



Australian Government

Department of Agriculture, Fisheries and Forestry
Bureau of Rural Sciences

Australia's forests at a glance 2009

Data to 2007–08



BRS 2009. *Australia's forests at a glance 2009*.
Bureau of Rural Sciences, Canberra

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ISBN: 978-1-921192-31-9

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Australia's State of the Forests Report 2008 and the *National Plantation Inventory 2009 Update* are the primary references for this booklet.

All values in tables in this booklet have been rounded, hence, column and row totals may not tally exactly. Where data earlier than 2007–08 are presented, they are the latest available, or used to indicate trend over time.

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More information on forest issues is available at
www.daff.gov.au/forestsaustralia

Cover images: John Davidson (front), Department of Agriculture, Fisheries and Forestry (back)

Graphic design: Fusebox Design, Melbourne
Printed by: Union Offset Printers, Canberra

Foreword



Forests are a sustainable resource base for industries that employ thousands of people across Australia, particularly in rural and regional areas. Ensuring these industries remain vibrant and strong in a continually evolving global economy is a priority for the Australian Government.

Australia's world-class forests also provide valuable environmental services and make a significant contribution to Australia's wealth and social wellbeing.

To prepare our forest industries for the future, the Australian Government has committed \$20 million to help address skill shortages, tackle illegal logging, prepare for a changing and more extreme climate and encourage value-adding to improve market development.

This publication is a vital source of information for anyone with an interest in Australia's forest industries. It contains up-to-date facts and figures about our forests and their management and shows – at a glance – the key features of Australia's forest industries, including their size, location, contribution to the economy and export markets.

Australia's Forests at a Glance 2009 shows that Australia's forests remain a well managed, sustainable resource.

The Hon. Tony Burke MP
Minister for Agriculture, Fisheries and Forestry

Australia's forests in summary

National statistics

Total population (July 2008)	21.4 million
Total land area	769.2 million hectares
Total forest area	149.4 million hectares
Forest as a proportion of land area	19%
Forest area per person	about 7 hectares
Native forest area	147.4 million hectares
Plantation forest area	1.97 million hectares
New plantation area reported (five year average)	72 000 hectares/year
Net plantation area increase (five year average)	61 000 hectares/year
Average area of native forest converted (mainly to agriculture) (2000–04)	260 000 hectares/year
Forest area in nature conservation reserves (IUCN I–IV)	23.0 million hectares

Public native forests where timber harvesting is permitted (gross area)	9.4 million hectares
Total carbon in forests	>12 billion tonnes
Total log harvest (2006–07)	27.1 million m ³
Total exports of wood products (2007–08)	A\$2.47 billion
Top export destinations (2007–08)	Japan (A\$965 million; 39%) New Zealand (A\$375 million; 15%) China (A\$360 million; 15%)
Major exports of commodities by value	Woodchips A\$1.07 billion Paper and paper products A\$461 million Sawn timber A\$120 million
Total imports of wood products (2007–08)	A\$4.40 billion
Trade deficit in wood products (2007–08)	A\$1.93 billion
Number of people employed in ABS categories – forestry, logging and wood manufacturing (2007–08)	76 800
Value of turnover in forest product industries (2005–06)	A\$21.4 billion
Forestry and forest products industries contribution to GDP (2005–06)	0.6%



Image Science and Analysis Laboratory, NASA Johnson Space Centre

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David Mannes

This is Australia's tallest known tree, the world's tallest flowering plant, the world's tallest eucalypt tree and the world's tallest standing hardwood tree. Named 'Centurion', this swamp gum (*Eucalyptus regnans*) is almost 100 metres tall and more than 4 metres in diameter near its base. It was discovered in 2008 near Geeveston in Tasmania.

Australia's state of the forests reporting

Australia's State of the Forests Report 2008 comprehensively describes Australia's forests. It uses the seven reporting criteria developed by the international Montreal Process Working Group on Criteria and Indicators for the Sustainable Management of Temperate and Boreal Forests. The working group involves 12 countries, including Australia.

Montreal Process Criteria

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 multiple socioeconomic benefits to meet the needs of societies
7. Legal, institutional and economic framework for forest conservation and sustainable management.

Australia's State of the Forests Report 2008 can be obtained from the Bureau of Rural Sciences (see inside back cover).



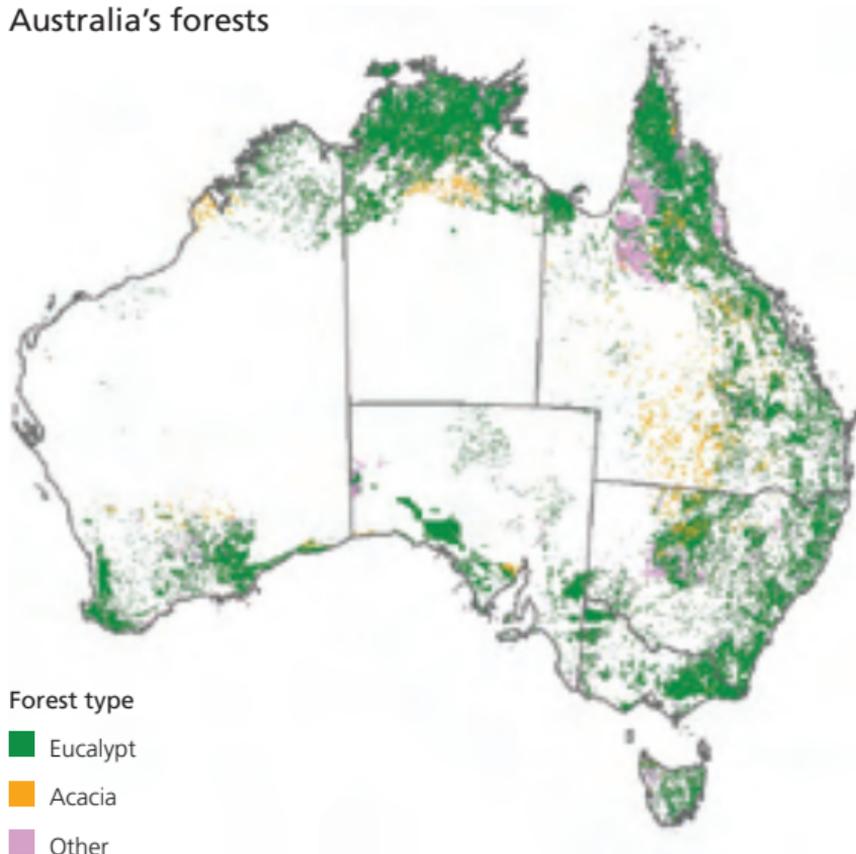
John Davidson

What is a forest?

The definition of forest used in the State of the Forests reports is:

'An area, incorporating all living and non-living components, that is dominated by trees having usually a single stem and a mature or potentially mature stand height exceeding 2 metres and with existing or potential crown cover of overstorey strata about equal to or greater than 20%.' This definition includes Australia's diverse native forests and plantations, regardless of age. It is also sufficiently broad to encompass areas of trees that are sometimes described as woodlands.

Australia's forests



Forest area

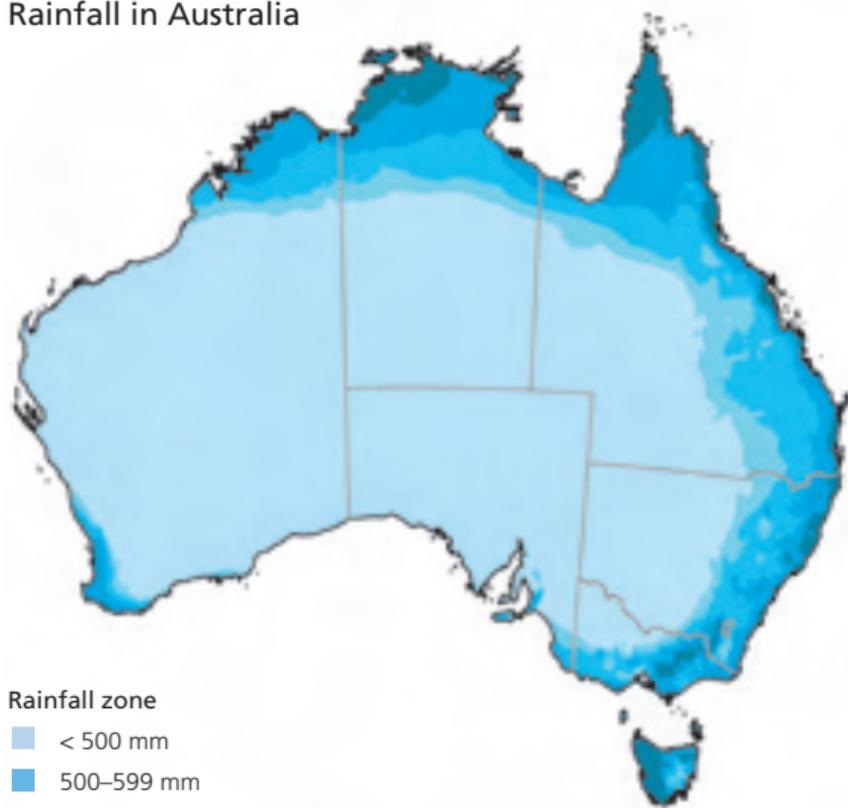
Australia has 147.4 million hectares of native forest and 1.97 million hectares of forestry plantations. Together these cover about 19% of the continent. This is about 7 hectares of forest for each Australian, one of the highest areas per person in the world. The world average is less than 0.6 hectares of forest per person. Australia has about 4% of the world's forest on 5% of the world's land area.

The current estimate of total native forest area is considered to be more accurate than the 2003 estimate of about 163 million hectares. Most of the difference is the result of changes in mapping technologies and data resolution, rather than a real change in forest cover. Native forest cover is declining in some regions, largely because of clearing of open woodland forests for grazing and cropping. The rate of clearing is declining.

→ Did you know?

About one quarter of Australia's land area is sand, sand ridge and sandstone desert that has no forest.

Rainfall in Australia



Rainfall zone

- < 500 mm
- 500–599 mm
- 600–799 mm
- 800–1199 mm
- > 1200 mm

Australia's climate

Australia is generally a warm and dry continent with erratic rainfall and frequently recurring drought. Arid lands occupy about 70% of the interior of Australia. Native forests are generally located in areas with an average of more than 500 millimetres of rain annually. Commercial plantations have been established mainly in areas with more than 700 millimetres of rain annually.

→ **Did you know?**

Australia is the driest inhabited continent.
(Antarctica is the driest continent.)

Types and classes of forest

Forests are categorised nationally by forest type (dominant genus) and by height and crown cover classes (forest structure).

Australia's native forest types are dominated by eucalypts (78%), followed by acacias (7%) and melaleucas (5%). In contrast, about half (52%) of Australia's plantations are exotic conifers (predominantly *Pinus radiata*), which are often referred to as softwood plantations.

Climate and soil properties broadly determine the distribution of forest types and classes across Australia, although other factors, especially fire frequency and intensity, are important.

→ Did you know?

Australia's native forest is 99% broadleaved. There are very few native conifers.

Forest area by types ('000 hectares)*

Acacia	10 365
Callitris	2 597
Casuarina	2 229
Eucalypt	116 449
Mangrove	980
Melaleuca	7 556
Rainforest	3 280
Other forest	3 942
Total native forest	147 397
Hardwood plantation	950
Softwood plantation	1 014
Other plantation	9
Total plantation	1 973
Total forest	149 370

* All estimates as at 2008

Forest crown cover

Crown cover is determined by measuring the proportion of ground covered by tree canopies. A line around the outer edge defines the limits of an individual canopy. All the area within that line is counted as 'canopy', irrespective of gaps and overlaps. There are three broad national forest crown cover classes used by the National Forest Inventory.

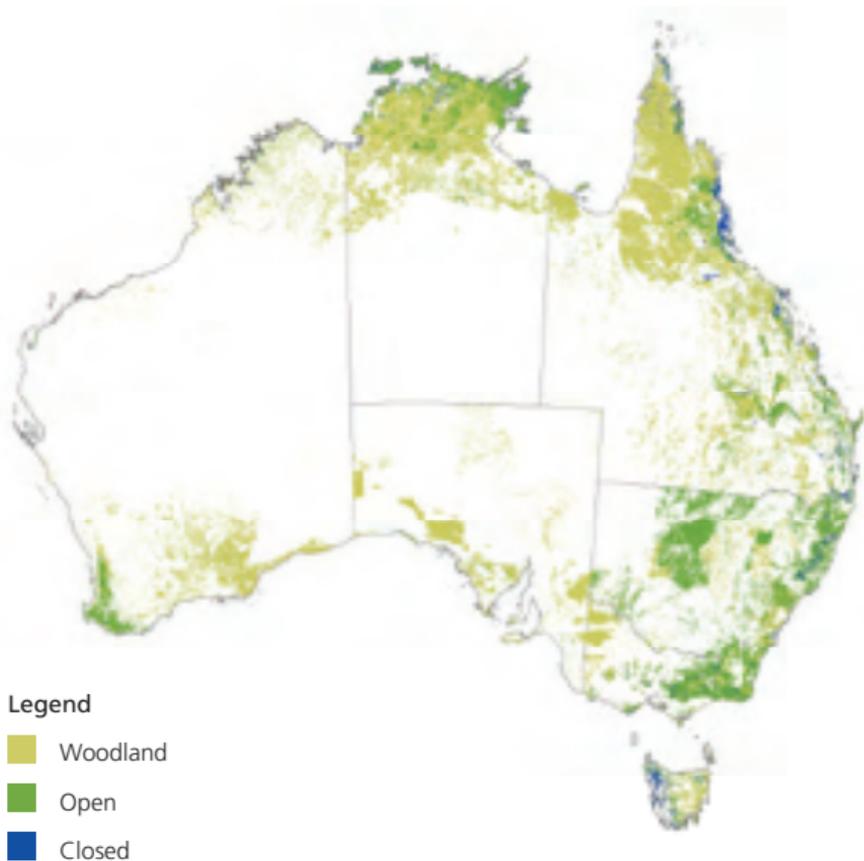
Native forest areas by crown cover class ('000 hectares)

Woodland forest (20–50% crown cover)	99 007
Open forest (51–80% crown cover)	44 120
Closed forest (81–100% crown cover)	4 270
Total native forest	147 397



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Native forest by crown cover class



Forest height

Forests are mapped into three national height classes based on potential mature stand height:

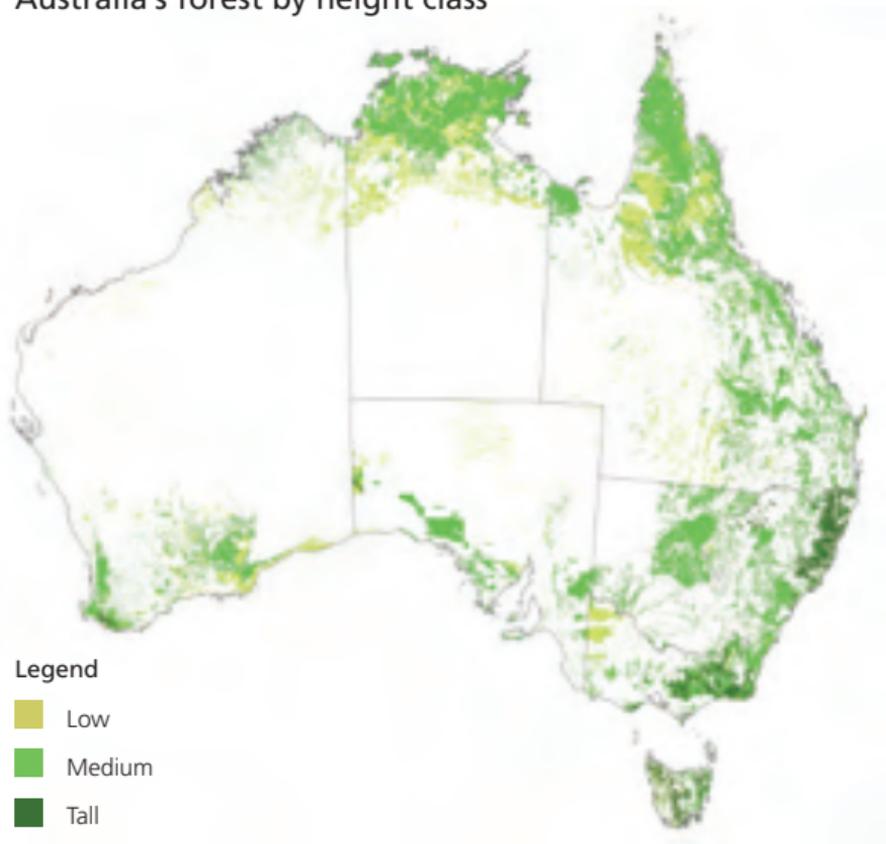
Native forest area by height class ('000 hectares)

Low (height 2–10 metres)	35 846
Medium (height 10–30 metres)	104 024
Tall (height > 30 metres)	7 329
Unknown	199
Total native forest	147 397



John Davidson

Australia's forest by height class



Legend

- Low
- Medium
- Tall
- Unknown

Native forest by crown cover and height classes

→ Did you know?

Nearly 46% of Australia's forest is medium height woodland forest and less than 1% is tall closed forest.



John Davidson

Proportion of Australia's forest extent in each class



Sources: Australian Land Information Group and JA Carnahan (1990). Atlas of Australian Resources, Vegetation. Australian Government Publishing Service, Canberra. Percentages from the NFI.

Old-growth forests

'Old-growth forests are ecologically mature forests where the effects of past disturbances are now negligible.'

Old-growth forests were surveyed in regions where assessments were conducted for Regional Forest Agreements (RFAs) a decade or more ago. There has been no comprehensive survey of old-growth forests across Australia. Old-growth forests in Western Australia were remapped in 2007.

In RFA areas:

- More than 5 million hectares of forest, 22% of total forest area, were classified as old-growth.
- 73% of these known old-growth forests are in nature conservation reserves. Some of the remainder are available for timber production.

→ Did you know?

Almost half of Australia's identified old-growth forest is in New South Wales and most of it is on public land.

Area of old-growth forest in areas surveyed for RFAs (‘000 hectares)

	Native forest in region	Area of old-growth identified	Area of old-growth in formal and informal reserves ^a	Proportion of old-growth in reserves
NSW ^b	8 989	2 536	1 742	69%
Qld ^b	3 230	270	196	73%
Tas.	3 116	1 229	973	79%
Vic. ^c	5 774	673	460	68%
WA ^d	1 909	331	331	100%
Total	23 018	5 039	3 702	73% ^e

Note: Old-growth forest has not been assessed in the Australian Capital Territory, Northern Territory and South Australia.

- a Includes nature conservation reserves and informal reserves on other tenures.
- b Area surveyed in Queensland did not lead to establishment of a RFA. New reserves have been established in New South Wales and Queensland since this information was prepared. The ‘area of old-growth in formal and informal reserves’ is therefore an underestimate.
- c The area of old-growth was reduced as a result of conversion to regrowth by fires, predominantly in 2003.
- d Original RFA old-growth mapping.
- e Proportion of total area for the five states listed.

Native forest tenure and ownership

Tenure is important in forest management because the owner of the land (and in most cases also the forest) has primary responsibility for its management. Six tenure categories are recognised. These can be further grouped under public and private management.

Multiple-use public forest – public forests managed for a range of values, including timber harvesting, water supply, conservation, recreation and environmental protection. Significant proportions of multiple-use forests are informal reserves where timber harvesting is not permitted.

Nature conservation reserves – Crown lands that are formally reserved for environmental, conservation and recreational purposes.

Forest on 'other Crown land' – Crown land held for a variety of purposes.

→ Did you know?

About 70% of Australia's forest is effectively privately managed, with 26% on land either held under freehold title or managed by Indigenous communities, and a further 44% on leasehold land where the predominant land use is grazing.

Private forest – forest on land held with freehold title.

Leasehold forest – forest on privately-managed leased Crown land generally used for grazing.

Unresolved tenure – forests where data are insufficient to determine ownership status are categorised.

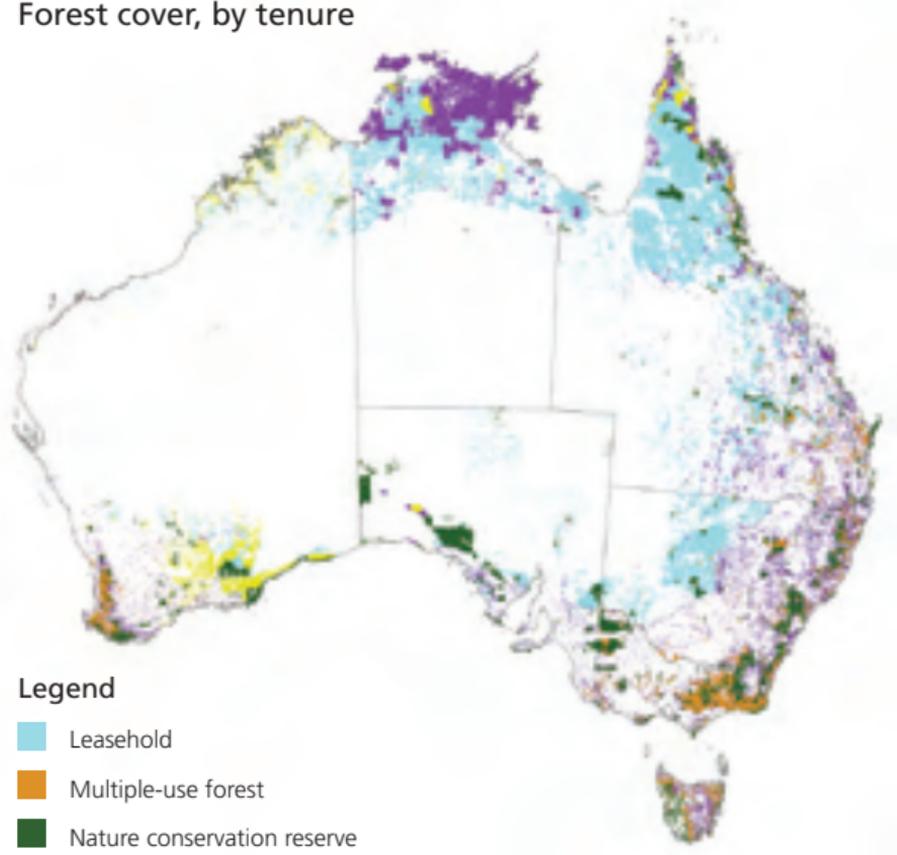
Indigenously managed native forests can be found in each of the tenure categories described above with the exception of multiple-use forests. There is no formal tenure classification system to enable native forests under Indigenous management to be identified.

Native forest area in 2008 by tenure category

Tenure	Area ('000 hectares)	Proportion of total
Multiple-use forest	9 410	6%
Nature conservation reserve ^a	22 371	15%
Other Crown land	10 862	7%
Private forest (including Indigenous)	38 099	26%
Leasehold forest	65 132	44%
Unresolved tenure	1 524	1%
Total native forest	147 397	100%

Note: Data in this table are supplied by the states and territories. The 23 million hectares of formal nature conservation reserve (IUCN categories I – IV) mentioned on p29 are derived from the Collaborative Australian Protected Area Database that includes additional reserved lands found in 'Other Crown land' and 'Private land (including Indigenous)' categories.

Forest cover, by tenure



Legend

-  Leasehold
-  Multiple-use forest
-  Nature conservation reserve
-  Unresolved
-  Other Crown land
-  Private

→ Did you know?

Australia is one of the world's most biologically diverse countries.

Forest biodiversity

Most (80%) of Australia's flowering plants, mammals, reptiles, frog and fish species, and about half the bird species are found only in Australia.

All states and the Northern Territory have developed lists of forest-dwelling vertebrates and vascular plant species. These lists continue to expand as information improves.

Some ecological information is available on around 60% of forest-dwelling vertebrate and vascular plant species, and comprehensive information is available on at least 10% of mammal, bird and amphibian species.

Significantly better information is available for species in regions that have been subjected to formal assessment processes, such as the Comprehensive Regional Assessments that preceded Regional Forest Agreements.

Information on forest-dwelling invertebrates, fungi, algae and lichens is limited.

A total of 1287 forest-dwelling species are listed as vulnerable, endangered or critically endangered under the Australian *Environment Protection and Biodiversity Conservation Act 1999*. Thirty-nine species or subspecies were removed from the list and 71 were added in the five years to 2008.

Forest in reserves

The Australian and some state governments have developed regional forest agreements (RFAs) for most of the main native forest timber production areas. RFAs are 20-year plans for the conservation and sustainable management of those forests. They provide a comprehensive, adequate and representative nature conservation reserve system. The aim of the process was to reserve at least 15% of the pre-1750 distribution of each forest type, 60% of the existing distribution of each forest type if vulnerable, 60% of existing old-growth forest, 90% or more of high quality wilderness forests, and all remaining rare and endangered forest ecosystems.

The area of informal forest reserves has increased in recent years, though the full extent of the increase has not been reported nationally.

→ Did you know?

The proportion of forest in nature conservation reserves recognised by the International Union for Conservation of Nature increased from 11% in 1998, to 13% in 2003 and 16% in 2008.

In 2008, 23.0 million hectares – 16% of Australia’s forest estate – were in dedicated formal reserves to protect natural values (reserved under International Union for Conservation of Nature (IUCN) reserve categories I–IV).

Additional forests are also conserved within leasehold land, multiple-use forest and private land (through covenants or other management arrangements). Codes of forest practice and other regulatory mechanisms also provide for conservation of forest biodiversity and protection of other values, such as water quality.

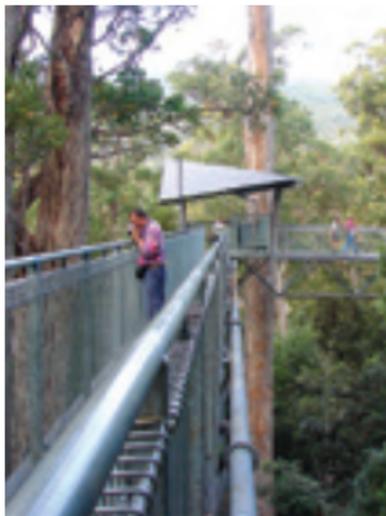


John Davidson

Recreational use of forests

Most public forest is available for recreation and tourism, regardless of whether it is primarily managed for conservation, environmental protection or wood production. Both native and plantation forests provide a wide range of recreational opportunities, including:

- walking and running
- fishing
- picnicking and playing
- swimming and water sports
- riding and walking animals
- cultural heritage appreciation
- nature study
- camping
- cycling
- orienteering
- climbing
- motor sport
- caving.



John Davidson

Plantation forests

What is a plantation?

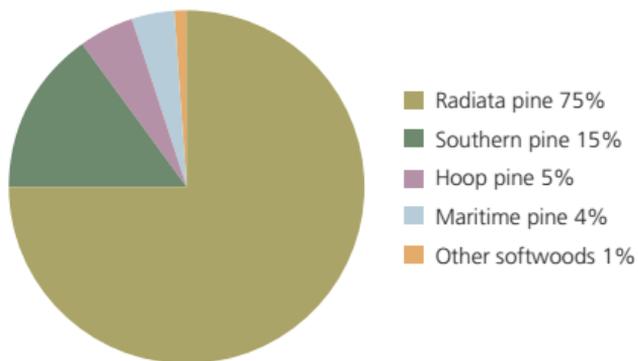
Plantations are: 'intensively managed stands of trees of native or exotic species, created by the regular placement of seedlings or seeds'.

The primary purpose of plantation forestry is wood production. Plantations also contribute to a range of environmental values and services, including water quality improvement, dryland salinity mitigation, carbon sequestration and habitat for native plants and animals.

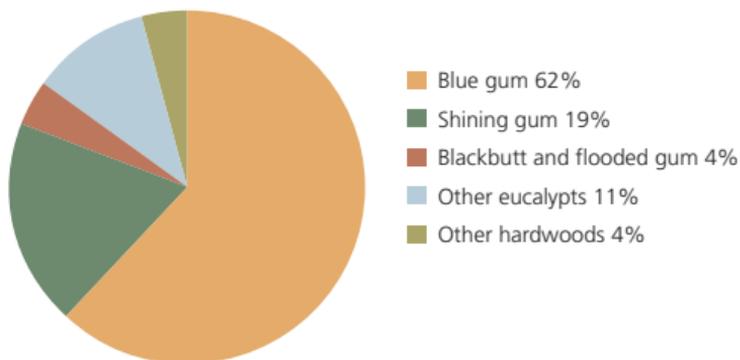
Plantation species fall into two groups:

- Softwood – mainly pine (*Pinus*) species.
- Hardwood – mainly eucalypts, including *Eucalyptus* and *Corymbia* species.

Softwoods



Hardwoods



Types of plantations

Plantation establishment began in Australia in the 1870s. About 200 000 hectares had been established by 1960 and more than 90% of that was with introduced pines. From the 1960s to the 1980s, the area of pine plantations increased rapidly because of investment by governments.

The total area by 1990 was a little over one million hectares. After 1990, the plantation area of hardwoods began to increase rapidly because of private investment, while the rate of establishment of new pine plantations has slowed. In some regions the softwood area has declined in the past few years because harvested pine areas have been replanted with hardwood species or the land use has shifted away from plantations.

The emphasis since 1990 has been on eucalypts established on farmland and managed to produce woodchips for paper manufacture on 10–15 year rotations with as yet only a small interest in longer rotations for sawlog production.

Types of plantations by climate region

Type	Climate region	Main species	Main uses
Hardwood	Tropical: high rainfall	Mangium (an Acacia)	Paper products
	Sub-tropical: medium rainfall	Flooded gum, Dunns white gum	Paper products
	Temperate: medium to high rainfall	Blue gum, shining gum	Paper products
	Tropical: high rainfall	African mahogany, teak, some native species	Sawn timber for furniture, flooring and other high value uses
	Several regions	Various eucalypts	Sawn timber for building and furniture
Softwood	Temperate: medium rainfall	Radiata pine	Sawn timber for building, joinery, furniture, plywood, other high-value uses, posts and poles; residues used for paper, particleboard and other panels
	Tropical, sub-tropical: medium rainfall	Caribbean pine, slash pine and hybrids	
	Temperate: low to medium rainfall	Maritime pine	
	Tropical, subtropical: high rainfall	Hoop pine	

Plantation expansion

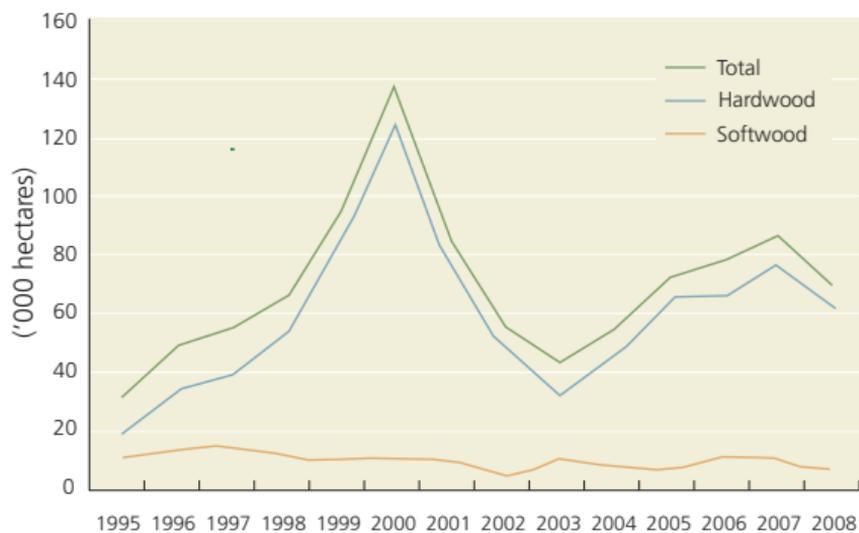
Governments and industry organisations share a goal of expanding the area of plantations for wood production to three million hectares by 2020 (www.plantations2020.com.au).

Australia's plantation area has been expanding steadily for several years. An average of 72 000 hectares of new plantations was reported established in each of the five years to 2008. After allowing for data corrections and loss of previously planted areas through various causes, including fires, the total plantation area increased at an average annual rate of 61 000 hectares in that period.

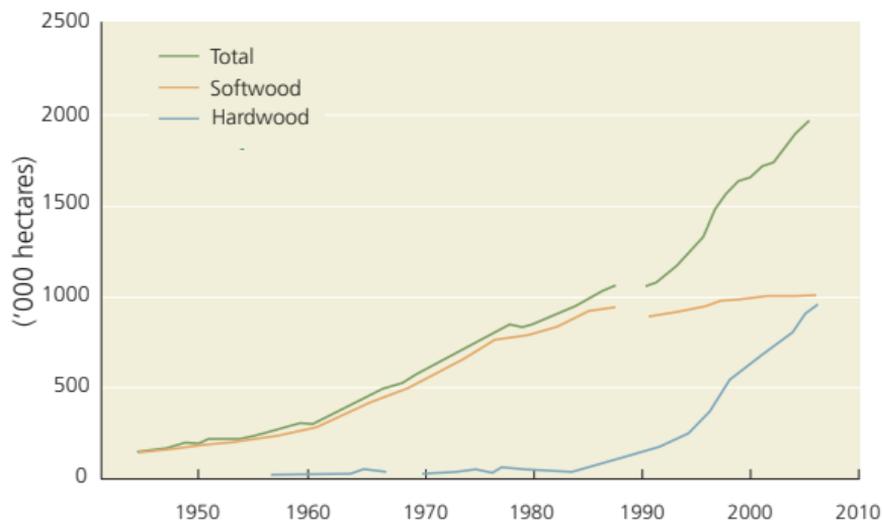


Peter Volker

New areas of plantation by species group



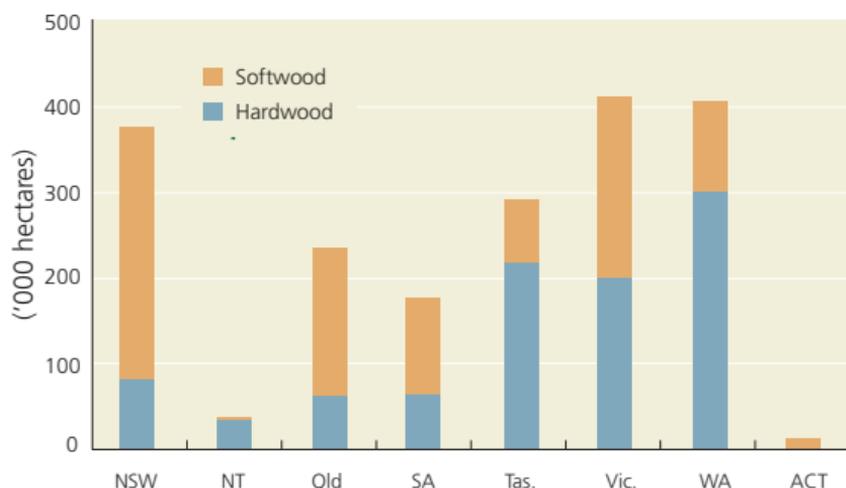
Cumulative plantation area by species group



Current area of plantations

There were 1.97 million hectares of plantations in Australia in 2008. Of this total, 950 000 hectares (48%) were hardwood species and 1 014 000 hectares (52%) were softwood species.

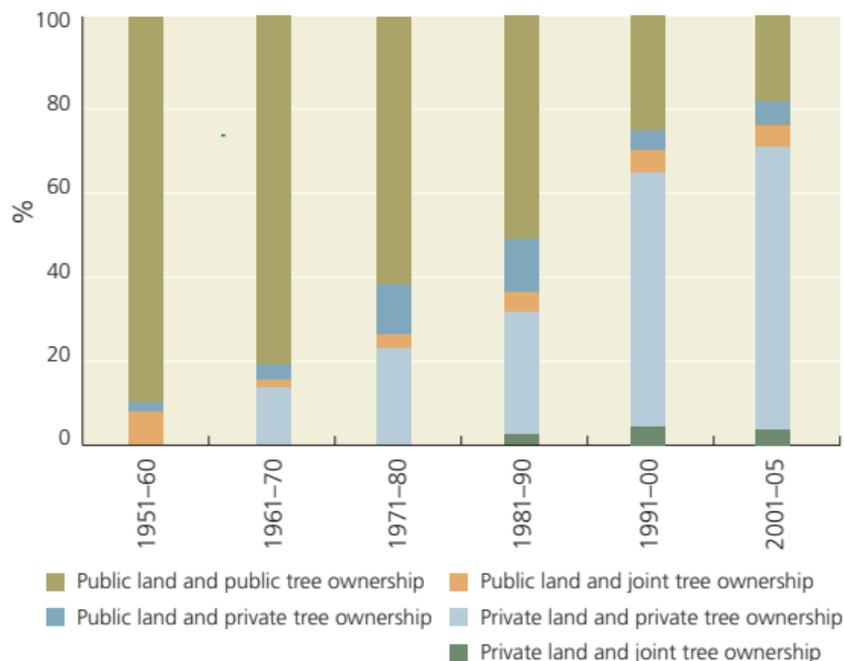
Plantation area by species group and jurisdiction 2008



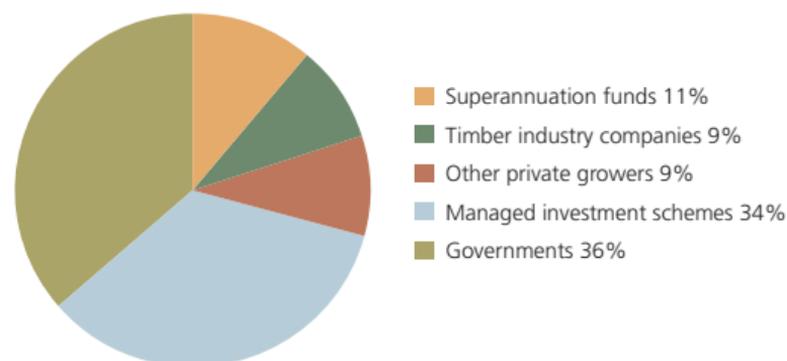
Plantation ownership

State governments were the major plantation owners in the early 1990s. Since then, the Victorian and Tasmanian governments have sold plantations to private investors and most of the investment in new plantations has been by the private sector. Private ownership of plantations has therefore increased from about 30% in 1990 to 46% in 1999 and to more than 64% in 2008. Most of the expansion in private plantations has been funded by managed investment schemes.

Plantation land and tree ownership by planting year



Plantation ownership by major industry type 2008



Future wood supply from plantations

Australia's plantations currently produce about two-thirds of the logs harvested in Australia each year. These, together with logs harvested from native forests and imported material, are used to manufacture the 21 million cubic metres of timber products consumed in Australia each year.

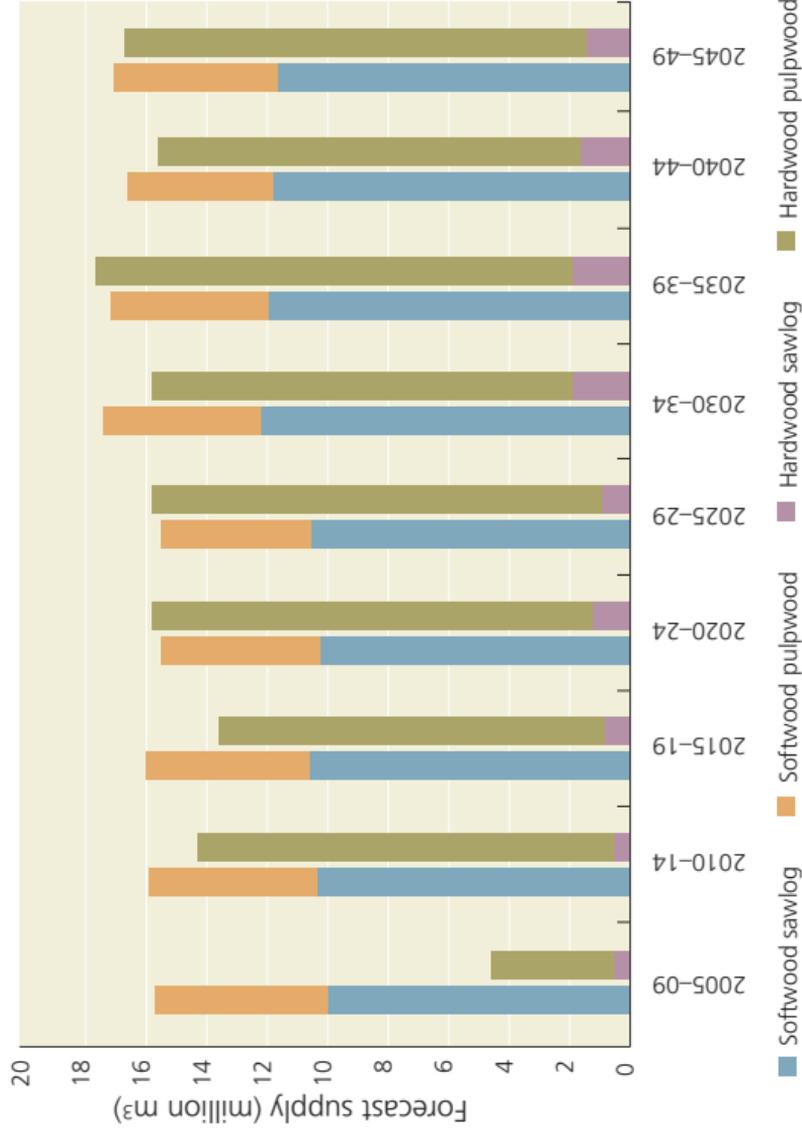
The potential supply of softwood plantation sawlogs and pulpwood is forecast to remain fairly stable over the period to 2050.

The potential log supply from hardwood plantations will rise rapidly in the next few years because the large areas established from the mid-1990s will be reaching rotation age. The vast majority of those plantations is managed to produce pulpwood for pulp and paper manufacturing. Hardwood sawlog supply from plantations is estimated to rise slowly to 2030 then stabilise at a low level or even decline to 2050.

→ Did you know?

Plantations provide more than two-thirds of the logs produced in Australia, yet comprise only a little over 1% of the forest area.

Future wood supplies from plantations



Forest certification, chain of custody and codes of practice

Forest and chain of custody certification assures buyers in Australia and around the world that the forest products they obtain originate from legally and sustainably managed native forests and plantations.

Several private organisations conduct forest and chain of custody certification in Australia. They use standards set by one of two certification schemes: the Australian Forest Certification Scheme (AFCS) and the international Forest Stewardship Council (FSC) scheme.

The AFCS uses the Australian Forestry Standard, which was developed via a nation-wide process involving representatives of the Australian community, industry and government.

The FSC uses a standard that complies with its international 'Principles of Responsible Forest Management'.

Both schemes also issue chain-of-custody certificates that identify and track certified wood and wood products through the supply chain.

The area of certified forest in Australia has grown rapidly to comprise more than 8 million hectares of native forests and plantations.

In addition to forest and chain-of-custody certification, most multiple-use public forests and private forests are managed in accordance with codes of practice and or environmental management systems (EMS) certified externally to an International Organization for Standardisation standard.

Public forest management agencies with certified EMS in place include Forests NSW, Forestry SA, Queensland's Department of Natural Resources and Water (Forest Products) and Forestry Plantations Queensland, Western Australia's Forest Products Commission, Victoria's Department of Sustainability and Environment, and Forestry Tasmania. Several large private forestry enterprises also have EMSs in place.



John Davidson

Socio-economic contribution

The forest and wood products industries contribute significantly to the economic and social well-being of rural and regional Australia. Forest industries are Australia's second largest manufacturing industry, with an annual turnover of about A\$21.4 billion. The industry contributes about 0.6% to Australia's Gross Domestic Product and 6.7% of its manufacturing output.



John Davidson

Estimated employment in forest-growing and wood product industry sector, 2006

Sector	No. of employees
Forest growing and management	7 348
Timber harvesting and haulage	8 973
Sawmilling and timber processing	19 081
Timber product manufacturing	37 800
Wood panel and board production	5 635
Pulp and paper manufacturing	11 024
Timber merchandising	22 134
Support service internal to industry	5 445
Support service external to industry	2 745
Total	120 184

Source: based on ForestWorks Ltd. data

The number of people employed in 2007–08 in the more constrained ABS labour force categories of forestry, logging and wood manufacturing was 76 800.

Forest products

Production

Australia produces substantial volumes of all major categories of wood products and all categories have increased markedly over the past decade. The contribution of production from native forest logs however has declined over the same period, contributing to lower production figures for eucalypt sawn timber and plywood.



John Davidson

Forest and timber products ('000 m³)

	1996 -97	2001 -02	2006 -07	10 year change
Logs harvested				
From native forests	9 567	10 123	8 661	-10%
From pine plantations	10 360	13 064	14 384	39%
From eucalypt plantations	151	1 112	4 038	large*
Total logs harvested	20 077	24 299	27 083	35%
Sawn timber production				
Coniferous (pine)	2 120	3 163	3 929	85%
Broadleaved (eucalypt)	1 491	1 339	1 135	-24%
Total sawn timber production	3 611	4 502	5 064	40%
Panel production				
Plywood	151	192	130	-14%
Particleboard	790	965	933	18%
Medium density fibreboard	434	732	680	57%
Total panel production	1 376	1 889	1 743	27%
Paper products production				
Newsprint	421	395	411	-2%
Printing and writing	364	624	676	86%
Household and sanitary	181	198	204	13%
Packaging and industrial	1 452	1 679	1 901	31%
Total paper products	2 418	2 896	3 192	32%

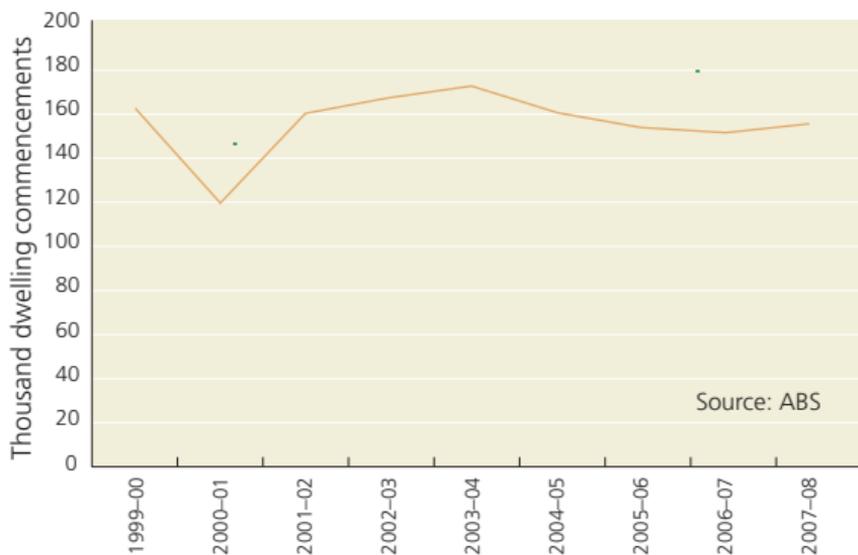
* Large increase because of low base in 1996-97

Source: Australian forest and wood products statistics, ABARE

Consumption

Most of Australia's forest products are used in dwelling construction. Wood consumption tends to be linked to rises and falls in dwelling construction over time, which are, in turn, a reflection of Australia's changing economic circumstances.

Number of dwelling commencements, Australia, 1999–2008



→ Did you know?

For more than 50 years, Australians have consumed, on average, a little over one cubic metre of log equivalent volume of timber products per person per year, indicating that growth in wood consumption has closely paralleled population growth.

Most hardwood sawn timber is used for flooring, decking, joinery, furniture and similar applications where particular appearances or colours are required, or for engineering and architectural applications that demand particular strength, hardness and durability.

Production of hardwood sawn timber declined by about 15% from 2001–02 to 2006–07, reflecting lower sawlog supply from native forests. Imports increased by 23% over the same period but are still a small proportion of consumption (11% of consumption in 2006–07).

Softwood sawn timber is used mainly as a structural component of house frames. Production rose by 24% from 2001–02 to 2006–07, reflecting increased sawlog supply from pine plantations, while exports increased and imports decreased.

Medium-density fibreboard and particleboard are used mainly for flooring and joinery (e.g. kitchen benches and cupboards) and together comprise about 90% of the consumption of all timber-based panels. About one-third of the medium density fibreboard manufactured in Australia is exported.

The major categories of paper and paperboard are newsprint, printing and writing papers, household and sanitary papers, packaging and industrial papers and paperboard. Australia's annual consumption of paper and paperboard increased by about 20% from 2001–02 to 2006–07 to nearly 4.2 million tonnes. Consumption far exceeds domestic production. The shortfall is made up by imports of about 1.8 million tonnes a year, 65% of which is printing and writing papers and 15% is newsprint.

Many products other than wood are harvested and consumed from Australia's forests and plantations. They include water, minerals, tree bark, honey, plant oils, flowers, foliage, seeds, animal meat and skins, and bush foods.

Recycling

Discarded forest products contribute about 6.5 million tonnes to the waste stream annually, usually in the form of paper and timber products. Recycling rates for paper and timber products are estimated to be 54% and 30% respectively. The remainder mainly ends up as waste in landfill.



John Davidson

Trade

Domestic production of most products is less than consumption, so substantial volumes are imported to meet demand. On the other hand, the volume of recovered paper exported has increased rapidly over the past decade.



Department of Agriculture, Fisheries and Forestry

→ Did you know?

Australia's trade deficit in forest products is around \$2 billion each year.

Five highest value timber product exports (\$millions)

	1997 -98	2002 -03	2007 -08	10 year change %
Woodchips	646	808	1 072	66
Paper and paperboard	318	630	635	100
Recovered paper	18	50	252	large*
Sawn timber	30	70	120	302#
Panels	81	188	109	35
Total timber product exports	1 348	2 091	2 471	83

* Reflects a large increase in exports to China from a low base.

Reflects increasing availability of sawn timber from maturing Australian pine plantations

Source: Australian forest and wood products statistics, ABARE

Five highest value timber product imports (\$millions)

	1997 -98	2002 -03	2007 -08	10 year change %
Paper and paperboard	1 697	2 158	2 249	33
Manufactured paper products	315	362	513	83
Sawn timber	423	505	492	16
Panels	146	206	274	90
Wood pulp	126	254	285	126
Total timber product imports	3 072	4 086	4 402	43

Source: Australian forest and wood products statistics, ABARE



John Davidson

Forest contribution to global carbon cycles

Forests take up carbon from the atmosphere during photosynthesis and release it during respiration, when they are burned, when they die and decay or when wood products are burned or decay after use.

In 2004, Australia's native forests stored more than 12 billion tonnes of carbon in biomass and soils. Another 84 million tonnes was held in plantations (excluding soil carbon). In 2005, 97 million tonnes of carbon was held in storage in wood products in service and 143 million tonnes in wood products in landfill.

In 2006, increases in carbon sequestered by native forests and plantations and in new wood products offset 8.4% of Australia's carbon emissions.

Kyoto accounting provisions include forestry in the 'land use, land use change and forestry' sector. In this sector, sequestration of greenhouse gases by reforestation (including afforestation) is offset against emissions from deforestation, mainly for agriculture. This offset reduced the emissions from the land use, land use change and forestry sector to 6.9% of the overall total in 2006, well below other sectors (transport 13.6%, agriculture 15.6%, stationary energy 69.6%).

National Greenhouse Gas Inventory 2006 data for Australia's forests¹

Carbon dioxide equivalent emissions ²	Million tonnes CO ₂ – e	Proportion of total national emissions
Native forests (forest land remaining forest land)		
Sequestration in managed (harvested) native forests	-36.5	
Biomass burning (prescribed fire and wildfire)	2.7	
Fuelwood used	7.3	
Net change in native forests	-26.5	
Plantations (land converted to forest land)		
Plantations established post 1990 on cleared land	-22.8	
Plantations established pre 1990	2.4	
Net change in plantations	-20.4	
Native forests plus plantations (forest lands)	-46.9	7.7%

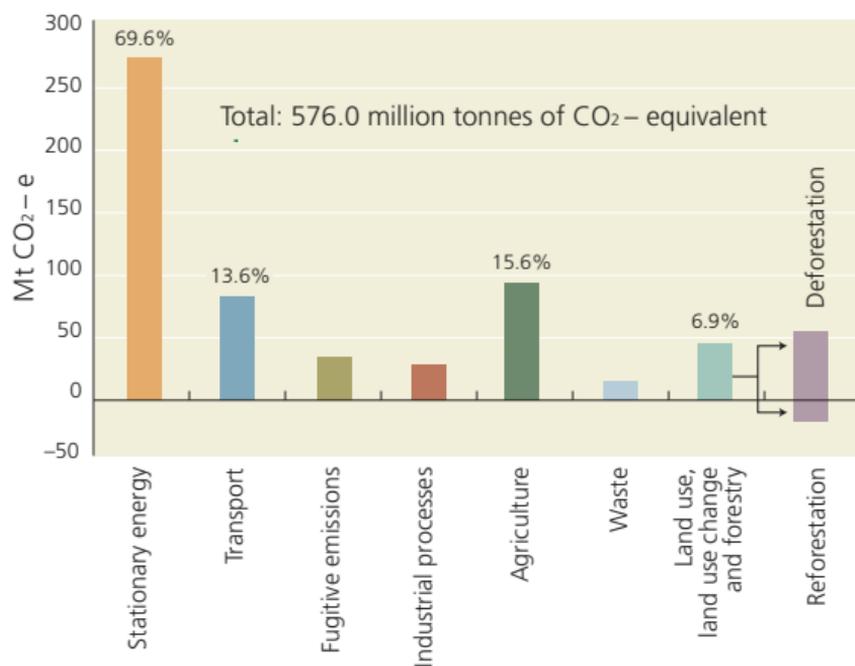
National Greenhouse Gas Inventory 2006 data for Australia's forests¹ (continued)

Carbon dioxide equivalent emissions ²	Million tonnes CO ₂ – e	Proportion of total national emissions
Wood products		
Storage in harvested wood products	-4.1	0.7%
Deforestation (land clearing) emissions	62.9	10.4%
Total national emissions (before deducting sinks)	604.9	
Net national emissions (after deducting sinks)	549.9	

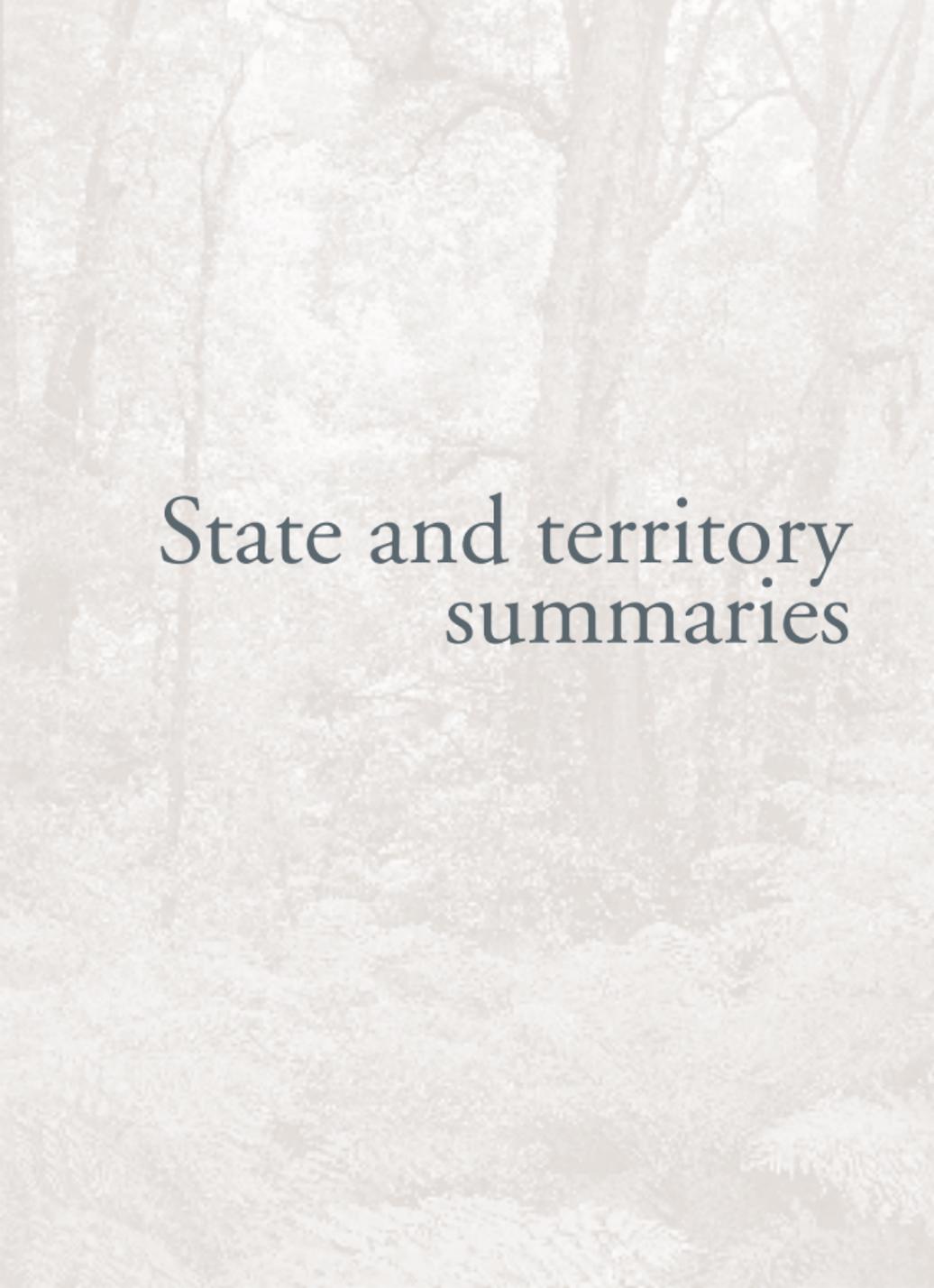
1 Using United Nations Framework Convention on Climate Change accounting provisions. These data are from the Australian Greenhouse Emissions Information System, Department of Climate Change http://www.ageis.greenhouse.gov.au/GGIDMUserFunc/QueryModel/Ext_QueryModelResults.asp.

2 Carbon dioxide equivalent emissions (CO₂ – e) refers to the combined greenhouse gas effect of carbon dioxide and other greenhouse gases. A negative sign and green shading denotes a sink, that is, net sequestration (capture) of carbon. Orange shading denotes a source, that is, greenhouse gases are emitted to the atmosphere.

Australia's national emissions profile in 2006 (using Kyoto Protocol accounting)



Source: National Greenhouse Gas Inventory 2006, Department of Climate Change ('Reforestation' here includes 'Reforestation' and 'Afforestation'. They, and 'Deforestation', are defined under the Kyoto Protocol (Marrakesh Accords (Decision 11/CP.7)). Deforestation (62.9 million tonnes of CO₂-e emissions) is offset by Reforestation (20.4 million tonnes of CO₂ sequestration, indicated here as a 'minus' quantity).

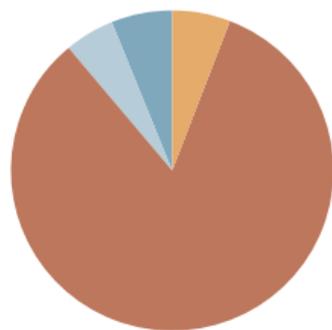


State and territory
summaries

Australian Capital Territory

		% Australian Capital Territory	% Australia
Population	344 200 people	n.a.	2
Land area	243 000 ha	n.a.	0.03
Native forest	123 000 ha	52	<1
Plantation forest	7 900 ha	3	<1
Forest cover	130 900 ha	56	<1

Australian Capital Territory forest area by tenure

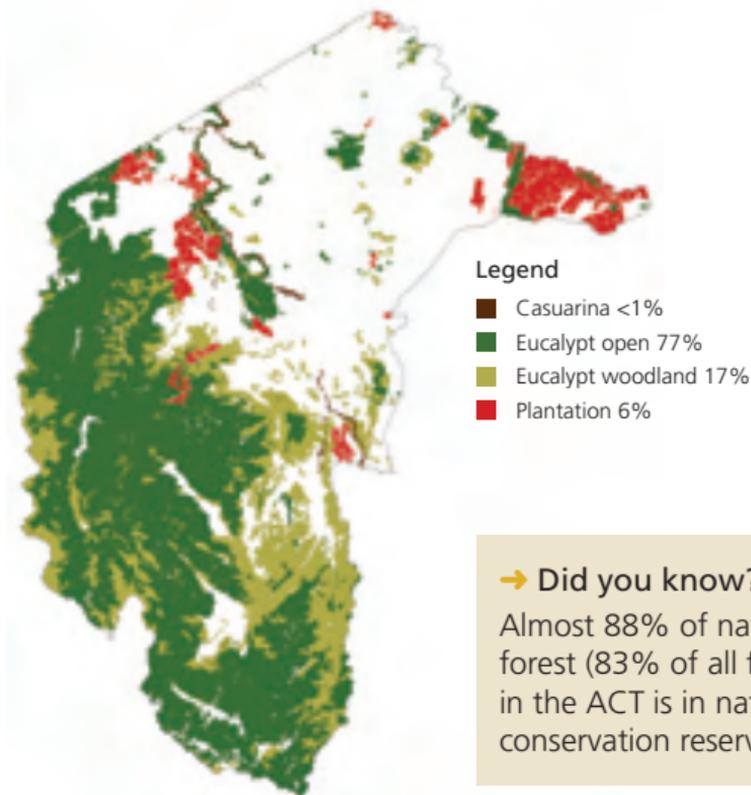


	hectares	% forest
Native forests		
Leasehold land	8 000	6
Multiple-use forest	0	0
Nature conservation reserve	108 000	83
Other crown land	7 000	5
Private land	0	0
Unresolved tenure	0	0
Plantations – all tenures	7 900	6

Forest industry

The Australian Capital Territory (ACT) forest industry was adversely affected by bushfires in 2003 with the loss of two-thirds (10 500 hectares) of its softwood plantations. The timber sawmilling industry has subsequently contracted. There are 1563 people employed in timber product manufacturing and marketing in the ACT.

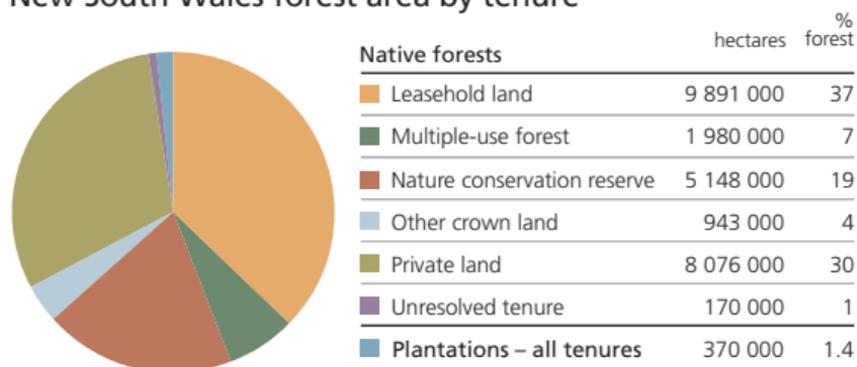
Australian Capital Territory forests by type



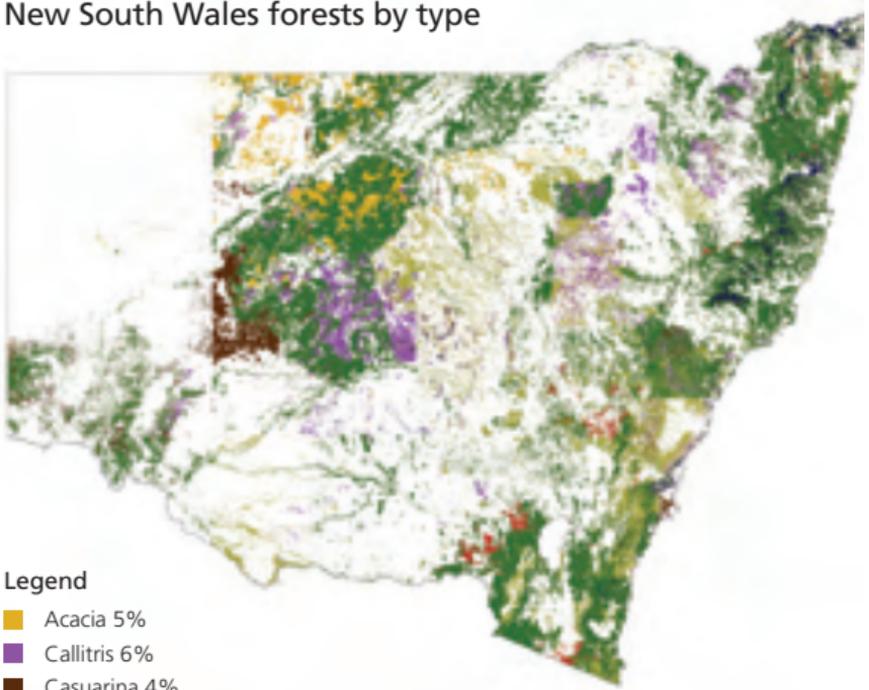
New South Wales

		% New South Wales	% Australia
Population	6 967 200 people	n.a.	33
Land area	80 064 200 ha	n.a.	10
Native forest	26 208 000 ha	33	18
Plantation forest	370 000 ha	<1	19
Forest cover	26 578 000 ha	33	18

New South Wales forest area by tenure



New South Wales forests by type



Legend

- Acacia 5%
- Callitris 6%
- Casuarina 4%
- Eucalypt mallee 1%
- Eucalypt woodland 18%
- Eucalypt open 61%
- Eucalypt closed <1%
- Mangrove <1%
- Melaleuca <1%
- Other 2%
- Rainforest 2%
- Plantation 1%

→ Did you know?

Forests NSW manages the largest plantation estate in Australia.

New South Wales forestry and forest products industries

Employment in the forestry and wood products manufacturing sectors in New South Wales (NSW) in 2006 was 23 792 people. When all businesses that depend on growing and using timber are included, total employment is estimated at about 38 000 people.

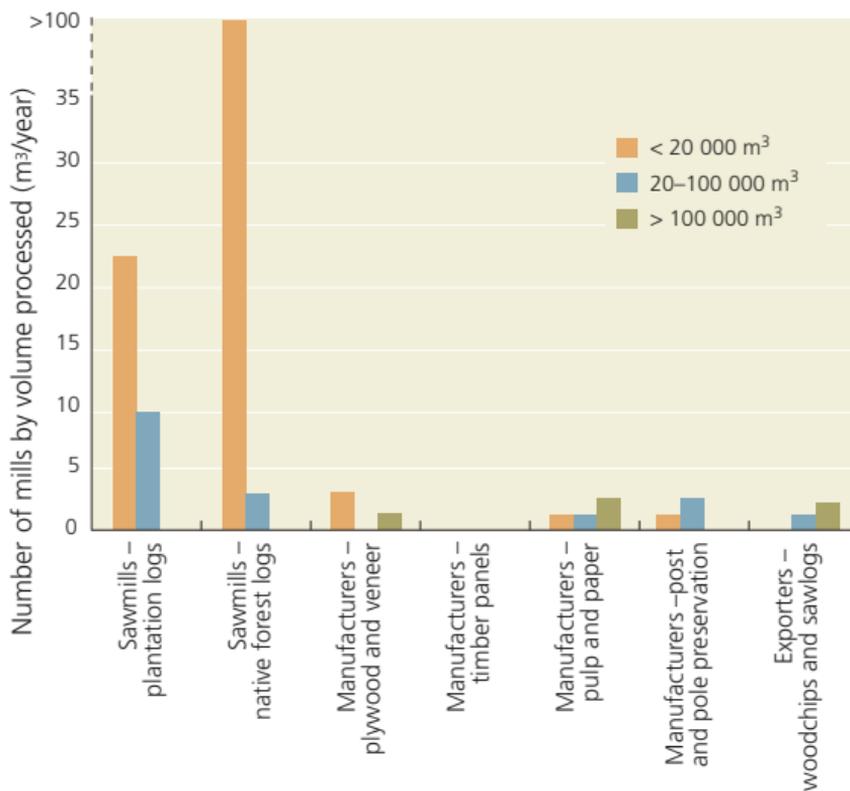
The forestry and wood products industries are a major part of several regional communities in NSW.



Department of Agriculture, Fisheries and Forestry

New South Wales timber processing facilities

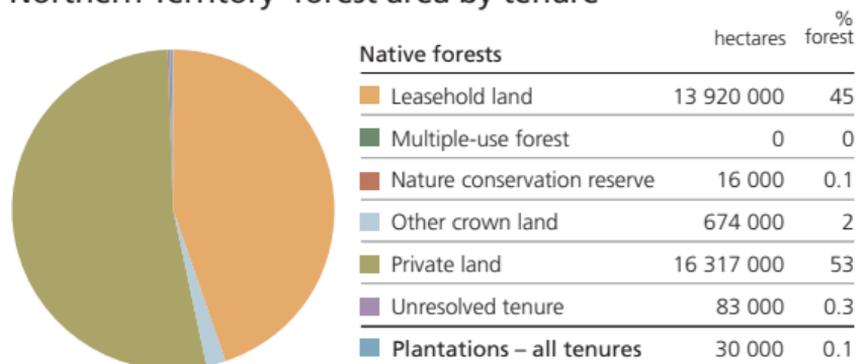
Type, number and size of the main timber processing industries in New South Wales



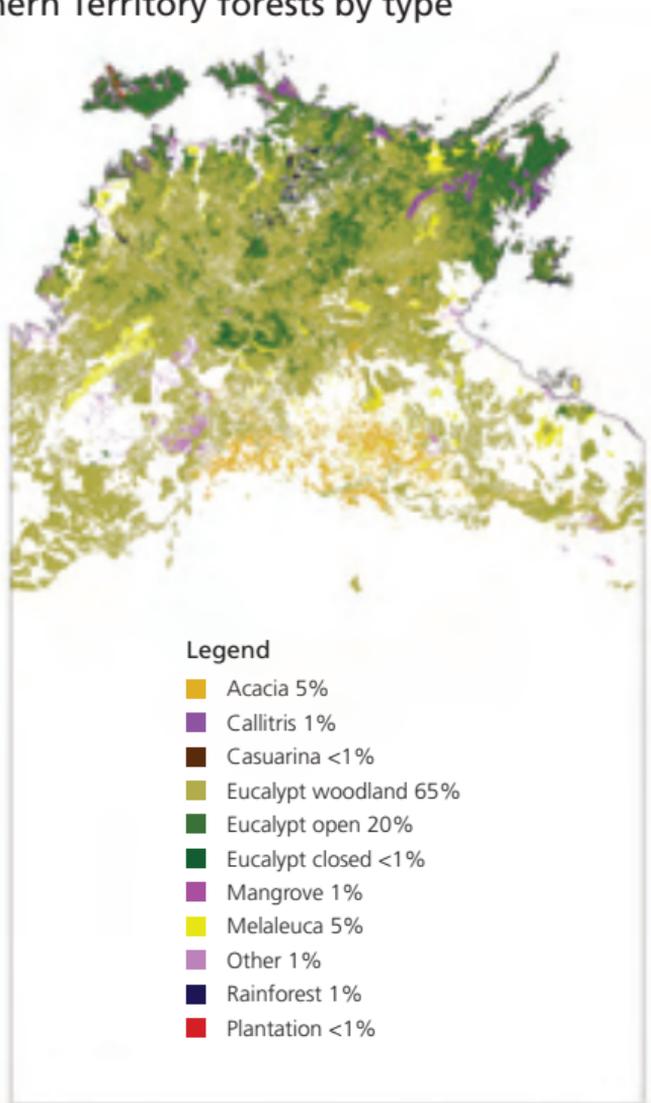
Northern Territory

		% Northern Territory	% Australia
Population	219 900 people	n.a.	1
Land area	134 912 900 ha	n.a.	18
Native forest	31 010 000 ha	23	21
Plantation forest	30 000 ha	<1	2
Forest cover	31 040 000 ha	23	21

Northern Territory forest area by tenure



Northern Territory forests by type



Northern Territory forestry and forest products industries

The Northern Territory forest industry is based on the 30 000 hectares of plantation and on the Indigenous arts and crafts industry that uses material from forests. A national survey identified 339 people employed in the timber industry in the Northern Territory. This is likely to be an underestimate because of the industry in Indigenous communities where arts and crafts can amount to more than 40% of a community's cash income.

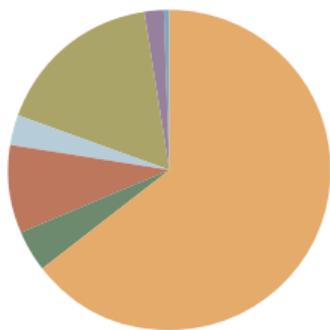
→ Did you know?

Kakadu National Park in the Northern Territory is the largest nature conservation reserve in Australia – at 1 980 400 hectares it is almost a third the size of Tasmania.

Queensland

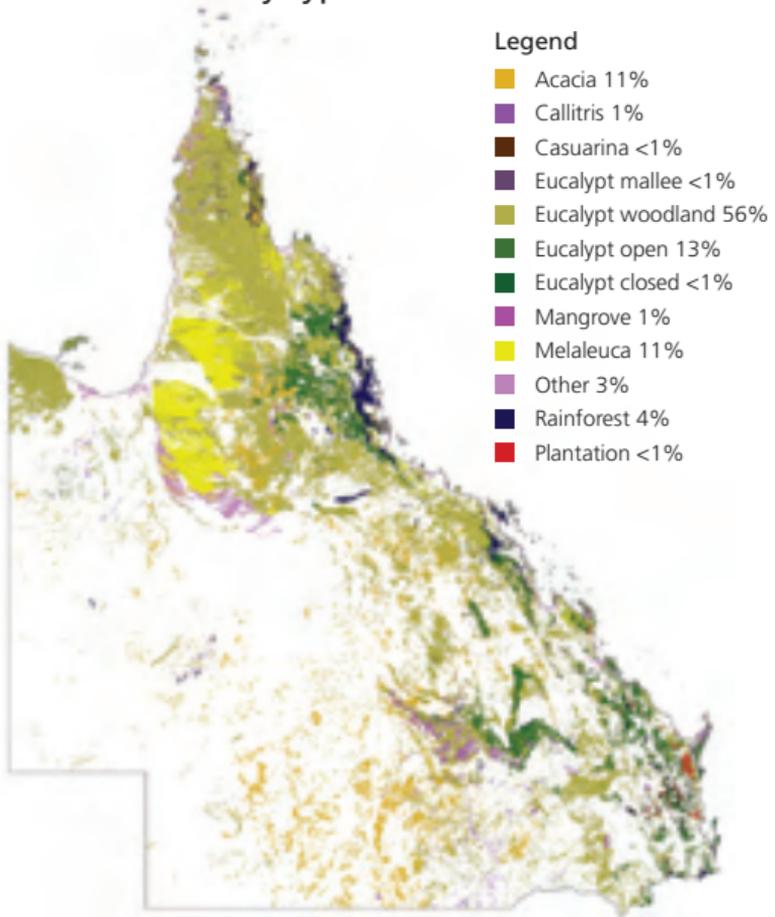
		% Queensland	% Australia
Population	4 279 400 people	n.a.	20
Land area	173 064 800 ha	n.a.	23
Native forest	52 582 000 ha	30	36
Plantation forest	250 000 ha	<1	13
Forest cover	52 832 000 ha	31	35

Queensland forest area by tenure



	hectares	% forest
Native forests		
Leasehold land	34 304 000	65
Multiple-use forest	1 991 000	4
Nature conservation reserve	45 760 000	9
Other crown land	15 980 000	3
Private land	89 080 000	17
Unresolved tenure	1 204 000	2
Plantations – all tenures	250 000	0.5

Queensland forests by type



→ Did you know?

Sixty-three per cent of Australia's World Heritage rainforest is in Queensland.

Queensland forestry and forest products industries

Employment in the forestry and wood products manufacturing sectors in Queensland in 2006 was 14 825 people. When all businesses that depend on growing and using timber are included, total employment is estimated at nearly 20 000 people. Some results from a survey of individual businesses that use logs from pine plantations are summarised in the following table. No data about the hardwood plantation and native forest-based timber industries in Queensland are available.



Department of Agriculture, Fisheries and Forestry

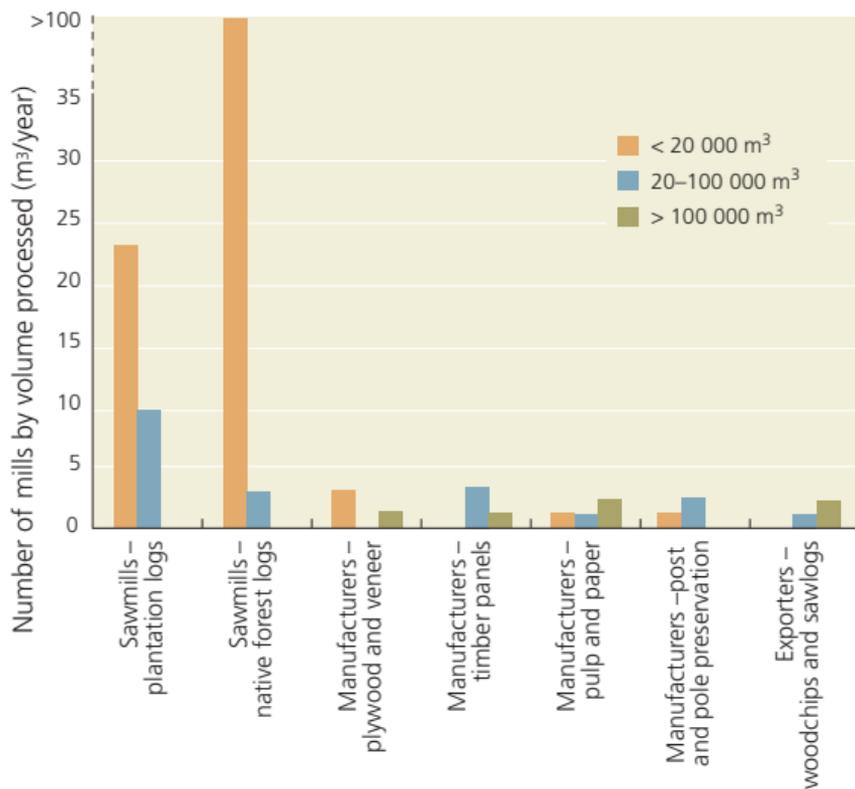
Socio-economic significance of Queensland's pine products industries

Socio-economic indicator	Sawmills	Panel manufacturers	Other businesses	Total
Number of employees	847	775	131	1754
Value of logs used (\$million/year)	115	39	25	179
Wages paid (\$million/year)	27	36	8	72
Contractor payments (\$million/year)	43	23	26	93
Value of sales (\$million/year)	245	231	97	573

Source: MBAC Consulting Pty. Ltd. 2005 A socio-economic assessment of the plantation processing sector in Queensland. Timber Queensland, Brisbane.

Queensland timber processing industries

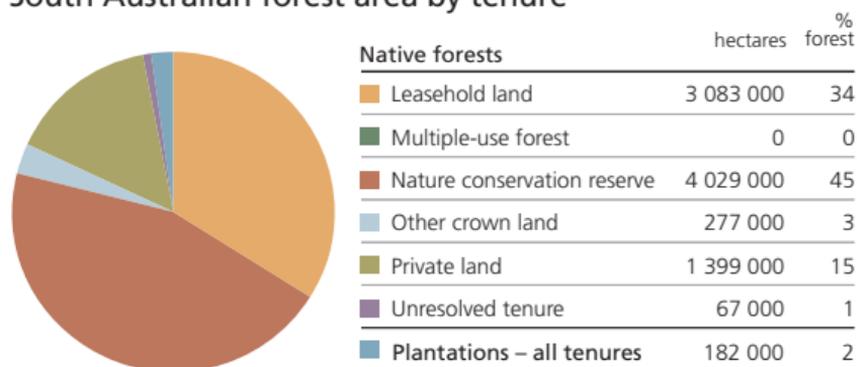
Type, number and size of the main timber processing industries in Queensland



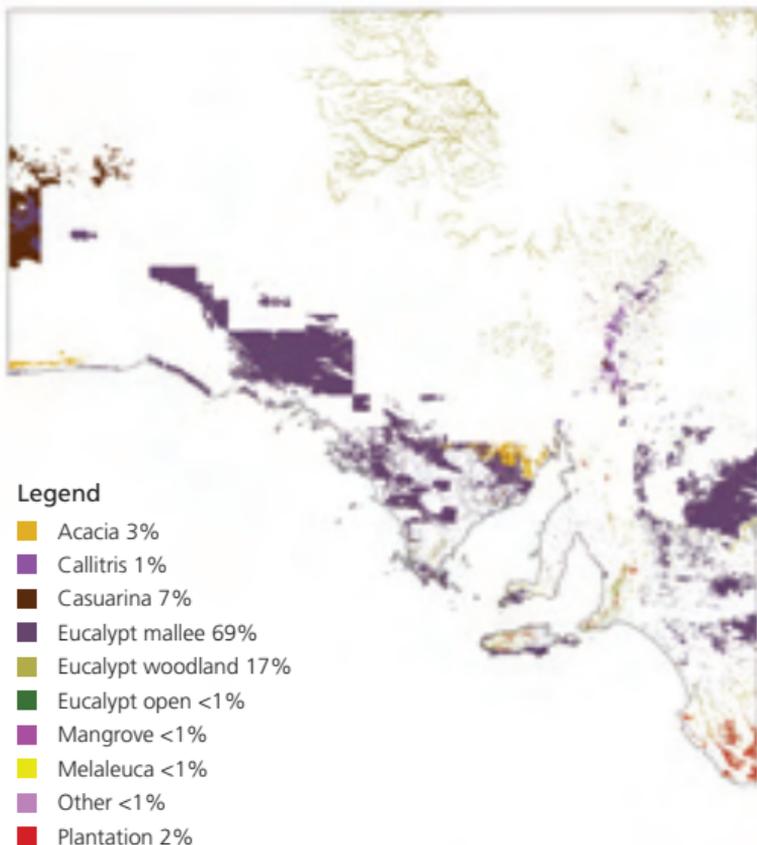
South Australia

		% South Australia	% Australia
Population	1 601 800 people	n.a.	7
Land area	98 348 200 ha	n.a.	13
Native forest	8 855 000 ha	9	6
Plantation forest	182 000 ha	0.2	9
Forest cover	9 037 000 ha	9	6

South Australian forest area by tenure



South Australian forests by type



→ Did you know?

All timber production in South Australia is from plantations.

South Australian forestry and forest products industries

Total employment in the forestry and wood products manufacturing sectors in South Australia in 2006 was 7470 people. When all businesses that depend on growing and using timber are included, total employment is estimated at about 13 000 people.

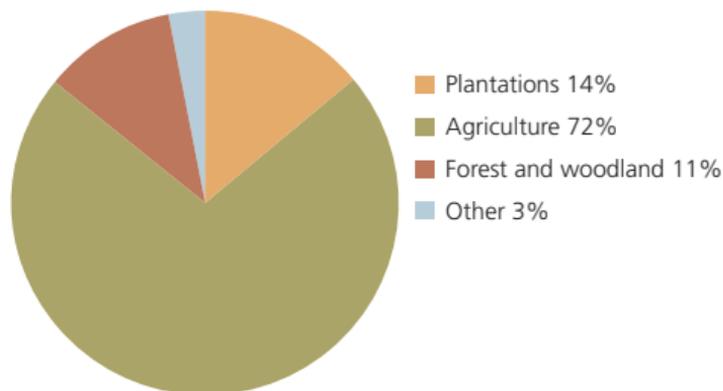
South Australia's forest industries are based solely on plantation timber growing and processing. Most of the plantations are located in the 'Green Triangle' region in the south-east of the state. Plantations in that region occupy about 14% of the region's land area compared with about 72% used for agriculture. Data on socio-economic impacts are summarised in the following table.

Socio-economic significance of forestry and wood products industries in the Green Triangle region, South Australia

Socio-economic indicator	Contribution to gross regional production (\$million)	Employment (number of jobs)
Socio-economic impact		
Direct effects:		
– Forestry	98	614
– Wood and paper products	368	3052
Flow-on effects	197	3416
Total	664	7082
Proportion of total primary industries	44%	35%
Proportion of total regional economy	27%	21%

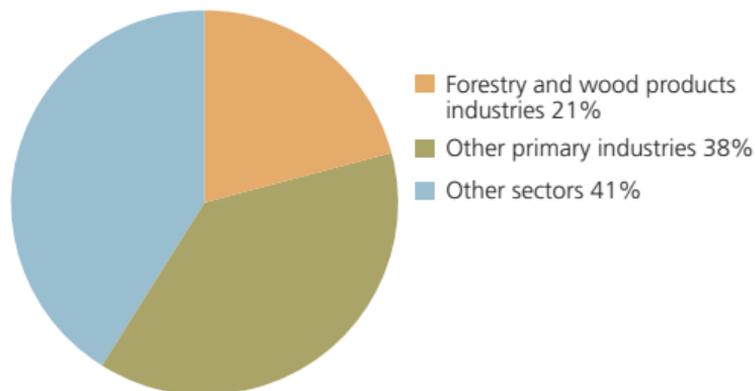
Source: EconSearch Pty Ltd 2005 *Economic impact of the timber industry in the Green Triangle region*. Green Triangle Regional Plantation Committee and ForestrySA, Mt Gambier.

Land use, south-eastern South Australia*

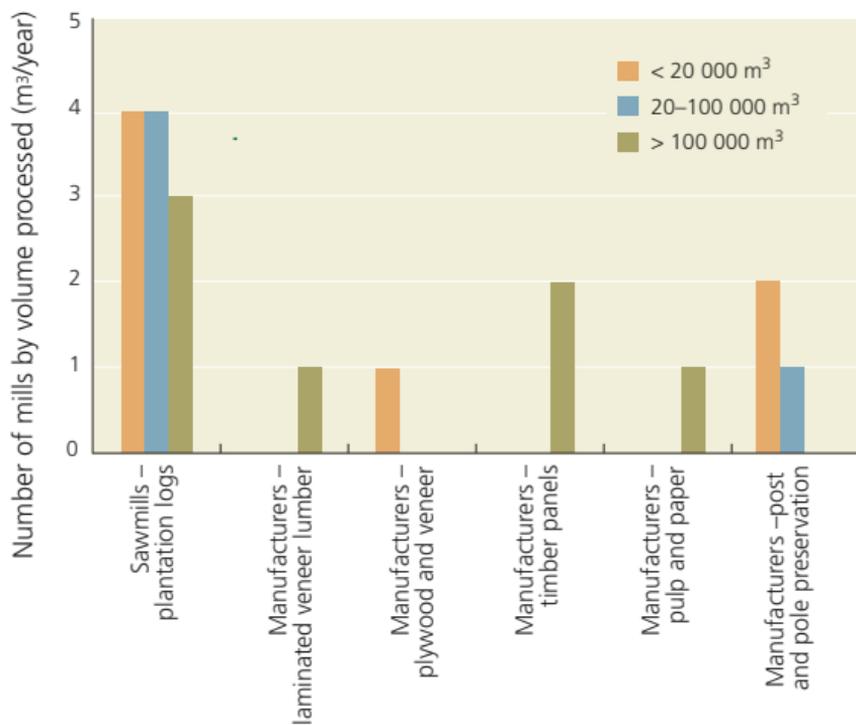


* For Millicent Coast catchment land area with above 600 mm average annual rainfall.

Employment, south-eastern South Australia



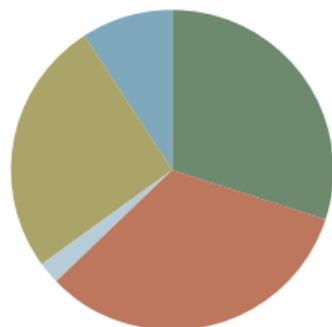
Type and location of the main timber processing industries in South Australia



Tasmania

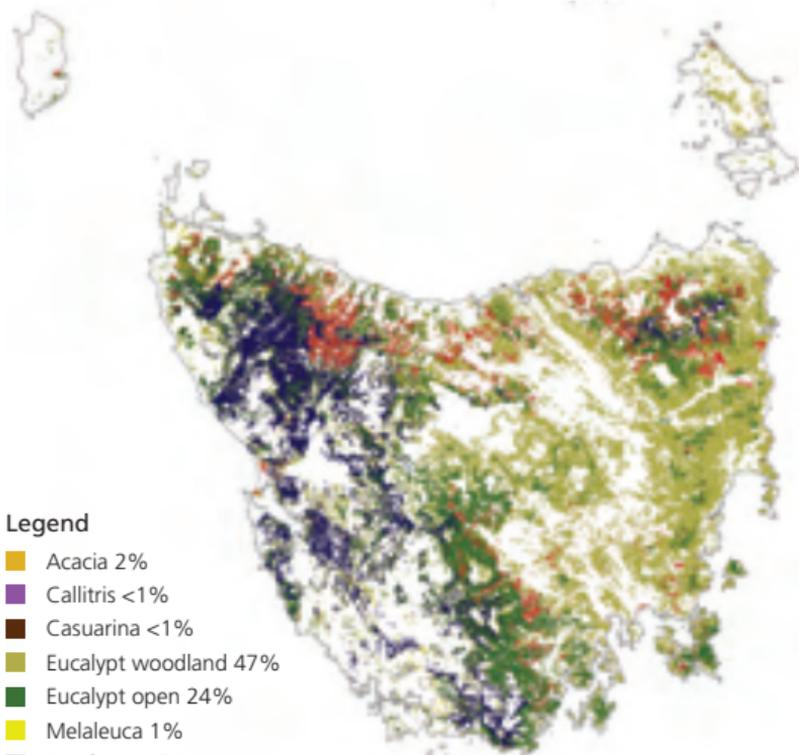
		% Tasmania	% Australia
Population	498 200 people	n.a.	2
Land area	6 840 100 ha	n.a.	1
Native forest	3 116 000 ha	46	2
Plantation forest	294 000 ha	4	15
Forest cover	3 410 000 ha	50	2

Tasmanian forest area by tenure



	hectares	% forest
Native forests		
Leasehold land	0	0
Multiple-use forest	1 026 000	30
Nature conservation reserve	1 121 000	33
Other crown land	85 000	2
Private land	885 000	26
Unresolved tenure	0	0
Plantations – all tenures	294 000	9

Tasmanian forests by type



Legend

- Acacia 2%
- Callitris <1%
- Casuarina <1%
- Eucalypt woodland 47%
- Eucalypt open 24%
- Melaleuca 1%
- Rainforest 17%
- Plantation 9%

→ Did you know?

Forty-seven per cent of Tasmania's native forests are in the formal and informal nature conservation reserves.

Tasmanian forestry and forest products industries

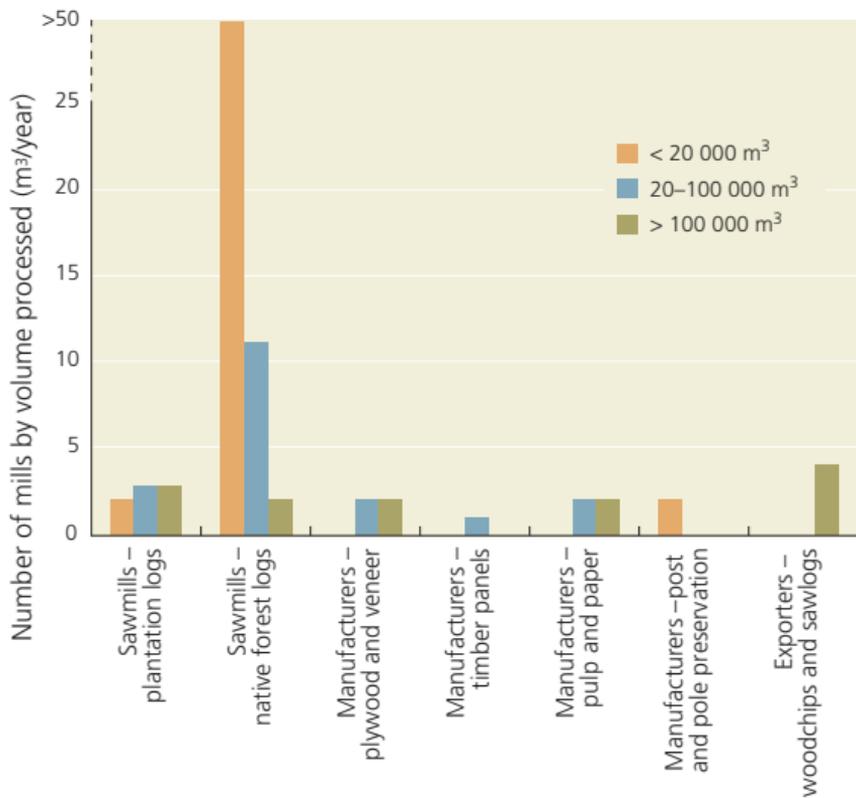
Tasmania's forestry and forest products industries employed an estimated total of 6300 people in 2005–06. After allowing for part-time employment, the total number of full-time equivalent jobs was 5870. This represented 3% of Tasmania's employed labour force in August 2006. Employment in the forestry and forest products industries exceeded 5% of total employment in 11 of the 23 Tasmanian local government areas. The proportions employed in different industry sectors are shown in the following tables.

Industry sector	Proportion of total employment (%)
Forest growers	11.7
Combined forest growers and log processors	10.9
Log processors	38.7
Contractors, service providers and nurseries	38.7
Total	100.0

Forest sector	Proportion of total employment (%)
Native forest based	68.3
Eucalypt plantation based	7.7
Pine plantation based	24.0
Total	100.0

Source: J. Schirmer, *Forestry, jobs and spending: Forest industry employment and expenditure in Tasmania, 2005–2006*. Cooperative Research Centre for Forestry, Tasmania, 2008.

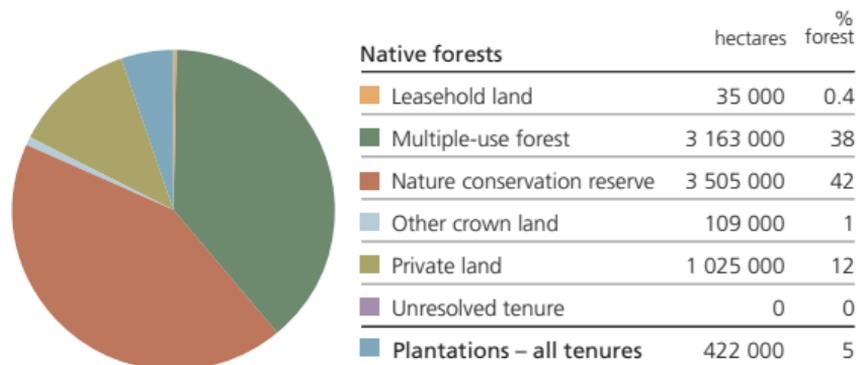
Tasmanian timber processing industries



Victoria

		% Victoria	% Australia
Population	5 297 600 people	n.a.	25
Land area	22 741 600 ha	n.a.	3
Native forest	7 837 000 ha	34	5
Plantation forest	422 000 ha	2	21
Forest cover	8 257 000 ha	36	6

Victorian forest area by tenure



Victorian forests by type



Legend

- Acacia <1%
- Callitris <1%
- Casuarina 2%
- Eucalypt mallee 18%
- Eucalypt woodland 13%
- Eucalypt open 54%
- Eucalypt closed 3%
- Mangrove <1%
- Melaleuca <1%
- Other 4%
- Rainforest <1%
- Plantation 5%

→ Did you know?

Victoria has one of the longest running forest monitoring and research programs of its type in the world, underway in the mountain ash (*Eucalyptus regnans*) forests of the Central Highlands since 1983.

Victorian forestry and forest products industries

Employment in the forestry and wood products manufacturing sectors in Victoria in 2006 was 21 941 people. When all businesses that depend on growing and using timber are included, total employment is estimated at about 32 000 people.

Victoria's forest industries are based on plantation timber growing and processing in several regions and on native forest timber growing and processing, mainly in the Central Highlands region and in Gippsland. Data on socio-economic impacts in Gippsland are summarised in the following table.



Department of Agriculture, Fisheries and Forestry

Socio-economic significance of Gippsland's wood products industries¹

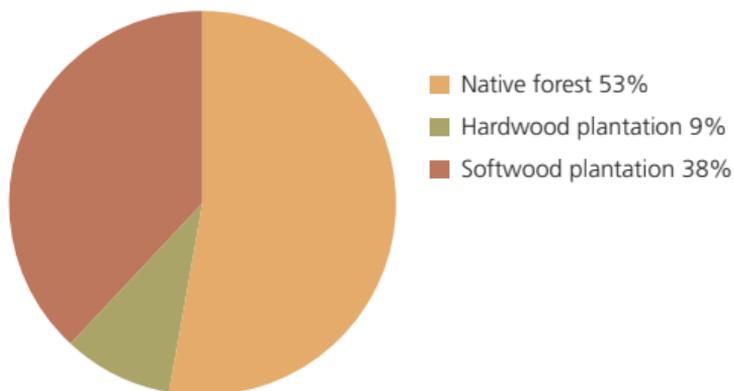
Socio-economic indicator	Hardwood sawmills	Softwood sawmills	Pulp and paper mills	Total ²
Value of logs used (\$million/year)	55.2	30.6	73.0	161.4
Wages paid (\$million/year)	41.4	15.2	92.6	151.3
Payments to local suppliers (\$million/year)	21.1	5.0	68.0	94.5
Other payments (\$million/year)	31.7	34.4	404.5	476.8
Total value of production (\$million/year)	149.4	85.3	638.1	884.0

1 The values shown are for primary processing. The annual value of production of processing logs and chips exported from the region was estimated at an additional \$315 million.

2 Totals include other wood products industries.

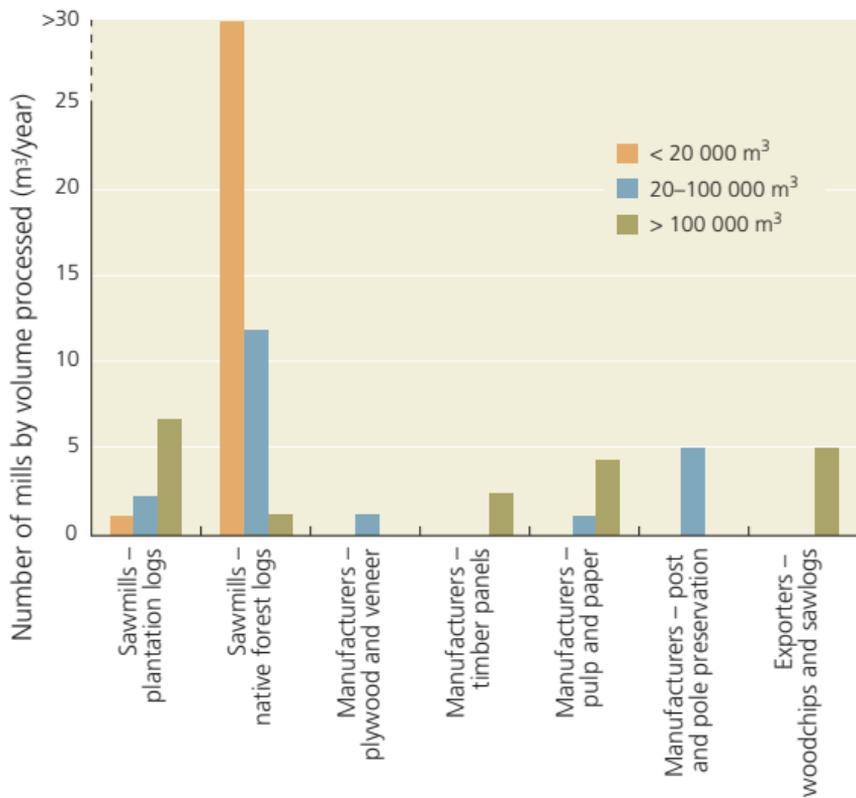
Employment in Gippsland's forestry and wood products industries was estimated to be 3124 people. The proportions employed in the native forest, hardwood plantation and softwood plantation sectors are shown below. Adding flow-on effects, total employment was estimated to be 6200 people.

Employment by forest sector



Source: Cameron, J., Gibbs, D., and Meynink, R. 2004
A socio-economic assessment of the timber industry in Gippsland, Victoria. Gippsland Private Forestry Inc., Bairnsdale.

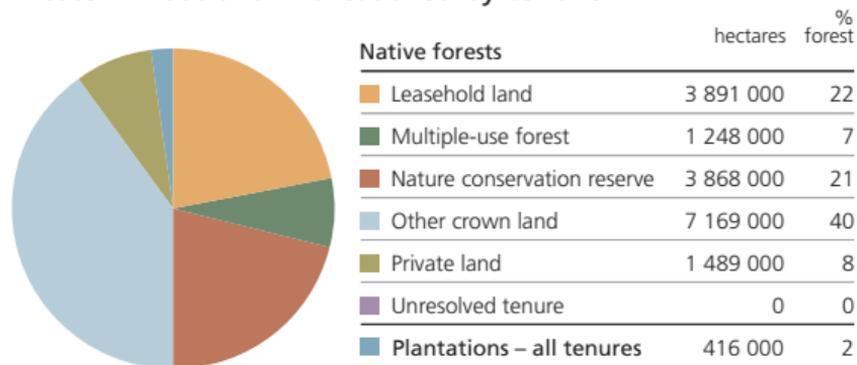
Victorian timber processing industries



Western Australia

		% Western Australia	% Australia
Population	2 163 200 people	n.a.	10
Land area	252 987 500 ha	n.a.	33
Native forest	17 664 000 ha	7	12
Plantation forest	416 000 ha	<1	21
Forest cover	18 080 000 ha	7	12

Western Australian forest area by tenure



Western Australian forests by type

Legend

- Acacia 6%
- Callitris <1%
- Casuarina <1%
- Eucalypt mallee 7%
- Eucalypt woodland 62%
- Eucalypt open 13%
- Eucalypt closed <1%
- Mangrove 1%
- Melaleuca <1%
- Other 8%
- Rainforest <1%
- Plantation 2%



→ Did you know?

All of Western Australia's old-growth forests are in nature conservation reserves.

Western Australian forestry and forest products industries

Western Australia's forestry and wood products industries employed an estimated 5570 people in 2005–06. After allowing for part-time employment, the total number of full-time equivalent jobs was 5090. The industries are concentrated in the Perth, Bunbury, Albany, Manjimup and Dardanup areas. The proportions employed in different industry sectors are shown on the following tables.



Department of Agriculture, Fisheries and Forestry

Employment by industry sector

Industry sector	Proportion of total employment (%)
Forest growers	3.1
Combined forest growers and log processors	3.9
Log processors	62.7
Contractors, service providers and nurseries	30.3
Total	100.0

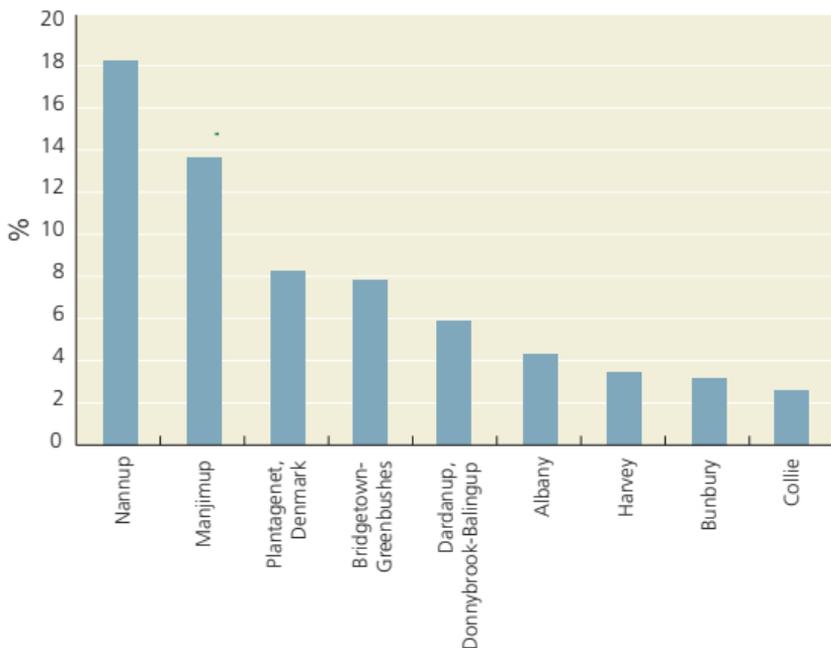
Employment by forest sector

Forest sector	Proportion of total employment (%)
Native forest	47–54
Eucalypt plantation	19–23
Pine plantation	24–28
Other plantation unspecified	1–3

Source: Schirmer, J. 2008 *Forestry, jobs and spending: forest industry employment and expenditure in Western Australia, 2005–06*. Cooperative Research Centre for Forestry, Hobart.

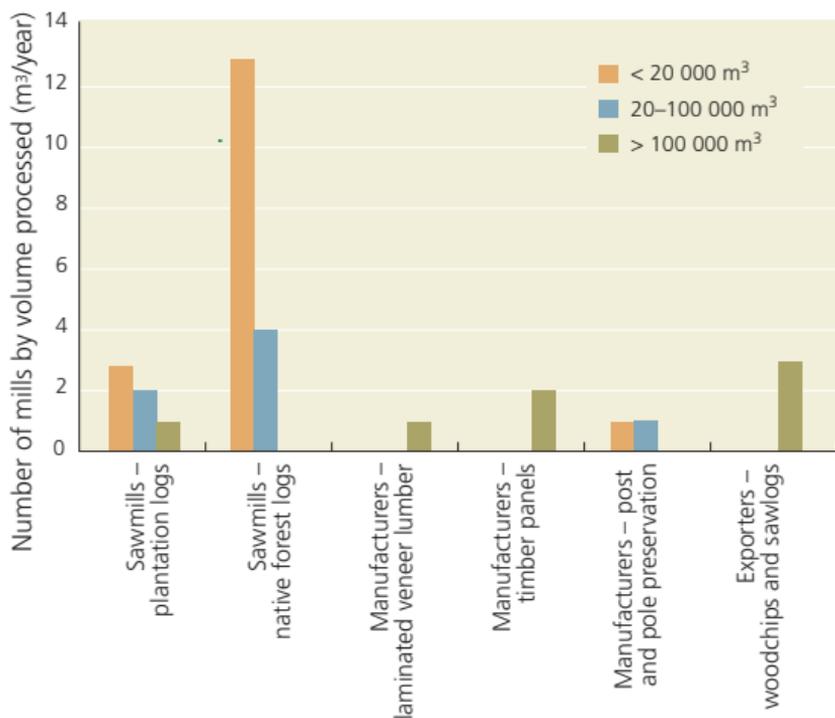
The local government areas where the largest proportions of the workforce are directly dependent on the forestry and wood products industries are shown on the following graph. Forest industry employment is less than 3% of total employment in all other local government areas in Western Australia.

Forest industries as a percentage of total local government area employment



Source: Schirmer, J. 2008 *Forestry, jobs and spending: forest industry employment and expenditure in Western Australia, 2005–06*. Cooperative Research Centre for Forestry, Hobart.

Type, number and size of the main timber processing industries in Western Australia



Information sources

National Forest Inventory and National Plantation Inventory

Since 1990, the National Forest Inventory (NFI) has been collecting and communicating information on Australia's forests. Its mission is to be the authoritative source of information for national and regional monitoring and reporting and to support decision-making on all of Australia's forests.



State, territory and private forest owners and managers collect data that the NFI collates and translates into national datasets and maps, such as those used in Australia's state of the forests reports and in this booklet. Most inventory and monitoring activities in native forests have focused on areas managed for wood production. Large gaps in forest information remain in the cases of privately managed forests and in forest areas managed for non-wood goods and environmental services.

The National Plantation Inventory (NPI) has been collecting data and reporting on Australia's forestry plantations since 1993. Its objective is to document the contributions tree plantations make to communities, the economy, the environment and the plantation resources in each region around the country. Comprehensive map-based reports are published about every five years and update reports are provided in other years.

Australian forest and wood products statistics

The Australian Bureau of Agricultural and Resource Economics (ABARE) compiles and publishes quarterly forest and wood products statistics derived from a range of sources. Production data are from ABARE and the Australian Bureau of Statistics (ABS) surveys and datasets, state forest services and industry organisations. Data on imports and exports are from the Australian Bureau of Statistics.

References and further reading

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BRS 2008 *Australian forest profiles*. Information sheet series of eight titles: Acacia, Callitris, Casuarina, Eucalypts, Mangroves, Melaleuca, Rainforest and Plantations; plus a poster: Australia's forests. Bureau of Rural Sciences, Canberra.

Davidson J, Davey S, Singh S, Parsons M, Stokes B and Gerrand A 2008 *The Changing Face of Australia's Forests – A summary of major changes in Australia's forests since 1992*. Bureau of Rural Sciences, Canberra.

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