



Victoria's
State of the Forests
Report 2008



This is the logo of The Montreal Process Working Group on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests. *Victoria's State of the Forests Report 2008* is consistent with this process.

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Melbourne, May 2009

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Foreword

This is the second Victorian State of the Forests Report. The information in this report complements Victoria's *State of the Environment Report 2008*, *Catchment Condition Report 2007*, and the *State of the Parks Report 2007*. Together, these provide a clear picture of the major issues surrounding the management of our natural resources and will help to ensure that Victoria's environment is protected for future generations.



Victoria's forests are important and treasured natural assets. They provide habitat for many native flora and fauna species and form some of our most spectacular landscapes. Forests provide a wide range of wood and non-wood products, clean water resources, and play a vital role in the mitigation of climate change. Forests are places where Victorians head to work and play, and are culturally and spiritually significant to Indigenous and non-Indigenous people alike.

A key objective of Victoria's sustainable forest management is to protect and enhance the health and diversity of our forests, whilst ensuring they continue to provide a range of social and economic benefits for Victorian communities. For this to be achieved, it is essential that the management of our forests is supported by the best possible information. Victoria's State of the Forest reporting makes a significant contribution to the knowledge required for informed management decisions.

I encourage you to read this report, to learn, and to share in the successes, the challenges and the ongoing improvements we are striving to achieve for the forests of Victoria.

A handwritten signature in black ink, appearing to read 'Peter Harris', written in a cursive style.

Peter Harris
Secretary

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About this report

This is the second Victorian State of the Forests Report, a five yearly report to the Minister for Environment and Climate Change from the Secretary, Department of Sustainability and Environment (DSE). It meets the reporting requirements set out in Section 8 of the *Sustainable Forests (Timber) Act 2004* and supports the Victorian Government's commitment to improve openness, accountability and community engagement in forest management.

State of the Forests reporting is a major component of sustainable forest management in Victoria, providing information on the environmental, economic, and social values associated with forests. This information supports continuous improvement in forest management by enabling the assessment of management performance and the further development of forest policy.

Scope of the report

This report assesses Victoria's native forests over the period 2001-02 to 2005-06, and is consistent with *Australia's State of the Forests Report*. Although the *Sustainable Forests (Timber) Act 2004* only requires DSE to monitor and report on Victoria's State forests, this report aims to present information related to all native forest land tenures in Victoria. However, much of the report focuses on Victoria's State forests due to limited data availability for other tenures.

Report content

This is the first State of the Forests Report to use the *Criteria and Indicators for Sustainable Forest Management in Victoria*. This report summarises the 45 indicators used to assess sustainable forest management in Victoria. Detailed information for each indicator can be found on DSE's website (www.dse.vic.gov.au/forests). It is highly recommended that this summary report be read in conjunction with the indicator information provided on DSE's website.

Data used in this report

This report uses the best available data from both State and Commonwealth Government agencies. Where possible, data is presented for the entire reporting period. However, this was not always achievable due to changes in data methodology or lack of annual data. In addition, data was not available for all indicators because some monitoring and management systems have not yet been developed. However, it is anticipated that more comprehensive data and information will be available in the future as knowledge improves.



Victoria's Criteria and Indicators for Sustainable Forest Management

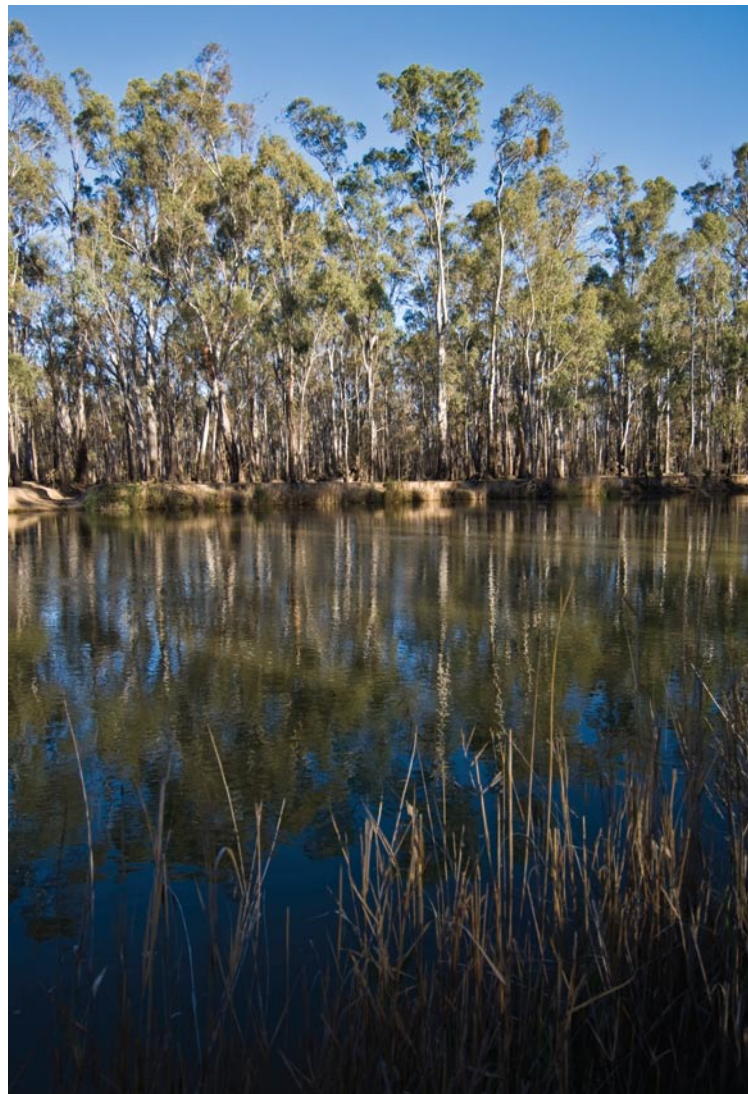
The *Criteria and Indicators for Sustainable Forest Management in Victoria* was released in 2007. It contains 7 criteria and 45 indicators which were developed with the assistance of key experts, Government partners, and in consultation with the Victorian community. The criteria and indicators are consistent with the Montreal Process (1995), and complement both regional and national State of the Forest reporting in Australia.

The Montreal process

Australia is one of 12 countries, including Canada and the USA, that use the Montreal Process criteria and indicators to assess progress towards sustainable forest management. Member countries span five continents and account for 60% of the world's forests. The Montreal Process provides seven broad criteria to describe the forest values that society seeks to maintain.

These are:

1. Conservation of biological diversity;
2. Maintenance of productive capacity of forest ecosystems;
3. Maintenance of ecosystem health and vitality;
4. Conservation and maintenance of soil and water resources;
5. Maintenance of forest contribution to global carbon cycles;
6. Maintenance and enhancement of long term socio-economic benefits; and
7. An effective legal, institutional and economic framework.



Managing Victoria's forests

The Department of Sustainability and Environment has primary responsibility for the sustainable management of Victoria's State forests, and sets the overall management framework for all public land. This includes the conservation of flora and fauna, protection of water catchments and water quality, the provision of timber and other forest products on a sustainable basis, the protection of cultural heritage, and the provision of recreational and educational opportunities.

Parks Victoria manages forests in the conservation reserve system, including National and State Parks and other reserves. Melbourne Water also manages 157,000 hectares of forested catchments for the supply and protection of water resources.

Victoria's sustainable forest management was enhanced during the reporting period (2001-02 to 2005-06) by the implementation of significant new policies and legislation including:

- ***Our Forests, Our Future (2002)*** – a key initiative of this policy was to separate forest regulatory and commercial functions within government to ensure the effective management of Victoria's timber industry. Other initiatives included new legislation for timber resource security, the independent auditing of forests, and commitment to regular reporting. *Our Forests, Our Future* also announced a 31% reduction in sawlog harvesting levels, supported by an \$80 million adjustment package for affected workers, businesses and communities;

- ***Sustainable Forests (Timber) Act 2004*** – a major reform which formally introduced the principles of ecologically sustainable development into Victoria's forest management. The Act provides a framework for sustainable forest management and sustainable timber harvesting in State forest. The Act also sets out reporting requirements to assess forest management performance, resulting in the development of Victoria's criteria and indicators for sustainable forest management, and a commitment to five-yearly State of the Forests reporting. In addition, VicForests was authorised under the Act to operate as the commercial harvest and sales manager for timber resources in the east of the State;



- **Sustainability Charter for Victoria's State forests (2006)** – a requirement under the *Sustainable Forests (Timber) Act 2004*, the charter sets out objectives, consistent with the principles of ecologically sustainable development, for the sustainability of forests and the timber harvesting industry; and
- **Environmental Management System** – developed as part of the initiatives of the *Our Forests, Our Future* program to ensure that DSE complies with legal obligations, minimises any negative environmental impacts of forest management activities, enhances operational efficiency, and fosters a culture of continual improvement within the organisation.

VicForests

VicForests is a state owned enterprise that was created in 2004 to manage commercial harvesting in State forests. This has provided more transparency in the sale of timber resources by removing the potential conflict between the regulatory and commercial functions within State Government. One of the responsibilities of VicForests was to develop an open and competitive sales system for publicly-owned timber to ensure the greatest possible returns for hardwood timbers. VicForests is also responsible for the management of remaining licences which grant commercial operators access to State forest timber in eastern Victoria. VicForests is regulated by DSE and is independently audited.



For more information see the following Indicators on DSE's website (www.dse.vic.gov.au/forests)

- 7.1 Extent to which the legal framework (laws, regulations, guidelines) supports the conservation and sustainable management of forests
 - 7.2 Extent to which the institutional framework supports the conservation and sustainable management of forests
 - 7.3 Extent to which the economic framework supports the conservation and sustainable management of forests
-

Victoria's forests

Forest area and type

In 2006, there was 8.3 million hectares of forest in Victoria covering 36% of the State. This included 7.8 million hectares of native forest, which accounted for 95% of the total forest area, and 441,000 hectares of plantations.

Eucalypt forest types accounted for 93% of Victoria's total native forest area. The most common eucalypt forest types were eucalypt medium open, mallee woodland, eucalypt tall open, and eucalypt medium woodland. The most common non-eucalypt forest type was casuarina which accounted for 2% of the total native forest.

Because of improvements in the methods used for forest area assessment, it is not possible to compare the forest area data used in this report with previous years. However, the total area of native forest, and the area of individual forest types, did not change over the reporting period due to the cessation of broadscale clearing and the improved protection of forests.

Area of forest in Victoria, 2006

Source: Department of Sustainability and Environment

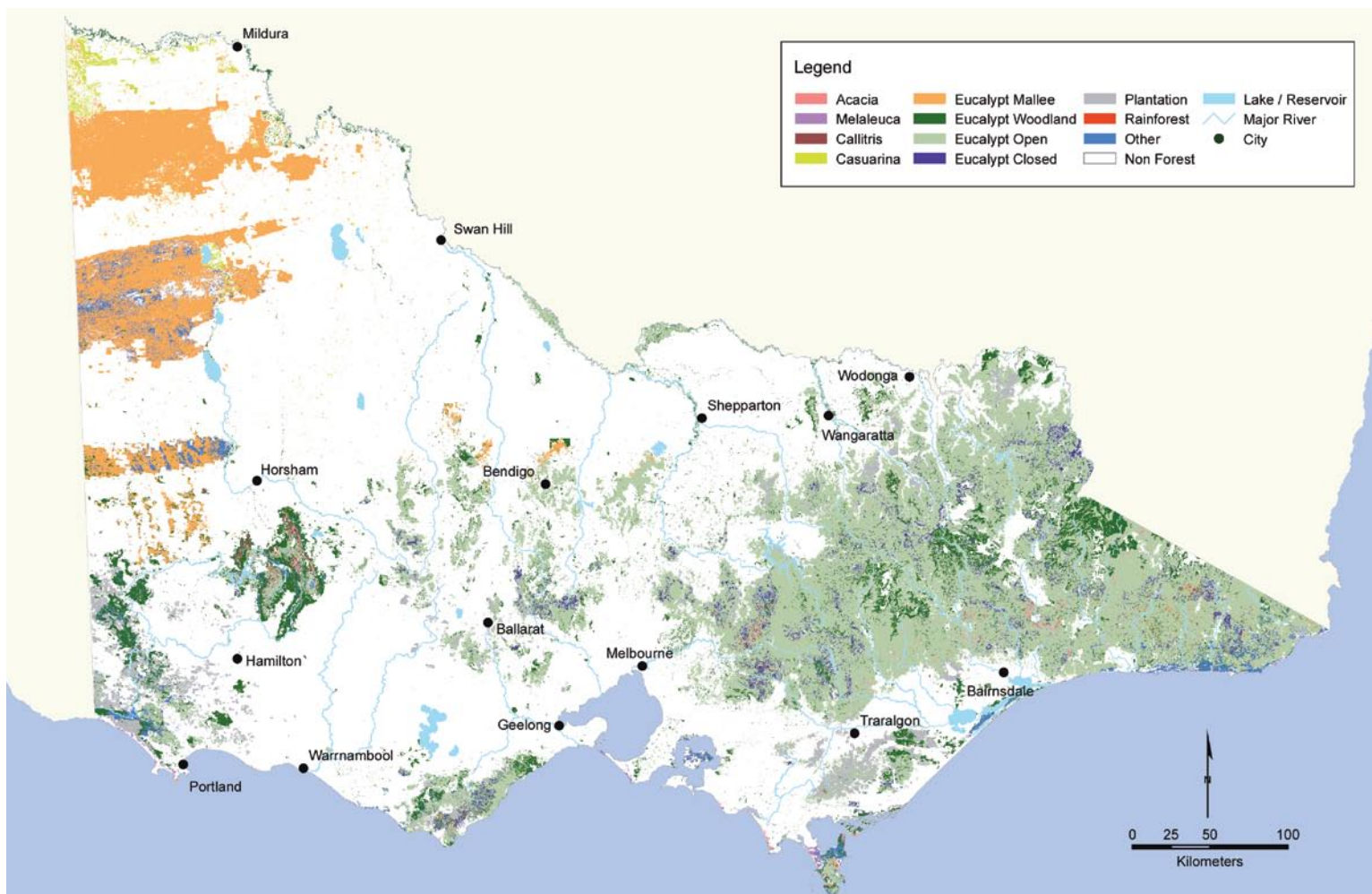
Forest type ¹	Area (hectares)	% of native forest area	
Native forest	Acacia	41,200	1
	Callitris	25,100	<1
	Casuarina	131,000	2
	Eucalypt tall woodland	73,300	1
	Eucalypt tall open	1,372,000	17
	Eucalypt tall closed	117,000	1
	Eucalypt medium woodland	1,008,000	13
	Eucalypt medium open	3,005,000	38
	Eucalypt medium closed	97,000	1
	Eucalypt low woodland	21,000	<1
	Eucalypt low open	69,700	1
	Eucalypt low closed	14,200	<1
	Eucalypt mallee woodland	1,504,000	19
	Total eucalypt	7,281,000	93
	Mangrove	2,200	<1
Melaleuca	24,400	<1	
Other	314,000	4	
Rainforest	18,300	<1	
Native forest total	7,838,000	95 ²	
Plantations	Hardwood and softwood	441,000	5 ²
Total forest	8,279,000		

¹ With the exception of mallee, eucalypt forest is divided into 9 sub-types based on height and crown cover classes. For more information see Indicator 1.1a on DSE's website (www.dse.vic.gov.au/forests).

² % of total forest

Broad forest types in Victoria, 2006

Source: Department of Sustainability and Environment



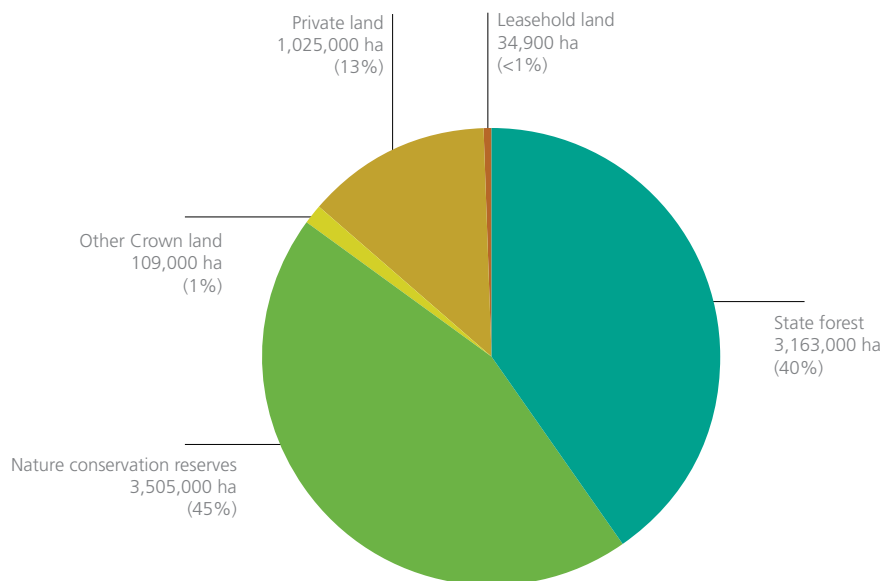
Forest tenure

In 2006, some 85% of Victoria's native forest was on public land, with 3.5 million hectares formally protected in nature conservation reserves and 3.2 million hectares in State forest. A further 1 million hectares of native forest was on private land.

The area of native forest in nature conservation reserves increased by 221,000 hectares between 2001-02 and 2005-06, mostly through the establishment of the Great Otway National Park and additions to reserve areas in the Box-Ironbark region of central and northern Victoria. These have been achieved mainly through the transfer of State forest into the reserve system. There is now more forest in nature conservation reserves than in any other land tenure in Victoria, demonstrating the continuing commitment to forest conservation in Victoria.

Native forest tenure in Victoria, percentage of total native forest area, 2006

Source: Department of Sustainability and Environment

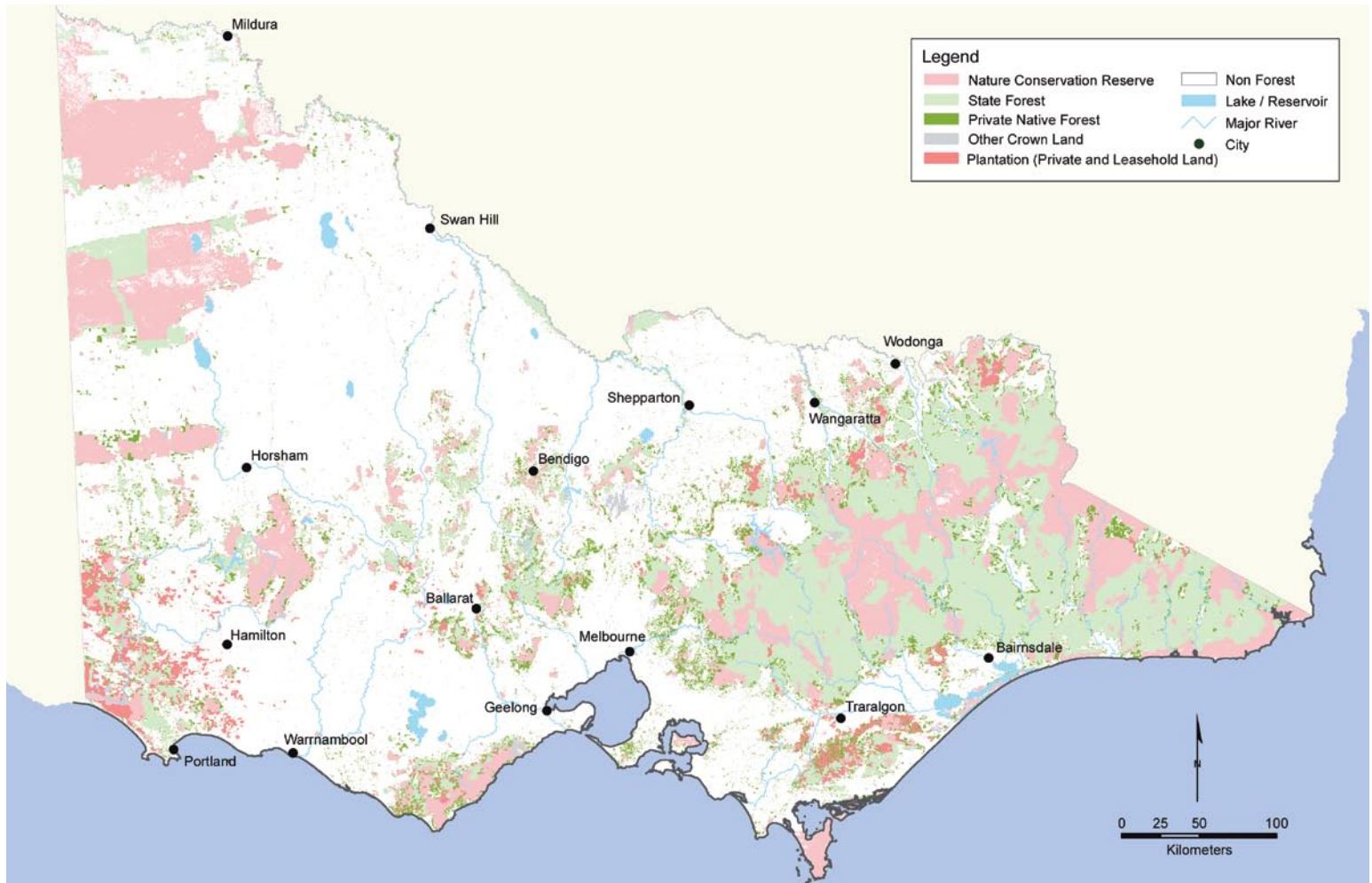


Native forest land tenures in Victoria

- **State forest** – Multiple-use forest managed for a range of values including timber harvesting, water supply, conservation, cultural heritage and recreation;
- **Nature conservation reserves** – Crown lands formally reserved for conservation, cultural heritage, and recreation. Includes national parks, nature reserves, State parks, and formal reserves for the protection of water supply catchments;
- **Other crown land** – Lands reserved for a range of purposes including utilities, research, education, stock routes, mining, military purposes, and use by Indigenous communities;
- **Private land** – Land held under freehold title and under private ownership; and
- **Leasehold land** – Crown land held under leasehold title and generally regarded as 'privately managed'.

Forested land tenure in Victoria, 2006

Source: Department of Sustainability and Environment



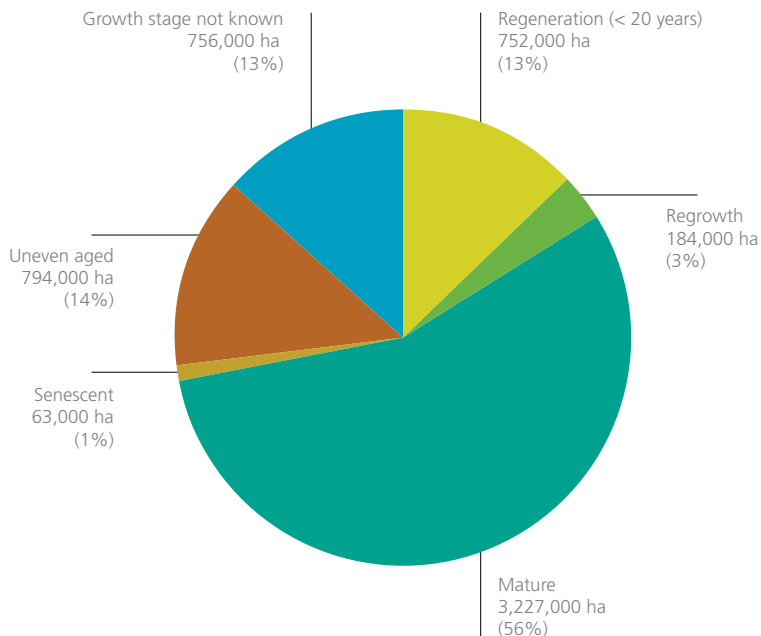
Growth stage

In 2006, nearly 5.8 million hectares of eucalypt forest was assessable for growth stage in Victoria. Of this area, growth stage was determined for 5 million hectares. Mature forest was the most common growth stage, accounting for 3.2 million hectares or 56% of the total assessable eucalypt forest area. The majority of eucalypt forest not assessed for growth stage was on private land.

There was 619,000 hectares of old-growth forest in 2006, or 11% of the total eucalypt forest assessed. Fire is the main threat to old-growth forest in Victoria, with bushfires destroying over 100,000 hectares of old-growth between 2003 and 2006.

Growth stage of native eucalypt forest (excluding mallee forest), percentage of total assessable forest area, 2006

Source: Department of Sustainability and Environment



What is growth stage?

Changes in forest growth and development are referred to as growth stages. Growth stage is used to determine the biodiversity and ecological values of a forest, as well as the availability of wood and other forest products. The area of each growth stage varies naturally over time because of growth stage transitions, tree mortality, and disturbances such as wildfire.

Old-growth is not a distinct growth stage, it is a term that describes ecologically mature forest that has received minimal disturbance from human activities. Old-growth forests are particularly important because they represent a unique stage in the development of a forest and are difficult to replace. Old-growth forests are important for biodiversity with many species relying on the diverse habitat they provide. However, the maintenance of biodiversity requires a range of different growth stages.

The assessment of growth stage and old-growth forest is restricted to native eucalypt forest (excluding mallee forest). For more information see **Indicator 1.1b** on DSE's website (www.dse.vic.gov.au/forests).

Victorian forest contribution to global carbon cycles

Forest ecosystems play an important role in the global greenhouse gas balance and global carbon cycle by storing carbon in both trees and soil. The ability of forests to take up carbon is vital to the mitigation of climate change.

In 2004, Victoria's native forest trees stored an estimated 852 million tonnes of carbon. This is equivalent to keeping over 3.1 billion tonnes of CO₂ out of the atmosphere, or 26 years worth of Victoria's current total CO₂ emissions. In addition, it is estimated that approximately 511 million tonnes of carbon is stored in Victoria's forest soils.

Forest management can have a significant impact on the global carbon cycle. Timber production forests are managed to ensure that carbon stocks are maintained. The sustainable harvesting of wood products adds to future carbon stocks, because carbon is stored in wood products for extended periods while regenerating forests absorb a greater amount of carbon for growth. However, there are short term emissions associated with timber harvesting.

For more information see the following Indicators on DSE's website (www.dse.vic.gov.au/forests)

- 1.1a Area of forest by type and tenure
 - 1.1b Area of forest type by growth stage
 - 1.1d Fragmentation of native forest cover
 - 3.1 Scale and impact of agents and processes affecting forest health and vitality
 - 5.1 Total forest ecosystem biomass and carbon pool by forest type, age class, and successional stages
-



Conservation of forests and biodiversity

Forest conservation

Both nature conservation reserves and State forest contribute to the reserve system in Victoria, providing an integrated network of forest conservation areas across the State.

Forest reserve types include:

- **Formal reserves** – Crown lands formally reserved for environmental protection under the *National Parks Act 1975*, including national parks, nature reserves, State parks and other conservation areas managed by Parks Victoria;
- **Informal reserves** – Public land protected through administrative instruments by public authorities. Informal reserves include State forest areas assigned to the following Forest Management Zones:
 - **Special Protection Zones**, forests managed to minimise disturbances that threaten ecological values. Timber harvesting is excluded in Special Protection Zones;
 - **Special Management Zones**, forests managed to conserve particular species or specific features. This may require modifying timber harvesting or other land use practices (rather than their exclusion).

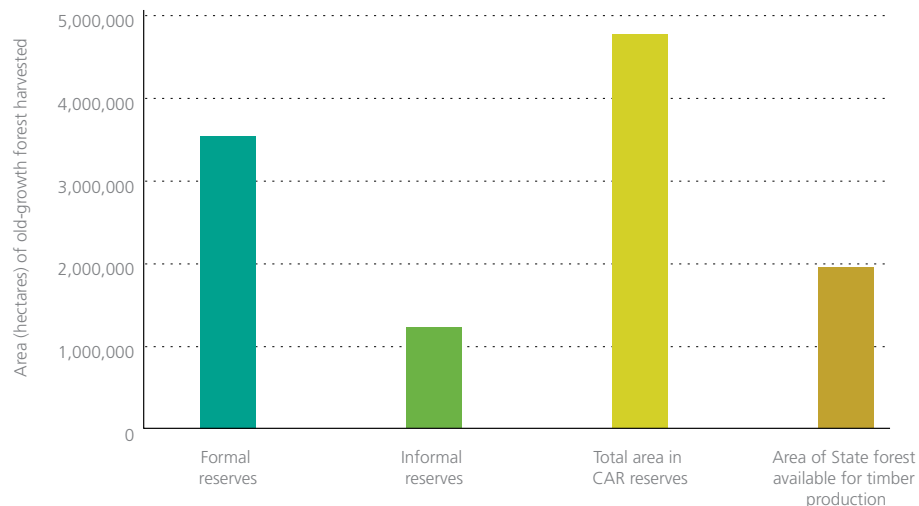
Area of forest protected

In accordance with nationally agreed criteria, specified levels of forest protection have been adopted in Victoria to establish a comprehensive, adequate and representative (CAR) reserve system. In 2006, there were over 4.7 million hectares of forest in CAR reserves in Victoria, more than double the area available for timber production. CAR reserves protected over 60% of the total native forest area and included over 3.5 million hectares in dedicated formal reserves and over 1.2 million hectares in informal reserves.

For the majority of forest types in Victoria, over 50% of their total area was protected in CAR reserves in 2006. This included over 90% of rainforest, mangrove and callitris forest types. In addition, 474,000 hectares of old-growth forest, 77% of the total old-growth in Victoria, was protected in CAR reserves.

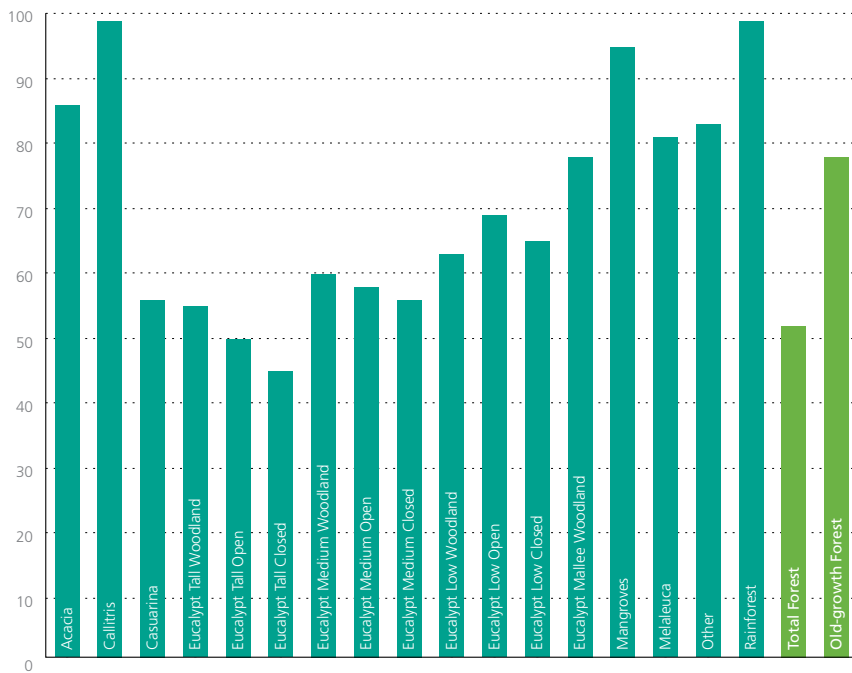
Area of native forest in CAR reserves and area available for timber production, 2006

Source: Department of Sustainability and Environment



Percentage of forest type protected in CAR reserves, 2006

Source: Department of Sustainability and Environment



Impacts of fox predation on the Long-nosed Potoroo in East Gippsland

The Long-nosed Potoroo (*Potorous tridactylus*) is classed as endangered in Victoria. Since European settlement, the distribution of the Long-nosed Potoroo has decreased and is now restricted to isolated patches along the south-eastern coast of mainland Australia. Predation by foxes poses a significant threat to the long-term survival of Long-nosed Potoroo populations in Victoria.

The Southern Ark project aims to protect biodiversity across one million hectares of land in East Gippsland through a program of integrated, large-scale and ongoing fox control. As part of the Southern Ark project, populations of Long-nosed Potoroos have been monitored at study sites in East Gippsland where fox control has been undertaken since 1988. Results have shown that populations of the Long-nosed Potoroo can significantly increase in response to effective and long-term fox control. Similar increases in native species populations have been achieved through introduced predator control in Victoria and elsewhere in Australia.

Biodiversity

Some 37 species of amphibians, 117 species of reptiles, 272 birds, 87 mammals and 2853 vascular plants are forest dependent in Victoria, relying on forest habitat for all or part of their life cycle. The main impacts on forest dependent species include forest clearing, introduced species, pathogens, disease, and inappropriate fire regimes which can decrease populations and habitat availability.

A total of 145 forest dependent fauna species have been identified as threatened or extinct in Victoria. This includes 9 extinct, 10 regionally extinct, 19 critically endangered, 31 endangered, 37 vulnerable and 39 near threatened species. In addition, insufficient data is available to assess the conservation status of 16 species. A total of 278 forest dependent flora species have been identified as threatened in Victoria. This includes 91 endangered and 187 vulnerable flora species.

During the reporting period, 49 species were added to the list of threatened species in Victoria, 11 species were removed, and 74 species changed conservation status. These were mainly the result of improvements in knowledge, taxonomic revisions and changes in assessment criteria. However, there was a real decline in 23 forest dependent species compared to a real improvement for only 4 species.

To protect and restore Victoria's forest dependent species, the Victorian Government undertook conservation efforts for 154 flora and fauna species, and 3 forest communities in 2006. Nearly all of these were for species and communities identified as being threatened in Victoria.



Brush-tailed Rock-wallaby

Brush-tailed Rock-wallabies (*Petrogale penicillata*) are classed as critically endangered in Victoria. Hunting of the species in the early 1900's reduced the population significantly and natural events, such as wildfire and drought, have led to further losses. Brush-tailed Rock-wallabies are now restricted to one wild population in the Snowy River catchment. The total population size is now likely to be fewer than 50 animals, with more than half that number currently in captivity.

Conservation measures

In 1996, a captive breeding program was established at the Healesville Sanctuary in response to critically low numbers. Genetic studies have been incorporated into conservation planning to assist in the monitoring of individuals in the wild, and to ensure breeding programs maintain and maximise genetic diversity.

Other ongoing measures to protect wild populations include fire management and prevention, control of predators including wild dogs and foxes, and habitat monitoring and maintenance. Future plans include the reintroduction of Brush-tailed Rock-Wallabies into the Grampians National Park.



For more information see the following Indicators on DSE's website (www.dse.vic.gov.au/forests)

- 1.1c Area of forest type by growth stage distribution in protected zones
- 1.2a The status of forest dependent species at risk of not maintaining viable breeding populations, as determined by legislation or scientific assessment
- 1.2b Area of habitat available for forest dependent indicator species
- 1.2c Representative indicator species from a range of habitats monitored at scales relevant to regional forest management
- 1.2d Degree of disturbance to native forest species caused by invasive species
- 1.3a The number of forest dependent species at risk from isolation that may lead to loss of genetic variation
- 1.3b Number of *in situ* and *ex situ* conservation efforts for forest dependent species
- 3.1 Scale and impact of agents and processes affecting forest health and vitality



Wood production in native forests

Area of native forest available and suitable for timber production

Approximately 2 million hectares or 62% of State forest was available for timber production in 2005-06. This area decreased by over 80,000 hectares between 2001-02 and 2005-06 due to changes in forest tenure from State forest to nature conservation reserves. Nearly 1.2 million hectares of State forest was unavailable for timber production due to exclusions associated with the *Code of Forest Practices for Timber Production* and Special Protection Zones.

Of the 2 million hectares available for timber production, only 929,000 hectares, or 29% of State forest, was suitable for timber production. Over one million hectares was determined to be unsuitable for timber production due to operational constraints (e.g. proximity to streams and steepness of slope) and unmerchantable stands (forest not suitable for timber production due to the age, size and type of trees).

Area and percentage of State forest available and suitable for timber production and area harvested, 2005-06

Source: Department of Sustainability and Environment

	Area of State forest (hectares)	% of State forest
Area excluded from harvesting		
- <i>Code of Forest Practices for Timber Production</i> exclusions	354,000	11%
- Special Protection Zone exclusions	841,000	27%
Area available for timber production	1,968,000	62%
Available area unsuitable for harvesting due to operational restrictions and unmerchantable stands	1,039,000	33%
Area available & suitable for timber production	929,000	29%
Annual area harvested ¹	9,470	0.3%
Total area of State forest	3,163,000	100%

¹ A range of different silvicultural methods are used in Victoria depending on the forest type harvested. These methods determine the area harvested e.g. single tree selection is less intensive but utilises larger areas. The figure shown in the table indicates the total area harvested, irrespective of the silvicultural system used.





Sustainable harvest levels

Timber harvesting from native forest is undertaken in accordance with sustainability principles and is subject to a rigorous regulatory framework. Harvesting volumes are set according to a calculated sustainable yield, which is the volume of timber that can be removed on an annual basis whilst ensuring the long-term health and productivity of the forest ecosystem. During the reporting period, sustainable harvest levels were based on sawlog volumes.

To ensure the sustainable production of timber from State forest, the 2002 *Our Forests, Our Future* policy statement identified the need to reduce sustainable harvest levels. As a result, the volume of sawlog production determined to be sustainable decreased by 395,000 cubic metres per annum between 2001-02 and 2003-04.

With the exception of 2002-03, timber harvesting from State forest was at or below the level

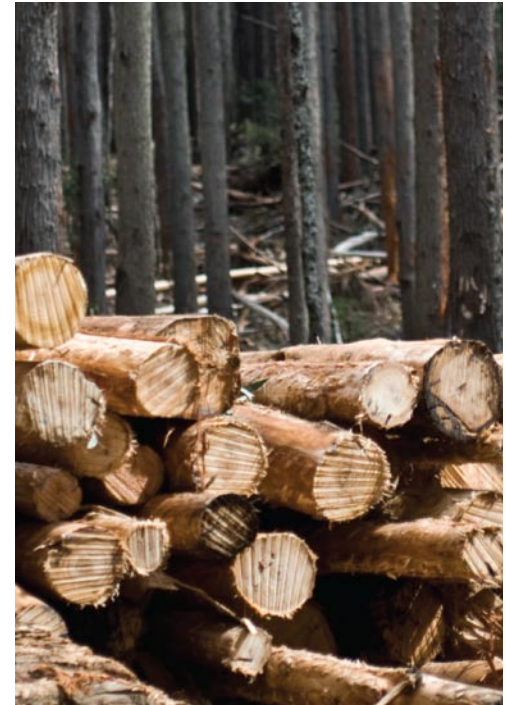
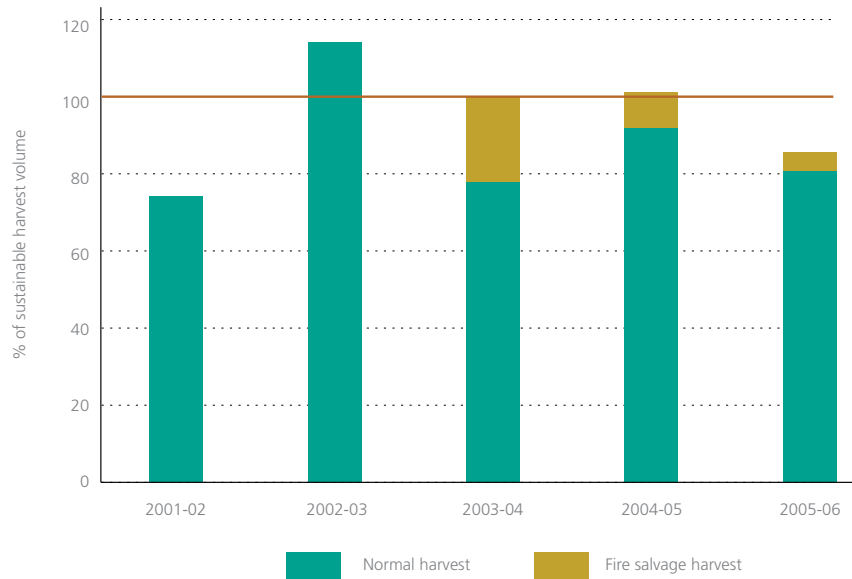
determined to be sustainable during the reporting period. In 2002-03, sawlog harvest exceeded sustainable levels by 79,000 cubic metres. This occurred during the transition to reduced sawlog harvesting levels identified as part of the *Our Forests, Our Future* policy statement. To facilitate the transition period, the Victorian Government gave an undertaking to meet remaining licence commitments. This resulted in harvesting levels above that determined to be sustainable in some areas.

After the 2003 Alpine fires, salvage operations were undertaken in 2003-04, 2004-05 and 2005-06. Whilst normal harvesting was lower than the sustainable volume for these years, the addition of fire salvage harvesting resulted in total harvest levels equal to, or slightly higher than, the volume determined to be sustainable in 2003-04 and 2004-05.



Annual harvest of sawlogs as a percentage of the volume determined to be sustainable, 2001-02 to 2005-06

Source: Department of Sustainability and Environment



Responding to sustainable yield challenges in Victoria

The Victorian Government's 2002 *Our Forests, Our Future* policy initiative aimed to ensure the sustainability of timber production in the State's native forests and the timber industry communities they support. The main components of the initiative were:

- A 31% reduction in timber harvesting across the State;
- An \$80 million assistance package, which included funding for a voluntary licence reduction program and a workers' assistance package;
- New legislation to ensure resource security;
- Independent forest auditing; and
- The establishment of a new commercial entity, VicForests, to help separate commercial forestry objectives from the policy and regulatory functions of Government and to ensure that the timber industry is managed efficiently.



Area of State forest harvested

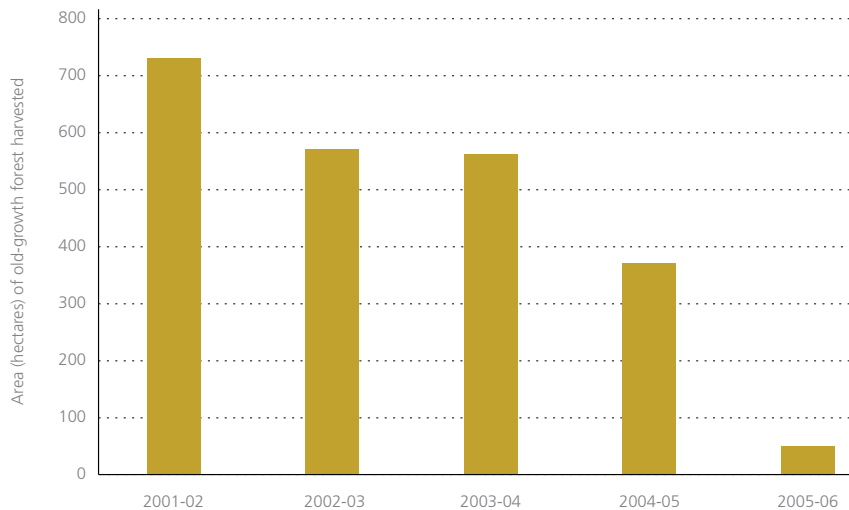
A range of silvicultural methods are used for timber harvesting in Victoria, with the choice of method depending on the regeneration requirements of the forest type, and management objectives. Silvicultural methods include single tree selection, seedtree retention and clearfelling. These methods determine the area harvested, for example single tree selection is less intensive but utilises larger areas.

The total area harvested between 2002-03 and 2005-06 was between 9,000 and 9,500 hectares per annum. This represented 1% of the total area available and suitable for timber production, and 0.1% of the total area of native forest in Victoria. This ensures a sustainable supply of timber in the future, and that viable timber industries are maintained in regional communities.

There has been a significant decrease in the area of old-growth forest harvested in Victoria, from 730 hectares in 2001-02 to 50 hectares in 2005-06. This is due to the development of policies for the improved protection of old-growth forests.

Area of old-growth forest harvested for timber production, 2001-02 to 2005-06

Source: Department of Sustainability and Environment



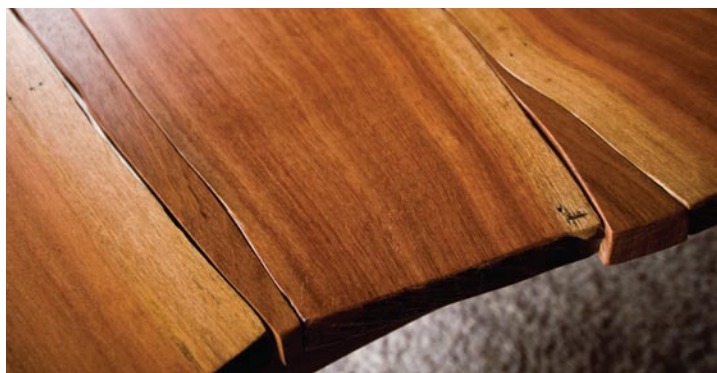
Annual production and value of wood products

The annual production of wood products from native forest was approximately 2 million cubic metres per year between 2001-02 and 2005-06. Sawlogs and pulpwood (usually a residual product of sawlog harvesting) were the main products harvested, contributing between 25-40% and 60-70% the total annual volume respectively. The volume of sawlogs harvested decreased over the reporting period in response to the reduced sustainable harvest levels identified as part of the 2002 *Our Forests, Our Future* policy statement.

Between 2001-02 and 2005-06, the annual value of wood production from State forests increased by 6% from \$137 million to \$147 million. This occurred despite a 10% decrease in the production of wood products due to reduced sustainable harvest volumes. Of the wood products produced from State forest, sawlogs had the highest value per volume. However, pulpwood had a higher total value due to the larger volumes produced. The value of log production from State forest in 2005-06 was equivalent to 0.1% of Victoria's Gross State Product.

Annual production of wood products from State forest, 2001-02 to 2005-06

Source: Department of Sustainability and Environment



Regeneration

To maintain the productive capacity of forests, harvested areas need to be regenerated. Effective regeneration also ensures that other forest values such as biodiversity, water quality, recreation and cultural heritage are protected.

DSE is responsible for ensuring regeneration standards are met following harvesting operations in State forest. DSE aims to successfully regenerate 90% of timber harvest areas at first attempt, for both the total area treated and for each forest type. However, uncontrollable factors such as drought, frost, fire and animal damage can reduce regeneration success.

Fire is an important part of the regeneration techniques practiced in Victoria's forests. Using fire to induce regeneration mimics natural processes, reducing competition from non-tree species and providing a receptive seedbed. The use of fire also reduces the fuel hazard that often results from tree harvesting operations.

For more information see the following Indicators on DSE's website (www.dse.vic.gov.au/forests)

- 2.1 Area and percentage of forest land and net area of forest available and suitable for timber production
 - 2.2 Volume of wood by forest type in State forest that is available and suitable for timber production
 - 2.3 Annual production of wood products from State forest compared to sustainable harvest levels
 - 2.5 Proportion of timber harvest area successfully regenerated by forest type
 - 3.2 Area and type of human-induced disturbance
 - 6.1a Value (\$) of wood and wood products
-



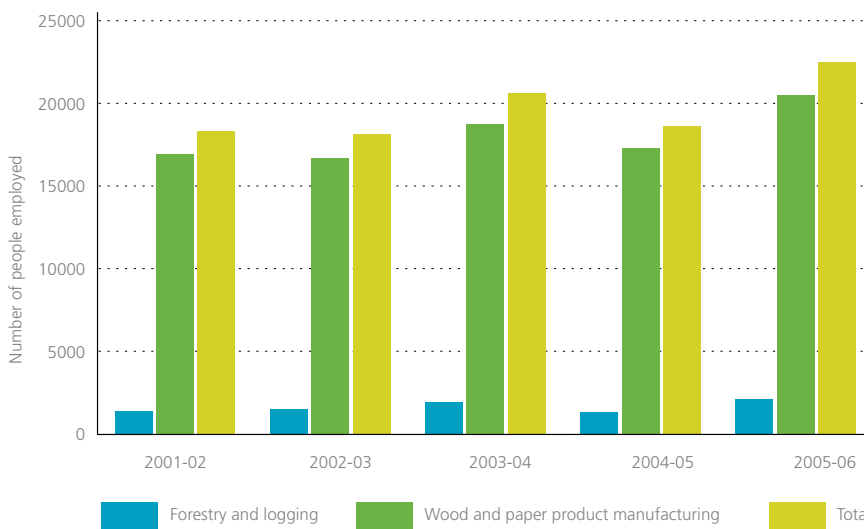
Employment in the forest sector

The forest sector is vital to the economic and social viability of many communities, providing direct and indirect employment in forest-related industries in many rural areas of Victoria. The forest sector also generates other benefits such as opportunities for business and service providers, as well as generating demand for social infrastructure such as schools and medical facilities.

In 2005-06, 22,500 people were employed in wood and wood product industries in Victoria (this includes both native forest and plantation forest employment). Over 90% of people were employed in wood and paper product manufacturing, with 9% employed in forestry and logging. Employment in wood and wood product industries was highly variable over the reporting period. This variability is likely to be the result of changes in timber production, and the establishment and harvesting of plantations.

Employment in the forest sector, 2001-02 to 2005-06

Source: Australian Bureau of Statistics



Notes: The wood and wood product industries comprise the Australian Bureau of Statistics categories 'Forestry and Logging' and 'Wood and Paper Product Manufacturing'. 'Forestry and Logging' refers to forest harvesting (including plantations), regeneration and silviculture. 'Wood and Paper Product Manufacturing' includes the three sub-sectors of 'Log Sawmilling and Timber Dressing', 'Other Wood Products' and 'Paper and Paper Products'.

Forest Industry Occupational Health & Safety Stakeholder Forum

Compared to other employment sectors, forestry and wood product manufacturing have a high rate of injuries and fatalities, but these have been decreasing over the past decade in response to Occupational Health and Safety auditing and management systems.

WorkSafe Victoria established the Forest Industry Occupational Health and Safety Stakeholder Forum in October 2002 with the aim of identifying and prioritising occupational health and safety issues for Victoria's forest industry workers. Among other things, the Forum produces guidelines to help improve occupational health and safety.

These include Fatigue Management in the Forest Industry, Manual Handling Solutions for the Sawmill Industry and the Safety in Forestry Operations (Harvesting and Haulage) Industry Standard.

The Forum is co-funded and co-owned by the forestry industry. Together with the support of industry land managers, principal contractors and government agencies, it has effectively developed a systematic approach to occupational health and safety in the Victorian forest industry. Since its inception, the Forum has successfully reduced injury rates in the wood and wood product sector in Victoria.

Source: WorkSafe Victoria

Forest dependent communities

Changes to the forest industry can be significant, particularly in response to the availability of timber resources. As a result of the Victorian Government's *Our Forests, Our Future* policy statement, total statewide sawlog harvesting was reduced by 31% to ensure the sustainability of the native forest timber industry in Victoria. The most dramatic change was in the Midlands region, where the volume of timber available for harvesting was reduced by approximately 80%. The changes brought about by *Our Forests, Our Future* are part of a series of Victorian timber industry reforms over the last 20 years, many of which were in response to changing markets and regulatory conditions.

One of the goals of the *Our Forests, Our Future* policy is to ensure that communities dependent on the native forest timber industry are supported and protected. \$80 million was provided over four years to buy back licences, and to assist displaced workers and affected communities in areas where timber harvesting was reduced. This was particularly important for a number of regional centres and rural towns, particularly in eastern Victoria, where local economies depend on the timber industry for their economic health and well being. In addition, the Timber Towns Support Program provided \$8.74 million for 35 projects across 10 Shires, and the Timber Towns Investment Support Program is facilitating around \$66 million of private sector investment in some 30 regional businesses and business networks. This investment is expected to generate around 800 jobs in affected timber towns.



For more information see the following Indicators on DSE's website (www.dse.vic.gov.au/forests)

- 2.3 Annual production of wood products from State forest compared to sustainable harvest levels
- 6.5a Direct and indirect employment in the forest sector and forest sector employment as a proportion of total employment
- 6.5b Average wage rates and injury rates in major employment categories within the forest sector
- 6.5c Resilience of forest dependent communities to changing social and economic conditions
- 6.5d Resilience of forest dependent Indigenous communities to changing social and economic conditions

Maintaining forest health and vitality

Victoria's forests are impacted by a range of disturbances, both natural and human-induced. Natural cycles of disturbance and regeneration play an important role in the maintenance of forest health. However, changes in the frequency of some types of disturbance, and the introduction of new pressures, can have significant impacts on forest health. Fire, pest plants and animals, and drought are the main agents affecting the health and vitality of Victoria's forests.



Fire

Fire is an important part of many forest ecosystems in Victoria. Much of Australia's flora and fauna has evolved with fire and rely on particular fire regimes for continued survival. Since European settlement, the timing, frequency (including an increase or reduction in the natural frequency of fire) and intensity of fires have changed. These changes can significantly impact on the health of Victoria's native forests.

Fires in Victoria include:

- **Unplanned or wildfire:** Lightning is the main cause of wildfires in Victoria. During summer, dry electrical storms pass across the State bringing lightning activity, but very little rain. Under the right conditions lightning strikes can develop into a wildfire. Wildfires are also started by accident, such as through fire escapes from burn offs or campfires, or by discarded cigarettes. Unfortunately, a large number of fires are deliberately started;

- **Planned (controlled) fires:** These fires are mainly used to decrease the occurrence and severity of wildfires by reducing fuel loads. This helps to protect life and assets such as buildings and water catchments. Planned fires are also undertaken for forest regeneration purposes after most clearfell harvesting operations; and
- **Ecological burning:** These planned fires are used to promote ecosystem health and vitality. The primary objective of ecological burning is to ensure the continued survival of species and/or communities that rely on fire to propagate.

Over 1.6 million hectares of native forest were burnt by fire in Victoria between 2001-02 and 2005-06. This included 1.3 million hectares of unplanned fires and 300,000 hectares of planned fires. Most of the area burnt by unplanned fires occurred in January 2003, when Victoria experienced one of its worst wildfire events. Over 1.1 million hectares of native forest was burnt by wildfires in the alpine region of north east Victoria.

Area of native forest burnt by planned and unplanned fires, 2001-02 to 2005-06

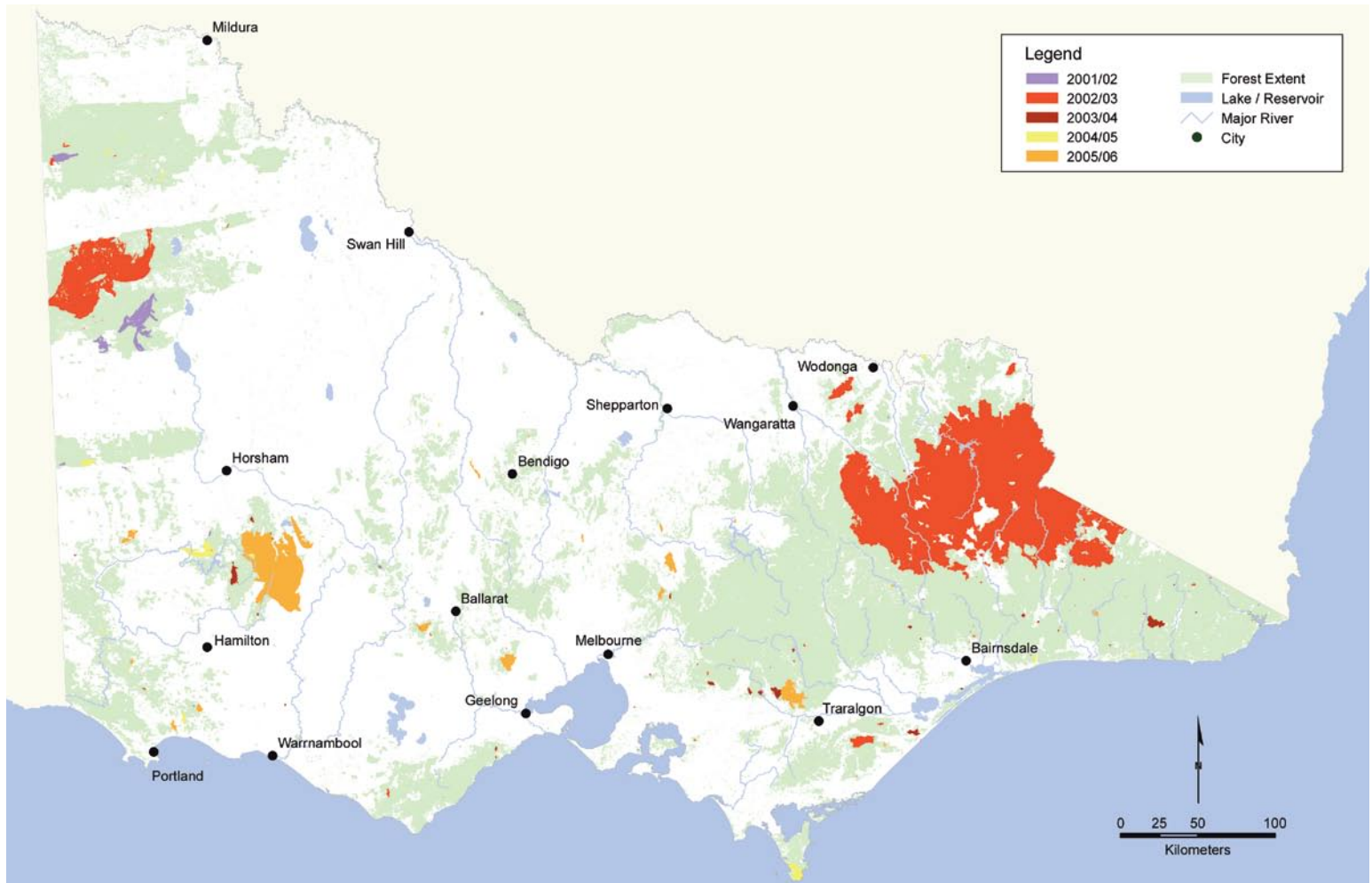
Source: Department of Sustainability and Environment

Fire type	Area burnt (hectares)				
	2001-02	2002-03	2003-04	2004-05	2005-06
Unplanned	38,000	1,141,000	12,000	19,000	104,000
Planned	53,000	30,000	101,000	97,000	52,000
Total	91,000	1,171,000	113,000	116,000	156,000

Notes: Includes public land tenures only. Planned fires include ecological burning.

Unplanned forest fires (wildfires) in Victoria, 2001-02 to 2005-06

Source: Department of Sustainability and Environment



Pest plants and animals

A range of plants, animals and pathogens impact on forest health and timber production. Introduced plants and animals are one of the most significant threats to biodiversity in Victoria and have caused extensive damage to Victoria's forest ecosystems. Introduced plants and animals can impact on native forest dependent species through predation, habitat alteration, soil erosion,

damage to vegetation, and competition with native species for food and habitat. Native species can also impact on forest health, for example overabundant native species can degrade forests by increasing the grazing pressure on vegetation. Pest plants and animals can also cause considerable economic losses though their impacts on forest production.

Alpine fires, January to March 2003

Eighty-seven fires were started by lightning in the north east of Victoria on 7 and 8 January 2003. Eight of these fires were unable to be contained and joined together to form what was then the largest fire in Victoria since the 1939 'Black Friday' bushfires. Burning for 59 days before being contained, the fires burnt over 1.1 million hectares, including 507,000 hectares of State forest, 470,000 hectares of national parks, and 90,000 hectares of freehold land.

About 60% of the Alpine National Park and 81% of the Mount Buffalo National Park were burnt during the fires. The environmental consequences of the fires included the loss of vegetation, including habitats for flora and fauna, and long term impacts on soils and water quality. The fires also resulted in the damage or loss of commercial timber resources, houses and other buildings, recreation and tourism infrastructure assets, cultural sites and farms adjacent to public land.

The cost of fighting the bushfires has been estimated at \$115 million, while an additional \$86 million was spent on post-fire recovery operations. The fires saw unprecedented levels of cooperation between government agencies, rural fire services, private companies, local government, and interstate and overseas-based fire personnel.

The 2003 fires clearly demonstrated the long-lasting and widespread environmental, economic, cultural and social impacts that can result from a failure to control wildfires. The rebuilding of local communities and the recovery of natural resources was a major task. The Government of Victoria allocated \$70.6 million for a bushfire recovery programme for the environment and agriculture.

Drought

Drought affected large areas of Victoria during the reporting period, with many forest areas suffering increased stress as a result of drought conditions. Drought also contributed to the occurrence of fires.





River regulation

River regulation is currently a major issue for forest management in Victoria. Victoria's Red Gum (*Eucalyptus camaldulensis*) forests occur along the channels and flood plains of inland waterways, principally the Ovens, Goulburn and Murray Rivers. River regulation has altered the natural flow regimes of inland waterways, including a significant decrease in the occurrence of flooding. This has resulted in reduced growth and regeneration, and increased mortality of River Red Gums in Victoria. Changes to water management will be required to improve the health of River Red Gums in the future.

Climate change

Climate change is predicted to have a major impact on forests and forest production in Victoria. Native forests in many locations are expected to experience increased temperatures and lower rainfall. This will have significant impacts on forest ecosystems and biodiversity and increase forest susceptibility to pests, diseases and other pressures such as wildfires. The productive capacity of both native and plantation forests may also decline affecting the timber industry in Victoria.

Human-induced disturbances

The main human-induced disturbances affecting forest health are timber harvesting and planned fires for fuel reduction and ecological objectives. Although these activities can have significant localised effects, they are managed and strictly regulated to minimise any impacts. In addition, these activities are only applied to a small proportion of Victoria's native forest estate. Over the reporting period, the area of native forest harvested annually was 0.1% of the total native forest area, and planned fires were applied to 1% or less of the total native forest area.

Other human-induced disturbances impacting on forest health include recreational activities and domestic stock grazing. Much of Victoria's forest is used for recreation purposes and grazing is permitted in 6% of Victoria's native forest area. Whilst it is known that these activities can have significant localised impacts on forest health, little information is available on the extent and severity of such impacts.

For more information see the following Indicators on DSE's website www.dse.vic.gov.au/forests

- 1.2d Degree of disturbance to native forest species caused by invasive species
 - 3.1 Scale and impact of agents and processes affecting forest health and vitality
 - 3.2 Area and type of human-induced disturbance
-

Soil and Water

Good quality soil and water resources are of inestimable value to society, providing ecosystem services such as good quality drinking water for our communities. Healthy forests are vital to protect soil and water resources.

Soil and water resources (including water quality, quantity and aquatic health) are protected by a combination of legal and policy instruments in Victoria. Risks are comprehensively assessed for a range of forest activities, particularly timber harvesting and associated roading activities in State forests. Measures to mitigate the effects of such activities have been developed and incorporated into forest management practices.

During the reporting period, independent audits by the Environment Protection Authority Victoria showed that native forest harvesting operations were generally compliant with measures for the protection of soil and water resources, as outlined in the *Code of Forest Practices for Timber Production*. Annual compliance increased during the reporting period, demonstrating that harvesting operations have appropriate measures in place to minimise impacts on soil and water resources.

River health

Assessments of river health undertaken for the Index of Stream Condition show that the overwhelming majority of river lengths in good to excellent condition are located in Victoria's forest regions. This indicates that the management of Victorian forests is effective in protecting and maintaining river health in forested catchments.

Water Resources

A total of 2.9 million hectares of native forest is managed for water supply in Victoria. The majority of this area is on State forest and nature conservation reserves.

The risks to water yield from forestry activities are minimised by restricting annual timber harvesting in water supply catchments. This ensures that there are no major fluctuations in water yield. For example, the harvesting and regeneration of native forest is limited to 0.3% of the Thomson catchment in any one year.

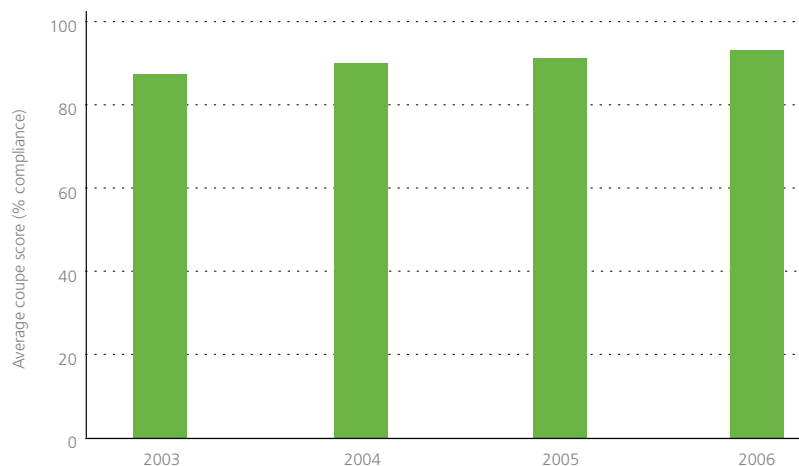


For more information see the following Indicators on DSE's website www.dse.vic.gov.au/forests

- 4.1 Area and percentage of forest by activity type systematically assessed for risk to soil attributes
 - 4.2 Change in forested catchment water yield characteristics through time
 - 4.3 Change in forested catchment river health characteristics through time
-

Environment Protection Authority Victoria audit of native forest timber harvesting operations – average coupe score for compliance with the Code of Forest Practices for Timber Production

Source: Environment Protection Authority Victoria



Wildfire poses a significant risk to soil and water resources in Victoria, particularly for designated water catchments. The removal of vegetation by fire can increase soil erosion leading to impacts on water quality and aquatic health, and can reduce water yield due to the increased water requirements of regenerating forest.

The major wildfires occurring in 2003 had a significant impact on water quality and river health. These impacts were most prevalent in the first year after the fires, with river health improving significantly in subsequent years. The 2003 wildfires are also expected to reduce forested catchment water yields in the North East and Gippsland regions for decades to come due to forest regeneration.



Recreation and tourism

Forests play an important role in nature-based recreation and tourism, which provides a significant contribution to Victoria's economy. Victoria's forests are managed to provide a broad range of opportunities for recreation and tourism. State forests are an important part of the public recreation estate, providing a broad range of recreational opportunities that may be excluded or unavailable elsewhere, such as horse riding and trail bike riding. State forests are also used by sporting bodies for events such as car rallies, mountain biking, and hunting.

In 2005-06, approximately 6.5 million hectares of Victoria's forested public land was available for recreation and tourism. This included 99% of State forests and 97% of nature conservation reserves. The area of forest available for recreation and tourism, and the types of activities permitted, is regulated to ensure the protection of environmental assets, biodiversity, cultural sites, and for public safety. A small number of forest areas are closed permanently to the public, including designated scientific reference and conservation areas, some water catchment areas, significant Indigenous cultural sites, and defence training areas.

Facilities are maintained across Victoria's forests to support recreation and tourism. In State forests, facilities are maintained by DSE, while nature conservation reserves are managed by Parks Victoria. Facilities such as walking or riding tracks, picnic sites and camp grounds are

provided solely for recreation and tourism, while roads and vehicular tracks are primarily managed for forest management purposes, although some of these may also be used recreation and tourism activities.

The Victorian Government increased the number of areas, tracks and sites available for recreation and tourism in State forests between 2001-02 and 2005-06. The most popular recreational activities in State forests are walking and running, picnicking, camping, and recreational vehicle use. Riding or walking animals, cycling, driving, and nature study were also popular pastimes.

For more information see the following Indicators on DSE's website www.dse.vic.gov.au/forests

- 6.3a Area and quality of forest actively utilised for recreation and tourism
- 6.3b Range and use of recreation and tourism opportunities that are available within forests
- 6.3c Number of visits per annum

Every year, an estimated 26.7 million visits were made to forests in national parks, State parks and other parks and gardens across Victoria. Visitor numbers have increased by 1.5% per year. It is estimated that over 4 million people visit State forests each year.



Cultural heritage

Indigenous and European settlements have left a rich legacy of historic places in Victoria's forests. Aboriginal people have long used Victoria's forests as a source of food and shelter, for medicines, clothing, tools, weapons and implements and for cultural, religious, social and spiritual activities. European settlement has also left behind numerous historic places including sawmill and tramway sites, cemeteries, mining sites, bridle paths, bridges and abandoned settlements.

Victoria's forests contain over 8,300 Aboriginal Cultural Heritage Places listed on the Victorian Aboriginal Heritage Register. It is likely the number of Aboriginal Cultural Heritage Places will increase as further surveys are undertaken. For non-indigenous cultural heritage sites, there are 390 sites recognised at the State level, 3,439 sites recognised at the local/regional level, and 639 sites yet to be assessed.

All known archaeological sites are listed on the Victorian Heritage Inventory and Victorian Aboriginal Heritage Register. Places deemed to be of statewide significance are listed on the Victorian Heritage Register, which provides the highest level of protection for historic places. All Aboriginal cultural heritage sites are formally protected under the *Aboriginal Heritage Act 2006*, including those not on the Victorian Aboriginal Heritage Register. All non-Indigenous cultural heritage sites are protected under the *Victorian Heritage Act 1995*.



The management of Victoria's forests must ensure that cultural heritage is protected. In State forest, known cultural heritage places are listed in forest management plans or regional inventories. For many Forest Management Areas, there are specific management actions to protect each site from potentially damaging forest operations and other activities such as planned fires. Consultation with Indigenous and non-Indigenous communities is undertaken to ensure that local knowledge is incorporated into forest management, and that known sites of historic and cultural significance, including sacred sites, are protected.

For more information see the following Indicators on DSE's website www.dse.vic.gov.au/forests

- 6.4b Proportion of places of Indigenous and non-Indigenous cultural values in forests formally managed to protect those values
-

Non-wood forest products

Non-wood forest products and services represent a significant resource supporting the livelihoods of many Victorians and contributing to the State's economy. To ensure the production of non-wood products is sustainable, permits are usually required to harvest native plant and animal products from Victorian forests.

A diverse range of non-wood products is provided directly or indirectly from native forest ecosystems. They include:

- Earth materials – stone, gravel, limestone, lime, sand, loam, clay, and soil;
- Food products – honey, mushrooms, herbs, berries, and seeds;
- Animal products – meat and pelts;
- Landscape and garden products – plants, mulches and seed;
- Health and personal care products – essential oils, herbal health products and fragrances;
- Indigenous products for both traditional and commercial purposes – bark paintings, wooden sculptures, weaving, pigments and dyes, and subsistence products; and
- Decorative and aesthetic products – specialty wood products, foliage, cones and wildflowers.



Data on the production and value of non-wood forest products and services is generally poor in Victoria. The annual production and value of non-wood products varies according to supply and demand for each product. For example, seed availability for some species can vary due to environmental conditions affecting germination and flowering. Some industries such as honey production rely heavily on native forests. For example, the Victorian Apiarists' Association estimates that 80% to 85% of honey production relies on native flora, making it significantly dependent on Victoria's native forests.

For more information see the following Indicators on DSE's website (www.dse.vic.gov.au/forests)

- 2.4 Annual production of non-wood forest products
 - 6.1b Value (\$) and yield of non-wood forest products
 - 6.1c Value (\$) of forest derived ecosystem services
-

Research, development and education

Investment in research, development and education is critical to the management of forest health and to the sustainability of forest industries. The socio-economic and environmental benefits provided by forests depend on investments in knowledge and education to ensure the conservation of ecosystem health and biodiversity, as well as to ensure the ongoing productivity of both the forest resource base and the Victorian timber industry.

Between 2001-02 and 2005-06, the Victorian Government invested over \$37 million in forest management research, development and education. Most of this investment was allocated to major research providers including the School of Forest and Ecosystem Science (University of Melbourne), Arthur Rylah Institute for Ecological Research and Department of Primary Industries - Private Forestry. The Victorian Government also funds various forest education programs to inform the community about forest management, ecology and protection.

For more information see the following Indicators on DSE's website
www.dse.vic.gov.au/forests

- 6.2b Investment in research and development, and education
 - 6.2c Extension and use of new and improved technologies
 - 7.5 Capacity to conduct and apply research and development aimed at improving forest management, including development of scientific understanding of forest ecosystem characteristics and functions
-

Forest education

DSE's Forest Education Service is located at the Toolangi Forest Discovery Centre, approximately 80kms northeast of Melbourne in the Toolangi State forest. It provides a unique opportunity for students, teachers and the wider community to learn about the ecology and sustainable management of Victoria's forests. The Service delivers forest education programs to over 12,000 primary and tertiary students annually.



Forest research

The School of Forest and Ecosystem Science was founded in July 2004 and is the culmination of a longstanding research partnership between the University of Melbourne and DSE.

The school investigates issues such as sustainable forest management, fire ecology, carbon sequestration, hardwood and softwood plantations, and farm forestry.



Criteria and indicator summary

This section provides the main findings for the 45 indicators used to assess sustainable forest management in Victoria. Detailed information for each indicator can be found on DSE's website (www.dse.vic.gov.au/forests).

It is important to acknowledge that no single criteria or indicator is a comprehensive measure of sustainability, each must be considered in the context of other criteria and indicators.



Criterion 1: Conservation of biological diversity

Unless otherwise noted, figures quoted are for the year 2005-06 and trends are for the reporting period 2001-02 to 2005-06.

Element 1.1 Ecosystem diversity

Indicator 1.1a Area of forest by type and tenure

- Victoria has 7.8 million hectares of native forest and 441,000 hectares of plantations;
- 93% of the total native forest area is eucalypt forest;
- 3.5 million hectares of native forest are in nature conservation reserves, 3.2 million hectares in State forest, 1 million hectares on private land; and
- Nature conservation reserves increased by 221,000 hectares, mainly due to transfers from State forest to the reserve system.

Indicator 1.1b Area of forest type by growth stage

- Mature forest is the dominant growth stage covering 3.2 million hectares, or 56% of the total forest area assessable for growth stage;
- 619,000 hectares of old-growth forest;

- 100,000 hectares of old-growth destroyed by wildfire; and
- Annual harvest of old-growth forest for timber production decreased from 730 to 50 hectares.

Indicator 1.1c Area of forest type by growth stage distribution in protected zones

- 4.7 million hectares of forest in CAR reserves, 60% of the total native forest;
- Most forest types have over 50% of their total area protected in CAR reserves;
- Mature forest was the dominant growth stage in CAR reserves; and
- 474,000 hectares of old-growth forest, 77% of the total old-growth area, protected in CAR reserves.

Indicator 1.1d Fragmentation of native forest cover

- Over 60% of native vegetation cleared since European settlement;
- Forest types most cleared are casuarina (81% cleared), eucalypt medium woodland (69% cleared), and mallee (55% cleared); and
- Preliminary assessments show most forest types have low fragmentation.

Element 1.2 Species diversity

Indicator 1.2a The status of forest dependent species at risk of not maintaining viable breeding populations, as determined by legislation or scientific assessment

- 145 forest dependent fauna species and 278 flora species threatened or extinct;
- 49 species added to the list of threatened species, 11 species removed, and 74 species changed conservation status;
- Most status changes were due to improvements in knowledge, taxonomic revisions and changes in assessment criteria;
- There was a real decline in 23 forest dependent species compared to a real improvement for only 4 species; and
- Ecological information is poor for the majority of forest dependent species.

Indicator 1.2b Area of habitat available for forest dependent indicator species

- No data. Forest dependent indicator species need to be identified and habitat availability assessed to be able to report on this indicator in the future.

Indicator 1.2c Representative indicator species from a range of habitats monitored at scales relevant to regional forest management

- No data. Representative forest dependent indicator species need to be identified and monitoring programs developed to be able to report on this indicator in the future.

Indicator 1.2d Degree of disturbance to native forest species caused by invasive species

- No data. More information on the distribution of invasive species and their impacts on forest dependent native species is required to report on this indicator in the future;

Element 1.3 Genetic diversity

Indicator 1.3a The number of forest dependent species at risk from isolation that may lead to loss of genetic variation

- No data. There is currently no comprehensive information on the number of forest dependent species at risk from isolation, nor the impact of such isolation.

Indicator 1.3b Number of *in situ* and *ex situ* conservation efforts for forest dependent species

- Over 4,300 conservation efforts undertaken for 154 forest dependent fauna and flora species, and 3 forest communities; and
- Nearly all conservation efforts were for threatened species and communities.

Criterion 2: Maintenance of productive capacity of forest ecosystems

Unless otherwise noted, figures quoted are for the year 2005-06 and trends are for the reporting period 2001-02 to 2005-06.

Indicator 2.1 Area and percentage of forest land and net area of forest available and suitable for timber production

- 2 million hectares, or 62% of State forest, was available for timber production. This area has decreased by over 80,000 hectares due to forest tenure changes;
- 1.2 million hectares of State forest was excluded from timber production under Special Protection Zone exclusions and *Code of Forest Practices for Timber Production* exclusions;
- Of the area available, 929,000 hectares was considered to be suitable for timber production; and
- Only 1% of the area suitable for timber production is harvested annually.

Indicator 2.2 Volume of wood by forest type in State forest that is available and suitable for timber production

- Data is only available for the east of the State. However, this area accounts for the vast majority of timber production in Victoria;
- A total volume of 27.7 million cubic metres of wood from an area of 477,000 hectares was available and suitable for timber production in Eastern Victoria; and

- Ash forest types accounted for 60% of the total volume of wood available and suitable for timber production.

Indicator 2.3 Annual production of wood products from State forest compared to sustainable harvest levels

- The annual production of wood products was approximately 2 million cubic metres;
- Sawlogs and pulpwood (usually a residual product of sawlog harvesting) were the main products harvested;
- With the exception of 2002-03, sawlog production was at or below the level determined to be sustainable;
- Sustainable harvest levels decreased by 395,000 cubic metres per annum between 2001-02 and 2003-04; and
- Only 1% of the area suitable for timber production is harvested annually.

Indicator 2.4 Annual production of non-wood forest products

- Data on the annual production of non-wood forest products is poor in Victoria; and
- Non-wood forest products and services support the livelihoods of many Victorians and contribute to the State's economy.

Indicator 2.5 Proportion of timber harvest area successfully regenerated by forest type

- Regeneration success following timber harvesting is generally high;

- Between 1996-97 and 2000-01, 34,000 hectares was subject to regeneration treatments with 30,000 hectares successfully regenerated at the first attempt; and
- Regeneration success is affected by drought, frost, fire and animal damage.

Criterion 3: Maintenance of ecosystem health and vitality

Unless otherwise noted, figures quoted are for the year 2005-06 and trends are for the reporting period 2001-02 to 2005-06.

Indicator 3.1 Scale and impact of agents and processes affecting forest health and vitality

- Fire affected over 1.6 million hectares of native forest with most of this occurring in 2002-03 when over 1.1 million hectares was burnt by wildfire;
- A range of plants and animals impact on forest health and timber production. The most significant impacts are from introduced plants and animals which threaten biodiversity;
- Drought affected many forest areas and also contributed to the occurrence of wildfires; and
- It is predicted that climate change will have a significant impact on forests including an increase in wildfires, drought, and pest plants and animals. The productive capacity of forests may also be affected.

Indicator 3.2 Area and type of human-induced disturbance

- The main human-induced disturbances affecting forest health are timber harvesting and the application of planned fires. These are managed and regulated to minimise impacts;
- 0.1% of native forest is harvested annually;
- 1% or less of the native forest area was subject to planned fires annually;
- Other disturbances include recreational activities and domestic stock grazing, little information is available on the impacts of these; and
- Impacts of water regulation on River Red Gum forest is a major issue for forest management in Victoria.

Criterion 4: Conservation and maintenance of soil and water resources

Unless otherwise noted, figures quoted are for the year 2005-06 and trends are for the reporting period 2001-02 to 2005-06.

Indicator 4.1 Area and percentage of forest by activity type systematically assessed for risk to soil attributes

- Soil attributes are protected by legal and policy instruments;
- Forest management practices include measures to reduce impacts on soil;

- 85% of native forest harvesting and silviculture activities, and 90% of plantation operations, road construction/maintenance, and fire management activities were assessed for risk to soil attributes;
- Independent audits show that native forest harvesting operations are generally compliant with measures for the protection of soil attributes; and
- Severe wildfires can significantly impact on soil attributes.

Indicator 4.2 Change in forested catchment water yield characteristics through time

- There is currently no comprehensive data on forested catchment water yields;
- A total of 2.9 million hectares of native forest is managed for water supply;
- Forested catchment water yield is protected by legal and policy instruments;
- Risks to water yield are assessed for a range of forest activities, and measures are implemented to reduce impacts;
- The main impacts on forested catchment water yield are fire and forestry activities;
- The major wildfires occurring in 2002-03 are expected to reduce forested catchment water yields in the North East and Gippsland regions for decades to come due to the increased water requirements of regenerating forest; and
- The risks to water yield from forestry activities are minimised by restricting annual timber harvesting in water supply catchments.

Indicator 4.3 Change in forested catchment river health characteristics through time

- River health is generally of good to excellent condition in forested areas;
- Forested catchment river health is protected by legal and policy instruments;
- 95% of native forest harvesting and silviculture, plantation operations, road construction/maintenance, and fire management activities were assessed for risks to river health;
- Forest management practices include measures to reduce impacts on river health;
- Independent audits show that native forest harvesting operations are generally compliant with measures for the protection of river health; and
- The major wildfires occurring in 2002-03 had significant impacts on some rivers. These impacts were most prevalent in the first year after the fires, while river health improved significantly in subsequent years.

Criterion 5: Maintenance of forest contribution to global carbon cycles

Unless otherwise noted, figures quoted are for the year 2005-06 and trends are for the reporting period 2001-02 to 2005-06.

Indicator 5.1 Total forest ecosystem biomass and carbon pool by forest type, age class, and successional stages

- In 2004, Victoria's native forest trees stored over 852 million tonnes of carbon. This is equivalent to over 3.1 billion tonnes of CO₂, or 26 years worth of Victoria's total CO₂ emissions from all sources in 2005;
- Between 1989 and 2004, the carbon stored in native forest trees declined by 6 million tonnes, or 0.7% of the total carbon stored. This decline is mainly the result of permanent forest clearing;
- Some 511 million tonnes of carbon is stored in forest soils; and
- Eucalypt forest accounted for over 90% of the total carbon stored.

Indicator 5.2 Contribution of forest ecosystems to the global greenhouse gas balance

- Between 1990 and 2005, plantations increased the sequestration of greenhouse gases by 6.7 million tonnes CO₂ equivalent;
- Deforestation resulted in emissions of 3.2 million tonnes CO₂ equivalent in 2005;
- Forestry is one of the most greenhouse-friendly sectors of the Victorian economy. CO₂ emissions from forest management and industry are small compared to CO₂ sequestered in the biomass of native forests and plantations, and stored in wood and wood products both in service and as waste in landfill; and
- Wildfires and planned fires release large amounts of greenhouse gases. However, these emissions are offset by forest regeneration.

Criterion 6: Maintenance and enhancement of long term multiple socio-economic benefits to meet the needs of societies

Unless otherwise noted, figures quoted are for the year 2005-06 and trends are for the reporting period 2001-02 to 2005-06.

Element 6.1 Production and consumption

Indicator 6.1a Value (\$) of wood and wood products

- Annual value of wood production from State forests increased by 6% from \$137 million to \$147 million despite a 10% decrease in wood products due to reduced sustainable harvest volumes;
- Sawlogs had the highest value per volume, however, pulpwood had a higher total value due to the larger volumes produced; and
- The direct value of timber production from State forest was equivalent to 0.1% of Victoria's Gross State Product.

Indicator 6.1b Value (\$) and yield of non-wood forest products

- No data. Improved information on the value and yield of non-wood forest products is required to report on this indicator in the future; and
- Non-wood forest products and services represent a significant resource supporting the livelihoods of many Victorians.

Indicator 6.1c Value (\$) of forest derived ecosystem services

- No data. Improved information on the value of forest-derived ecosystem services is required report on this indicator in the future.

Indicator 6.1d Degree of reuse and recycling of wood products

- Limited data is available in Victoria on the degree of reuse and recycling of wood products. Improved information is required to report on this indicator in the future.

Element 6.2 Investment in the forest sector

Indicator 6.2a Investment and expenditure in forest management

- Victorian Government expenditure on forest management ranged from \$419 million to \$640 million per annum;
- With the exception of 2005-06, the highest expenditure was for 'Forest and Fire Management'; and
- Substantial increases in 'Forest and Fire Management' expenditure occurred in 2002-03 and 2003-04. This was due to the occurrence of large wildfires.

Indicator 6.2b Investment in research and development, and education

- Victorian Government annual expenditure on forest research, development and education ranged from \$6.5 million to \$8.1 million per annum;

- Most investment was for major research providers including the School of Forest and Ecosystem Science (University of Melbourne), Arthur Rylah Institute for Ecological Research and Department of Primary Industries - Private Forestry; and
- The Victorian Government also funds various forest education programs to inform the community about forest management, ecology and protection.

Indicator 6.2c Extension and use of new and improved technologies

- The extension and use of new technologies has improved sustainable forest management in Victoria; and
- New technologies include more accurate forest modelling and analysis, the development of an online wood auction system, and advances in harvesting and hauling to minimise the environmental impacts of forestry operations, improve resource utilisation, and increase harvesting safety and efficiency.

Element 6.3 Recreation and tourism

Indicator 6.3a Area and quality of forest actively utilised for recreation and tourism

- 6.5 million hectares of Victoria's forested public land was available for recreation and tourism including 99% of State forests and 97% of nature conservation reserves; and

- Areas unavailable for recreation and tourism were mainly for scientific reference and conservation purposes, and for the protection of water catchment areas.

Indicator 6.3b Range and use of recreation and tourism opportunities that are available within forests

- A wide range of forest-based recreation and tourism facilities are available;
- The number of areas, tracks and sites available for recreation and tourism activities increased in State forests; and
- The most popular recreational activities in State forests were walking and running, picnicking, camping, and recreational vehicle use.

Indicator 6.3c Number of visits per annum

- The number of visits to forest is better known in nature conservation reserves than for State forest;
- Every year, an estimated 26.7 million visits are made to forests in national parks and other areas managed by Parks Victoria;
- Over 4 million people are estimated to visit State forests per year; and
- It is anticipated that some forest areas will experience a significantly higher level of use in the future, especially where there is proximity to growing population centres.

Element 6.4 Indigenous and non-Indigenous cultural, social and spiritual needs and values

Indicator 6.4a Area of forest to which Indigenous people have access and rights that protect their cultural heritage and are recognised through formal and informal management regimes

- Victoria has formal and informal management arrangements with Indigenous peoples to provide access to public forest and forest products for cultural purposes; and
- Victoria has a total of 173 hectares of forest on the Register of the National Estate for Indigenous values.

Indicator 6.4b Proportion of places of Indigenous and non-Indigenous cultural values in forests formally managed to protect those values

- There are almost 200 reserves in Victoria for which the primary land use is the protection of historic and cultural features;
- 8,356 Aboriginal Cultural Heritage Places have been identified in Victoria's forests and listed on the Victorian Aboriginal Heritage Register. All sites are formally protected under the *Aboriginal Heritage Act 2006*;
- 4,468 non-indigenous cultural heritage sites have been identified, all sites are protected under the *Victorian Heritage Act 1995*; and
- In State forest, known cultural heritage sites are listed in forest management plans and protected from activities such as forestry operations and planned fires.

Element 6.5 Employment and community needs

Indicator 6.5a Direct and indirect employment in the forest sector and forest sector employment as a proportion of total employment

- 22,500 people were employed in wood and wood product industries in Victoria (this includes native and plantation forest employment). Over 90% of people were employed in wood and paper product manufacturing, with 9% employed in forestry and logging;
- Employment in wood and wood product industries was highly variable. This is likely to be the result of changes in timber production, and the establishment and harvesting of plantations;
- Employment in wood and wood product industries accounted for around 1% of Victoria's total employment. However, the forest industry provides an important source of employment in regional Victoria with individual townships and areas having a much higher reliance on the forest sector; and
- Both native and plantation forests provide an important source of employment in regional Victoria.

Indicator 6.5b Average wage rates and injury rates in major employment categories within the forest sector

- Total wages for 'Wood and Paper Product Manufacturing' increased from \$774 million to \$1.02 billion (6.3% of total manufacturing wages and salaries in Victoria);

- Average wage rates were variable with changes likely due to general wage inflation, changing emphasis on skill levels, and a possible reduction of lower-skilled positions; and
- The 'Forestry and Logging' and 'Wood and Wood Products Manufacturing' industries have a high rate of injuries and fatalities compared to other industries, but it has been decreasing over the past decade in response to Occupational Health and Safety auditing and management systems.

Indicator 6.5c Resilience of forest dependent communities to changing social and economic conditions

- It is currently not possible to measure the resilience of forest-dependent communities to changing social and economic conditions; and
- Dependence on forest-industries is declining, representing less than 5% of the total employment across many regions of Victoria and approximately 1% of total employment in Victoria. However, individual townships and areas can have a much higher reliance on the forest industry.

Indicator 6.5d Resilience of forest dependent Indigenous communities to changing social and economic conditions

- It is currently not possible to measure the resilience of forest-dependent Indigenous communities to changing social and economic conditions; and

- The increased recognition of native title rights and interests over public land will enhance the resilience of forest-dependent Indigenous communities. These will strengthen the role of forests in assisting Indigenous people to pursue forest-based economic independence.

Indicator 6.5e Area of forest available and accessible for Indigenous people to exercise their inherent rights to meet subsistence or individual and family cultural and spiritual needs

- It is not possible to report on this indicator at the present time;
- Victoria has formal and informal management arrangements with Indigenous peoples to provide access to public forest and forest products for cultural purposes; and
- Victoria has a total of 173 hectares of forest on the Register of the National Estate for Indigenous values.

Element 6.6 Indigenous participation

Indicator 6.6a Extent to which the management framework includes the exercise of customary, custodial, traditional and native title rights as an essential component in achieving sustainable forest management

- The Victorian Government recognises that Indigenous communities have a fundamental role in sustainable forest management. This role is formalised in the *Aboriginal Heritage Act 2006* which provides a consistent approach to protecting and managing Indigenous cultural heritage, and specifies Indigenous roles

in a number of planning and management areas; and

- Indigenous cultural heritage protection is a key consideration of much of the planning, management and operational procedures undertaken by public bodies involved in sustainable forest management.

Criterion 7: Legal, institutional and economic framework for forest conservation and sustainable management

Unless otherwise noted, figures quoted are for the year 2005-06 and trends are for the reporting period 2001-02 to 2005-06.

Indicator 7.1 Extent to which the legal framework (laws, regulations, guidelines) supports the conservation and sustainable management of forests

- Victoria has a comprehensive legal framework providing governance for a range of forest management issues;
- Whilst the legal framework is comprehensive for forest on public land, it does not apply to forest on private land for many aspects of sustainable forest management; and
- Victoria's legal framework for the sustainable management of forests was strengthened during the reporting period with the addition of new legislation including the *Sustainable Forests (Timber) Act 2004* and *Sustainability Charter for Victoria's State Forests*.

Indicator 7.2 Extent to which the institutional framework supports the conservation and sustainable management of forests

- Victoria has a comprehensive institutional framework which provides for a range of forest management issues;
- While the institutional framework is comprehensive for forest on public land, it does not apply to forest on private land for many aspects of sustainable forest management; and
- Victoria has strengthened its institutional frameworks for sustainable forest management by significantly reforming and clarifying management responsibilities, increasing community participation, development of an Environmental Management System, revising guidelines and planning documents, and enhancing independent audits of forest management activities.

Indicator 7.3 Extent to which the economic framework supports the conservation and sustainable management of forests

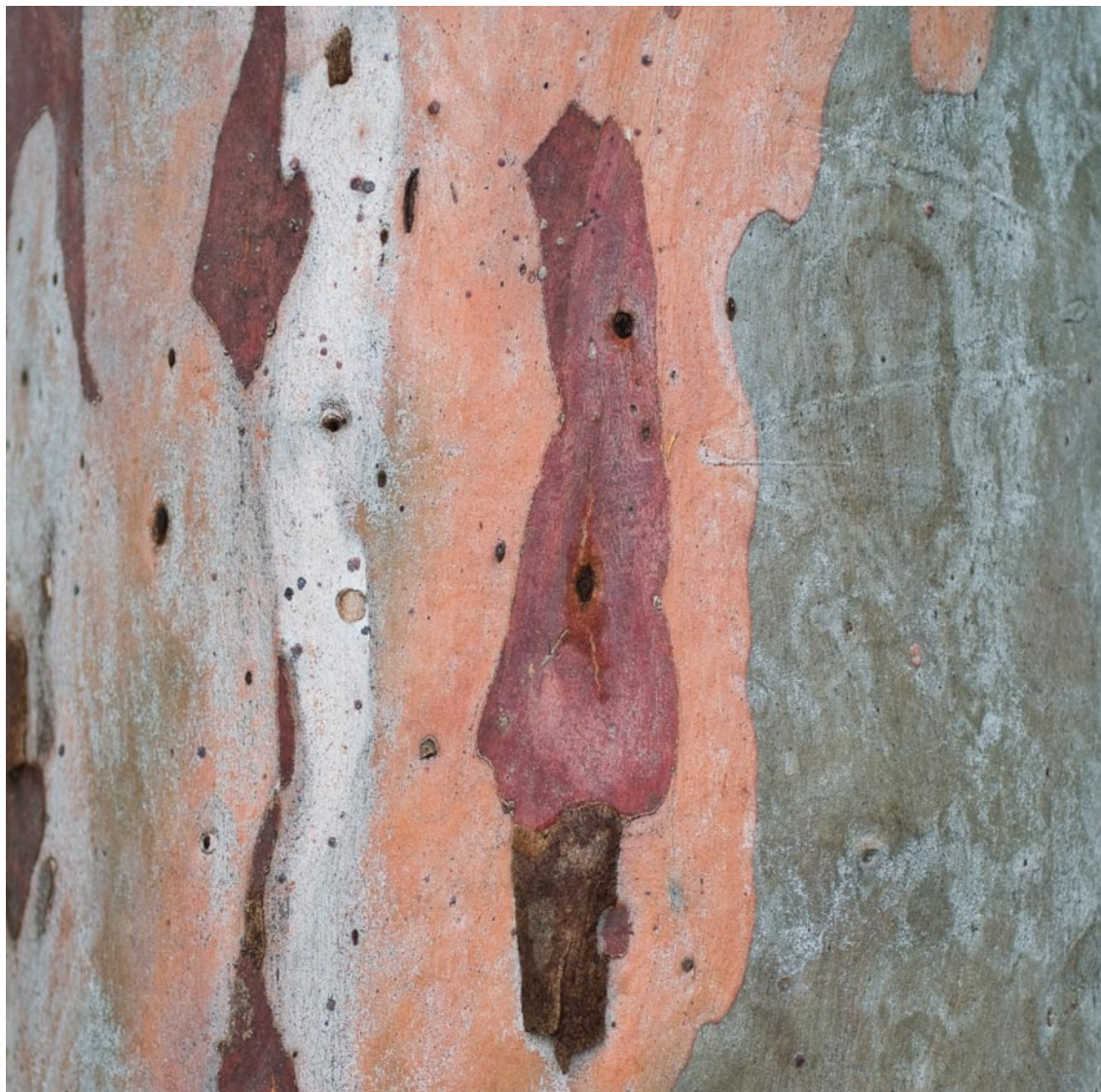
- The economic framework for Victoria's native forests has changed substantially over the reporting period with the creation of VicForests as a state-owned enterprise; and
- The hardwood plantation sector has continued to expand significantly in response to financial incentives.

Indicator 7.4 Capacity to measure and monitor changes in the conservation and sustainable management of forests

- Victoria's capacity to report on sustainable forest management is limited by data/information availability and an inability to report long term trends for most indicators;
- The most comprehensive data/information is available for forests on public land, particularly State forest, for which regular reporting on management performance and compliance is required; and
- Improved data/information is required for native forest on private land, forest health and biodiversity, non-wood forest products, forested catchment water yields, native forest contribution to the global greenhouse gas balance, value of forest-derived ecosystem services, forest-dependent communities, and forest related Indigenous cultural and subsistence needs.

Indicator 7.5 Capacity to conduct and apply research and development aimed at improving forest management, including development of scientific understanding of forest ecosystem characteristics and functions

- Numerous forest related research and development programs are conducted by the Victorian Government; and
- The Victorian Government also invests in forest research through a range of organisations.





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