# 1. Victoria – Setting the Scene

# A GUIDE TO CHAPTER 1

This chapter is backward and forward looking, providing historical context and a focus on major drivers and trends that will influence Victoria's future. Section 1.1 provides introductory information about the review. Section 1.2 outlines the history of environmental decline and protection in Victoria. Although the environment has been influenced by tens of thousands of years of Aboriginal management, the historical focus is limited to the past 200 years since European colonisation. Section 1.3 outlines three major drivers of environmental change in Victoria – climate change, population growth and land use intensification. Section 1.4 provides some background to Victoria's national park and conservation system, and explains the terminology used in this report for protected area categories.

## Topics covered

*1.1 Introduction to the review*

*1.2 A short environmental history*

- European colonisation, 1800-1970
- VNPA nature conservation reviews, 1971-2001
- Progress since 2001

*1.3 Environmental drivers and trends*

- Climate change
- Population growth
- Land-use intensification

*1.4 Victoria's national park and conservation system*

*1.5 Sources*

## 1.1 Introduction to the review

This is the fourth nature conservation review published by the Victorian National Parks Association (VNPA). When the first review was published 43 years ago, just 1.2% of Victoria's land area was protected (to a limited extent) for conservation, there were no marine parks, the management budget for parks was $141,000 and little was known about Victoria's biodiversity assets. 'There has never been an official corps of fully trained biologists able to assess the biological content of the State in a systematic fashion,' the 1971 reviewer Judith Frankenberg wrote. We know a great deal more now (although still surprisingly little about many aspects of biodiversity such as invertebrates), and about 5% of the marine environment and 14% of land area are in the national park estate. But pressures on nature have also grown, far exceeding the progress made, and on current trajectories they condemn our seas, lands and waters to growing biological poverty and ecological dysfunction.

The first three reviews – in 1971, 1987 and 2001 – were each done by one or two experts, in consultation with many other experts and with reference to the scientific literature. For this fourth review, VNPA commissioned the following seven expert reviews – of Victoria's environmental history and conservation issues in marine, coastal, terrestrial and freshwater ecosystems.

| Title | Authors | Institution | Date | Chapter | Appendix |
|---|---|---|---|---|---|
| Phases of Ecological Impact of the European Occupation of Victoria | Don Garden | Melbourne University | 2012 | 1 | 1 |
| VNPA Nature Conservation Review: Marine Conservation Priorities and Issues for Victoria | Matt Edmunds, Simon Mustoe, Kim Stewart, Elizabeth Sheedy, Joyce Ong | Australian Marine Ecology | 2010 | 2 | 2 |
| The Coast is Unclear: An Uncertain Future for Nature Along the Victorian Coast | Chris Smyth | | 2014 | 2 | 3 |
| VNPA Nature Conservation Review: Terrestrial Ecosystems | Steve Matthews, Geoff Carr, Andrew McMahon | Ecology Australia | 2011 | 3, 5 | 4 |
| Terrestrial Biodiversity Review: Bioregional Vegetation Summaries | David Endersby | Sinclair Knight Merz | 2010 | 3 | 5 |
| Nature Conservation Review: Freshwater-dependent Ecosystems | Yung En Chee | Melbourne University | 2010 | 4 | 6 |
| Ecological Benefits of Riparian Restoration with Particular Application to Victoria | Laura Williams, Robin Hale, Paul Reich, Sam Lake | Monash University, Arthur Rylah Institute | 2010 | 4 | 7 |

This report synthesises those reviews, supplemented by information from a wide range of other sources. An expert reference group guided the process and assisted with the development of recommendations. The objectives were to:

- review new information, knowledge and approaches to nature conservation and their applicability to Victoria
- identify priority areas for nature conservation and national parks
- review threatening process and identify reforms to protect biodiversity and conserve nature in Victoria.

Although the report ranges across many different topics, it is not comprehensive, for it focuses on areas most relevant to VNPA's nature conservation mission.

The focus of policy analysis and recommendations is primarily the state government. While the federal and local governments and many non-government institutions also have vital roles, the state government has primary responsibility for the laws, policies and programs that most influence people's actions in the Victorian environment. The recommendations involve a wide array of conservation tools, including laws, policies, stewardship programs, and land and sea management. Protected areas are a core focus, as they offer the greatest potential for dedicated conservation management and threat mitigation. Many types of properties are called 'protected areas' but only properties with a secure and perpetual conservation tenure and primarily managed for conservation are genuinely protected. In this report, these properties are referred to as the 'national park and conservation system' (see section 1.4 for an explanation). Public properties receiving the highest level of protection are referred to as the 'national park estate'.

## Chapter overviews

*Chapter 1* is both backward and forward looking. Understanding the current state of the Victorian environment and its challenges requires knowledge of the past. The long Aboriginal history with this part of Australia has been influential in shaping its ecology (and is important for its future as well), but the focus in this chapter is limited to the past two centuries. Section 1.2 outlines the major eras of European colonisation from an environmental perspective up to 1970 and then summarises VNPA's past three nature conservation reviews, which cover major conservation issues since 1971. As well as dealing with the legacies of a destructive past, Victoria must prepare for a more difficult future. Section 1.3 outlines major drivers and trends – rapid changes in climate, population and land use – that will shape the environment of the future and that increase the urgency of reforms to strengthen protections for nature. Section 1.4 explains what is referred to in this report as the Victorian 'national park and conservation system' – the network of protected areas that meet VNPA's criteria for secure and permanent protection.

*Chapter 2* focuses on marine and coastal ecosystems, in recognition of their tight ecological links and the need for integrated management. The area of focus is waters under state jurisdiction (to 5.5 kilometres seaward from the high water mark) and land within 500 metres of the shoreline. Sections 2.1 to 2.3 discuss the values, characteristics and state of marine and coastal ecosystems and the threats to them. Sections 2.4 and 2.5 focus in on each of the five marine bioregions and ten coastal subregions, identifying values and conservation gaps, particularly in the national park and conservation system. Sections 2.6 and 2.7 identify gaps in and priority reforms for state-wide policies and programs affecting marine and coastal systems. The priority areas for reform are improving knowledge, developing a comprehensive, adequate and representative national park and conservation system and strengthening institutions, laws and policies for integrated management of coastal and marine systems.

*Chapter 3* focuses on terrestrial ecosystems, particularly on vegetation and protected areas. Sections 3.1 to 3.4 discuss the values, characteristics and state of terrestrial ecosystems, the adequacy of protection afforded by the national park and conservation system, and the threats to terrestrial habitats. Sections 3.5 and 3.6 identify gaps in and priority reforms for policies and programs affecting terrestrial systems. The priority areas for reform are developing a comprehensive, adequate and representative national park and conservation system, strengthening protection of native vegetation and improving management of bushfire and invasive species threats to nature.

*Chapter 4* focuses on freshwater ecosystems – those associated with rivers and streams, riparian areas, wetlands, floodplains and groundwater systems. Sections 4.1 to 4.4 discuss the values, characteristics and state of freshwater ecosystems and the threats to them. Sections 4.5 and 4.6 identify gaps in and priority reforms for policies and programs affecting freshwater ecosystems. The priority areas for reform are restoring environmental flow regimes, protecting and restoring riparian habitats, establishing freshwater protected areas and strengthening wetland protection and catchment management.

*Chapter 5* focuses on environmental governance issues that underpin problems faced across all Victorian environments. Section 5.1 outlines governance flaws and section 5.2 identifies governance reform priorities in laws, institutional structures, climate change adaptation, planning funding, and knowledge. Section 5.3 describes VNPA's five priority cluster areas for conservation work and section 5.4 lists priority reforms, including a proposed new structure for environmental institutions.

*Chapter 6* is a compilation of recommendations from each of the preceding chapters.

# 1.2 A SHORT ENVIRONMENTAL HISTORY

Understanding the Victorian environment requires knowledge of its past and how it has been shaped by humans. The following history is short in two respects: it is only a sketch (a summary of four reports), and it focuses only on the two centuries since European colonisation – a brief but tumultuous period in ecological terms, and representing less than 1% of the more than 40,000 year duration of Aboriginal history with this part of Australia. Section 1.2.1 is a summary of *Phases of Ecological Impact of the European Occupation of Victoria* by Don Garden,[1] and section 1.2.2 a summary of the three previous VNPA nature conservation reviews.

## 1.2.1 European colonisation, 1800-1970

*'The ecological impact of colonial and post-colonial exploitation can be seen to have occurred in a number of chronological phases. These phases essentially reflect four factors…: the number of humans inhabiting Victoria; the level/volume of their consumption; the principal economic activities they pursued; and the technologies available to them.'*

Don Garden, 2012[2]

Early European colonists were not drawn to Victoria. Naval explorers had reported a coast of mainly dense low forest and sandy wetlands, lacking in timber, fertile soils and large rivers. The first European settlement, in 1803 at Sorrento, was abandoned after a few months due to lack of water and fertile soils.

But the colonisers' view of Victoria changed in the 1830s when sheep graziers sought more land. Explorers and potential pastoralists encountered abundant grasses, often shoulder high, amid scattered trees and tree stands. 'I entertain the most promising expectations of the fertility of the regions we are now traversing,' said NSW's Surveyor General Thomas Mitchell in 1836 of the place that would become Swan Hill.

### 1800s–1840s: sealing and whaling

The discovery of large fur seal colonies in the late 1700s brought sealers from Sydney and Van Diemen's Land to exploit valuable fur and oils. But the industry drove itself to extinction by the 1830s, after almost total extermination of seals. A similar pattern was followed by the whaling industry, which killed mostly right whales migrating each winter from Antarctica. It was a major shore-based industry in the first three decades of the 19th century, with local vessels joined by dozens from Europe and North America. The industry ceased to operate from Victorian stations in the 1840s after whale populations crashed.

### 1834–1851: pastoral settlement

Sheep grazing became the major industry in eastern Australia in the 1830s and 40s due to demand from British textile industries. The first pastoralists and permanent settlers moved from Tasmania to Portland in 1834. By the late 1840s, sheep and, to a lesser extent, cattle were grazing over much of central and western Victoria. Only the arid country of the Wimmera and Mallee, the dense Gippsland rainforests

and the Alps were not occupied. The Port Phillip District gained a population of nearly 100,000 Europeans.

Early pastoralists periodically burned the land to clear it of scrub and promote fresh grasses. John Robertson gave a graphic account in 1853 of rapid damage from sheep grazing in the Casterton area. When he arrived in 1840 it was 'splendid country' with excellent grasses (he counted 37 species) – 'all the landscape looked like a park with shade for sheep and cattle'. But native herbs and grasses soon began to disappear and weeds invaded; 'deep-rooted grasses that held our strong clay hill together have died out; the ground is now exposed to the sun, and it has cracked in all directions, and the clay hills are slipping in all directions'.[3]

## 1851–1870: the gold era

Days after Victoria became a separate colony in 1851, gold was discovered, triggering a great rush. A host of gold towns sprung up, the population surged in 20 years from less than 100,000 to almost three-quarters of a million in 1871, and gold took over from wool as the principal export industry. Victoria became one of the wealthiest places in the world, with high standards of living.

Initially, mining was of alluvial gold. Vegetation was removed, soil and rock were dumped, and streams were diverted. From the late 1850s, the focus shifted to gold-bearing quartz, which required deep shafts, sophisticated technology and great volumes of water. Many creeks were dammed and diverted, arsenic-contaminated tailings accumulated, and vast woodlands in central Victoria were stripped for timber. Concern about timber losses drove the first efforts at forest conservation in the 1860s, and close to 1 million acres of timber reserves and state forests were set aside by 1874. Later in the century, new techniques for gold mining involved huge, steam-driven water hoses blasting away creek banks to give access to alluvial deposits. Large dredges worked their way down creeks, digging up and processing soil as they went, causing irreparable damage to water systems and spreading large areas of mullock that grew little more than weeds.

Because of the much increased demand for food, agriculture expanded, leading to large-scale clearing. With arable land converted to crops, sheep and cattle grazing was pushed into drier areas. In the 1850s, a commercial fishing industry established. New plants and animals were introduced – cats, dogs, foxes and rabbits. Manufacturing industries were established, and roads, telegraph lines and railways carved up the countryside. Australia's first large dam, the Yan Yean reservoir, was built in the upper reaches of the Plenty River in 1857 to service Melbourne. As the Yarra was no longer needed for potable water, it was made available as Melbourne's main drain for effluent.

## 1870–1901: selection laws, agriculture and marvellous Melbourne

A series of Selection Acts were passed in the 1860s to 1880s, to take land from pastoral licence holders and make it available for small farms, to provide food and employment, and create a yeoman society of small farmers. By the turn of the century almost half of Victoria's land area had been privatised. Rural life was regarded as morally and socially superior to urban life, and other industries were needed to employ people as gold mining declined. Large parts of the Northern Plains, Goulburn Valley, Gippsland and the Wimmera were subdivided, and millions of hectares of native vegetation were cleared. But fragile soils, limited fertility and irregular climate made survival tenuous. The 1870s were quite wet, encouraging more people onto the land. But dry times in the following decades – including the Federation Drought from 1895 until 1902 – ruined many small farmers. Compounding the environmental damage was a great plague of rabbits, which destroyed vegetation and caused erosion over vast areas. Rabbit extermination and trapping for human consumption became new industries.

Irrigation was promoted as the solution for a dry climate. In 1884 Parliamentarian Alfred Deakin headed a Royal Commission on irrigation, and under the resulting laws in 1886, the government took control of all waters and planning for large reservoirs and canals. The first project was the Goulburn reservoir near Nagambie. There was also large-scale drainage of wetlands, including the 50km$^2$ Carrum Carrum Swamp and the even larger Koo Wee Rup Swamp.

Victoria became increasingly urban, and Melbourne reached a population of half a million. Known as 'Marvellous Melbourne' during these prosperous times, it also earned the nickname of 'Smellbourne', as low-lying areas along the Yarra River became polluted slums and the site of noxious industries, and the Maribyrnong River around Footscray hosted animal processing and other polluting industries. Industrial and human wastes poured into open drains that flowed into the Yarra and Maribyrnong Rivers. A Royal Commission in 1888 resulted in the construction of a deep sewer system, with effluent pumped to the Werribee Treatment Farm.

Victoria's first conservation reserve of 600 hectares at Tower Hill near Warrnambool was established in 1866 and others followed at Fern Tree Gully in 1882, and Mount Buffalo and Wilsons Promontory in 1898. In 1892 Tower Hill became Victoria's first national park, although in name only, for by then it had lost most of its natural vegetation. The status and objectives of early reservations make it problematic to identify Victoria's first true national park.[4]

## 1901–1945: closer settlement, irrigation, forestry

Punctuated by two world wars and major economic depression in the 1930s, the first 45 years of the 20th century were not an easy time. Under various closer settlement and soldier settlement schemes, large areas were cleared. Spurred by a belief that dry land could be made productive by adding water, there were renewed efforts to develop irrigation. The 1905 Water Act established the State Rivers and Water Supply Commission to take control over inland waterways. Over time, it allocated rights to considerably more water than was available. Between 1914 and 1940 the area under irrigation increased from about 40,500 hectares to 240,000 hectares. The overall area under cultivation more than doubled to 3.8 million hectares by 1931, with wheat the main product. When wheat prices fell in the 1920s, there was pressure on farmers to grow more, and many over-worked their land. The 1930s brought dust storms and made dust bowls of lands bare and vulnerable due to clearing, rabbit plagues and damaged soils. Victoria lost large volumes of its 'soil capital'.

Melbourne's population exceeded one million by the end of the 1920s, making up about 57% of the state population. Timber cutters worked their way into the hills and mountains to the north and east of Melbourne to meet the demand for construction. A Forests Act was passed in 1907, establishing a Department of State Forests under a minister for forests. Major transformations came with brown coal mining in 1920 for electricity generation and the rapid adoption of motor vehicles. The availability of cheap energy enabled Victoria to maintain its position as a major industrial and manufacturing centre. Commercial fishing had spread well beyond Port Phillip, to port towns such as Port Fairy, Portland, Warrnambool, Lakes Entrance and San Remo. At first it was mainly coastal fishing, but then ocean-going vessels moved well into Bass Strait and beyond.

The increasing exploitation caused mounting concern among a minority of the population and stimulated early conservation advocacy. Some of the earliest habitat protection came from the establishment of timber reserves on crown lands, to provide for future timber use or protect water catchments. The protection of birds became popular, with the 1901 establishment of the Royal Australian Ornithologists Union, followed by the Gould League of Bird Lovers in 1909, which was organised through Victoria's education department to encourage school children to value birds. Bushwalking was a favoured activity from about the 1880s and boomed in the interwar years. Bushwalking and naturalist clubs lobbied the government to preserve wilderness areas, and were instrumental in the establishment of national parks. In 1906 the 'national park' at Wilsons Promontory was upgraded, its grazing licences cancelled and a management committee appointed.[5] In 1909 more-remote areas were reserved at Wingan Inlet, Wyperfeld and Mallacoota, although they had only limited protection until 1956.

## 1945–1970: prosperity, technology and environmentalism

After the second world war came more-intensive development and environmental degradation, but also a growing movement for environmental protection. A large-scale immigration program and a baby boom caused the Victorian population to jump from 2 million in 1945 to 3.5 million in 1971. New reservoirs were built in the hills and mountains east of Melbourne to try to meet water demand. Agriculture intensified, with more soldier settlement schemes and technologies such as bulldozers and chainsaws that made land clearing and timber felling easier and cheaper, subsidised by a taxation system offering deductions for 'improvements'. The application of trace elements, chemical fertilisers and pesticides and systematic damming or diversion of most of the state's rivers greatly boosted production.

Demand for timber increased, initially mostly for the housing boom, but governments also began to licence the export of wood chips to Japan for papermaking. Loggers pushed further into Gippsland and East Gippsland. Concern about forests led to the establishment in 1944 of a professional organisation, the Save the Forests Campaign, which in 1951 morphed into the Natural Resources Conservation League of Victoria. In 1952 the Victorian National Parks Association was created by a federation of organisations concerned about these issues. As a result of advocacy led by the VNPA, a National Parks Act was passed in 1956 that more clearly defined and protected national parks. The Australian Conservation Foundation, based in Melbourne, was formed in 1965.

Probably the single most important trigger in the rise of environmental consciousness in Victoria was the Little Desert controversy in the 1960s. An area of sandy and partly saline Mallee country in far western Victoria, the Little Desert had remained Crown Land because it was considered too poor for agriculture. In the late 1950s and 1960s proposals to subdivide the land for farms were unsuccessful. But in 1967, the government proposed to set part of it aside as a national park and open the majority to farming. The legislation to do so was passed in 1969. But there was strong opposition, both locally and in Melbourne, including by the Melbourne *Age*. In Melbourne, scientists and concerned citizens formed the Save Our Bushland Action Committee. Eventually, for a mixture of political and environmental reasons, the government abandoned the scheme and most of the Little Desert was eventually declared a national park. In 1969, energised by the successful Little Desert campaign some citizens and organisations formed the Conservation Council of Victoria (now Environment Victoria), and with other campaigns such as that to protect the Lower Glenelg in south-western Victoria from development, environmental issues became prominent as never before.

The watershed Little Desert campaign also triggered reforms to make land management decision-making 'both scientific and a public concern'.[6] In 1971, the government formed the Land Conservation Council (now the Victorian Environmental Assessment Council) to 'carry out investigations and make recommendations to the government with respect to the use of public land in order to provide for balanced land use in Victoria'. It fostered research to develop a knowledge base for the ecological evaluation of Victorian landscapes and resulted in the declaration of many national parks. Another response to mounting environmental concern was an extension of government policies, authorities and actions, including the 1971 establishment of the Victorian Environment Protection Authority and a department responsible for conservation.

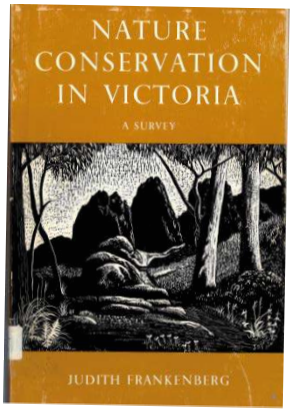
## 1.2.2 VNPA nature conservation reviews, 1971-2001

*In 1971 the Victorian National Parks Association published a small book with a large impact, entitled Nature Conservation in Victoria – a survey … The information assembled and presented established a baseline from which successive governments and the community have moved to develop further a nature conservation reserve system for Victoria.*

Doug Frood and Malcolm Calder, 1987

The three previous VNPA nature conservation reviews – in 1971, 1987 and 2001 – tell the more recent history of European impacts on Victoria's environment, and are also themselves part of that history because of their influence on conservation reforms.

### 1971 review: Nature Conservation in Victoria: A Survey by Judith Frankenberg, edited by John Turner[7]




*It is shown that from the point of view of wildlife conservation the present system of reserves is entirely inadequate. At the same time there is sufficient suitable unalienated Crown land to allow the establishment of a state-wide system of reserves which would protect the majority of our plant and animal communities and prevent the further loss of indigenous species.*

Judith Frankenberg, a recent Masters graduate from Melbourne University's Botany School, was appointed in 1966 to conduct a 2-year survey, the objects to 'assess the extent and value of the various kinds of nature reserve now existing in Victoria and to assess the current deficiencies in the field of nature conservation by an examination of those parts of the ecosystem for which no adequate conservation measures have yet been taken'. John Turner, the head of the Botany School, edited the manuscript.

Only about 1% of Victoria's land area was then protected in conservation reserves and, apart from birds, little was known of their values. The National Parks Act, which established the National Parks Authority, was just a decade old. Prior to that most of Victoria's national parks and nature reserves were managed by local committees, which often had to lease areas for grazing and timber harvesting to finance any management.

There was no detailed vegetation map of the state and little had been done to assess the status and biology of the state's flora and fauna. The basic ecological work necessary for defining ecological communities was still in progress.

In 1971, in a pivotal move for Victorian conservation, after the successful campaign to protect the Little Desert from an agricultural scheme, the state government established the Land Conservation Council to advise on the most appropriate uses for public land, then about 38% of Victoria's land area. By highlighting conservation priorities, the review was to prove of great value to inform and influence the work of the Land Conservation Council.

To assess the adequacy of the reserve system, Frankenberg compiled the first systematic characterisation of vegetation communities in Victoria, listing 62 'vegetational alliances' and recording their distribution in vegetation provinces.[8] They were the basis of her assessment of the adequacy of the reserve system, the first such assessment in Victoria and one of the first in Australia. Of the 62 alliances, about 25 (40%) were assessed as 'reasonably well protected in some form of reserve' while the remaining 37 had 'poor to inadequate' protection. Seventeen alliances (27%) required 'urgent measures for conservation'. Frankenberg warned that it could be difficult to locate 'relatively undamaged examples' of some communities, especially the grasslands, and their regeneration would be difficult.

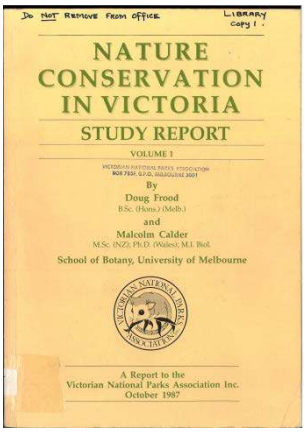
Frankenberg also assessed the adequacy of the reserve system for species conservation and compiled the first list of Victoria's flora and vertebrate fauna and their likely conservation status. She found that 39% of Victoria's native plants and 5% of birds were not recorded in any reserve. There was insufficient knowledge of other groups to assess the extent of their

protection in reserves. She highlighted threats to species due to fire, fertilisers, alien species, pollution, spear fishing, river improvement schemes, dams, and grazing in alpine areas.

Frankenberg concluded that if 'examples of what remains of Victoria's wildlife and plant communities are to survive, the basis of a State-wide conservation system must be laid down within the next few years.' She found that in most cases the selection of reserves had been soundly based, 'although their promulgation as reserves was acceptable only because no other use for them could then be envisaged'. She advocated reserving areas larger than 100 acres and stressed the importance of conserving 'the more common widespread species and communities … as 'those characteristic of this part of Australia, giving Victoria its distinctive appearance and providing habitat for the common and characteristic animal species'.

The review recommended the establishment of large reserves in 11 regions, the conservation of 11 other areas, extensions to eight national parks and the establishment of eight multiple-use national parks. It also advocated the establishment of marine reserves, particularly in coastal waters. 'In the whole spectrum of flora and fauna of Victoria the life of the coastal waters is the largest group completely lacking conservation measures and among those needing it most.'

## 1987 review: *Nature Conservation in Victoria: Study Report* by Doug Frood and Malcolm Calder, University of Melbourne[9]




*In this State we are still working actively towards the provision of an adequately comprehensive and representative system of reserves … [It] is sadly true that much has been lost.*

The 1987 review was a 20 month desk-top study to prepare a database from which a rational assessment of the adequacy of the reserve system could be made, and to identify species and communities in need for further protection.

## Progress since the 1971 review

The Land Conservation Council had completed the first round of regional studies and made over 4000 recommendations to reserve public land for a wide range of purposes. Many areas with high conservation values had been protected, including most identified in the 1971 review (but with important exceptions such as mountain ash forests in the Central Highlands). There was 'wide acceptance' of most recommendations by the Land Conservation Council, although several 'generated heated and polarised debate'. Between 1971 and 1987 the area of national parks and other protected areas (those on the schedules to the National Parks Act) expanded from 0.2 million hectares to more than 1.4 million hectares, comprising 30 national parks, 2 wilderness parks, 25 state parks and 19 other parks and reserves. Important national park and wilderness park additions include the following (a complete list is in appendix 8).

| | | |
|---|---|---|
| 1978 | North-eastern Victoria | Burrowa-Pine Mountain |
| 1979 | Eastern Victoria | Baw Baw, Croajingolong, Snowy River, Tingaringy |
| 1979 | Mallee | Big Desert |
| 1980 | Mallee | Hattah-Kulkyne |
| 1981 | Otways | Otway |
| 1981-82 | Victorian Alps | Bogong, Wonnangatta |
| 1984 | South-western Victoria | Grampians |
| 1986 | South Gippsland | Tarra-Bulga National Park |
| 1986 | Gippsland | Mitchell River |
| 1987 | Victorian Alps | Avon |

A new management structure had been established for reserves. Under administration by the Department of Conservation, Forests and Lands, public land management was devolved to 16 regional groups. Frood and Calder were uncertain how successful it would be. The major vegetation 'alliances' of Victoria were being mapped at a 5 minute grid scale, and a Victorian bird atlas and mammal atlas were to be undertaken. There had been major advances in ecological knowledge.

## Focus of 1987 review

The 1987 review was important for its analysis of conservation concepts and approaches. For example, Frood and Caldwell emphasised the importance of genetic conservation: 'A different way of looking at species is required – not as a single genetic entity, but as a collective description for a range of genetic forms which have a lot in common with each other. When any

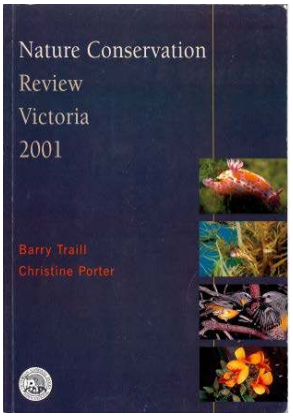
of these forms are lost, it is a permanent loss of genetic diversity (the product of millions of years of evolution). ' They defined the conservation ideal as each genetic entity retaining its presence within the ecosystem, 'with some kind of long-term viability to this process'. Frood and Caldwell also emphasised the importance of maintaining ecological processes

Over 60% of the state had been cleared by this stage, including 95% of private land. About 1% of remnant bushland was being cleared each year and 'patterns of formerly piecemeal alteration [were] merging together'. Of forests, 50% had been cleared and 70% of the remainder severely modified. More than 35% of wetlands had been drained and close to 80% of rivers and wetlands had been substantially modified. Most (95%) native grassland communities had been eliminated or modified. About one in six native vertebrate animals and vascular plants were in need of 'careful protection'. Frood and Calder described major land uses and the extent of alteration in each of the vegetation provinces. They reviewed major management issues – in particular fire regimes, timber harvesting, grazing, introduced species, and disturbance factors. The issues and dilemmas they discussed still largely apply today. Of fire, they said, 'Appropriate fire-regimes vary between localities and vegetation-types within localities. The ecological effects of fire regimes (particularly as applied via fire-reduction burning) are inadequately known… '

Frood and Calder compiled lists of Victorian plants and vertebrate animals, assessed their conservation status and considered the ecological requirements of each group.

They identified opportunities to increase the representativeness of the reserve system. They found broad-scale deficiencies in the protection of plant communities and biases towards land that was not productive for agriculture. The reservation of grasslands and grassy woodlands had not greatly improved since the 1971 survey by Frankenberg, and only small fragments remained. They noted that the 'required size and spacing of reserves is a contentious issue on which more information is badly needed.' Lowland grasslands, grassy woodlands, mallee woodlands, saltbush shrublands, wetlands and riparian communities were in urgent need of conservation.

## 2001 review: *Nature Conservation Review Victoria 2001* by Barry Traill and Christine Porter[10]




*Many gains have been made but local and regional extinctions are continuing.*

The aim of the 2001 review was to identify gaps in conservation and in the reserve system and make recommendations to slow and reverse biodiversity losses.

### Progress since the 1987 review

Considerable progress had been made in the 14 years since the previous review – particularly with new measures for biodiversity conservation, vegetation protection, catchment management and marine conservation. But the review found that extinction processes were nonetheless continuing largely unabated.

The Flora and Fauna Guarantee Act had been enacted, providing a process to identify and protect threatened species and communities and to address threatening processes. But implementation was being stymied by lack of adequate funds and prioritisation of commercial interests.

In 1997, the Victorian biodiversity strategy was launched, setting out the state of biodiversity and broad mechanisms for conservation. Traill and Porter commented that although 'it could be criticised for its lack of policy specifics, it nonetheless sets out a clear vision of what is sought for nature conservation.' Whether it would be successful would depend 'on the preparedness of government to enact the vision set out in the strategy and to provide the necessary political will and funding'.

Clearing controls on private land were introduced in 1989, which reduced rates from an estimated 15,000 hectares to 3000 hectares annually. There had been great progress on mapping of terrestrial ecosystems, and developing better structures for protecting native vegetation. A state vegetation framework and regional vegetation plans were in preparation. Catchment

management authorities had been set up to help administer policy and to provide for better mechanisms 'to confront the increasing scale and complexity of problems such as salinity'. There was 'a significant and increasing number of landholders willing as individuals to manage land for conservation', including those who purchased land solely to protect conservation values and others seeking a lifestyle block.

There was a long overdue focus on marine ecosystems. An environmental inventory had been under way since 1992 to classify Victoria's marine ecosystems, and the Land Conservation Council and its successor, the Environment Conservation Council, had been conducting the marine, coastal and estuarine Investigation since 1991 to recommend the establishment of a representative system of protected areas and areas suitable for marine aquaculture.

Since 1987, the extent of protected areas (on the schedules to the National Parks Act) had more than doubled, to nearly 3.1 million hectares. By the end of 2001 there were 36 national parks, 3 wilderness parks, 31 state parks and 22 other parks and reserves on the schedules to the Act. Important additions to the national park estate include the following.

| | | |
|---|---|---|
| 1988 | Western Victoria | Little Desert expansion |
| 1988 | Northern plains | Terrick Terrick State Park |
| 1988 | East Gippsland | Coopracambra, Errinundra, Snowy River expansion |
| 1988 | Coastal | Point Nepean |
| 1989 | Victorian Alps | Alpine |
| 1991 | Mallee | Murray-Sunset, Wyperfeld expansion |
| 1992 | Wilderness | Wilderness areas expansion |
| 1995 | Central Highlands | Yarra Ranges |
| 1997 | Coastal | Coastal parks: Bay of Islands, Cape Conran, Cape Liptrap |
| 1999 | Northern plains | Terrick Terrick |

## Focus of 2001 review

Traill and Porter reviewed the status of Victoria's marine systems and described the major threats including habitat loss and alteration, declining water quality, overexploitation of resources, introduced species and pathogens, and global warming. The extent of threats was 'largely unknown'. They assessed data limitations and high priority research and management needs, which included identifying rare and threatened species, mapping their distribution and identifying habitat requirements, and mapping breeding aggregations and nursery areas for a wide range of species.

At the time of the 2001 review, only 600 hectares of Victoria's marine waters were protected (other areas covering 53,500 hectares were labelled as such but they permitted exploitation such as fishing). The Environment Conservation Council had developed draft recommendations for a system of protected areas that Traill and Porter recommended VNPA support 'in principle'. However, they criticised the process as having been too influenced by economic considerations and inadequate to protect variation within bioregions. They recommended that 20% of each major marine habitat by area be included within highly protected marine protected areas, that a minimum of two marine national parks in each bioregion be urgently established, and that funding for management be increased. They also advocated the integration of marine national parks within a framework of coastal zone management.

Traill and Porter reviewed the state of terrestrial biodiversity and primary threats: habitat loss and degradation, environmental weeds (after habitat destruction, probably 'the single most important cause of habitat loss and degradation'), feral animals, logging and firewood removal, overgrazing, salinity, greenhouse effect ('the potential to be the greatest threat to nature conservation in Victoria'), and changes to water flows.

Although expanding, Victoria's reserve system had been 'disproportionately occurring in the land types which are not desired for human exploitative uses'. Based on an assessment of the extent of reservation of ecological vegetation communities, the review found 'very poor achievement of target levels'. Of 632 ecological vegetation classes (vegetation types based on ecological and physical features) mapped in Victorian bioregions, just 19% were adequately reserved, 76% were not adequately reserved, and others lacked data or were extinct. More than half were threatened or extinct.

High priority recommendations were to protect all vegetation remnants in highly fragmented landscapes and establish major new park systems for protection of south-western Victoria, riverine forests and woodlands, the Strzelecki Ranges, and box–ironbark woodlands and forests. There were also recommendations to address invasive species and climate change and threats to freshwater systems.

## 1.2.3 Progress since 2001

Although the majority of recommendations from the 2001 review have not yet been achieved, some important progress has been made.

In 2001, a native vegetation management framework was introduced with the goal of achieving a net gain in the extent and quality of native vegetation, given force through local government planning provisions. The approach had flaws but in 2013 the goal of net gain was abandoned and the regulations were considerably weakened, so clearing rates are expected to rise again.

In 2002 a world-first representative system of marine protected areas was created to protect 5.3% of state waters (about 53,000 hectares). There was an increase in the terrestrial national park estate by about 300,000 hectares, and the creation of 13 new national and state parks.

For the first time in Victoria, Aboriginal people's struggle for land was recognised with the creation of a national park board of management with majority Indigenous membership at Barmah, one of the new red gum national parks created in 2010.

Important additions to the national park estate include the following.

| | | |
|---|---|---|
| 2002 | Box-ironbark forests and woodlands | 4 new national parks: Chiltern-Mt Pilot, Greater Bendigo, Heathcote-Graytown, St Arnaud Range. 2 new state parks. Additions to existing national & state parks. |
| 2002 | Marine | 13 marine national parks, 11 marine sanctuaries |
| 2005 | Otways | Great Otway |
| 2008 | South-western Victoria | Cobboboonee |
| 2010 | River red gum forests | 4 new national parks: Barmah, Gunbower, Lower Goulburn, Warby-Ovens. Additions to existing national and state parks. |
| 2010 | East Gippsland (old growth forest) | Additions to Croajingolong, Errinundra and Snowy River |
| 2012 | East Gippsland | Lake Tyers State Park |

Since the 2010 election of the Liberal/National government, many environmental reforms have been undone or abandoned, including a 2009 white paper for reversing environmental decline and protecting biodiversity under climate change, prepared at the end of a four-year process (*Securing Our Future: A White Paper for Land and Biodiversity at a Time of Climate Change*). Controls on land clearing, forestry, firewood collection and planning have been weakened, and national parks are being opened to damaging exploitation. The government reneged on creating Murray River Park, a string of crown lands along the Murray River between Mildura and Yarrawonga, in favour of allowing ongoing cattle grazing.

# 1.3 Environmental drivers and trends

*Human-mediated environmental impacts are now so extensive and pervasive that many consider that the planet has entered a new geological epoch – the Anthropocene.*

Christoph Kueffer & Christopher Kaiser-Bunbury, 2014[11]

There are many continuities in this nature conservation review with the findings of the three previous reviews. Victoria is still a long way from having a comprehensive, adequate and representative national park and conservation system, a core element of any effective nature conservation strategy. Most major threats to nature identified in the past reviews, many initiated in the early days of settlement, are still very much with us – habitat loss and degradation, invasive species, harmful fire regimes, over-grazing, modified water flows and over-exploitation of natural resources. Several have intensified, and the speed, magnitude and types of change are increasing. Three interrelated major drivers of these changes – climate change, population growth and agricultural intensification – will profoundly shape Victoria's future.

## 1.3.1 Climate change

Already significantly affecting life in Victoria, climate change will drive multiple escalating and cascading changes – in temperature and rainfall patterns, extreme weather events, sea level rise and ocean acidity – and exacerbate many other threats, particularly severe fire events and invasive species. Since the 2001 nature conservation review, Victorians have experienced the longest, hottest and driest period since European colonisation. During the 13 years of the millennium drought (1997–2009) rainfall totals were the lowest on record.[12] Fourteen of the past 17 years have recorded below-average rainfall and every year has been warmer than the 1961-1990 mean (Figure 1.3).[13] Six of the 10 hottest years recorded in Victoria have been in the past 20 years and eight have been since 1980 (Table 1.1).

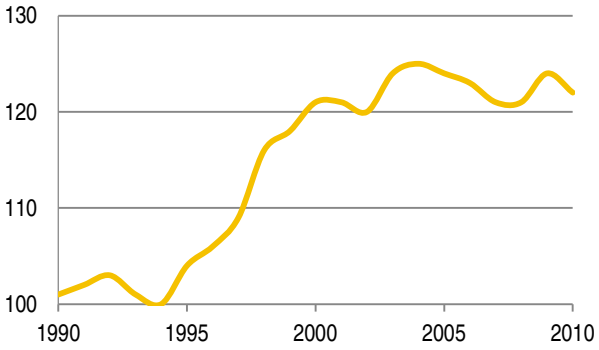
**Table 1.1 Victoria's ten warmest recorded years**[14]

| |
|---|
| 2007 |
| 1988 |
| 2013 |
| 1914 |
| 1961 |
| 1981 |
| 2000 |
| 2005 |
| 1999 |
| 2001 |

Severe fires in eastern and alpine Victoria in 2003, in eastern Victoria in 2006 and 2007, and to the north and east of Melbourne in February 2009 caused catastrophic damage. Although individual weather events cannot be attributed to climate change, the extremes of recent times are consistent with climate change and some patterns of change can only be explained by factoring in anthropogenic warming.[15]

Victoria is among the world's worst greenhouse gas emitters, with its heavy use of fossil fuels and emissions increases of more than 20% since 1990 (Figure 1.2).[16]

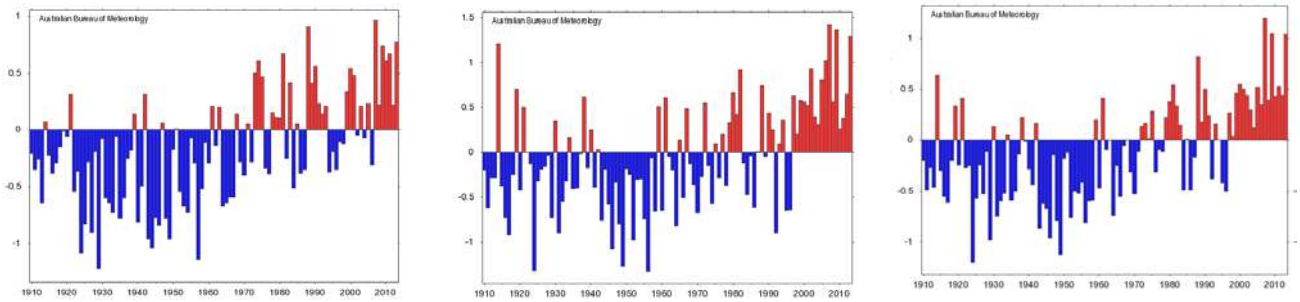
**Figure 1.1 Victoria's greenhouse gas emissions**[17]




Data source: Victorian government. Note: The units are $CO_2$-equivalent (million tonnes), excluding land use, land use change and forestry

With the global failure to arrest greenhouse gas emissions and continued warming inevitable, there needs to be a concerted effort to optimise the resilience of ecological and human communities and their potential for adaptation. Mitigating other threats to nature and expanding the national park and conservation system have become even more important. Adapting to climate change will surely be Victoria's greatest challenge in the near-term future.

**Figure 1.2 Annual temperature anomalies, Victoria 1910-2013: annual minimum temperatures (left), annual maximium temperatures (middle) and annual mean temperatures (right)**[18]



Source: Bureau of Meteorology. The graphs shows variations from 1910 to 2013 around the annual minimum (left), maximum (middle) and mean (right) temperatures based on a 30 year climatology from 1961-1990.

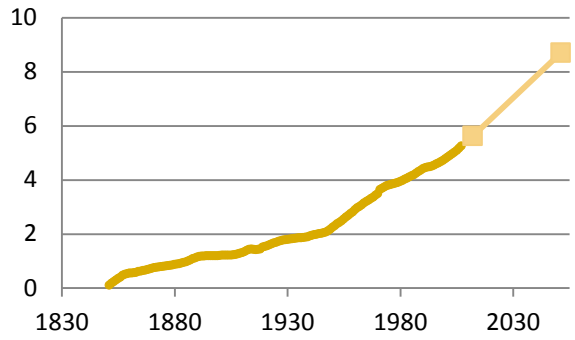
## 1.3.2 Population growth

Victoria's burgeoning human population is the driver of many threats. Precious habitat remnants are being bulldozed for urban expansion or paved for roads. More people are emitting more greenhouse gases, consuming more natural resources (water and firewood for example) and introducing more invasive species for gardens or pets or through increased travel and trade. Victorians consume several times their equitable share of planetary resources. Some forms of recreation – fishing for example – are also taking a heavy toll on nature. At the same time, a more sedentary and indoor lifestyle is increasingly severing many Victorians from nature, undermining health and wellbeing as well as support for conservation.

Victoria's population has grown by almost a million over the past decade, reaching 5.8 million in 2013. About three-quarters (4.1 million) live in Melbourne, compared to about 40% in 1900. Recent increases have been driven by a 'mini baby boom' and immigration from overseas. It is projected that by mid-century the population will increase by almost 60% to reach 8.7 million (6.5 million Melbourne) (Figure 1.4).[19] Victoria is Australia's most densely populated state, and by 2030, Melbourne is expected to become Australia's largest city.[20]

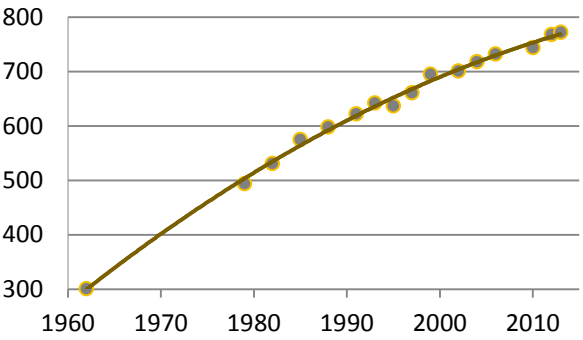
Population growth over the next three decades is predicted to require more than 300,000 more dwellings, which will add enormously to pressures on biodiversity in the urban fringes.[21] The impacts of a burgeoning population are exacerbated by increasing consumption, such as higher vehicle ownership (Figure 1.5).

**Figure 1.3 Victoria's population (millions) since European colonisation and projected to 2050**[22]




Source: Australian Bureau of Statistics

**Figure 1.4 Vehicles per 1000 population in Victoria**[23]




Source: Australian Bureau of Statistics

## 1.3.3 Land-use intensification

*The fundamental challenge … is to develop farming systems that are more intrinsically Australian: that are resilient in the face of extreme weather and extreme seasonal variability; that are miserly with water and conserving of energy; that maintain groundcover and are kind to the soil; that sit lightly on the landscape and don't displace native wildlife or habitat; that are highly profitable in good seasons and don't lose money in bad seasons; that preserve and build their natural, human and financial capital; that recover quickly from shocks and stress…*

Andrew Campbell, 2008[24]

The majority of land in Victoria, and much of the sea as well, is subjected to intense human exploitation. A major driver of change is increasing intensification of land-use, primarily agriculture. The spread of urban areas is also a form of intensification in some places.

Although Victoria has just 3% of Australia's total farm area, it produces about 25% of the value of national agriculture output.[25] Close to 60% of Victoria's land area, about 12.7 million hectares, is used for agriculture and about 80% of this area has been cleared. Conventional farming practices – clearing, cultivation, irrigation, grazing, spraying, fertilisation – have caused the greatest ecological damage in Victoria, and any intensification of these practices is likely to have further conservation consequences.

Agricultural intensification involves a 'simplification of the agroecosystem' and increased inputs (fertilisers, pesticides or water).[26] In Victoria, it has included the conversion of grazing lands to crops, the planting of 'improved' pastures (using introduced, often invasive, plants and applying fertiliser) pastures, the use of new technologies such as centre pivot irrigation (for which paddock trees and small buloke remnants are removed) and basalt rock crushing on the Victorian Volcanic Plains.

The number of farms in Victoria has more than halved in the past four decades (from almost 70,000 in 1963-64 to about 32,500 in 2012) but the average farm size has almost doubled (from about 210 to 390 hectares).[27] Since the turn of the century, the area of crops in Victoria has increased by about 1 million hectares to more than 4 million hectares, close to a fifth of Victoria's land area.[28] Terms of trade for agriculture have declined, putting pressure on farmers to increase productivity.[29] Agricultural businesses not in the top 10% of productivity are generally subject to chronic unprofitability and rising debt.[30] Aspirations to increase Australia's food exports are likely to drive greater intensification. On current trends, global food consumption is expected to be 75% higher in 2050 than in 2007, and the 2013 national food plan has a target to increase agriculture and food-related exports by 45% by 2025.[31]

Some of the major recent changes in land use are captured in the following five-fold classification of Victoria's landscapes by Neil Barr (Figure 1.6).[32]

*Production landscapes* (26 statistical local areas) are mostly in northwest Victoria and have larger farms with broadacre cropping or grazing. They have achieved productivity increases that match or exceed the long-term decline in agricultural terms of trade. (A statistical local area is a classification used by the Australian Bureau of Statistics.)

*Transitional landscapes* (25 statistical local areas) are mostly areas where agricultural industries such as sheep farming have declined in profitability and are gradually being replaced by more profitable forms of broadacre agriculture, blue gum plantations and small boutique crops or animal production. Some wool producers have diversified to 'prime lamb production'. Some land has been bought for conservation restoration.

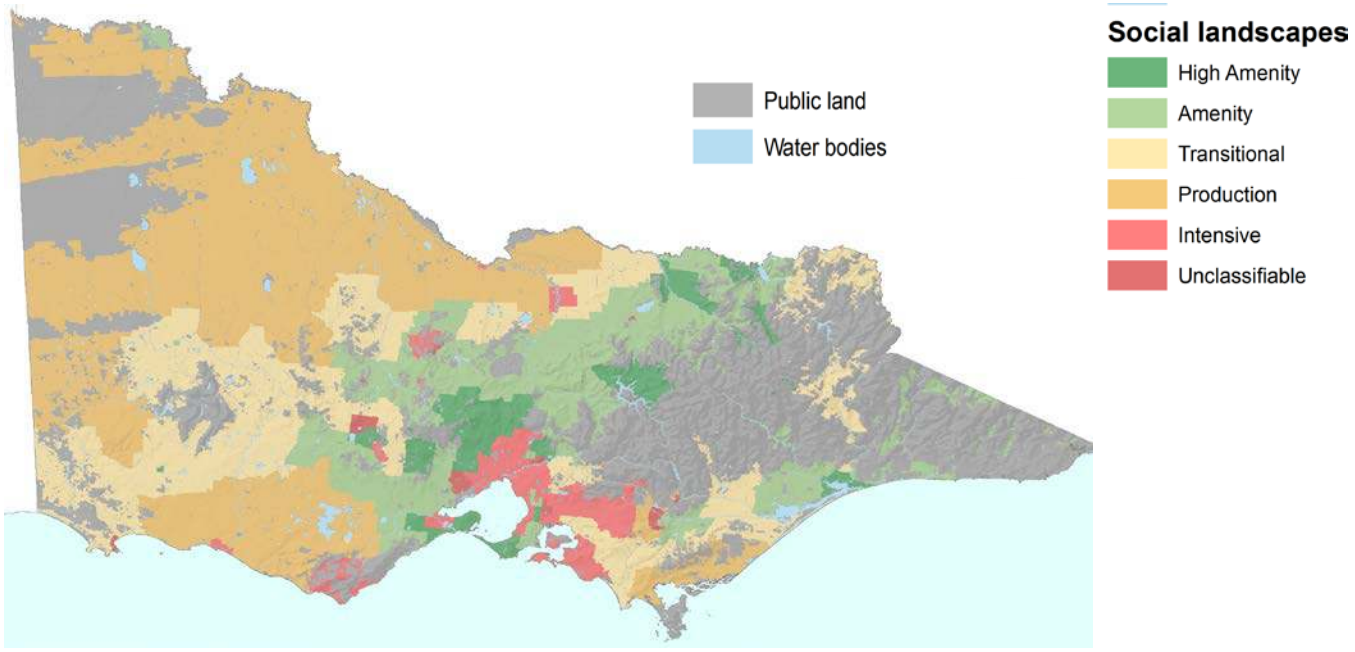
*Amenity farming landscapes* (35 statistical local areas) are in areas with high scenic qualities but beyond the Melbourne commuting zone, where land is being bought for its residential value, often as weekenders. In many local government areas, 30% to 50% of properties have non-resident ratepayers. The small number of farms that have prospered have often done so by intensification. Others are run by ageing farmers who are not under pressure to increase productivity to pay a mortgage.

*High amenity landscapes* (19 statistical local areas) are mostly on the outskirts of Melbourne or major provincial centres; a few are in mountain tourism

destinations. Two-thirds of rural property purchases in these landscapes are made by people living outside the district and land price is determined by location and scenic qualities rather than agricultural potential. Farms are smaller than elsewhere and have been shrinking. Agriculture plays a minor role in the local economy.

*Intensive agriculture landscapes* (20 statistical local areas) are mostly located on the outskirts of Melbourne, Bendigo and Ballarat. In common with amenity landscapes, they have high population growth, high land values and a significant part-time farming community. They also have a flourishing intensive farming sector that produces chicken meat, vegetables, mushrooms, pork, eggs and wine.

**Figure 1.5 The social Landscapes of Victoria**



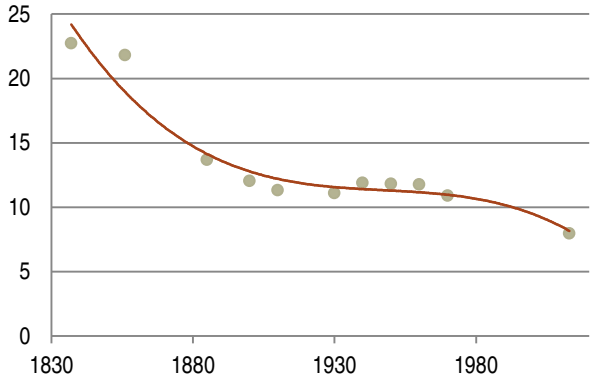

Map: VNPA. Data source: Rural Social Landscapes datasets compiled by Neil Barr (2008).

# 1.4 Victoria's national park & conservation system

The greatest progress in Victorian conservation has come from providing public lands and waters with a high level of conservation security in the national park estate. As the history in section 1.2 makes clear, the rapid development of Victoria and large-scale land clearing was given strong impetus by the selling (alienation) of crown land. Changes in land tenure from public to private ownership have preceded most damaging land uses. Some early and fortuitous intervention came with decisions in the late 1800s to reserve in public ownership the unalienated sections of coastal foreshore and river frontages, to support water transport and land access.[33]

About two-thirds of Victoria's land area has been alienated (close to 15 million hectares, Figure 1.7), leaving about 8 million hectares of land in public ownership.[34] (All marine waters are in public ownership.) Most national parks have been created by upgrading the tenure of public lands, about half of which are now managed primarily for conservation (Table 1.2).

### Figure 1.6 Progressive alienation of public (crown) land in Victoria (millions of hectares)[35]




Sources: Judith Frankenberg, Department of Environment and Primary Industries. The increase in public land area after 1930 was due to forfeitures.

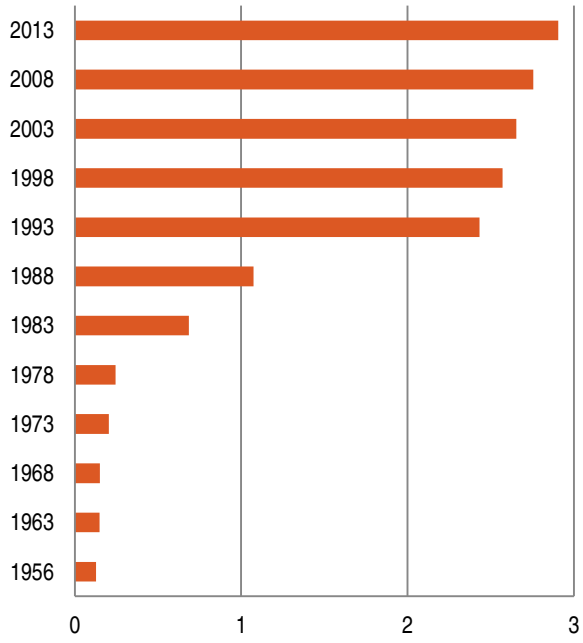
The cornerstone of biodiversity conservation in Australia and internationally is the establishment and effective management of a comprehensive, adequate, and representative system of protected areas.[36] 'Comprehensive' requires protecting examples of the full range of ecosystems within and across bioregions, 'adequate' requires protecting areas sufficient to maintain the viability and integrity of populations, species, and communities, and 'representative' requires protecting the variability of habitats within ecosystems.[37]

Although Victoria's terrestrial national park estate is fairly extensive, it is far from comprehensive, adequate or representative, mainly because of the early alienation of public land in the most productive landscapes for agriculture (chapter 3). For different reasons, the marine national park estate also does not meet these protected area goals (chapter 2).

For the past four decades, Victoria has had the great benefit of independent public bodies to investigate and recommend the protection of crown land for conservation and other public purposes. This began with the Land Conservation Council in 1971, replaced by the Environment Conservation Council in 1997, which was replaced by the Victorian Environmental Assessment Council in 2002.

Figure 1.8 shows the growth in Victoria's national parks since the first National Parks Act (see appendix 8 for details). More recently, private land and Aboriginal land have become a small but growing part of the national park and conservation system.

### Figure 1.7 Growth of Victoria's terrestrial national parks, 1956-2013 (millions of hectares)




Sources: Annual reports for the National Parks Act.

## 1.4.1 Defining the national park and conservation system

Although many types of tenure or legal agreement imply some form of conservation protection, only properties that are securely and permanently protected and managed primarily for conservation are genuinely protected (Box 1.2 explains these criteria). In this report, marine and terrestrial properties that meet these criteria are referred to as the 'national park and conservation system'. They are a subset of what governments refer to as 'protected areas' or 'reserves'.

Properties with the highest level of protection are referred to in this report as the 'national park estate'. They are properties listed under the National Parks Act in schedules 2, 2A and 2B (national parks, state parks, wilderness parks) and schedules 7 and 8 (marine national parks, marine sanctuaries) or they are reference areas under the Reference Areas Act. The terrestrial national park estate covers about 3.3 million hectares and the marine estate about 54,000 hectares (Table 1.2).

A second tier of protected areas that are also part of the national park and conservation system ('other conservation properties') includes properties listed under schedule 3 of the National Parks Act and private properties with a perpetual covenant under the Victorian Conservation Trust Act (Trust for Nature covenants). They are securely and permanently protected but have less rigorous legal requirements for conservation management than the national park estate. They are typically also smaller properties, averaging 150 hectares. They total about 600,000 hectares (Table 1.2).

Other tenure types that are typically called 'protected areas' or 'reserves' but do not meet the criteria for the national park and conservation system include properties such as those listed in schedule 4 of the National Parks Act (marine and coastal parks, marine reserves, marine parks) and wildlife reserves that permit hunting. Their protection may be insecure (able to be easily changed) or temporary or there is no specified primary management intent for conservation.

Table 1.3 outlines the protected area categories used in this report, including the legislation under which they are enacted.

### Table 1.2 National park and conservation system[38]

| Category | Number | Area (hectares) | % of state |
|---|---|---|---|
| **Marine – national park estate** | | | |
| Marine national parks | 13 | 52,241 | 5.2 |
| Marine sanctuaries | 11 | 864 | 0.1 |
| **Marine total** | 24 | 53,776 | 5.3 |
| **Terrestrial – national park estate** | | | |
| National parks | 45 | 2,901,284 | 12.8 |
| State parks | 26 | 157,825 | 0.7 |
| Wilderness parks | 3 | 200,699 | 0.9 |
| Reference areas(1) | 54 | 25,392 | 0.1 |
| **Subtotal** | 128 | 3,274,528 | 14.4 |
| **Terrestrial – other conservation properties** | | | |
| *Public*: eg nature conservation reserves | 2,775 | 526,041 | 2.3 |
| *Private*: Trust for Nature properties & covenants | 1,330 | 93,456 | 0.4 |
| **Subtotal** | >4,000 | 595,033 | 2.7 |
| **Terrestrial total** | >4,000 | **3,901,941** | 17.2 |

Sources: Federal Department of the Environment (CAPAD 2012), Victorian Department of Environment and Primary Industries (Public Land Management spatial data 2013), Trust for Nature (2014). Note: (1) There are additional reference areas that overlap with other protected area categories.

### Box 1.1 Criteria for the national park and conservation system

Three criteria must be met for an area to qualify as genuinely protected and part of the national park and conservation system: the conservation agreement is secure and permanent and the primary focus of management must by law be biodiversity conservation.[39]

- Security – protected areas are secure if their status is under control of an act of parliament (one focused on conservation) and requires a parliamentary process to extinguish the protected area or excise portions from it, or if they are under a secure contract, covenant, agreement or other legal instrument that has similar security.
- Permanence – ideally, protection should be in perpetuity; 99 years is a minimum.
- Primary management intent – biodiversity conservation must be the primary management goal. It is important to distinguish between a requirement to pro-actively manage for biodiversity conservation, and a lesser (insufficient) requirement to simply restrict particular uses which may impact negatively on biodiversity.

## Table 1.3 Protected area categories: Victoria's national park and conservation system, as defined by VNPA

| Tenure / mechanism | Legislation | PROTECTED AREAS[1] | | |
|---|---|---|---|---|
| | | National park & conservation system [2] | | Not in the national park and conservation system |
| | | National park estate[3] | Other conservation properties | |
| PUBLIC LANDS (LAND STATUS DEPENDENT ON ACT) | National Parks Act[4] | Schedule 2: National park<br>Schedule 2A: Wilderness park<br>Schedule 2B: State park<br>Schedule 7: Marine national park<br>Schedule 8: Marine sanctuary | Schedule 3: other parks & reserves:<br>▪ Coastal park<br>▪ Flora & fauna reserve<br>▪ Park<br>Schedule 4: selected reserves:<br>▪ Nature conservation reserve | Schedule 4: miscellaneous parks & reserves:<br>▪ Marine & coastal park<br>▪ Marine reserve<br>▪ Marine park |
| | Crown Lands (Reserves) Act | | Nature conservation reserves:<br>▪ Flora & fauna reserve<br>▪ Wildlife reserve (no hunting)<br>▪ Flora reserve<br>▪ Nature conservation reserve<br>Natural features reserves:<br>▪ Scenic reserve<br>▪ Geological reserve<br>▪ Bushland reserve<br>▪ Natural features & scenic reserve<br>▪ Streamside reserve<br>▪ Cave reserve<br>▪ Geological & geomorphological features area<br>Phillip Island nature parks[5] | Natural features reserves:<br>▪ Wildlife reserve (hunting)<br>▪ River Murray reserve |
| | Fisheries Act | | | Fisheries reserve (if used for critical habitat) (not in use) |
| PRIVATE LANDS | Victorian Conservation Trust Act | | Perpetual covenant[6]<br>Trust for Nature nature reserve[7] | |
| | Conservation, Forests & Lands Act | | | Section 69 agreement in perpetuity[8] |
| | Wildlife Act | | Wildlife sanctuary | |
| | Private agreements | | | Land management cooperative agreement with Alcoa[9] |
| INDIGENOUS LANDS | National Parks Act | Jointly managed schedule 2, 2A, 2B reserve (as above)[10] | Jointly managed schedule 3 or 4 reserve (as above) | Jointly managed schedule 4 reserve (as above) |
| | EPBC Act (federal)[11] | | | Indigenous protected area agreements to manage natural and cultural values |
| OVERLAYS | Reference Areas Act | Reference area | | |
| | National Parks Act | | Schedule 6:<br>▪ Remote natural area[12] | |
| | Wildlife Act[13] | | State wildlife reserves:<br>▪ State game refuge<br>▪ State faunal reserve<br>Nature reserve<br>Wildlife sanctuary | State wildlife reserves:<br>▪ Game reserve (hunting) |
| | EPBC Act (federal) | | | Critical habitat (not in use) |
| | Flora & Fauna Guarantee Act | | | Critical habitat (not in use) |

Explanatory notes for Table 1.4

(1) Most of these tenures are those recognised as protected areas by the Victorian Government in its provision of information to the 2012 Collaborative Australian Protected Area Database (CAPAD),[40] and thus are recognised by the IUCN, the Convention on Biological Diversity, Australia's National Reserve System and National Representative System of Marine Protected Areas. However, Trust for Nature covenants and reserves and section 69 agreements are not recognised in the CAPAD. Areas designated under the Forests Act, such as special protection zones, special management zones and Section 50 reserves, are not considered secure enough to be regarded as protected areas since they can be easily altered.

(2) Properties in this category are regarded as 'conservation reserves' by the Victorian Environmental Assessment Council. Other reserves placed in this category by the Victorian Environmental Assessment Council (but not in the national park and conservation system as defined in this review) include marine reserves, marine parks and national heritage parks (under the National Parks Act)

(3) These areas are largely exempt from mining by virtue the Mineral Resources (Sustainable Development) Act (section 6).

(4) The historic park and national heritage park reserve categories are protected under the National Parks Act but are not regarded as part of the national park and conservation system.

(5) The crown lands that make up Phillip Island Nature Parks were reserved for the conservation of areas of 'natural interest', 'ecological significance', 'natural beauty and historic interest', 'recreation and amusement' or other public purposes.

(6) Covenants are not recognised in the CAPAD 2012 but they are included here as part of the national park and conservation system because their protection is permanent and they are required by law to be managed for conservation. A few covenanted areas are used for production and therefore not regarded as part of the national park and conservation system.

(7) For example, Ned's Corner. These are not recognised in CAPAD 2012 as protected areas but are permanently and securely protected.

(8) Not recognised in CAPAD.

(9) Agreement on 8 November 2000 to manage Anglesea Heath.[41]

(10) Title is held by Indigenous owners, the land is subject to an agreement under the Traditional Owner Settlement Act, a management board with majority Indigenous owner representation is established and the land is managed in accordance with the National Parks Act.

(11) EPBC Act is the 1999 federal Environment Protection & Biodiversity Conservation Act.

(12) All remote natural areas created to date lie within the national park estate, which offers additional protection.

(13) Each reserve type overlays an equivalent wildlife reserve (either hunting or no hunting) under the Crown Lands (Reserves) Act.

# 1.5 Sources

## Endnotes

[1] Garden (2012)
[2] Garden (2012)
[3] Robertson (1898)
[4] Garden (2013)
[5] Garden (2013)
[6] Robin (1998)
[7] Frankenberg (1971)
[8] Frood & Calder (1987) defined a vegetational alliance as 'a series of climax plant communities which have the same structural characteristics, related species as dominants in the uppermost stratum and possibly the same or related species in the understorey'.
[9] Frood & Calder (1987)
[10] Traill & Porter (2001)
[11] Kueffer & Kaiser-Bunbury (2014)
[12] Department of Sustainability and Environment (2012)
[13] Bureau of Meteorology (2014a)
[14] Department of Sustainability and Environment (2008); Bureau of Meteorology (2014a).
[15] CSIRO (2012). The South Eastern Australian Climate Initiative research has demonstrated that an expansion of the tropics, indicated by the Hadley Circulation expanding at about 50 km per decade, is pushing mid-latitude storm tracks further south and leading to reduced winter rainfall across southern Australia. Climate modelling shows that this observed expansion can only be reproduced if human influences (such as greenhouse gases, aerosols and stratospheric ozone) are included in the models, providing evidence that observed changes in large-scale atmospheric circulation patterns affecting south-eastern Australia are at least partly attributable to climate change.
[16] Department of Climate Change and Energy Efficiency (2012)
[17] Department of Climate Change and Energy Efficiency (2012)
[18] Bureau of Meteorology (2014b)
[19] Department of Transport Planning and Local Infrastructure (2013); Department of Planning and Community Development (2012)
[20] Department of Planning and Community Development (2010)
[21] Department of Planning and Community Development (2009)
[22] Australian Bureau of Statistics (2008); Department of Planning and Community Development (2012)
[23] Source: Australian Bureau of Statistics various databases
[24] Campbell (2008)
[25] Australian Bureau of Statistics (2012)
[26] Maron & Fitzsimons (2007)
[27] Campbell (2008), citing DPI (2008); Australian Bureau of Statistics (2013)
[28] Australian Bureau of Statistics (2004); Australian Bureau of Statistics (2013)
[29] Barr (2009)
[30] Campbell (2008)
[31] Department of Agriculture Fisheries and Forestry (2013)
[32] Barr (2008)
[33] Public Record Office of Victoria (2005)
[34] Victorian Environmental Assessment Council (2011); Department of Environment and Primary Industries (2013a, Trust for Nature (2013)
[35] Frankenberg (1971); Department of Environment and Primary Industries (2013a)
[36] Natural Resource Management Ministerial Council (2009)
[37] Natural Resource Management Ministerial Council (2009)
[38] Department of the Environment (nd); Department of Environment and Primary Industries (2013b)
[39] Fitzsimons (2006)
[40] Department of the Environment (nd)
[41] Parks Victoria (2002)

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