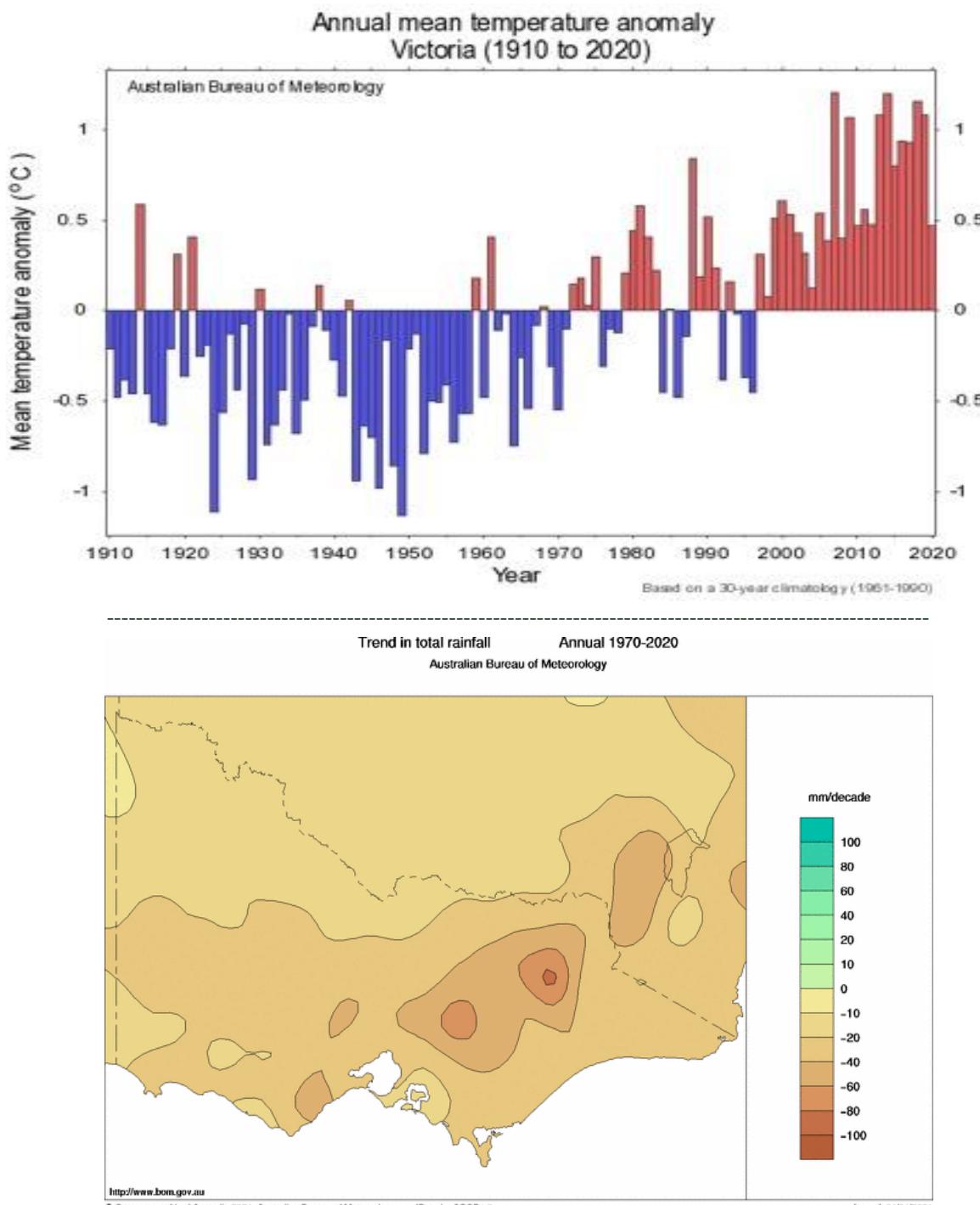


Figure 6: Victorian weather observations show a clear increase in mean temperature over recent decades (top) and a decline in annual rainfall (bottom) across the whole of Victoria in the last 50 years (Source: BOM Annual Climate Variability and Change Trend Maps and Time Series).

In addition to these long-term warming and drying trends, the frequency of extreme fire weather days is increasing, raising the risk of severe bushfires (Figure 7).

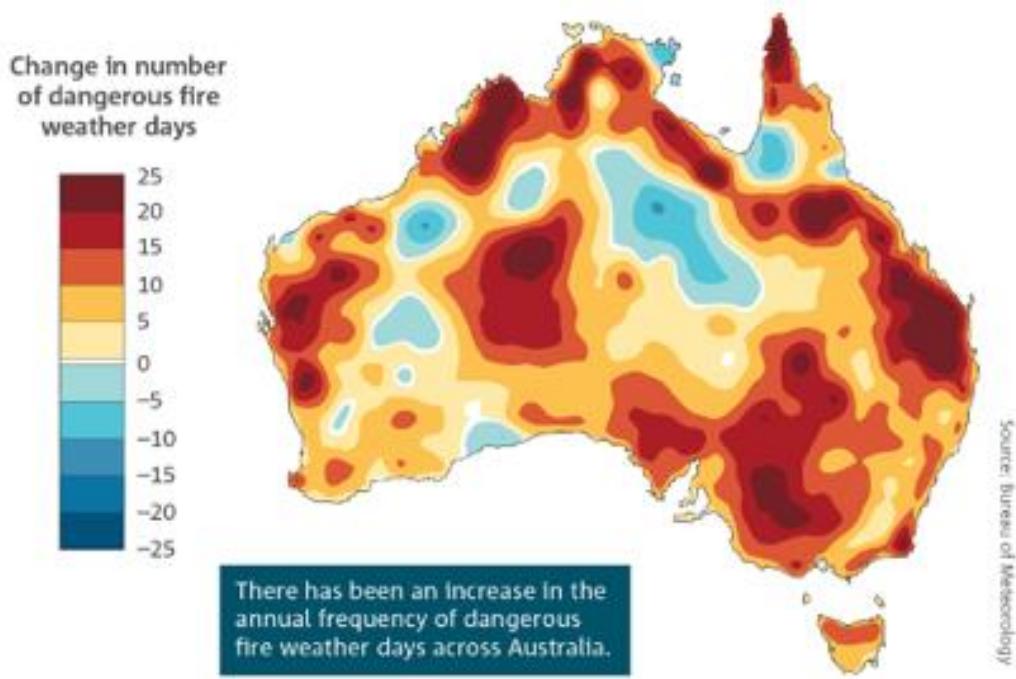


Figure 7: Change in number of dangerous fire weather days (i.e. >90 Forest Fire Danger Index) 1985-2020 compared to the period 1950-1985 (Source: BOM 2021).

The predicted further warming and drying of south-east Australia (State of the Climate report, BOM, 2018; DELWP Climate Change Projections, 2019) will increasingly challenge the resilience of many ecosystems across the state and the species that live within them. We will see a further southerly shift of weather systems bringing:

- **hotter conditions** – increasing mean and maximum temperatures (and overnight minimums), more days of extreme heat
- **drier conditions and more droughts** – variable over time and by geography, but winter and spring rainfall likely to decrease, summer rainfall to slightly increase (but more than countered by higher evapotranspiration), decreased stream flows
- **more fires** – more frequent bushfires and longer, harsher fire seasons, increased fire severity and impacts, increased frequency of dry lightning strikes
- **more floods and storms** – more intense extreme rainfall events (with drier intervening periods), damaging high wind events, and coastal storm surges with erosion impacts
- **warming seas** – increasing water acidification and reduced nutrients (due to weakening deep water and Southern Ocean circulation).

In combination, these factors will have intensifying impacts on Victoria's biological systems and species that have evolved over hundreds of thousands to millions of years under less rapidly changing environmental conditions. The impacts include depletion or extinction of species, major change in ecosystem structure, and potential major change to our landforms, water bodies and coasts as a result of large-scale inundation, erosion and siltation. We will also suffer loss or damage to the 'ecosystem services' that nature provides to society and the economy including clean air and water, pollination of agricultural and other plants, flood mitigation and bush products like honey.

Climate impacts on parks and nature

Climate impacts are occurring in parks and protected areas across the globe. Gonzalez *et al.* (2018) identified 416 instances of major climate change impacts on the United States parks system. Some of these are destroying the core natural values of the parks - such as Joshua Tree National Park under threat of losing its Joshua trees and Glacier National Park losing its glaciers.

In Victoria we can forecast (and are already witnessing) many of the likely impacts based on recent events, and examples of the ecosystems and species that we know to be vulnerable:

- **direct mortality from extreme conditions** – heatwave death of more than 2000 flying foxes in Bairnsdale in the 2018-19 summer
- **direct mortality from fire** – major species and rainforest habitat loss from large, severe bushfires in eastern Victoria in 2019-20
- **reproductive failure from excessive fire frequency** – Mountain Ash and Alpine Ash loss where large areas of juvenile trees regenerating following fire are killed by another fire before they reach seed production age
- **drying of aquatic habitats** – loss of wetlands and stream habitats, collapse of Lake Albacutya Ramsar wetland, severe decline in range and abundance of the native fish, the Murray Hardyhead
- **climate conditions outside environmental tolerances** – loss of whole Ecological Vegetation Classes (EVCs) or ecosystems, loss of marine kelp forests, death of River Red-gum forests, contraction of rainforest areas which are now becoming warm and dry enough to burn
- **lack of available habitat for migration and/or clinal transition** - alpine species unable to transition to higher/cooler altitudes
- **reproductive disruption from seasonal miscues** - mistimed insect emergence, flowering, bird nesting
- **asynchrony with, or collapse of, critical food sources** – Mountain Pygmy Possum impacts due to collapse of Bogong Moth populations after drought
- **arrival of/advantage for introduced or clinal migrant native species** – NSW black sea urchins moving into eastern Victoria and transforming kelp forests to urchin barrens
- **reduced ocean productivity** – declining Australian fur seal populations
- **reduced available habitat from sea level rises** – loss of coastal mudflats, mangroves and saltmarshes on physically restricted or artificially bound coastlines.

3.2 We must dramatically shift our thinking

These issues and collective impacts pose major global challenges to the protection, maintenance and/or recovery of natural systems and species. The implications are: dramatic and irreparable transformation of ecosystems (both gradual and sudden), significant reduction in population sizes and species diversity, increased vulnerability of plants and animals (even for common species) and species extinctions.

Victoria's parks estate is already experiencing all these challenges and the composition of Victorian nature is changing. Parks Victoria will be making decisions under conditions of considerable uncertainty as the magnitude, timing and extent of impacts are unclear. At threat is the survival of Victoria's unique plants and animals, and the persistence of both its distinctive ecological communities and broader ecosystems.

The 2019-20 bushfire season in eastern Victoria provided stark lessons for Victoria's land managers, including Parks Victoria, given the speed and scale of the bushfires – lessons on preparedness, responsiveness and the reality of dramatically impacted and changing ecological communities, ecosystems and landscapes.

For many ecosystems, impacts resulting from sudden or gradual changes in climate and/or weather extremes will be irreversible. The Jones Creek Rainforest in Coopracambra National Park in East Gippsland provides a good example. Significantly burnt in 1983, remnant temperate rainforest patches have not recovered with gradual drying and warming transforming this area into eucalypt woodland. Even in the absence of fire, gradual transformations of ecosystem type are occurring around the state, like the loss of two thirds of Messmate eucalypts in Warrandyte State Park over recent years as water tables sink.

A change of perspective or thinking is required. Should the concept or reason for existence of parks be changed from protecting a static temporal or spatial concept of the resident species and communities? Or rather should parks be places where the appropriate management and interventions give nature the best chance to survive, adapt, evolve or even thrive under climate change? A park initially gazetted for its rainforests may be transitioning to a stronghold for open grassy woodlands and equally vulnerable woodland bird communities. We must confront hard questions such as:

- when is it feasible to attempt to slow or reverse such ecological changes resulting from climate change?
- should those areas least likely to be impacted, such as the wettest gullies or wetlands, be managed as refuges and receive increased attention, protection and intervention to preserve them?
- when do we accept loss of species or ecosystems?
- when vulnerable ecosystem components are being lost, how much do we intervene to maintain ecosystem structure and function, through introductions of better adapted species to take their place?
- how do we keep the public/community/visitor connected to and actively engaged with transforming parks and regions?

A systematic approach is required that involves the assessment of climate change vulnerability and risk to species, ecological communities and ecosystems; evaluating options under different climate change scenarios; implementing adaptation options, or where outcomes are challenging or uncertain, conducting experimental trials; and monitoring and adjusting as information improves. The IUCN guidance for protected area climate change adaptation identifies four general categories of action: managing for persistence, resisting change, accommodating change, and directed change.

Managing for persistence involves managing existing threats and maintaining or restoring ecological processes where possible (see *Strategy 1*). This includes the use of effective, conventional methods of threat management that will support ecosystem health, function and resilience – particularly invasive and overabundant species management, habitat/vegetation restoration and improved habitat connectivity.

In addition to managing for persistence, we need to take action by adopting new approaches and techniques to **resist** the climate-induced threats facing us and mitigate the severity of the impacts (see *Strategy 2*). These include:

- **establishing refuges** at all scales to minimise complete loss (extinction) of species and ecological communities.
- **active interventions** in the form of insurance populations and options for many of Victoria's threatened species, translocations, offsite (*ex situ*) captive holding and breeding colonies, cryopreservation, and seed banks and horticulture programs for threatened plant species.

Assessments of vulnerability and risk will further inform actions for persistence management and resistance to climate change impacts:

- deep investigation of Victorian **fire ecology and management**, including all sources of knowledge, partnerships, needs, strategies and the place of fire in managing our landscapes. This investigation to contribute to improvements in prevention, preparedness, fuel management, response, recovery and monitoring, evaluation and reporting for bushfire.
- deep investigation of environmental water needs and availability, including ground water, surface water, **environmental water flows, cultural water needs**, market and social issues, and ecosystem needs and vulnerabilities.

Persistence and resistance approaches can both be used as a way of buying time while preparing for future decisions, and to maximise the chances of recovery and rewilding for future potential wetter and cooler times (on an unknown timescale).

Other new ways of managing nature need to include actively intervening to **direct ecological change** toward a desired state:

- **transformational adaptation** – active ecosystem engineering, e.g. aerial seeding of non-local canopy tree species to provide a forest canopy structure to counter disappearing, no-longer-adapted, obligate seeder species such as Alpine Ash.
- **ecological thinning** to lower tree densities as an intervention to support tree maturation and survival in water- and fire-stressed environments.

These approaches do not come without risks. All new interventions need to be subject to science-based decision-making and supported by feasibility and risk assessments. Monitoring, evaluation and adaptive management must be used to mitigate any unintended consequences if they become apparent. But in the face of accelerating climate change the consequences of not acting are greater than the potential risks. A wide range of Victorian nature conservation organisations and specialists are in agreement on the need to take new steps (e.g. VicNature2050 Alliance; VNPA, 2015). Through partnerships, collaborations, knowledge gathering, information sharing, experimentation and iteration, new programs and actions can be built to meet large nature conservation challenges.

3.3 The key threats to nature in parks

Nature in Victoria's park system faces eight major categories of threat. These threats have been identified using information from climate change forecasts and modelling, information drawn from the State of the Parks process and other monitoring data, and scientific research. They are:

- *Catastrophic bushfires and other large-scale events*
- *Invasive species and overabundant native species*
- *Altered fire regimes*
- *Altered hydrology and water quality*
- *Human impacts and nature disengagement*
- *Legacies of past land uses*
- *Major ecological transitions*
- *Inadequate conservation knowledge, capability, capacity and resourcing*

Catastrophic bushfires and other large-scale events

The single biggest challenge to Victorian nature conservation is preparing for and responding to growing bushfire frequency, severity, geographic extent and duration of bushfire seasons. This was clearly demonstrated through the unprecedented 2019-20 bushfire season in eastern Victoria and elsewhere across Australia.

Other potential catastrophic threats include widespread and prolonged extreme temperature events, taking a major toll on both wildlife and flora. Heatwave mortality in birds, flying foxes, possums and gliders can be extremely high. Extreme unseasonal cold can similarly cause high mortalities, particularly in juveniles. The same applies to marine ecosystems and species. A single high seawater temperature episode or major anoxic (low oxygen) event could have catastrophic impacts on Victoria's abundant cool temperate marine life. Preparation for such events in marine systems and appropriate or effective responses are extremely difficult and require further investigation and consideration.





Major bushfire impacts

The Victorian bushfires over the summer of 2019-20 burnt around 1.5 million hectares, mainly in eastern Victoria. While not the largest fire event on record for Victoria, this fire season was unprecedented in many ways:

- the bushfires impacted one of the largest blocks of continuous forest in Victoria and south-east Australia.
- extended drought in eastern Victoria predisposed these areas to ignite (particularly through dry lightning storms) and burn fast and hot, with unprecedented extremely low fuel moisture levels for a region historically known for its wetness and prevalence of temperate rainforests.
- large areas of rainforest were burnt, many areas experiencing high fire severity.
- it is estimated 244 flora and fauna species had more than 50% of their modelled habitat burnt
- there were significant impacts on wildlife welfare (including burns and other injuries, heat stress, post-fire starvation).
- fire fronts were not impeded by moisture or altitude temperature barriers, and in places burnt from mountain summits to the sea.
- the duration of the season was long, commencing in November and persisting until March.
- Post-fire flooding had major waterway impacts with ash, sediment and debris choking many water bodies and threatening many vulnerable aquatic species, including threatened species.

The scale and speed of the eastern Victoria fires, particularly in East Gippsland, exposed issues for biodiversity protection. Opportunities exist to improve pre-identified options for biodiversity protection or management during fire response, integration of biodiversity considerations into emergency management structures and systems, quality and accessibility of biodiversity data, risks to biodiversity asset, and communication and collaboration across diverse stakeholders to improve agility/responsiveness.

Invasive species and overabundant species

The term ‘invasive species’ applies to introduced pests and weeds not native to Victoria. ‘Overabundant species’ are plants and animals endemic to Victoria whose populations have an unsustainable impact on habitats and ecosystems (can be local species or climate migrants beyond their historical distributions). Parks Victoria’s 2018 *State of the Parks* report recognised that introduced predators (foxes and both feral and domestic cats) continue to take a heavy toll on wildlife across the state, while deer, feral horses, rabbits, pigs and goats consume and damage native vegetation and habitats.

A wide range of weed species occur throughout the parks estate, including in coastal and marine ecosystems. In marine systems, northern hemisphere pests and weeds brought into Victoria in shipping ballast continue to have major impacts, particularly the Northern Pacific Seastar and Japanese kelp *Undaria*. Invasive species can take advantage of underlying stress in native ecosystems and are an indicator of overall system health. Large areas of the Victorian parks system have major or extreme invasive species impacts at present and the impacts are increasing in many areas.

Overabundant native animal populations, particularly kangaroos and wallabies in both urban and regional parks, deplete vegetation and ground cover, impeding habitat restoration projects and survival of threatened species. Overabundant aggressive birds such as the Noisy Miner can displace other native bird species and significantly reduce local bird diversity. Overabundance of native animals can also result in significant welfare issues for the overabundant population including starvation and disease. Overabundant native plants can form monocultures that reduce habitat diversity as occurs in encroachment by unmanaged Coastal Teatree and Sallow Wattle.

Diseases and pathogens are also major issues – plant diseases, particularly root rot fungus *Phytophthora* and myrtle wilt, can significantly alter habitat structure and kill susceptible threatened plant species, while chytrid fungus has significantly impacted frog species across the state.



Deer impacts

There are four species of deer established in Victoria. These are Hog, Red, Sambar and Fallow deer. Sambar deer are widespread and occupy most suitable habitats in eastern and central Victoria, and are being reported as far west as the Grampians and to the north in Barmah National Park. Impacts from all four species of deer are of concern, but the combined extensive range, physical size and ecology of Sambar make them a significant threat to several native species and vegetation communities. Deer species are variously defined as 'protected species' and 'game' under the *Wildlife Act 1975* and are considered of value for recreational hunting. The impacts of deer are managed consistent with the *Victorian Deer Control Strategy* (DELWP, 2020).

- Deer impact the environment and private land through browsing, antler rubbing (causing ringbarking of trees), wallowing and trampling native vegetation and plant communities. Introduced deer compete for available food with native species and outside parks compete with livestock and damage crops.
- "Reduction in biodiversity of native vegetation by Sambar (*Cervus unicolor*)" is listed as a threatening process under the *Flora and Fauna Guarantee Act 1988*.
- The obligation for Parks Victoria to manage exotic species, including deer, is established under the *National Parks Act 1975*.
- The four species of deer established in Victoria are not considered eradicable using currently available tools. Therefore, control programs focus on protection of highly vulnerable habitats including alpine peatlands, vegetation recovering from bushfire and waterways.
- Successful reduction in the population sizes and impacts of deer in Victoria will require sustained control programs that use a range of tools as required, based on terrain, access conditions and management objectives. Programs need to be delivered cross-tenure, deploy humane techniques and be designed to exploit deer behaviours and habitat use patterns.

Altered fire regimes

Fire is a necessary component for some of Victoria's natural systems but for others it can pose major threats. Fire can threaten already-endangered species, destroy critical habitat and irreversibly alter ecosystems. In almost all systems where alterations occur to the long-term, prior fire regime – through changes to the frequency, seasonality, severity or extent of burning – then plant and animal species and communities in that system are likely to be affected. As stated above, fire frequency is increasing, with many areas of the state being burnt multiple times since 1995 (Figure 8).

The sound management of both bushfires and planned burning is critically important to nature conservation and needs to draw from the best of Traditional cultural knowledge and practices, fire ecology science, onground knowledge and experience, and predictive modelling. Changed perceptions of 'fuel' threats, impacts of fire frequency and severity on species and ecological communities, and the establishment of protective buffers and/or ramped up emergency fire responses for recognised refuge areas, are all issues requiring much greater investigation. Fire in parks is managed in conjunction with DELWP, which has the primary legislative responsibility for management and control of bushfire on public land in Victoria, and activities are governed by the *Code of Practice for Bushfire Management on Public Land* (DSE, 2012). The *Victorian Traditional Owner Cultural Fire Strategy* (2019) provides a framework and support for Traditional Owners to undertake cultural burning for the range of cultural values entailed in caring for Country including on the parks estate.

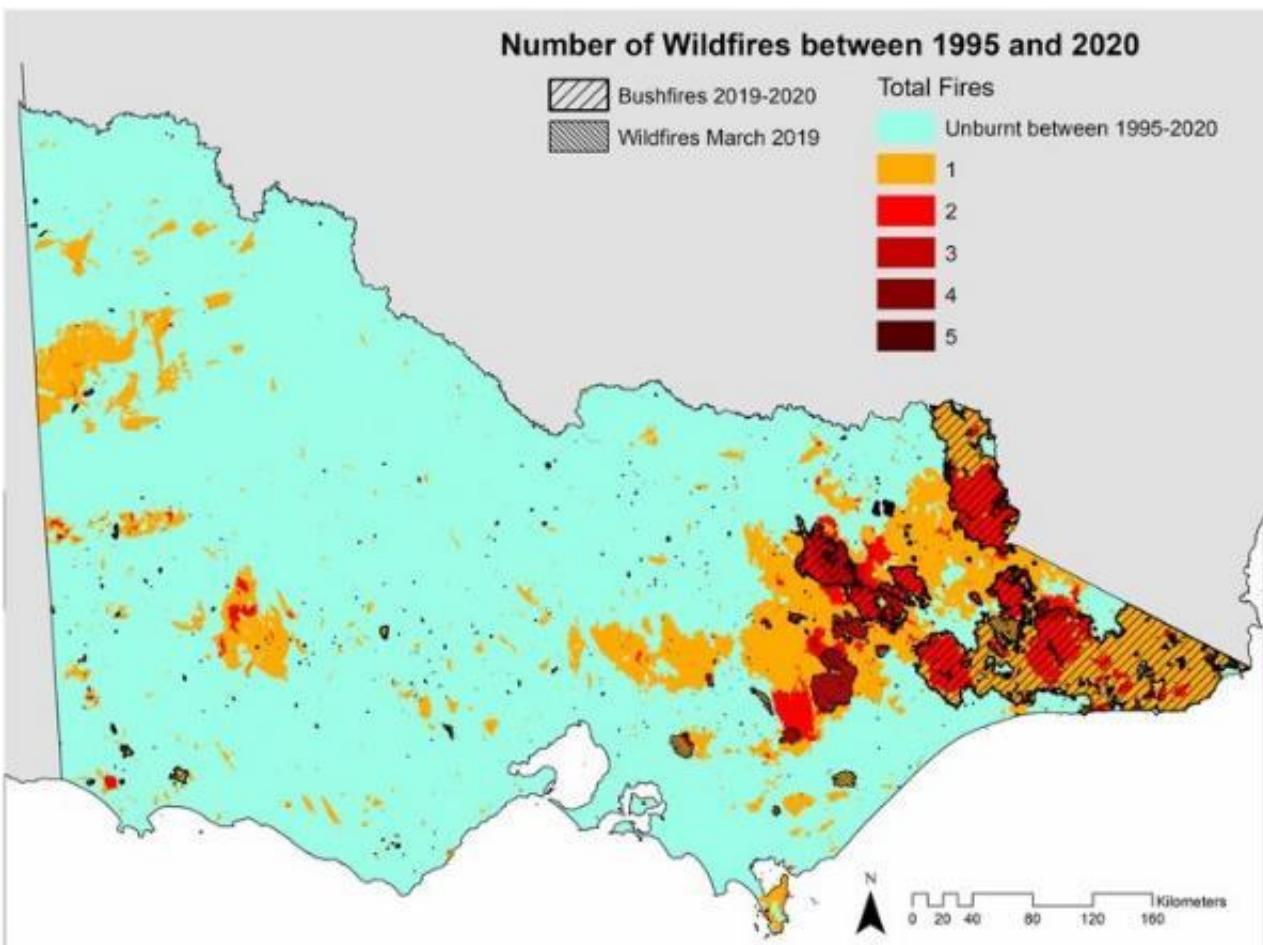


Figure 8: Areas of Victoria burned by bushfire one or more times since 1995 (Source: Lindenmayer and Taylor 2020).

Altered hydrology and water quality

Altered climate systems, changed drivers of weather, reduced rainfall and disrupted seasonal cycles all impact water availability to Victoria's natural systems. In addition, competing agricultural, community, industrial and market demands for water can mean that environmental water flows to natural systems are severely challenged. The majority of Victoria's waterways are highly engineered and manipulated; few river systems across the state are unregulated.

Active intervention, such as the delivery of environmental water, is used in some catchments to replicate some components of natural river flow and wetland inundation patterns. Such deliveries are restricted to systems where there is both delivery infrastructure and environmental water entitlements available. Most of these systems also have constraints that limit the timing and volume of water that can be delivered.

Environmental water cannot be considered a complete solution to mitigate the threats to water availability in our waterways because not all flow components can be supplied. Where environmental water can be delivered, complementary on-ground actions – such as invasive plant and animal control – are critical to ensure that best value can be derived from the limited environmental water resources that are available.

Other work, undertaken with partner agencies such as catchment management authorities, to increase the area of wetlands that can receive environmental water can also be investigated. Some wetlands however, will remain out of reach, and will inevitably transition to a drier state. The impact of reduced flooding events as a consequence of climate change and river regulation is already being seen, waterbird numbers are in decline, and flood-dependent vegetation communities – once prevalent annually in the landscape – now only occur during very large-scale flood events or in small areas in response to targeted delivery of environmental water.

Active interventions are required to enable near-natural processes to occur. Parks Victoria works with water authorities, river managers and catchment management authorities that have the primary legislative responsibilities for water and stream flows. Traditional Owners are also leading calls for control of cultural water flows, with the Gunaikurnai Land and Water Aboriginal Corporation recently securing cultural water rights and allocation from the Victorian state government.



Complex wetland management

Barmah National Park is located near a natural narrow point in the Murray River called The Choke. Natural river flows in the Murray River were lower in summer, with higher flows and over-bank events occurring in winter-spring as a result of rainfall and snow melt. Over millennia, these seasonal variations and over-bank flows have created a range of floodplain vegetation communities at Barmah, including river red gum forest and woodlands, wetlands and the threatened Moira grass plains. The forest is an important feeding and breeding site for waterbirds including egrets, spoonbills and night herons, as well as significant fish, frog and turtle populations.

The flow of the Murray River is now highly regulated upstream of the Barmah Choke, and naturally occurring higher pulses of flow are captured in storage, and floods only occur when capacity of these storages is exceeded. Regulated flows are generally delivered within the river channel, so adjoining wetlands remain disconnected from the main river channel, resulting in increased periods of dry. Reduced rain and snow fall due to climate change[†] results in less run-off, and flood events are less likely.

As a further complication, during periods of high irrigation demand during summer, some flow must be delivered through the Barmah Forest, due to the constraint imposed by The Choke on the volume of water that can be delivered within the banks of the Murray River. This can result in the unseasonal summer inundation of the marshlands with warm water.

In the Barmah Forest, this (along with invasive plant and animal impacts) has significantly contributed to the decline in the health and extent of Moira grass (*Pseudoraphis spinescens*) floodplain marshlands of Barmah National Park. In addition to the stress of the site's altered hydrology, grazing, trampling and browsing caused by feral horses and other animals degrades vegetation, soil and ecosystem structures. Only 12 per cent of this vegetation community remains, relative to that mapped when the site was Ramsar listed in 1982, and less than 5 per cent of its extent in the 1930s, prior to regulation of the Murray River.

As a management response, current water management practices aim to deliver environmental water that increases the frequency and duration of seasonally appropriate inundation events, while reducing the likelihood of unseasonal warm-water flooding that can change the composition of wetland vegetation.

Human impacts and nature disengagement

Human impacts on nature and the parks estate occur in many forms, with the threats they can bring falling into three broad categories: visitation and use pressures, people causing unauthorised harm to nature, and no/low levels of engagement with nature.

- The first category covers the scale and associated impacts of permitted visitation and use. As population and visitation increases, so do pressures on parks.
- The second category covers illegal access and activities, as well as the illegal take of natural resources including plants, timber/firewood, wildlife, water, earth and/or minerals.
- The third category refers to the connection, or more importantly, disconnection that can occur between humans and nature, both by park users and the broader community.

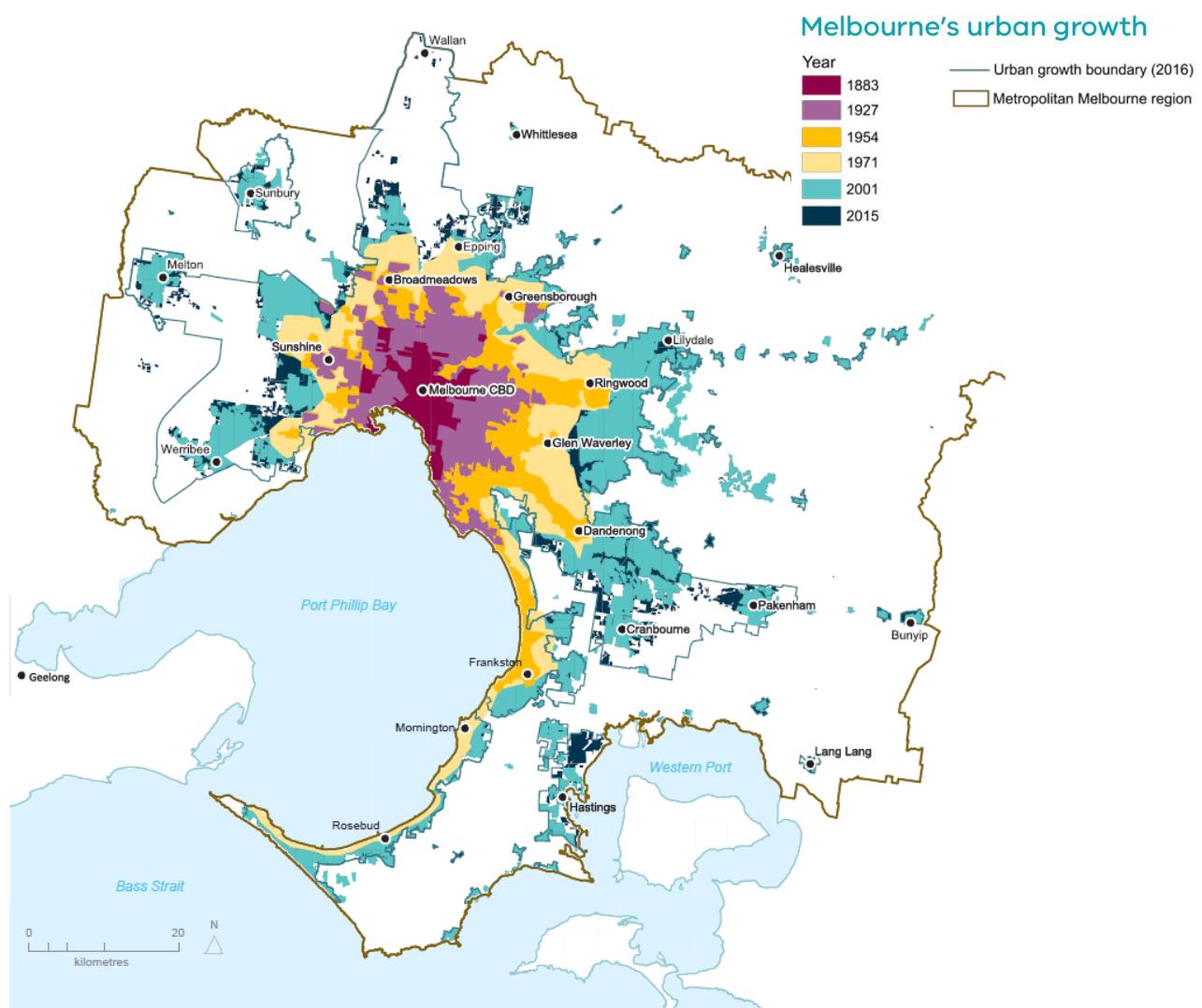


Figure 9: Melbourne's rapid urban growth – the areas shaded teal and dark blue represent growth since 1971
(Source: DELWP, Plan Melbourne 2017).

For a small state, Victoria has experienced rapid population growth (Figure 9) and is projected to experience the largest and fastest increase in population of any Australian state over the period 2017-2066, increasing by 60-130%. Victoria's population is currently 6.3 million and is projected to reach 7.5-7.9 million people by 2027 (Australian Bureau of Statistics, 2018). At the same time, visitor numbers to the state and visits to the parks estate continue to rise (Figure 10). In 2018, three million international visitors spent 73 million nights and \$8.5 billion in Victoria, with projected growth predicting this number will reach 5.2 million visitors by 2027 (Business Victoria, 2019). Visits to Victoria's parks estate exceeded 100 million in 2018. The future and potential impacts of the Covid-19 pandemic on growth and visitation remain unknown.

In combination, these numbers bring pressure on the built assets and other infrastructure within parks and reserves, but also to native species and habitats. Areas are at risk of being loved to death. Nature contact and nature-based tourism require planning and active management for sustainability, rotation and/or protection from excessive visitation pressures.

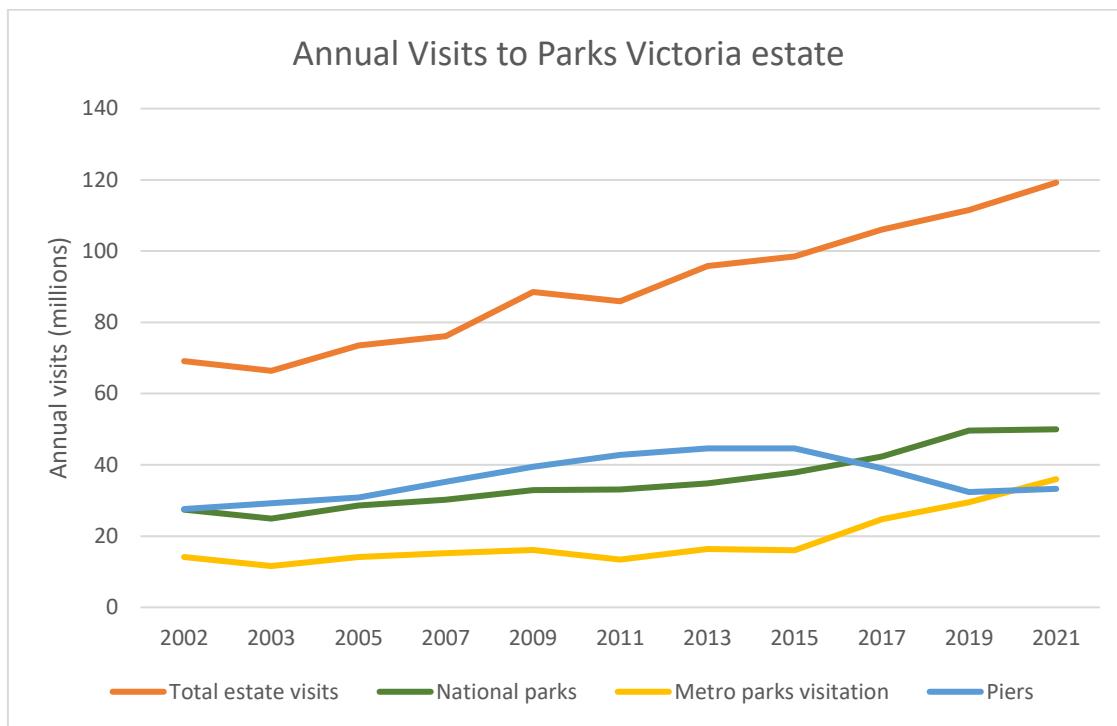


Figure 10: Growth in visitation to Victoria's parks.

The visits by the majority of users have minimal impact on the values of parks. However, even a small number of visitors can have a substantial impact in sensitive areas. Many human impacts on nature in parks result from either inadvertent or intentional activities, including:

- Track formation and habitat damage, e.g. 4WDs, motorcycles, mountain bikes, rock climbers
- Illegal track access, including destruction of locked gates and barriers, beach access for fishing
- Firewood collection damaging habitat and ground cover and illegal commercial-scale firewood theft
- Dumping, including industrial waste and asbestos
- Vandalism to assets, including built infrastructure, signage, and interpretations and education content
- Killing of, or injury to, native animals
- Release/introduction of invasive species, disease and pathogens, e.g. pigs for hunting
- Collection of native species, e.g. tree ferns, reptiles, bird eggs
- Illegal social events, e.g. illegal rave parties, illegal motorcycle races
- Illegal camping with habitat impacts
- Illegal fishing in marine protected areas
- Littering, including plastics and fishing gear into aquatic systems and abandoned camping equipment
- Arson and failure to extinguish legal and illegal campfires
- Release/presence of domestic dogs, cats and aquarium fishes into parks.

As well as these human impacts that originate within parks, there are landscape and/or community-wide practices that threaten nature and enter parks, such as contamination of waterways by pollution and plastics waste, and widespread and industrial use of fertilisers, herbicides and pesticides.

A further category of human influence is effectively an 'anti-impact' – disinterest or disconnection with nature or parks. This represents a real threat via a lack of social or political engagement or support for Victorian nature,

and thus for nature conservation activities to be carried out on Victoria's parks. Both globally and within Australia, populations are becoming increasingly urbanised with little contact with nature. Eighty-six percent of Australians were recorded as being urban dwellers in 2017, with this trend predicted to continue to rise (United Nations Population Division, 2018). There are also those who may not be able to connect with nature due to a range of social, physical and cultural barriers, including people with a disability, people from culturally diverse backgrounds and those who don't have the necessary skills to engage. To conserve nature, it is essential that there is wide public awareness, emotional connection, understanding, engagement and active involvement.

Legacies of past land uses

Victoria's natural systems have also inherited the cumulative impacts of past land use practices, particularly land clearing, highly fragmented habitats, modified and simplified forest structures (monocultures, single age structures), and drained wetlands. Many parks and reserves have a history of extensive logging, land clearing, mining (characterised by Dja Dja Wurrung in central Victoria as creating 'upside down country') and/or grazing by livestock. In many places these practices continued until recent decades. In some cases, such as sheep grazing in the Mallee parks, the practices were intensive and major transformation of the vegetation structure occurred. These areas are still in the process of recovering from this exploitation. The legacy impacts pose significant ongoing conservation threats and in many cases the risks will be compounded by new stresses created by climate change.

Major ecological transitions

Victoria's ecosystems and many of its ecological communities are already in a state of transition. Even in the absence of sudden or catastrophic events such as major bushfires, changes are being observed. For example, canopy-forming tree species such as Messmate in Warrandyte State Park, eucalypts on Mt Macedon, Blackwoods in the Otways and eucalypts in the Warby-Ovens National Park are either dying off or dramatically losing canopy cover. This in turn impacts mid- and understorey plant species, the fauna that rely on these plants and the fundamental composition of characteristic ecological vegetation classes (EVCs).

These transitions are occurring both on land and at sea. Warming waters and decreasing seawater nutrient levels due to changing oceanographic currents are mirrored by fundamental changes in fur seal populations – Australian Fur Seals that feed amongst coastal kelp reefs are decreasing in number, while the Long-nosed Fur Seals that feed in open waters on pelagic fish species are increasing in number.

New conservation approaches are required. For ecosystems where recovery or restoration is unlikely, management may need to move to more interventionist adaptive ecosystem management and modification. Forest systems primarily composed of eucalypt species that are ill-adapted to high burn frequency (such as Alpine and Mountain Ash), may be lost unless alternative better-adapted genetic variants or different species are actively planted. Experimental evidence and a suite of field trials will all be required.



Transitioning wetlands

Lake Albacutya, a sub-terminal lake associated with the Wimmera River, is naturally prone to extensive periods of dry in between inundation events. However, recent studies indicate that the current hydrological regime is most likely well outside the natural range. The long-term historical average indicates dry periods lasting between 10 to 15 years. The current dry period is greater than 25 years with the last partial filling in 1996 and recent modelling suggest that dry periods may extend to more than 40 years.

The extended dry period has significant implications for the watercourses and wetlands downstream of Lake Albacutya, which is required to spill before water will flow along Outlet Creek into lakes and wetlands further north located within Wyperfeld National Park. Historical evidence suggests these wetlands would have received inflow every 20 years, but they have not filled since the 1970's and are now predicted to remain dry for more than 100 years. Given the current 40+ year dry period, the lakes of northern Wyperfeld have already transitioned to primarily terrestrial species, and red gums fringing the wetlands and watercourses are being lost.

This may be the likely trajectory for the future of Lake Albacutya and would represent a major ecological transition. Unlike the wetlands further north however, current vegetation within the central lake bed of Lake Albacutya remains colonised by grasses and small shrubs representative of Lake Bed Herblad EVC which typically develops as water recedes and during dry periods. As yet there is no evidence of vegetation transition, though it's likely that the existing vegetation is providing habitat for mostly terrestrial fauna like grassland and savanna birds. Partial fill events may continue to create some wetland habitat that supports breeding of aquatic fauna and growth and recruitment of River Red-gums, prolonging the period that wetland vegetation communities remain healthy. However, partial inundation means shorter duration, and over time, without fuller and longer duration inundation events, terrestrial species may become more dominant. To reflect these substantial changes, the management objectives for Lake Albacutya have been revised, and now recognise the value of the ecosystem services that Lake Albacutya provides under the predominant dry conditions, as well as the exceptional diversity and conservation value that occurs when it is inundated.



Lake Albacutya Ramsar-listed wetland now permanently dry, last partially filled in 1996 (left), and Outlet Creek, Wyperfeld National Park (right).

Inadequate conservation knowledge, capability, capacity and resourcing

Knowledge

There is a large body of knowledge about Victoria's nature, including for native plant and animal species, communities and ecosystems, their biological attributes and needs, ecology and ecosystem processes. This knowledge includes major data repositories such as the state collections of Museums Victoria and the Royal Botanic Gardens Victoria, the Victorian Biodiversity Atlas managed by the Department of Environment, Land, Water and Planning's Biodiversity division, and the national Atlas of Living Australia, as well as technical reports

and scientific literature. These knowledge sources in turn inform critical species and habitat modelling tools, such as DELWP's NaturePrint and Strategic Management Prospects decision support tools.

While this extensive pool of biodiversity knowledge has wide value and extensive species and geographic coverage, it has some limitations – namely the extent of temporal and spatial coverage. A large proportion of biodiversity records date back to major surveys and investigations in the 1970s and 1980s by the past Land Conservation Council and its successors, through to the present-day Victorian Environmental Assessment Council. In recent years, such large-scale studies have been limited with the collection of more recent data restricted largely to confined areas and issues. A loss of long-term monitoring and dedicated government resources for biodiversity surveys have dated much of the available information. For taxonomic groups such as invertebrates (e.g. insects), certain plant groups and fungi, we have extremely limited knowledge.

Further biocultural knowledge (also known as Traditional ecological knowledge and encompassing biological, cultural and linguistic diversity) is held by the elders and members of Traditional Owner Nations across Victoria, passed down through generations in Lore, practice and living cultures. Trusted and respectful relationships and conversations need to be further developed between Traditional Owners and government agencies, including Parks Victoria, to draw on this rich knowledge in meeting shared nature conservation and health of Country obligations.

In addition to these knowledge sources, a wealth of knowledge and experience is also held by other sectors of the broader community, including scientific community, naturalists, land management professionals and landholders.

In light of a rapidly changing climate and high pressures from the further threats listed above, there is an urgent need for up-to-date status and condition information across the state's native plants, animals and ecological communities. Knowledge gaps (both temporal and spatial) need to be filled and validated through onground and remote sensing programs. This considerable task will require multi-partner collaborations with Traditional Owners and other knowledge holders, including the scientific community, natural resource management organisations, volunteer specialist groups (e.g. Field Naturalists, BirdLife Australia), other citizen scientists and the broader public.

Resourcing

Parks Victoria's nature conservation programs are funded by the Victorian Government and tied program support from Australian Government and philanthropic sectors, with some additional revenue from limited commercial operations. Parks Victoria has been successful in attracting short-term grant funding to achieve common objectives with its key partners and core collaborators, which unavoidably creates gaps where the responsibility for managing park values lies solely with Parks Victoria and where discontinuity of funding compromises effective management. In recent decades, Parks Victoria has been responsible for managing a massive expansion of the park system between 1980 and 2010, while servicing the constant growth in park visitation. Similar scale resourcing is required to match these tasks.

To deliver effective nature conservation outcomes, Parks Victoria needs to strengthen four processes for funds generation and business case development:

- development of economic estimates of total cost of delivering conservation actions to achieve long-term outcomes as identified through each Conservation Action Plan (for 18 CAP landscapes), including public engagement and support
- development of value proposition business cases to seek longer-term economic support to meet these needs through government (state and federal), community, philanthropic and/or corporate stakeholders
- active collaboration with, and increased funding support for, capacity building in Traditional Owner Nations and NGO Conservation sector groups to work together to deliver nature conservation outcomes at scale
- a prioritisation process for applying available resources to issues of greatest need and/or effectiveness, both within and between CAP landscapes.

Strategies and actions



4 Strategies and actions

This section sets out the strategies and actions that we will implement to deal with the challenges described in the previous sections. The strategies address the capabilities and planning necessary to undertake conservation action, the conservation works and measures we will deliver, and how we will leverage Parks Victoria's own conservation efforts by harnessing the knowledge and capacities of our partners and the wider public. Research and monitoring underpin the development, implementation and improvement of these strategies and actions, address critical knowledge gaps, support evidence-based decision-making and improve conservation outcomes.

Actions are shown as one of three states: a primary phase; a successive phase; or as ongoing actions:

- **Primary actions** are foundational or high priority actions that will be delivered in the first 1 to 4 years of the plan's ten-year timeframe.
- **Successive actions** require primary actions to be implemented or are lower priorities, and will generally be commenced in the later phase of the ten-year timeframe, unless needs or opportunities bring their scheduling forward.
- **Ongoing actions** involve ongoing delivery and will generally be implemented across the full plan timeframe.

Strategy One Intensified action to combat rising threats

Need

This strategy addresses the threats posed by *Catastrophic bushfires and other large-scale events, Invasive species and overabundant species, Altered fire regimes, Altered hydrology and water quality, Human impacts and nature disengagement, and Legacies of past land uses* (Section 3).

A conjunction of hazards is confronting nature in parks. Climate change is bringing new and more extreme threats while the stress of hotter, drier conditions is compounding pre-existing problems. Many of the threats facing nature on Victoria's parks estate today are long-established. Past practices such as extensive land clearing still impact our nature more than 150 years later, as do many exotic plant and animal species intentionally or accidentally introduced to the State. Similarly, changed hydrology and fire regimes and intensive use and harvesting of natural resources also impact our ecosystems.

Where there is high probability of retaining ecological values and ecosystems under a changed climate, applying currently understood best management practices to reduce the impact of existing threats will support their persistence under climate stresses. Long-term monitoring will evaluate and improve existing programs and new research is crucial in developing new programs and methods.

Outcomes

Biodiversity in Victoria's parks is protected, key threats are mitigated, and priority ecosystems and species are restored.

Outputs

General

- Priority threats identified in Conservation Action Plans are mitigated to strengthen ecosystem resilience and to support the persistence of native species in the context of long-term climatic change.

Ecosystem restoration

- Degraded environments are restored to reinstate habitat health and continuity, including delivery of ecosystem services.

Invasive species and overabundant species

- The scale, intensity and effectiveness of invasive and overabundant species control in terrestrial, freshwater and marine environments is increased as required to address emerging and legacy threats that are compounding under climate change.

Hydrology and water quality

- Environmental water flows and quality on the parks estate (identified in Conservation Action Plans) are achieved by working with water agencies and catchment authorities.

Fire regimes

- The resilience of natural ecosystems and their ability to deliver services including biodiversity, water and carbon storage are maintained or improved while supporting the Victorian Government's primary objectives for public land bushfire management: minimising the impact of major fires on human life, property, infrastructure, industries, the economy and environment.
- Park ecosystem resilience is not unacceptably impaired by the frequency, severity, extent and timing of planned burning and other fuel management activities through collaboration with fire managers (DELWP and Traditional Owners) on knowledge acquisition, procedures, and participation in fire management planning.

Altered fire regimes - A single fire event in some systems, such as the Mallee habitats of north-west Victoria has been estimated to take 100 years or more to recover.

Very large bushfire events (>100 000 ha) have recently occurred approximately every 10-20 years in Mallee heathland vegetation and are caused by lightning igniting multiple bushfires which then merge in the landscape. The most recent large fire events in the Mallee Parks have involved the Wyperfeld National Park – Big Desert Wilderness Park complex of reserved land (2002: 180 000 ha; 2014 110 000 ha).

Very large bushfire events simplify extensive tracts of vegetation, the effects of which may include:

- Reduced species diversity – Even-aged stands of vegetation are suitable habitat for only select fauna species. Many Mallee species show preference for habitat features that are not always present: *Triodia* specialists (Striated Grasswren, Ningau, Mallee Emu-wren) prefer mid-age vegetation at ~20-40 years when hummock grasses are at their most 'bushy'. For Murray Sunset National Park, the desired age-class distribution has been modelled as a combination of early, mid and late (>80 years) age-classes, weighted towards the older vegetation which is when tree hollows develop.
- Local extinction – Large fire can kill all individuals in a population and make recolonisation very unlikely. After the 2014 bushfires, Victoria became the only place in Australia to find Mallee Emu-wren when they were wiped-out from South Australia.
- Loss of refuges in a drying landscape – high severity bushfires leave few remaining unburnt patches and are more likely to impact the low-lying soaks and woodlands that provide important drought (and fire) refuges.
- Loss of stands of fire-sensitive semi-arid woodland tree species occurring in the landscape, such as Cypress-pine or Buloke, which may take 80-100 years for habitat-forming tree hollows to develop.



Increasing high risk fire weather days, and continuing declines in rainfall, are likely to result in more frequent very large bushfire events, from which the environment will take longer to recover, and may not fully recover from one event before the next occurs. Management of Mallee heathland is a balance of protecting critical habitat in the face of natural bushfires, whilst also ensuring a changing mosaic of age-classes at an appropriate patch-sized scale so the future will have a mix of suitable habitats with resident fauna close enough to recolonise as the vegetation ages and becomes suitable habitat once again in the decades to come.

Bronzewing FFR (unburnt patch and burnt) was ~95% burnt in the 2014 bushfires which wiped out its resident population of threatened Black-eared Miner.

Controlling invasive species and overabundant species threats

Actions	Phase	
1.1	Deliver alpine deer, feral horse and pig control programs, including aerial control of deer and pigs and ground control programs for all three species to protect alpine wetlands and other alpine/sub-alpine environments.	Primary then ongoing
1.2	Deliver <i>Strategic Action Plan: Protection of floodplain marshes in Barmah National Park and Barmah Forest Ramsar site [2020-2023]</i> to control feral horses, deer and pigs in partnership with Yorta Yorta Traditional Owner Land Management Board.	Primary then ongoing
1.3	Maintain and improve existing fox control programs, and establish new programs based on CAP priorities, in partnership with DELWP Ark programs and adjacent land managers, where appropriate.	Ongoing
1.4	Trial fox fertility chemical control methods: pilot the spontaneous abortion drug, Cabergoline, in a Victorian park in partnership with Phillip Island Nature Park.	Primary
1.5	Co-plan and co-deliver total cat eradication program on French Island using combination of Curiosity™ poison and proposed use of padded leg-hold traps.	Primary
1.6	Establish an adaptive experimental management program for Curiosity cat baiting, across a variety of habitat types.	Successive
1.7	Deliver Koala Management Program including fertility control, at Budj Bim National Park in partnership with Gunditj Mirring Traditional Owner Corporation, and at French Island.	Ongoing
1.8	Deliver introduced and overabundant native herbivore control on a landscape scale as total grazing management program, e.g in the Mallee and Wilsons Promontory National Park.	Ongoing
1.9	Develop and deliver evidence-based urban overabundant native animal management programs, focused on macropods (kangaroos and wallabies) and possums.	Primary then ongoing
1.10	Deliver overabundant native sea urchin control programs at Beware Reef, Corner Inlet and Point Cook in collaboration with Victorian Fisheries Authority, University of Melbourne and Friends of marine parks groups.	Successive
1.11	Build resources and expand delivery and effectiveness of landscape-scale park projects delivered with support of the DELWP Weeds and Pests on Public Lands program including Southern Ark, Grampians Ark, Glenelg Ark, Barry Mountains project, Central Highlands Eden, Glenelg Eden, Otway Ark and Eden, Peri-urban Weeds Program and Mallee Bounceback (including rabbits) projects.	Ongoing
1.12	Deliver and profile control programs for high-risk emerging weed species, such as alpine Hawkweed eradication, with relevant partners including volunteer groups, Agriculture Victoria and other land and natural resource managers.	Primary
1.13	Deliver improved and expanded on-ground programs to control transformer and high priority invasive plant (weed) species identified in CAP priorities to achieve ecological objectives and regularly evaluated for effectiveness.	Ongoing
1.14	Implement invasive Japanese Kelp control programs in at key sites in impacted marine protected areas: e.g. Port Phillip Bay and Apollo Bay.	Ongoing

Managing water regimes in a drying era

Actions	Phase	
1.15	Develop a Parks Victoria Environmental Water Partnership Strategy for Ramsar sites and other key wetlands: build organisational framework and capacity for collaborative actions to support environmental water management.	Primary

1.16	Deliver complementary actions to support implementation of Environmental Water Partnership Strategy and associated works across Ramsar sites and other key wetland systems through state and national programs.	Primary then ongoing
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Managing fire regimes in the face of climate change

Actions	Phase
1.17 Work with DELWP to identify and map biodiversity assets that are sensitive to fire and/or fire control techniques (including long-unburnt areas and ecosystems with zero fire tolerance), and develop strategies or options to protect them during all aspects of fire management and bushfire response.	Primary then ongoing
1.18 Work with DELWP and government on improving the bushfire risk management framework to better address risks to biodiversity and cultural landscapes of more frequent and severe bushfires , including risk of potential species extinctions and irreversible changes in ecosystems.	Primary
1.19 Work with DELWP and other emergency managers to identify and minimise impacts of emergency response operations on biodiversity and cultural landscapes during and following events, including creation of fire breaks, use of aerial retardant in relation to waterways and wetlands, road and roadside clearing, hazardous tree management, emergency road works and water management.	Primary then ongoing
1.20 Work with DELWP and other emergency managers to identify and minimise impacts of planned burn operations on biodiversity and cultural landscapes including governance frameworks, decision-making processes, values identification and recognition, burn objectives and justifications, cost/benefit impacts analyses of proposed burns, creation of fuel breaks and sector and community engagement.	Primary then ongoing
1.21 Influence strategic and operational bushfire planning to achieve identified ecological goals for the frequency, severity and scale of planned burning while supporting the paramount need to protect life and property. Contribute to procedures and tools to guide how planned burning is re-introduced into large bushfire areas.	Ongoing
1.22 Collaborate with DELWP and other partners on continuous improvement of ecosystem resilience assumptions and metrics for bushfire management , in particular: updated Tolerable Fire Intervals (TFIs) to reflect regional/local variations in vegetation type; metrics relating to the use of low severity fire and cultural burning practices; improved models for measuring species diversity, vegetation growth stage and vital attribute datasets; and a better understanding of the effects of fire on less fire-adapted ecosystems, (e.g. rainforests) and long-unburnt vegetation.	Ongoing
1.23 Work with DELWP to improve the alignment between the Joint Fuel Management Program and Conservation Action Plans , and work to identify and resolve any potential divergences of objectives and priorities. Continue the use of planned burns as a tool to achieve ecological outcomes for ecosystems adapted to fire.	Primary then ongoing
1.24 Build relationships and partnerships with Traditional Owner groups to share fire ecology knowledge and practices: through on-Country visits, dialogue and shared participation in cultural burns (where culturally appropriate).	Primary then ongoing
1.25 Partner and participate, where invited and appropriate, in planning, delivery and evaluation of cultural burn trials to assess biodiversity impacts and/or benefits and the amelioration of fire severity in a range of parks.	Primary

Strategy Two New interventions to address major ecological change

Need

This strategy addresses the threats posed by *Catastrophic bushfires and other large-scale events, Altered fire regimes, Altered hydrology and water quality, Human impacts and nature disengagement, and Major ecological transitions* (see Chapter 3).

Under a changing climate, major ecological changes are already happening across areas of the parks estate and are likely to manifest in more areas over time. These changes will occur at two rates – 1) gradual transformations, and 2) extreme event changes such as major bushfires, droughts, storms, floods and coastal erosion events. Management responses to both require the same stepped processes of detection, prediction, preparation, response and, where possible, recovery. Where outcomes are more challenging or uncertain, more dramatic and/or novel interventions may be necessary. These include:

- **conserving ecological values by actively resisting change**, through establishment of temporary and long-term refuges, insurance options for vulnerable plants and animals, prioritisation/triage processes and emergency operational responses and interventions, such as physical removal of hard barriers to the inland migration of coastal wetlands and mangroves.
- **facilitating transformational change**, moving to new ecological goals and intervening actively to direct ecological changes toward a desired state, such as through introducing non-local canopy tree species to maintain forest structure.
- **accommodating significant ecological changes** and modifying conservation goals and actions to maximise biodiversity conservation outcomes and ecosystem services provision under a changed state, such as grassy woodlands and their native inhabitants replacing wet forests but still needing conservation protection.

This strategy relies on knowledge gap analysis, predictive modelling and research on innovative methods and adaptive management. It also recognises that the public and visitors to parks need to be informed and aware of these changes and encouraged to actively participate in adaptation responses.

Ecosystems and species may be impacted by formally declared emergency events such as bushfires, major storm events, floods and marine pollution. The mitigations, response and recovery for these events are established under *Emergency Management Act 2013, Victorian State Emergency Management Plan* and relevant response plans. Parks Victoria will work closely with relevant response agencies and support agencies including DELWP; Country Fire Authority; Department of Transport; Department of Jobs, Precincts and Regions; State Emergency Service; Emergency Management Victoria; Bushfire Recovery Victoria; Agriculture Victoria, Catchment Management Authorities and Zoos Victoria to seek the best conservation outcomes for threatened or impacted species and ecosystems, while actively contributing to continual system improvements.

Outcomes

Ecosystem resilience is strengthened, and where irreversible ecological transitions are unavoidable their negative impacts on biodiversity are mitigated.

Output

- New interventions and new principles for park ecosystem management mitigate the effects of major ecological change under climate change.

Scenario planning and evaluating adaptation options

Actions		Phase
2.1	Identify areas being significantly impacted by climate change across parks estate through on-ground knowledge and detection, expert elicitation, remote sensing, geospatial analysis and other data sources.	Primary then ongoing

2.2	Identify ecosystems likely to undergo the greatest change and undertake future thinking such as scenario planning and pathways approaches to evaluate potential management interventions. Align the approach with proposed <i>Climate Change Adaptation Action Plan for Natural Environment System</i> at the appropriate scale.	Primary
2.3	Identify threatened species vulnerabilities and potential <i>in situ</i> refuge areas within broader impacted areas. Develop localised action prioritisation processes and plans: for increased management attention/interventions and allocation of resources.	Primary then ongoing

Conserving ecological values by active resistance to, and recovery from, change

Actions	Phase	
2.4	Define and rank conservation assets in the park system by vulnerability: - for two CAP landscapes, trial and fully integrate conservation data into emergency management geospatial systems and emergency operational guidance. - develop for all CAPs.	Primary Successive
2.5	Establish a tiered system of wildlife safe haven options with partners, including temporary relocation shelters, permanent refuges to spread risk, and long-term sanctuaries with heightened protections (see also Strategy 3).	Successive
2.6	Establish native plant safe haven options in collaboration with Royal Botanic Gardens Victoria, Traditional Owner groups and the public, to store seed and/or grow rare, threatened, keystone and culturally significant plant species.	Primary then ongoing
2.7	Establish, train and equip biodiversity field deployment teams for emergency interventions and extractions of threatened flora and fauna, for deployment during fire events and/or immediately following peak emergency levels; work with relevant partners including DELWP and other response and support agencies (e.g. Zoos Victoria and Royal Botanic Gardens Victoria).	Primary then ongoing
2.8	Forecast areas of highest likely threat to parks from bushfire, extreme heat or storm/flood through monitoring and modelling and develop contingency plans for identified priority areas on an annual basis.	Primary then ongoing
2.9	Protect biodiversity in-situ during extreme events by increasing management prioritisation; build intelligence via aerial imaging and on-ground reconnaissance and operations and implement immediate interventions to protect remaining intact/unaffected areas during and after event; work with relevant partners including DELWP and other response and support agencies.	Primary then ongoing
2.10	Build on existing arrangements to identify fire severity impacts and assess recovery prospects, including recognition of systems unlikely to return to prior state, e.g. temperate rainforests in a drying climate.	Ongoing
2.11	Identify candidate sites and build recovery programs for active rehabilitation including recovering habitat continuity and, where appropriate, reintroduction of flora and fauna.	Ongoing
2.12	After extreme events, protect impacted native plants and animals in parks from further damage by reviewing future planned burns and other potential activities. Take account of the conservation status of the affected flora and fauna in the wider regional landscape and risks to those populations outside parks.	Ongoing

Facilitating transformational change: active interventions to direct ecological changes

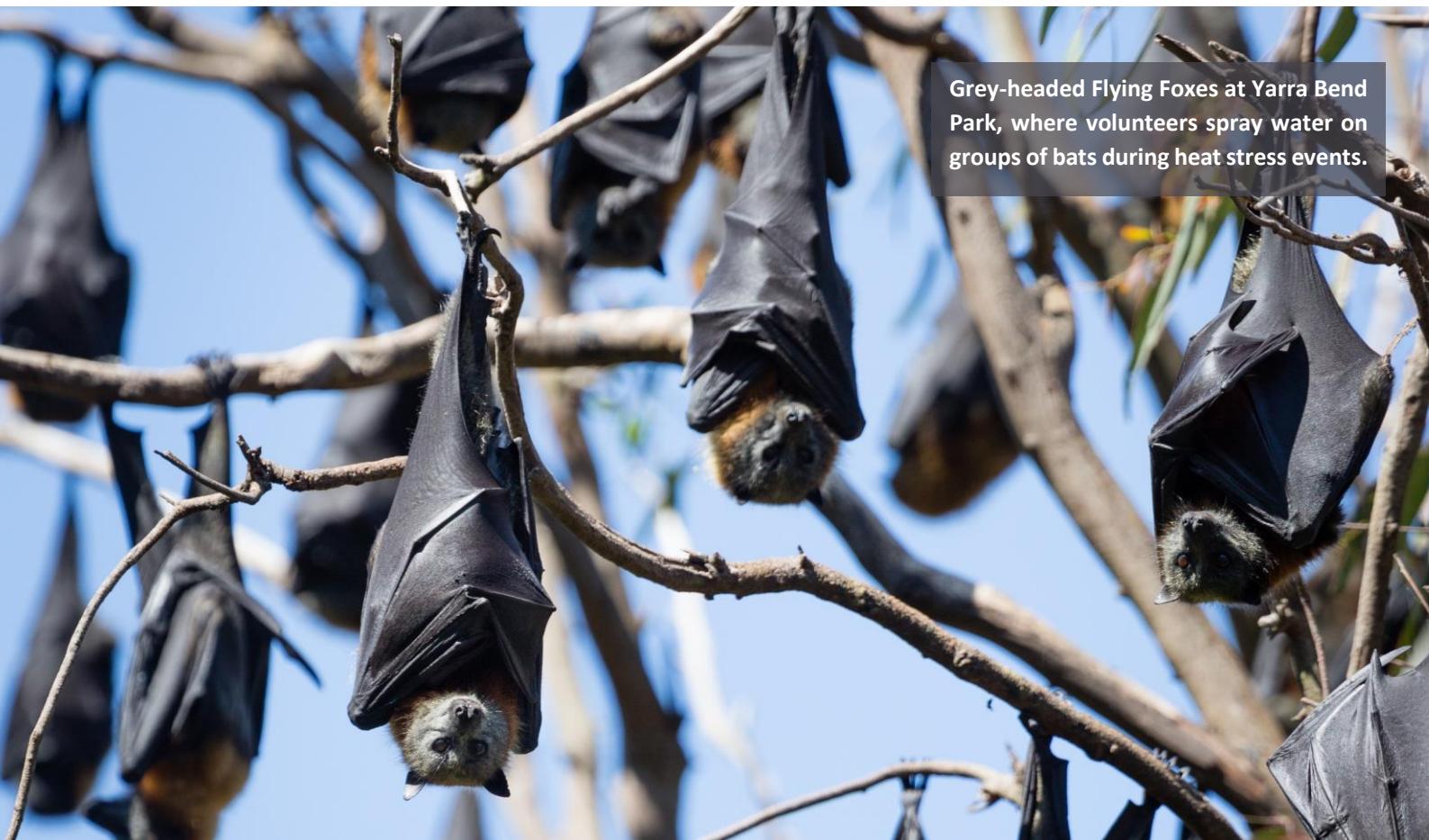
Actions		Phase
2.13	Design and implement trials of forest canopy substitute species to replace locally indigenous dominant canopy tree species with more climate-tolerant, surrogate species.	Successive
2.14	Identify opportunities for alternatives to environmental watering to improve the natural hydrological regime in wetlands, and where this is not feasible, develop plans to facilitate successful transition to a drier state.	Successive

Accommodating significant ecological change

Actions		Phase
2.15	Evaluate and review conservation plan goals using improved climate risk modelling, and where changes in ecosystem state are inevitable, adjust actions to maximise ecosystem services that can be provided under a changed state.	Primary then ongoing

Communicating climate change impacts and implications

Actions		Phase
2.16	Implement a candid communication campaign on climate impacts on parks, connected to public opportunities for participation, events and ways to help.	Primary
2.17	Increase Parks Victoria standing as a lead voice on climate change's impacts on nature and call to action, through staff professional development and/or external partnerships.	Successive
2.18	Develop and align volunteering programs to meaningful climate change adaptation/response projects.	Ongoing



Grey-headed Flying Foxes at Yarra Bend Park, where volunteers spray water on groups of bats during heat stress events.

Strategy Three Conservation flagships

Need

This strategy addresses the threats posed by *Invasive species and overabundant species* and *Human impacts and nature disengagement* (Section 3).

The majority of the Victorian public and the state's visitors have limited understanding and engagement with Victoria's natural riches. Nature conservation is not possible without an engaged and active public, which in turn builds social and political license to act. To capture public and visitor imagination, big-idea high-profile projects are required that bring together visible protection of nature with real outlets for public nature contact, engagement and active participation.

Through promotion of iconic natural places, species, and nature conservation programs and platforms, the Conservation Flagships concept aims to build the flagship brand, moving from easily grasped projects (such as the Prom Sanctuary or Island Havens) and familiar species (such as penguins and platypuses), to understanding and valuing the lesser-known native ecosystems and species in urgent need of our help (such as native grasslands and less familiar plants and animals such as Cabbage Fan-palm and Plains-wanderers). The NCS proposes lead conservation flagship ideas under two categories: 1) fenced or island havens, and 2) profiled restoration of dispersed and threatened habitat types.

Developing an understanding of the landscape ecology and a basis for long term monitoring and evaluation is critical to the success of these projects, in close collaboration with key knowledge holders and implementation partners.

Outcomes

Biodiversity in Victoria's parks is protected, key threats are mitigated, and priority ecosystems and species are restored.

Outputs

- Collective conservation outcomes are delivered at scale, while building greater public and stakeholder awareness, understanding and support for nature conservation through high-profile and accessible major nature conservation projects.

Large-scale fenced or island havens

Actions	Phase	
3.1	Plan, fund and develop the Prom Sanctuary , a landscape-scale lead sanctuary site at Wilsons Promontory National Park: a 50,000-hectare biodiversity sanctuary, free of introduced predators and large herbivores and supported by large-scale threat management and ecological restoration programs.	Primary then ongoing
3.2	Plan, fund and develop Island Havens in partnership with Traditional Owners to protect penguin and seabird colonies, cultural heritage sites and unique island habitats across Victoria's Bass Strait islands through invasive animal and plant eradication programs and other measures.	Successive
3.3	Increase public awareness, support and resourcing for the Woodlands Eastern Barred Bandicoot Sanctuary predator-proof 230 ha captive breeding enclosure at Woodlands Historic Park.	Primary
3.4	Plan, fund and develop the French Island Sanctuary as part of the Australian Government initiative for cat-free islands: a multi-tenure, whole-of-island, wildlife sanctuary free of feral cats, foxes and goats, and home to reintroduced species including the rewilding of Eastern Barred Bandicoots.	Primary

Profiled restoration of dispersed and threatened habitat types

Actions	Phase	
3.5	Build on the long-running Alpine Peatlands Protection Program to establish a network of Alpine Peatland Sanctuaries that protect and profile endangered alpine peatlands and their unique inhabitants from the impacts of introduced pest and weed species, fire, inappropriate visitor use and other threats. Planned and delivered in partnership with CMAs, Federal government and DELWP at a landscape scale and includes innovative management interventions and long-running monitoring and evaluation programs.	Ongoing
3.6	Create a virtual native grasslands network as Victoria's Grasslands Sanctuaries to raise the profile, resources and partnership support for fragmented remnant native grassland reserves across Victoria and their related threatened species conservation programs, including Zoos Victoria's Plains-wanderer captive breeding program. Continue to build the management of northern plains grasslands biomass and structure using ecological grazing while trialling and evaluating ecological and cultural burning. Seek support to upgrade infrastructure for ecological grazing management (e.g. water supplies and fencing) across key reserves.	Primary and ongoing
3.7	Expand the Restoring Box Ironbark Woodlands project to restore Box-Ironbark woodlands across a network of central Victorian parks, improving habitat for many threatened species, including the Flora and Fauna Guarantee Act-listed threatened Victorian Temperate Woodland Bird Community.	Successive
3.8	Build on the long-term grazer control for the Restoration of the Mallee's semi-arid woodlands to ensure the establishment and persistence of fire-sensitive canopy species in the landscape, through fire management protection and active revegetation, potentially using climate-adapted genotypes or species.	Primary then ongoing

Prom Sanctuary: A 50,000-hectare wildlife refuge

In November 2020, the Victorian Government provided foundational funding to establish the *Prom Sanctuary*. This project will create a 10-km long predator-proof fence across the narrow Yanakie entrance to the much-loved Wilsons Promontory National Park to create a 50,000-hectare fox, cat and deer proof sanctuary for Victoria's native wildlife, plants and habitats.

Located at the southern tip of mainland Australia and surrounded by the cool temperate waters of Bass Strait, it is also ideally placed to be buffered from the increasing heat, dry and bushfire threats occurring under climate change.

Supported by parallel habitat restoration, species recovery and rewilding programs with core community and volunteer involvement, the resulting protected landscape will become a nationally significant conservation hub that will profile critical conservation programs and projects, offer rich visitor experiences, drive nature-based tourism and bring regional economic benefits.



Strategy Four A connected and actively involved public

Need

This strategy addresses the threat posed by *Human impacts and nature disengagement* (Section 3).

For an individual to support nature conservation, it is necessary to know about and have some form of personal and positive connection with nature. For many Victorians and visitors to the state, this nature connection is either poorly developed or absent. To make such positive connections, it helps to have had positive nature experiences. To go one step further and help protect nature, you need to have avenues to get actively involved. This strategy seeks to address the need for greater public awareness, engagement and involvement in nature conservation, while growing the social license that Parks Victoria requires to carry out its nature conservation obligations.

Parks Victoria plays a lead role in public engagement with Victoria's nature. This ranges from frontline contact with millions of visitors, to diverse interpretation programs, accessibility programs, volunteer and friends' groups (including environmental restoration and citizen science projects), large youth and education programs (such as Bush Kinder, Junior Rangers, and school and holiday programs), and major communications and media activity. Parks Victoria is part of growing global movements in engagement with nature through its *Healthy Park Healthy People* initiatives and IUCN's #NatureForAll (IUCN, 2021) that are seeking to reach out to raise awareness and engage more diverse communities in nature and nature stewardship.

Over 100 million visits are made each year to Victoria's parks, reserves, ports and waterways. Employing more than 1000 staff, the crucial role played by Parks Victoria and the high value of this public interface with nature cannot be understated.

To improve outcomes for Victoria's native species and habitats, Victoria's public and its visitors need to be better connected, informed, engaged and involved. This requires three streams of work – better understanding and consideration of socio-psychological factors underpinned by social science research, development of campaigns and programs to improve knowledge of and personal connections with nature including through meaningful citizen science engagement, and reduction of the destructive impacts of illegal activities.

Outcomes

- The public is connected to nature and parks, and bring their interests and capacities to the conservation task.
- The community values, supports and contributes to park conservation through flagships, citizen science and sustainable visitor practices.

Outputs

- Research, campaigns, programs and outlets for action result in significantly improved public connection with, and positive behaviours towards, Victorian nature.

Understanding the social dimensions of public and visitor relationships with Victorian nature

Actions

Phase

4.1	Use social science research to interrogate and understand drivers of public behaviour, development of pro-conservation behaviours, barriers to constructive engagement with nature, and mechanisms for fostering stewardship and advocacy for both park visitors and across the broader public.	Primary
4.2	Identify and measure key indicators of social license and public perceptions of Parks Victoria's ability and reputation to deliver successful nature conservation outcomes: to assess efficacy of education and engagement campaigns and programs.	Primary then ongoing

Building personal connection between the Victorian public/visitors and Victorian nature

Actions	Phase	
4.3	Identify and promote select threatened species, communities and/or ecosystems to build awareness, understanding and support for nature conservation in the community, by using social research to develop evidence-based communication strategies. Trial for six priority parks and two CAPs.	Primary then ongoing
4.4	Identify, categorise and localise conservation issues, actions and key deliverers (PV and partners): pilot trial for three high-profile issues (e.g., fire, environmental water, invasive species).	Primary
4.5	Develop two trial campaigns on key difficult conservation issues to build Parks Victoria's social license to act: profile values and threats for key issue, target building connection, sympathy and active advocacy (including consideration of mass reach and social mobilisation approaches).	Primary then ongoing
4.6	Collaborate with Traditional Owner corporations and groups (where invited and appropriate) in meeting aspirations for wider public and visitor knowledge of Victorian species, places and nature of cultural significance.	Ongoing
4.7	Develop lead spokespersons to both praise and champion Victorian nature and be the Victorian 'Voice of the Environment': including through talent development and increased media training.	Ongoing
4.8	Develop collaborative campaign with conservation sector partners: facilitated through the Victorian Environment Forum (VEF). Develop and co-deliver one shared campaign.	Primary
4.9	Build collaborative engagement partnerships: including co-promotion of priority messaging and narratives of Parks Victoria and partner organisations (with intellectual property and branding awareness and sensitivity).	Ongoing
4.10	Build <i>My Park My Nature</i> : a wiki-nature web portal to catalyse community action and local custodianship of nature in parks through volunteer submission of information, imagery, narratives, condition monitoring, events and volunteering opportunities.	Primary
4.11	Implement <i>Nature's Mascots</i> education program: a species-based approach to promote the benefits of habitat conservation in the Victorian curriculum's learning outcomes.	Successive
4.12	Implement <i>Youth Volunteering for Nature</i> initiative and tertiary work placement programs to provide practical and recognised on ground learning experiences for youth from 18 to 29 years.	Successive
4.13	Implement the <i>Learning For Nature Strategy</i> including early steps into nature programs for connecting or reconnecting community with nature and supporting early and positive contact with nature through facilitated safe experiences.	Successive
4.14	Support existing volunteer groups, and grow and diversify volunteering programs for nature: through thematic and promotional support, secure funding, and co-development with regions and partners.	Ongoing

Decrease scale and impacts of illegal human activities destructive to key species/habitats

Actions	Phase	
4.15	Identify and develop public campaigns on three priority illegal behaviours impacting the survival of key species/habitats (e.g. illegal timber harvesting, illegal track formation, illegal waterway damage): through both education and compliance programs.	Primary then ongoing
4.16	Identify and develop best practice behaviour change interventions to improve compliance with park regulations and raise the profile of successful prosecutions.	Ongoing

My Park My Nature

A public engagement portal for connecting with and caring for nature

Cabbage Tree Creek Flora Reserve

East Gippsland, Victoria

Cabbage Tree Creek Flora Reserve

Add a photo | Share this page

Map tools

© 2017 Microsoft Corporation © 2017 HERE

Original description: Land Conservation Council, East Gippsland Review
"Cabbage Tree Creek (1700 ha)
1700 ha be used to preserve streamside communities and particularly cabbage fan palm. This reserve includes an important representative sample of the Noorinbee land system."

Access and activities...

Description	Add comments
This reserve showcases Australia's most southerly palm, the Cabbage Fan Palm and great examples of cool temperate rainforest more
Observations	
21 June 2017 – Orbost Secondary College Observed Yellow-tailed Black Cockatoos listening and digging for grubs in blackwood trunks (see photos). Saw echidna feeding roadside...	more
12 May 2017 – John Smith Heard then watched three yellow-bellied gliders moving through the treetops at Smith's campground (listen to recording). Also heard ...	more
5 March 2017 – East Gippsland Field Naturalists	... more

Report abuse...

IMAGE GALLERIES

Habitat

.....more or add

Species

.....more or add

Video/audio

.....more or add

Species lists

birds	mammals	reptiles	amphibians	land invertebrates
fishes	aquatic invertebrates	plants & fungi	geology	fossils

My Park My Nature.....

Parks VICTORIA Healthy Parks Healthy People

The *My Parks My Nature* proposal aims to build a Wikipedia-style portal representing every Victorian park and reserve – across land, wetlands, waterways and sea. A landing page for each of 3,200+ parks and reserves would be pre-populated with maps, the original reason the park was established, and editable fields and tools where users (Parks Victoria staff, community groups, special interest groups, the general public, students and/or individuals) can contribute text, stories, images, video, audio, checklists, park health checks, volunteering announcements and/or citizen science data on 'their' park. Over time the platform would establish an invaluable drawcard for community action and visitor interest, and an invaluable resource and platform for community engagement and park management.

Strategy Five Conservation capability to match the challenge

Need

This strategy addresses the threat posed by *inadequate conservation knowledge, capability, capacity and resourcing* (Section 3).

Over recent decades, the requirement to service and manage growing visitation, an expanding estate, increasing threats from invasive species and climate change, and increasing demands in managing fire have all affected the relative resourcing of nature conservation management across the parks estate. A major uplift in knowledge, expertise, effort and resources is urgently required. Current and past nature conservation programs suffer from highly variable resourcing, longevity, intensity and prioritisation against other demands.

The actions under this strategy cover four primary themes: knowledge, planning, securing resources and benchmarking. New knowledge needs to be secured, analysed and interpreted to plan and deliver sound conservation outcomes in challenging times. Based on this knowledge, conservation action planning and delivery need to be fully supported, including through the development of processes and tools to cost estimate and prioritise the identified conservation actions. Armed with realistic estimates of resourcing needs, business cases and value propositions need to be built to secure sufficient and sustained resources. Finally, our efforts and outcomes need to be held up to international conservation standards to assess their quality.

Outcomes

Park nature conservation is based on robust knowledge and planning, and the necessary resourcing is secured, sustained and sufficient to meet nature conservation obligations.

Outputs

- Nature conservation knowledge, planning and resourcing is significantly lifted and sufficient to mitigate rising threats.
- Specialist capabilities in areas of highest risk are expanded, especially in climate change science, fire ecology and water management.

Build better knowledge of natural assets and the impact of climate and other risks

Actions	Phase	
5.1	Continue and expand monitoring programs and research partnerships that improve knowledge of the state of natural assets and the effectiveness of conservation actions.	Ongoing
5.2	Build and incorporate climate risk modelling into all forward thinking: increase inhouse capability and capacity across land and sea; increase access to climate data and modelling through multi-agency and inter-jurisdictional collaborations and forums, e.g. Alpine Ash vulnerability research.	Primary
5.3	Develop risk matrices and climate change vulnerability mapping across the park system.	Primary
5.4	Co-develop climate risk and refuge geospatial layers: for shared risk management and operations with DELWP and Forest Fire Management Victoria, Emergency Management Victoria and the Victorian Environmental Water Holder.	Primary
5.5	Grow the <i>Park Health Check</i> assessment program: expand roll out, training and tool use. Implement regional training and trials of <i>Park Health Check</i> tool and investigate links and data feed opportunities with <i>My Park My Nature</i> project.	Ongoing
5.6	Develop a <i>PV Env36</i> park condition and trend project: proposed as a new Parks Victoria biannual assessment of broad environmental condition across a representative suite of 36 parks and reserves, from small to large, across land and water.	Primary
5.7	<i>State of the Parks</i> annual pulse surveys using key subset criteria. Design and carry out pilot pulse survey on three trial parks.	Primary

5.8	Grow citizen science data sources and quality: Develop the <i>My Park My Nature</i> project as a citizen input web portal (see Strategy 4) and explore links with other potential partners.	Primary
5.9	Develop increased specialist capabilities in fire ecology to provide the principal source of expertise and advice to DELWP and the Victorian Government for maintaining and improving the fire resilience of park ecosystems.	Ongoing
5.10	Develop increased specialist capabilities in environmental water management to deal with projected drying conditions and increased risk.	Ongoing

Complete conservation action plans for all parks, aligned with Traditional Owner plans and regional conservation planning

Actions

5.11	Complete Conservation Action Plans for all 18 of Parks Victoria's conservation management landscapes. Implement, monitor, review and adapt as needed.	Primary
5.12	Develop extreme impact contingency plans within CAPs: Pilot the process for two CAPs.	Primary
5.13	Align CAPs with Traditional Owner Country plans and/or other Traditional Owner expectations and aspirations for protecting cultural landscapes and returning health of Country.	Ongoing
5.14	Develop Sea Country collaborations with Traditional Owner groups including potential on-water projects, e.g. through projects such as the <i>Island Havens</i> project (see <i>Strategy 3</i>).	Successive
5.15	Implement an uplift in planning, coordination and delivery of the state-wide Marine and Coastal program aligned with findings of past VAGO marine audits and implementation of <i>Marine and Coastal Act</i> reforms. High priority focus on marine pests (detection, control, public engagement and interagency support), promotion of marine protected areas (interpretation and nature-based tourism), and compliance (fishing and other collecting).	Primary then ongoing

Secure a sustained uplift in conservation resourcing

Actions

5.16	Build prioritisation and cost-of-service estimation capability for nature conservation management actions using decision support tools such as Strategic Management Prospects and structured decision-making to identify priorities for investment and resourcing needs.	Primary then ongoing
5.17	Estimate cost-of-service for prioritised actions in individual CAPs based on established quantity surveyor models and and collectively for whole-of-estate conservation needs.	Primary then ongoing
5.18	Strengthen cost of service estimates for post-fire biodiversity recovery programs, and contribute to and strengthen the resource estimate components in DELWP Rapid Risk Assessment Team (RRAT) processes.	Primary
5.19	Develop detailed sanctuary and haven business cases and proposals (see <i>Strategy 3</i>).	Primary
5.20	Develop 'close-the-loop' income generation pilot project to visibly direct commercial revenue back into local nature conservation needs, e.g. Wilsons Promontory National Park/Prom Sanctuary.	Successive
5.21	Investigate large-scale carbon market sequestration investment opportunities that are suitable for implementation on public land categories managed by Parks Victoria. Develop a framework, pilot and/or potential pipeline projects that could deliver both carbon and biodiversity benefits.	Primary
5.22	Seek and develop opportunities for the resourcing of compliance activities commensurate with an increasing incidence of illegal activities impacting on biodiversity values.	Primary

- 5.23 Investigate potential volunteer tourism avenues to fund high-profile high return nature conservation issues or programs. Successive

Meet best practice standards

Actions

- | | | |
|------|---|------------|
| 5.24 | Implement the necessary actions to achieve IUCN Green list accreditation for Victorian parks: at least one each for terrestrial and marine protected areas. | Primary |
| 5.25 | Develop pipeline of candidate parks for Green List nomination: identify and submit two more park nominations. | Successive |



Warby-Ovens National Park, known for its ancient grass-trees, is the first park in Victoria to be listed under the IUCN Green List, which recognises well-managed protected and conserved areas.

Strategy Six Ensuring park use is sustainable

Need

This strategy addresses the threats posed by *Human impacts and nature disengagement*, and aspects of *Invasive species and overabundant species* and *Altered hydrology and water quality* (Section 3). It outlines the stewardship actions required to avoid or minimise impacts to biodiversity when managing park services or functions that may include attracting visitation to the parks estate, construction and maintenance of critical utility and community infrastructure, and/or natural resource extraction where this is permitted by legislation.

There is ever-increasing visitation to Victoria's conservation estate, particularly its many key iconic sites. This brings benefits through raised public interest and positive contact with nature, but it can also bring increased pressure to ecosystems and species, many of which are already under stress. Nature can be 'loved to death'. It is important to achieve the right balance between rich nature experiences and protecting environmental and cultural values (see inset box below). In addition, proper environmental impact assessment and regulation is needed for proposals to develop infrastructure in parks, such as accommodation, visitor services or utilities.

An urgent uplift is required in the processes and programs deployed by Parks Victoria to facilitate visitation and connecting people to nature. All projects, programs, activities and physical infrastructure on Victoria's parks estate must be planned, designed and delivered in a way that is environmentally sustainable, and potential environmental impacts are addressed and avoided or mitigated. Planning and design require a contemporary understanding of visitation demand, as well as of motivation and behaviours. This strategy proposes new initiatives to develop and meet higher standards, while strengthening inhouse capability and capacity in environmental design, impact assessment and enforcement. This will ensure that any proposed project or activity meets the highest nature conservation and sustainability standards.

This approach will ensure that Parks Victoria meets the commitment in Bio2037 for all government agencies to consider and act on their 'duty of care' to the land, waters and biodiversity that they manage, as part of their standard management practices, by:

- taking reasonable steps to avoid exacerbating threats to biodiversity, as part of both planning and implementation of programs
- reporting on their biodiversity performance, including contributions to biodiversity targets as well as the consequential impacts from public land-use decisions.

Outcomes

The environmental impacts of park use by visitors, tenants and others are minimised and sustainable.

Outputs

- Park visitor use, infrastructure development and any authorised resource use is managed to minimise environmental impacts and meet the highest sustainability standards.

Assessing and reporting on the environmental impacts of proposed uses and developments

Actions	Phase	
6.1	Strengthen inhouse expertise in environmental impact assessment as part of park planning processes across all Parks Victoria projects, programs and activities. Initiate forums with all Parks Victoria internal stakeholders to develop agreed environmental impact assessment obligations, processes and practice.	Primary
6.2	Improve the rigour and consistency of environmental impact assessment and mitigation for major projects delivered by Parks Victoria.	Ongoing

6.3	Systematise Parks Victoria's approach to the regulation of environmental impacts of use and development by others on the park estate. Integrate park planning and environmental impact processes for mining, extraction, energy, tourism, transport or essential services projects on (or potentially impacting) the parks estate.	Primary then ongoing
6.4	Provide reports on consequential environmental impacts of park use and development as part of duty-of-care obligations for Parks Victoria's biodiversity management.	Primary then ongoing

Drive environmental sustainability outcomes

Actions

Phase

6.5	Develop and implement environmental sustainability principles and performance criteria for energy and water use efficiency, materials and waste in Parks Victoria's operations, programs and infrastructure builds, in alignment with Parks Victoria's <i>Environmental Sustainability Plan</i> .	Successive
6.6	Develop and implement environmental sustainability guidance and requirements for licensed tour operators, commercial lessees and other third-party operations occurring on parks estate.	Successive
6.7	Implement an improvement program for on-site wastewater treatment systems to ensure that systems are maintained and not polluting the environment including surface waters.	Primary

Managing human disturbance and controlling natural resource use

Actions

Phase

6.8	Undertake an audit of Parks Victoria key close-contact wildlife experiences across the parks estate and review and update welfare and conservation impact procedures and practices, e.g. flying fox colony visitor experiences at Yarra Bend.	Primary
6.9	Implement a trial of visitor wildlife experiences that builds knowledge on appropriate interactions that are sustainable, minimise disturbance to wildlife, consistent with welfare principles and provide a positive visitor experience.	Successive
6.10	Increase risk-based and intelligence-led compliance activity for issues impacting conservation values (in partnership with the Office of the Conservation Regulator) and reduce visitor impacts through implementing Parks Victoria's <i>Enforcement Strategy</i> .	Ongoing
6.11	Target illegal firewood collection through enforcement and education addressing the habitat and cultural heritage impacts of removing ground timber and hollow-bearing trees.	Ongoing
6.12	Target compliance on illegal campfires, rubbish dumping and water contamination in high-use camping locations including the Murray River and Gippsland Lakes.	Ongoing
6.13	Undertake education and enforcement to protect threatened species habitats at risk from disturbance by people and pets, including wetland and shoreline nesting birds, and micro and megabat colonies.	Primary then Ongoing
6.14	Contribute to the modernisation of the regulatory framework to deter damaging behaviours	Successive



Nature and visitors – a necessary interdependency



There is a dilemma at the core of nature conservation management within parks and reserves. Across the globe, humans largely impact nature in negative ways and are best kept at a distance from vulnerable and precious species, habitats or ecosystems. Yet this distance or lack of knowing poses a major threat to the survival of nature and species.

Without direct human awareness, familiarity and advocacy, nature's conservation needs will not be met. This leads to a form of non-intuitive interdependency. Without human experience, awareness or emotional connection, nature will not receive the attention or be allocated the resources it urgently requires to protect it from its many pressing threats.

In managing nature and people within parks and reserves, a balance therefore needs to be struck – one where visitors and nature contact are necessary and can be beneficial for conserving nature, the ecosystem services it provides, and to human health and wellbeing.

If the health/condition of nature is treated as the key management priority and is maintained or improved, then its profile and reputation becomes an attractor of public interest and visitation. If the visitor experience is then managed at the highest quality with the least impacts on the nature subjects, then these experiences can build a strong profile, public support and conservation advocacy to continue to protect nature. In turn with nature condition treated as the top priority, its health and rich contact experiences become drivers of wider social, political and economic support, generating concrete resources for conservation action. The little penguin experiences offered by Phillip Island Nature Parks are a good example – done well, healthy and growing penguin colonies and broader conservation benefits (habitat restoration, fox elimination and rewilding programs) have all been facilitated by quality nature experiences that draw high profile and visitation.

The critical component of this interdependency is not to kill the golden goose - to ensure the protection of nature is guaranteed through sound knowledge, monitoring, planning, environmental impact protections and the need to develop programs and experiences that are bespoke to nature's needs. Strategies Four and Six together aim to build the engagement, processes and standards by which this interdependency can be best supported and delivered.

Implementation and review



5 Implementation and review

Monitoring and evaluation of progress and success in implementing the *Nature Conservation Strategy 2021-2031* (NCS) is required by both Parks Victoria as the park system custodian and manager, and the Victorian Government as the major investor. This will be undertaken using the *Outcomes Reform in Victoria* (Victorian Government, 2019). This requires that outcomes be established for proposed programs, and that the indicators and measures of outcome success are specified.

Implementation

An implementation plan for the *Nature Conservation Strategy 2021-2031* will be developed following the Strategy's release that will establish accountabilities and time frames for action, and any immediate priorities for additional investment. These priorities will determine those primary actions requiring more detailed scoping and funding case development. The implementation plan will program the actions to be undertaken across the ten-year duration of the NCS, including the necessary steps to support and implement currently unfunded primary and successive actions.

The implementation plan will also specify project-level detail such as the park locations and ecosystems or species, and will describe the fine-scale 'outputs' for each action and evidence of indicators, measures and targets for actions or groups of actions. Where these actions align with landscape-scale management such as Conservation Action Plans, they will be monitored and evaluated at this level of implementation, as well as at a whole-of-state level.

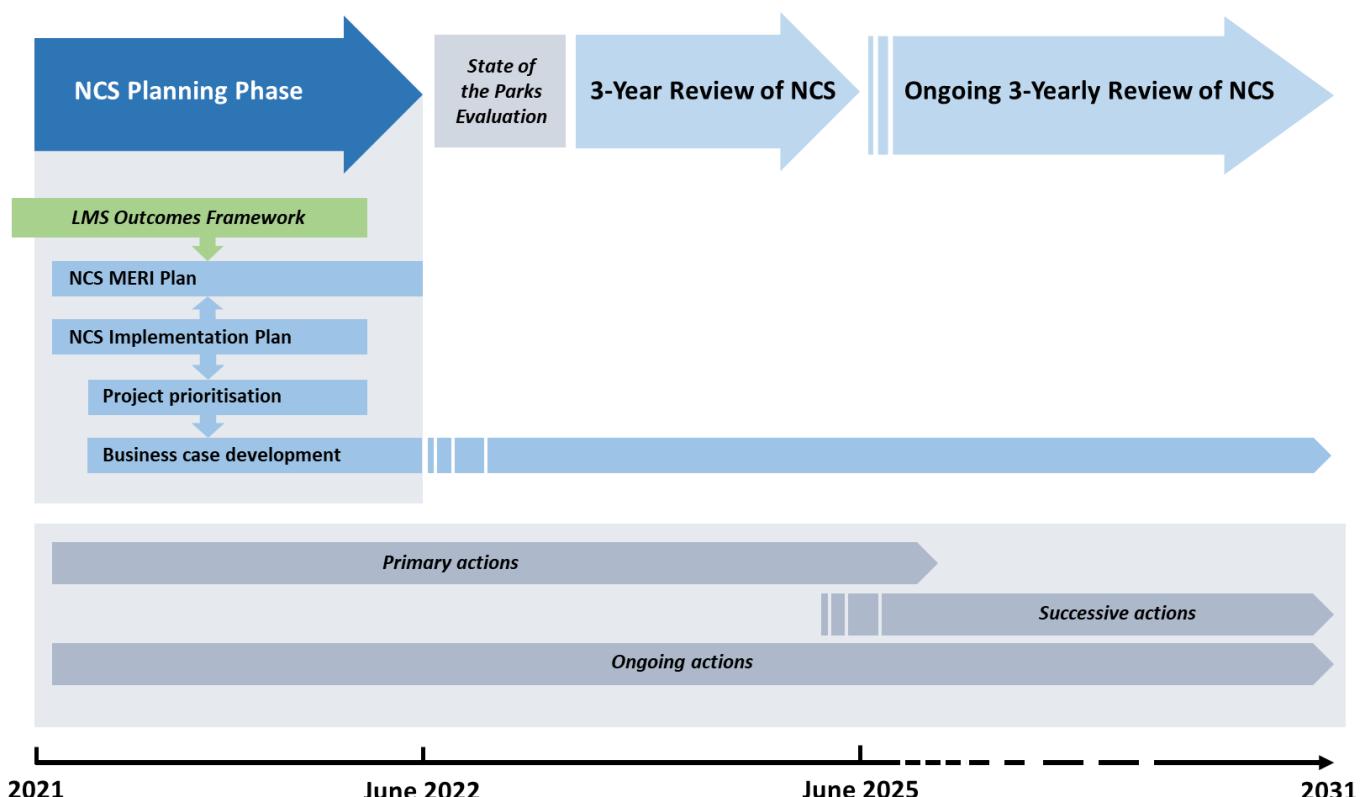


Figure 11: Timeline of implementation and review of the Nature Conservation Strategy.

Monitoring, Evaluation and Reporting

Monitoring and evaluation processes for the NCS will be aligned with equivalent requirements for Land Management Strategy and *Biodiversity 2037 Monitoring, Evaluation, Reporting and Improvements Framework v2* (MERIF). The Biodiversity 2037 MERIF provides a framework of outputs, intermediate outcomes, longer-term Nature Conservation Strategy

outcomes and key performance indicators to describe progress towards overall Bio2037 targets. Likewise, following the release of the NCS, a Monitoring, Evaluation, Reporting and Improvement Plan will be developed for the NCS that details performance measures for each of its strategies.

The outcomes for the NCS are presented in Table 1. These are high-level end states that represent the result of outputs and actions for the strategies in Section 4. Table 1 also shows the alignment between the NCS outcomes, the outcomes in Parks Victoria's broader *Land Management Strategy*, and the relevant outcomes in the Victorian Government's *Protecting Victoria's Environment – Biodiversity 2037* (DELWP, 2017).

The NCS outcomes will be measured and evaluated primarily through Parks Victoria's existing monitoring and reporting processes, including the formal State of the Parks program. These processes use fundamental dimensions of nature conservation to evaluate outcomes: the condition of natural values, the status of threats to those values, and progress towards management objectives for conserving the values. In the near future, accounting for and measuring change in ecosystem services provided by Victoria's parks will be part of environmental-economic accounting conducted across all environment portfolio agencies, and will assist in demonstrating the benefits of conservation action to improve Victoria's natural capital.

Reporting will also occur through Parks Victoria's corporate planning and annual reporting process.

To guide the development of the Nature Conservation Strategy MERI Plan, the following outline of the process (adapted from the Biodiversity 2037 MERIF) is presented, describing the purpose, Key Evaluation Question, approach and level of relevance within each strategy for each step of the process.

Monitor and analyse

- **Purpose** – Monitor the KPI to support reporting and evaluation of the NCS
- **Key Evaluation Question** – To what extent has the NCS been implemented?
- **Approach** – Annual collection of standard outputs, and other data collection per KPI
- **Level** – Outputs and actions of each strategy

Evaluate implementation

- **Purpose** – Refine and improve the delivery approach so that the best methods for meeting the goals and outcomes of the NCS are adopted and it is delivered effectively and efficiently
- **Key Evaluation Question** – How effective is the implementation of the NCS?
- **Approach** – 5-yearly evaluation of actions to achieve NCS outcomes and goals using pre-existing reporting structures including the LMS MERI Plan and Conservation Action Plan MER Plans
- **Level** – Outcomes, outputs and actions of each strategy

Report on progress

- **Purpose** – Report progress against KPI, inform partners and understand where additional efforts may be required
- **Key Evaluation Question** – Does reporting accurately describe the implementation efforts of the NCS and identify areas of improvement?
- **Approach** – 3-5 yearly reporting on NCS key performance indicators and trends, built on pre-existing reporting structures including State of the Parks, and Parks Victoria corporate planning and annual reporting
- **Level** – Outcomes and outputs of each strategy

Improve planning and delivery of actions

- **Purpose** – Ensure the delivery of NCS is evidence-based and effective, embedding continuous improvement in the planning used and actions undertaken
- **Key Evaluation Question** – How appropriate are the tools, processes and actions to achieve the outcomes of the NCS?
- **Approach** – Review of capacity- and knowledge-building actions to identify priorities for knowledge acquisition
- **Level** – Outcomes and outputs of each strategy

Adapt implementation

- **Purpose** – To enable Parks Victoria and key partners to respond to ideas and directions flagged through the evaluation and review process, as well as to adapt its approach to account for new information, risks or significant events
- **Key Evaluation Question** – Are the performance indicators adequately able to reflect progress and identify areas of need?
- **Approach** – 5-yearly adaptation of implementation based on evaluation of previous implementation, progress towards goals and outcomes of the NCS
- **Level** – Outcomes, outputs and actions of each strategy



Table 1: Parks Victoria's NCS strategies and outcomes, and their alignment to the Land Management Strategy and Bio2037.

NCS Strategies	NCS Outcomes	PV Land Management Strategy outcomes	Victorian Bio2037 outcomes
1. Intensified action to combat rising threats 3. Conservation flagships	Outcome: Biodiversity in Victoria's parks is protected, key threats are mitigated, and priority ecosystems and species are restored	High value natural systems, cultural values and landscapes are protected and restored (LMS Outcome 2)	Victoria's natural environment is healthy (Bio2037 overarching goal) Victoria's biodiversity is protected and managed (Bio2037 Outcome 7)
2. New interventions to respond to major ecological transitions	Outcome: Ecosystem resilience is strengthened, and where irreversible ecological transitions are unavoidable their negative impacts on biodiversity are mitigated	The impacts of climate change are responded to by planned adaptation, mitigation and, where necessary, accepting irreversible changes to some natural/cultural values and landscapes (LMS Outcome 3)	
	Outcome: Traditional Owners and Parks Victoria shape conservation knowledge, planning, practices and evaluation in partnership	Traditional Owner self-determination is advanced through managing Country together (LMS Outcome 1)	Aboriginal Victorians have opportunity, prosperity and are connected to Country (Bio2037 Outcome 6)
4. A connected and active public	Outcome: The public is connected to nature and parks, and bring their interests and capacities to the conservation task	Partnerships increase park management capability and capacity and enable management across boundaries and at the landscape scale (LMS Outcome 5)	Victorians value nature (Bio2037 overarching goal) Everyone is working cohesively to ensure biodiversity outcomes from their contribution are maximised (Bio2037 Outcome 5)
	Outcome: The community values, supports and contributes to park conservation through flagships, citizen science and sustainable visitor practices	Communities and people of all backgrounds and abilities value and are advocates for parks (LMS Outcome 6)	Victorians place more importance on a healthy environment and contribute to its health (Bio2037 Outcome 2)
5. Capability to match the challenge	Outcome: Park nature conservation is based on robust knowledge and planning, and the necessary resourcing is secured, sustained and sufficient to meet nature conservation obligations		Investment is sufficient to stop biodiversity decline (Bio2037 Outcome 4)
6. Ensuring park use is sustainable.	Outcome: The environmental impacts of park use by visitors, tenants and others are minimised and sustainable	Sustainable assets and park management provide quality visitor experiences and protect natural and heritage values (LMS Outcome 8)	

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