



Australian Government

Australian Bureau of Agricultural and  
Resource Economics and Sciences

# Australia's forests at a glance 2011

with data to 2009–10



ABARES 2011. *Australia's forests at a glance 2011*.

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The main sources of data for this booklet are *Australia's State of the Forests Report 2008*, *Australian Forest and Wood Products Statistics, November 2010* and *Australia's Plantations 2010 Inventory Update*. References and further reading are listed on page 99. The final year is shown for data reported for financial years. Where data earlier than 2010 are presented, they are the latest available, or are used to indicate trends. Totals in some tables may not tally exactly due to rounding.

# Foreword



Australia's forests are valued for their role in conserving flora and fauna, sequestering carbon, supplying fresh water and meeting many social and cultural needs. They are also a sustainable resource for industries that employ thousands of people, particularly in rural and regional areas. Those industries make wood and paper products that we all use. Ensuring that the forests are conserved and that these industries remain vibrant and strong in a continually evolving global economy is a priority for the Australian Government.

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

*Australia's forests at a glance 2011* is very relevant in this International Year of Forests, which aims to raise awareness on the sustainable management, conservation and sustainable development of forests throughout the world.

**Phillip Glyde**

Executive Director, ABARES

March 2011

# Australia's forests in summary

Total land area	769.2 million hectares
Total forest area	149.4 million hectares
Forest as a proportion of land area	19 per cent
Native forest area	147.4 million hectares
Forest area in nature conservation reserves	23.0 million hectares
Public native forests where timber production is permitted (gross area)	9.4 million hectares
Total carbon stored in forests	>12 billion tonnes
Plantation forest area	2.0 million hectares
Total logs harvested (2010)	24.8 million m <sup>3</sup>
Total imports of wood products (2010)	\$4.2 billion
Total exports of wood products (2010)	\$2.3 billion



Major wood product imports (value in 2010):

Paper and paperboard	\$2 175 million
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Manufactured paper products	\$563 million
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Sawn wood	\$429 million
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Panels	\$250 million
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Major wood product exports (value in 2010):

Woodchips	\$856 million
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Paper and paperboard	\$649 million
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Sawn wood	\$125 million
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Panels	\$87 million
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Number of people employed in ABS categories forestry, logging and wood manufacturing (2010)	75 800
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Value of turnover in forest product industries (2009)	\$22.0 billion
----------------------------------------------------------	----------------

Forestry and forest products industries contribution to GDP (2008)	0.6 per cent
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## **INTERNATIONAL YEAR OF FORESTS • 2011**

The United Nations Forum on Forests has declared 2011 'International Year of Forests'. The logo conveys the theme of 'Forests for People', celebrating the central role of people in the sustainable management, conservation and development of our world's forests. The icons in the design show that forests provide shelter to people and habitat to biodiversity, are a source of food, medicine and clean water and play a vital role in maintaining a stable global climate and environment. These elements taken together reinforce the message that forests are vital to the survival and wellbeing of people everywhere.

*Source:* United Nations Forum on Forests.

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# Forest area

The information about Australia's native forests in this booklet is derived mainly from *Australia's state of the forests report 2008*. Copies of that report can be obtained from ABARES (see inside back cover).

Forest is defined as:

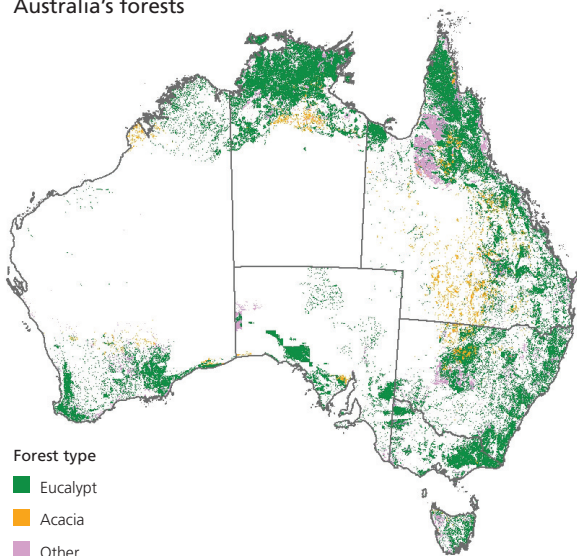
'An area, incorporating all living and non-living components, that is dominated by trees having usually a single stem and a mature or potentially mature stand height exceeding 2 metres and with existing or potential crown cover of overstorey strata equal to or greater than 20 per cent.'

This definition includes Australia's diverse native forests and plantations, regardless of age, and encompasses areas of trees that are sometimes described as woodlands.

Australia has 147.4 million hectares of native forest and 2.0 million hectares of forestry plantations. Together these cover about 19 per cent of the continent. Australia has about 4 per cent of the world's forests on 5 per cent of the world's land area.

Photo (left): Arthur Mostead

## Australia's forests



Development of crops and pastures has led to the removal of around 13 per cent of native vegetation, including forest, over the past 200 years. The area of tall eucalypt forests where timber harvesting occurs is now estimated to be 86.6 per cent of the original extent.

**Estimated change in native vegetation extent,  
pre-European to present, Australia**

Major native vegetation group	Proportion remaining %
Acacia forests and woodlands	82.5
Callitris forests and woodlands	80.2
Casuarina forests and woodlands	89.7
Eucalypt low forests and woodlands	73.2
Eucalypt tall forests	86.6
Mallee woodlands and shrublands	70.2
Other shrublands	78.3
Rainforests and vine thickets	65.3
All groups	87.5

# Types and class of forest

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

Australia's native forest types are dominated by eucalypts (78 per cent), followed by acacias (7 per cent) and melaleucas (5 per cent). In contrast, about half of Australia's plantations are exotic conifers (predominantly *Pinus radiata*). The other half is mostly native hardwood species.

The distribution of forest types and class is mainly determined by climate and soil properties. Other factors, especially fire frequency and intensity, are also important.



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## Forest area by types ('000 hectares)

Forest type	Area
Acacia	10 365
Callitris	2 597
Casuarina	2 229
Eucalypt	116 449
Mangrove	980
Melaleuca	7 556
Rainforest	3 280
Other forest	3 942
<b>Total native forest (2008)</b>	<b>147 397</b>
Hardwood plantation	991
Softwood plantation	1 020
Other plantation	9
<b>Total plantation (2009)</b>	<b>2 020</b>
<b>Total forest</b>	<b>149 417</b>

### Did you know?

Australia's native forest is 98 per cent broadleaved; the area of native conifers is small.

## Forest crown cover

Crown cover is the area 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. The National Forest Inventory uses three crown cover classes.

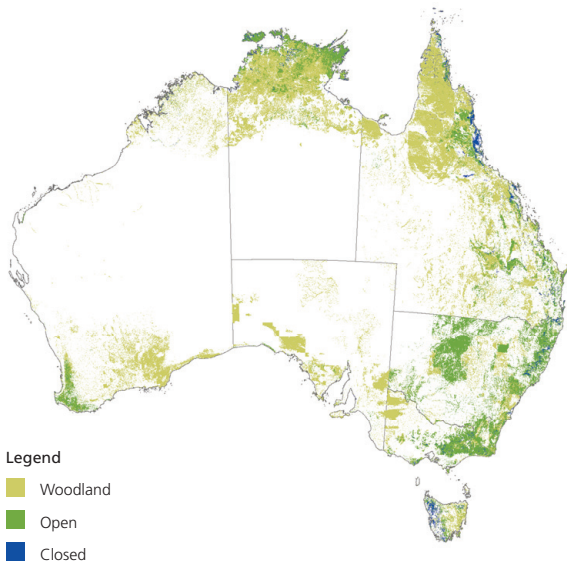
### Native forest areas by crown cover class ('000 hectares)

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



Margie Eddington

## Native forest by crown cover class



## Forest height

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

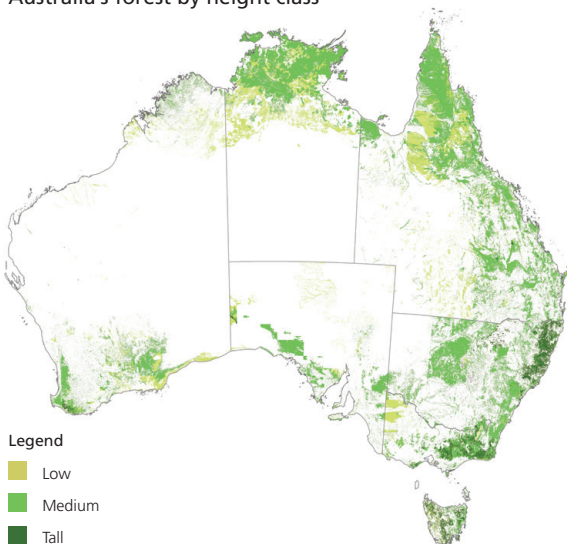
### Native forest area by height class ('000 hectares)

Height class	Total
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



Mark Parsons

## Australia's forest by height class



## Native forest by crown cover and height class

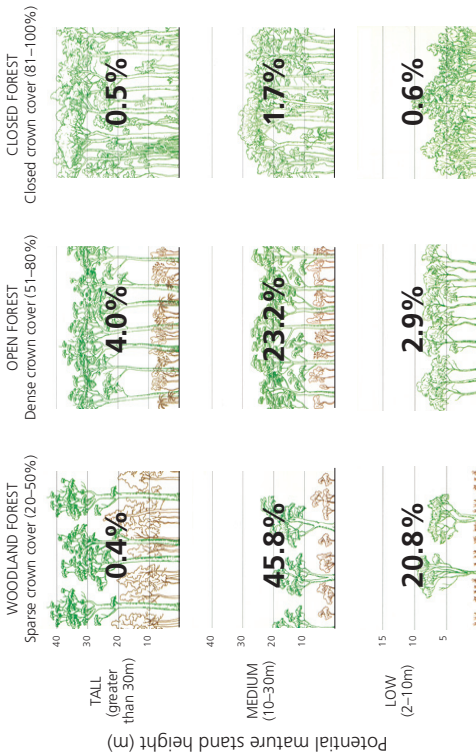
### **i** Did you know?

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



Mark Parsons

# 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.

Note: Percentages from the National Forest Inventory.

## 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 the rest of Australia. Old-growth forests in Western Australia were remapped in 2007.

In RFA regions:

- more than five million hectares of forest, or 22 per cent, were classified as old-growth
- 73 per cent of these known old-growth forests are in conservation reserves. Some of the remainder are available for timber production.

### Did you know?

79 per cent of Tasmania's identified old-growth forests are in conservation reserves.



## 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 reserves <sup>a</sup>	Proportion in reserves %
NSW <sup>b</sup>	8 989	2 536	1 742	69
Qld <sup>b</sup>	3 230	270	196	73
Tas	3 116	1 229	973	79
Vic <sup>c</sup>	5 774	673	460	68
WA <sup>d</sup>	1 909	331	331	100
Total	23 018	5 039	3 702	73 <sup>e</sup>

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

- a Includes nature conservation reserves and formal 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 in formal and informal reserves' is therefore an underestimate.
- c The area of old-growth was reduced because 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.

**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.

**Private forest**—forest on privately owned land.

## Did you know?

About 70 per cent of Australia's forest is on privately managed land—26 per cent on land with freehold private title or managed by Indigenous communities and a further 44 per cent on leasehold land where the predominant land use is grazing.

**Leasehold forest**—forest on privately managed leased Crown land generally used for grazing.

**Unresolved tenure**—forest for which ownership status has not been determined.

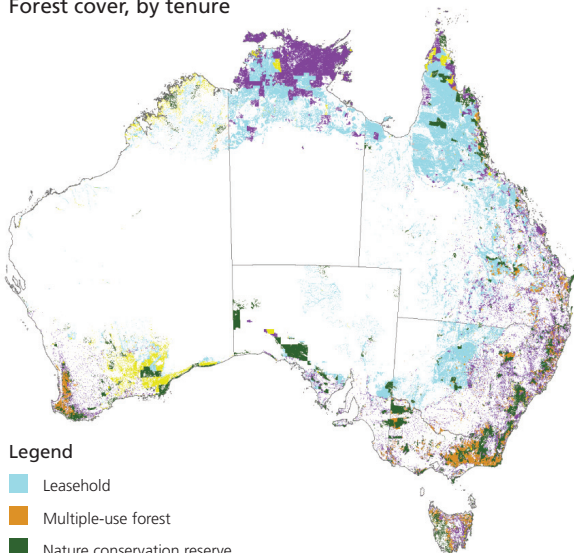
There are Indigenously managed native forests in each of the tenure categories described above with the exception of multiple-use forests. There is no formal tenure classification system to enable native forests managed by Indigenous people to be identified.

### Native forest area by tenure category, 2008

Tenure	Area (‘000 hectares)	Proportion of total %
Multiple-use forest	9 410	6
Nature conservation reserve <sup>a</sup>	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 page 23 are derived from the Collaborative Australian Protected Area Database that includes additional reserved lands found in the ‘Other Crown land’ and ‘Private land’ categories.

## Forest cover, by tenure



### Legend

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

# Forest in reserves

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 system was to reserve at least 15 per cent of the pre-1750 distribution of each forest type: 60 per cent of the existing distribution of each forest type if vulnerable; 60 per cent of existing old-growth forest; 90 per cent or more of high quality wilderness forests; and all remaining rare and endangered forest ecosystems.

In 2008, 23.0 million hectares—16 per cent of Australia's forests—were in dedicated formal conservation reserves (reserved in International Union for Conservation of Nature reserve categories I–IV).

Additional forests are 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 require conservation of forest biodiversity and protection of other values, such as water quality.

**i** Did you know?

The proportion of Australia's forests in nature conservation reserves recognised by the International Union for Conservation of Nature increased from 11 per cent in 1998 to 16 per cent in 2008.



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# 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.

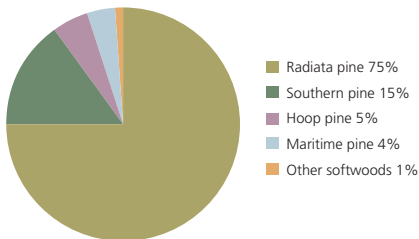
The following information about plantations is derived mainly from *Australia's Plantations 2006*, *Australia's Plantation Log Supply 2005–2049* and *Australia's Plantations 2010 Inventory Update*.

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, biofuels, carbon sequestration and habitat for native plants and animals.

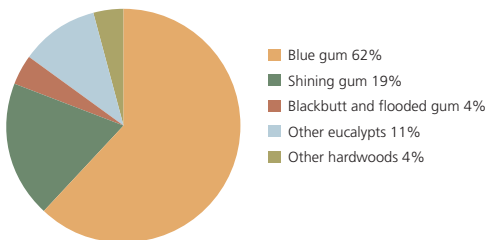
Plantation species fall into two groups:

- softwood—mainly pine (*Pinus*) species
- hardwood—mainly eucalypts, including *Eucalyptus* and *Corymbia* species

## Softwoods



## Hardwoods





Plantation establishment began in Australia in the 1870s. About 200 000 hectares had been established by 1960 of which over 90 per cent was 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 area of hardwood plantations began to increase rapidly because of private investment, while the rate of establishment of new pine plantations slowed. In some regions the area of softwood has declined in the past few years because harvested pine areas have been replanted with hardwood species or the land has been used for other purposes.

The emphasis since 1990 has been on eucalypts established on farmland and managed to produce woodchips for paper manufacture using 10 to 15 year rotations. A small proportion is managed 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	

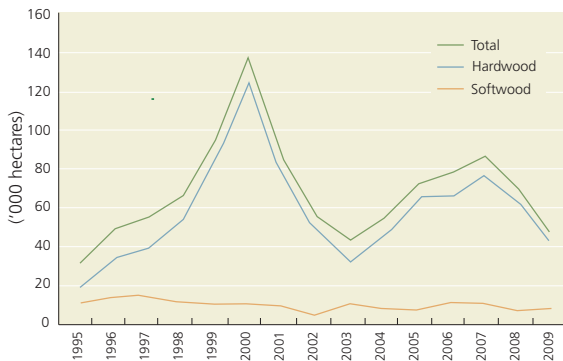
## Plantation expansion

Australia's plantation area has been expanding steadily for several years. An average of 60 000 hectares of new plantations was established in each of the five years to 2010. The rate of expansion has decreased substantially in the past few years.

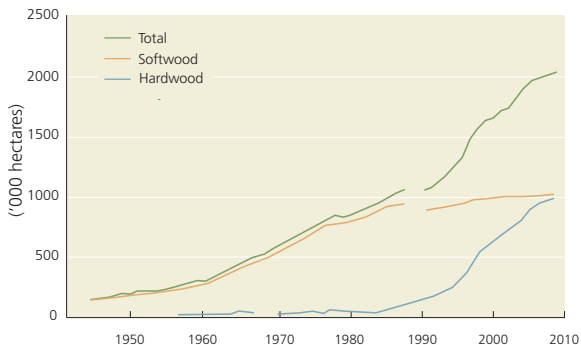


Mark Parsons

## New areas of plantation by species group



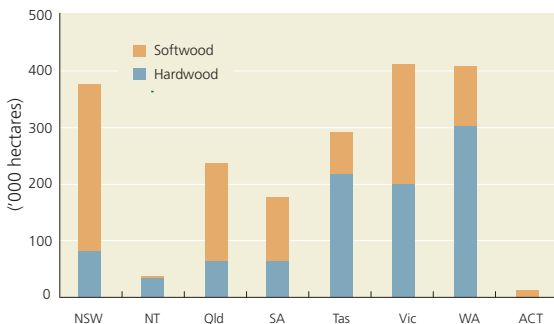
## Cumulative plantation area by species group



## Current area of plantations

There were 2.0 million hectares of plantations in Australia in 2009. Of this total, about half were hardwood species and half were softwood species. Victoria and Western Australia are the states with the largest areas of plantations.

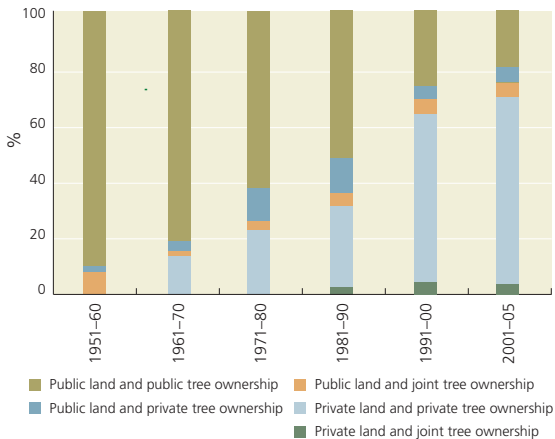
### Plantation area by species group and jurisdiction 2009



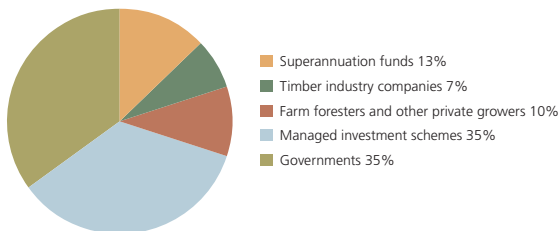
## Plantation ownership

State governments were the major plantation owners in the early 1990s. Since then, most of the investment in new plantations has been in the private sector. The Victorian and Tasmanian governments have sold plantations to private investors. Private ownership of plantations has therefore increased from about 30 per cent in 1990 to about 62 per cent in 2009. The private plantations include an estimated 100 000 hectares of small-scale farm forestry plantings. Public ownership is 33 per cent and about 5 per cent is jointly owned. Most of the expansion in private plantations has been funded by managed investment schemes.

## Plantation land and tree ownership by planting years



## Plantation ownership by owner type 2010



## Wood supply from plantations

Plantations currently produce about two-thirds of the average 27 million cubic metres of logs harvested in Australia on average each year. The balance of the logs comes from native forests.

The potential supply of softwood plantation sawlogs and pulpwood is not expected to change significantly from now to 2050 or beyond.

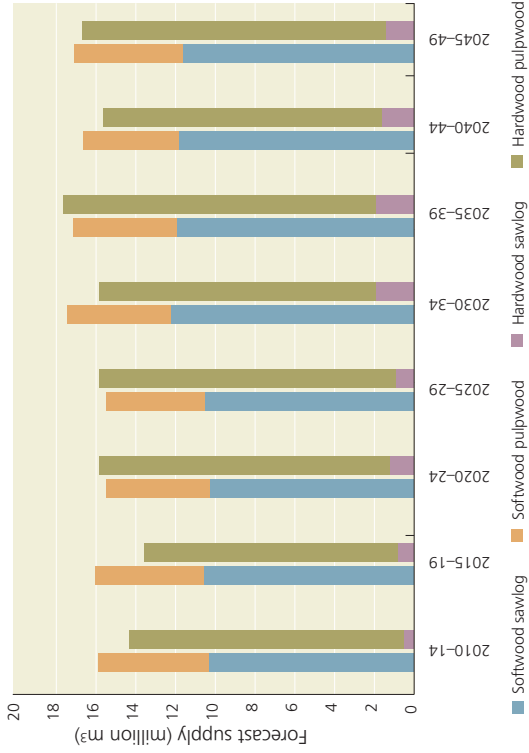
The potential log supply from hardwood plantations is rising because the large areas established from the mid-1990s are reaching harvest age. The vast majority of those plantations is managed to produce pulpwood for papermaking. Hardwood sawlog supply from plantations is estimated to rise slowly from now until 2030, then stabilise at a low level or decline to 2050.

### Did you know?

Softwood plantations provide 75 per cent of the sawlogs produced in Australia, yet comprise only 0.7 per cent of the forest area.



## Future wood supplies from plantations



# Forest certification 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 harvested and sustainably managed native forests and plantations.

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

The AFCS uses the Australian Forestry Standard, which was developed through 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 issue chain-of-custody certificates that identify and track certified wood and wood products through the supply chain.

The area of certified forest and plantation in Australia has grown to about 10.4 million hectares. This includes most of the native forests managed for timber production. About 80 per cent of Australia's certified forest area is native forest and about 85 per cent of Australia's certified forest area is publicly owned.

In addition to certification, multiple-use public forests and private forests are managed in accordance with codes of practice. Many forest managers use environmental management systems (EMS) that are certified independently to an ISO standard. Public forest management agencies with certified EMS in place include Forests NSW, Forestry SA, Queensland's Department of Environment and Resource Management (Forest Products), Western Australia's Forest Products Commission, Victoria's Department of Sustainability and Environment, and Forestry Tasmania. Several large private forestry enterprises also have EMS.



Arthur Mostead

# Forests, wood products and carbon

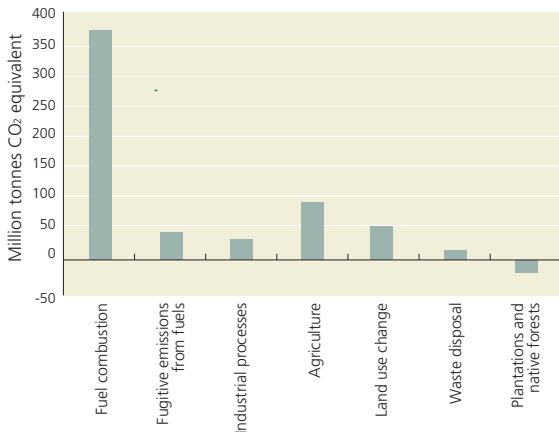
Trees take up carbon dioxide from the atmosphere during photosynthesis. The carbon dioxide is released during respiration, when trees are burned, die and decay and when wood products are burned or decay after use.

Australia's total greenhouse gas emissions from power generation, transport, agriculture and other sources were estimated to be 599 million tonnes in 2008. Plantations and native forests sequestered a net 23 million tonnes of carbon dioxide in that year, which reduced net national emissions by 3.8 per cent.



Greg Nolan

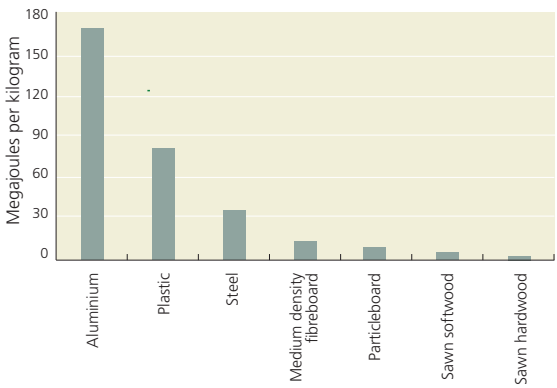
## Australia's greenhouse gas emissions by sector, 2008



Source: *National Greenhouse Gas Inventory*, Department of Climate Change and Energy Efficiency 2010.

The embodied energy of a product is all the energy used to obtain raw materials and to manufacture, package and transport the product. Energy use is closely associated with the amount of carbon dioxide emissions released into the atmosphere. Different materials have widely different embodied energy. The embodied energy of timber products is much lower than that of many other materials.

### Embodied energy in new materials



Source: Taylor, J and Van Langenberg, K 2004, *Review of the environmental impact of wood compared with alternative products used in the production of furniture*, Forest and Wood Products Research and Development Corporation.

Note: The value for plastic is for PVC (polyvinylchloride). The values for timber are for kiln-dried timber.

# Fire

The extent and intensity of forest fires in Australia vary with latitude and season of rainfall. In northern Australia, where conditions are generally humid, low-intensity fires often burn across large areas. Hot, dry and windy summers in south-eastern Australia often lead to intense bushfires that are difficult to control. Those fires can cause loss of human life and can destroy assets such as trees, livestock, buildings, fences, bridges and power lines. Bushfires in southern Australia lead to soil erosion and degrade stream water quality. The resulting natural regrowth reduces water yields for decades.

Climate change could have serious implications for the frequency and severity of bushfires in Australia. There is some evidence that the observed warming trend has already contributed to increased drought severity through higher evaporation and water demand. Native forests in many locations may become more susceptible to fire.

## Large fires in southern Australia

Year	Location	Area burnt* (‘000 hectares)
1926	Victoria	394
1939	Victoria	1 400
1943–44	Victoria	1 100
1952	North-east Victoria	>100
1961–62	Victoria	>100
1965	Eastern Victoria	378
1969	Victoria	>250
1983	Central and south-west Victoria	210
1993–94	Sydney – Blue Mountains, north coast – New South Wales	>800
1995	South-east Queensland	333
1997–98	Hunter, Blue Mountains, Shoalhaven, New South Wales	>500
2001–02	Greater Sydney, New South Wales	744
2002–03	Eastern Highlands, Victoria	1 100
2002–03	Brindabella Ranges – Canberra, New South Wales – Australian Capital Territory	157
2002–03	East coast – greater Sydney, New South Wales	1460

*Continued...*



Year	Location	Area burnt* ('000 hectares)
2002–03	Arthur – Pieman, Tasmania	100
2005	Eyre Peninsula, South Australia	145
2006–07	Eastern Highlands, Victoria	1 050
2009	Central – north-east Victoria	430

\* Total area burnt, including vegetation types other than forests.

Sources: Bartlett, T, Leonard, M and Morgan, G 2007, 'The mega-fire phenomenon: some Australian perspectives', in *The 2007 Institute of Foresters of Australia and New Zealand Institute of Forestry Conference Papers*, Institute of Foresters of Australia, Canberra. Dexter, BD and Hodgson, A 2005, *The facts behind the fire – a scientific and technical review of the circumstances surrounding the 2003 Victorian bushfire crisis*, Forest Fire Victoria, Parkdale.



Michael F. Ryan

# Forest industry employment

The wood products industries have an annual turnover of about \$22 billion, which reflects the value of sales and services across the industry sectors. In terms of value adding, as a direct measure of the contribution of the industry to gross domestic product, the forestry, timber and paper products sectors contribute around \$7 billion each year. This represents 6.7 per cent of the manufacturing sector and 0.6 per cent of national gross domestic product.

The total number of people employed in the forestry and wood products industries has been estimated, based on an industry survey, to be about 120 000. The number of people employed in the Australian Bureau of Statistics industry classifications 'forestry', and 'wood, pulp and paper manufacturing' for 2010 was 75 800. Those industry classifications cover a narrower range of activities than the industry survey.

## 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
<b>Total</b>	<b>120 184</b>

Source: based on ForestWorks Ltd data.

# Multiple-use forests and timber harvesting

Timber production is allowed in State forests classified as 'multiple-use' in New South Wales, Queensland, Tasmania, Victoria and Western Australia. Substantial areas within those forests classified as 'multiple-use' are reserved from timber harvesting to protect particular landscape, flora, fauna and other values. The balance is available for timber production, although a substantial portion is not suitable for commercial timber harvesting or is inaccessible. Timber may be harvested from a portion of the net available area each year. Timber is also harvested from some leasehold forested land in some states, particularly Queensland.

The net forest area available for timber harvesting and the areas actually harvested on average each year are shown in the table opposite.

# Harvesting from multiple-use forest; areas available and annual average areas harvested (hectares)<sup>a</sup>

State <sup>b</sup>	Area available <sup>c</sup>	Area clearfelled & regenerated	Area thinned or partially felled	Total harvest area	Proportion harvested %
New South Wales	1 470 000	0	43 500	43 500	3.0
Tasmania	890 000	4 800	6 700	11 500	1.3
Victoria	922 000	4 900	2 900	7 800	0.8
Western Australia	848 000	430	8 820	9 250	1.1

## Notes:

- Annual averages generally for previous five years. Areas of forest cleared from mine sites are not included.
- Information for Queensland is incompatible with the reporting format. Native forest timber harvesting in Queensland on State-controlled lands occurred on about 23 000 hectares in 2009–2010. There is no multiple-use forest in the Australian Capital Territory, Northern Territory and South Australia.
- This is the State forest area available for timber harvesting after excluding areas reserved by management plans and regional forest agreements. Timber harvesting is excluded from additional parts of the available areas to meet regulatory requirements to protect flora, fauna, catchment and other values.

# Wood products

Australians consume around 22 million cubic metres (in log volume equivalent terms) of wood products on average each year. Most of the logs from which those products are made are grown in Australia. The volume of logs harvested from plantations has increased by about 42 per cent in the past decade, while the volume harvested from native forests decreased by 44 per cent. The volume of logs harvested from plantations has increased because larger proportions of plantation estates have reached harvest age. The decrease from native forests was caused by transfer of forests to nature conservation reserves and, more recently, by a variety of commercial and economic factors.



DAFF

## Logs harvested ('000 m<sup>3</sup>)

Source of logs	2000	2005	2010*	10-year change %
Native forests				
Sawlogs and veneer logs	4 244	3 612	2 768	-35
Pulpwood and other logs	7 142	6 546	3 631	-49
Total	11 386	10 158	6 399	-44
Hardwood plantations				
Sawlogs and veneer logs	149	273	161	8
Pulpwood and other logs	690	2 663	4 284	521
Total	839	2 936	4 445	430
Softwood plantations				
Sawlogs and veneer logs	7 044	8 829	9 197	30
Pulpwood and other logs	5 133	5 075	4 778	-7
Total	12 182	13 904	13 975	15
Total log harvest	24 407	26 998	24 819	2

Source: Australian forest and wood products statistics, ABARES.

\* Figures for 2010 are provisional.

## Production and consumption of wood products

	1999	2004	2009	10-year change %
Paper products production (thousand tonnes)				
Newsprint	405	442	444	10
Printing and writing	497	585	723	46
Household and sanitary	187	200	196	5
Packaging and industrial	1 475	1 956	1 949	32
Total	2 564	3 164	3 312	29
Paper products consumption (thousand tonnes)				
Newsprint	667	725	639	-4
Printing and writing	1 186	1 527	1 733	46
Household and sanitary	212	248	240	13
Packaging and industrial	1 401	1 519	1 586	13
Total	3 466	4 019	4 199	21
Sawn timber production (thousand cubic metres)				
Softwood <sup>a</sup>	2 338	3 712	3 740	60
Hardwood <sup>b</sup>	1 405	1 277	990	-30
Total	3 744	4 989	4 730	26

*Continued...*



## Production and consumption of wood products (cont.)

	1999	2004	2009	10-year change %
Sawn timber consumption (thousand cubic metres)				
Softwood <sup>a</sup>	2 980	4 370	3 974	33
Hardwood <sup>b</sup>	1 471	1 373	1 021	-31
Total	4 451	5 743	4 985	12

a Mainly sawn from plantation pine logs.

*Continued...*

b Mainly sawn from native forest eucalypt logs.

Source: Australian forest and wood products statistics, ABARES.



Michael Nicholson

## Production and consumption of wood products (cont.)

	2000	2005	2010	10-year change %
Veneer and panel production (thousand cubic metres) <sup>a</sup>				
Veneers			116	large <sup>b</sup>
Plywood	192	156	120	-38
Particleboard	978	944	928	-5
Medium-density fibreboard	621	794	558	-10
Woodchip exports (bone dry tonnes)				
Softwood	1 046	1 105	847	-19
Hardwood	3 582	4 493	3 971	11
Total	4 628	5 598	4 818	4

a Laminated veneer lumber and hardboard cannot be reported because of confidentiality restrictions.

b The large increase is because structural veneer manufacturing commenced in Tasmania in 2008.

Source: Australian forest and wood products statistics, ABARES.

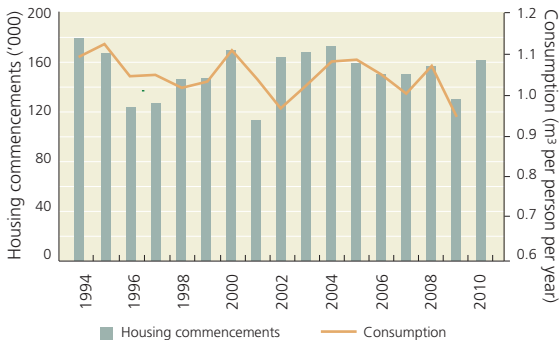
### Did you know?

For more than 50 years, Australians have consumed on average a little more than one cubic metre of log equivalent volume of wood products per person per year.

## Wood products consumption

Most of Australia's wood products are used in home building and other construction. From year to year, consumption tends to be linked to rises and falls in building industry activity. Consumption per person fluctuates around 1.05 cubic metres per year. Total national consumption has increased in parallel with population growth for many years.

### Housing commencements and wood consumption in Australia



The major categories of paper and paperboard are newsprint, printing and writing papers, household and sanitary papers and packaging and industrial papers. Australia's consumption of paper and paperboard increased by about 21 per cent in the 10 years to 2009. The increase was mainly because of a 46 per cent increase in consumption of printing and writing papers. Consumption of paper products far exceeds domestic production. The shortfall is made up by imports of about 1.7 million tonnes per year, 67 per cent of which is printing and writing papers. Imported paper products cost nearly \$2.3 billion and were 51 per cent of total timber products imports in 2009.

Most hardwood sawn timber is used for flooring, decking, joinery, furniture and similar uses where particular appearances or colours are required or for engineering and architectural applications that need particular strength, hardness and durability. The consumption of sawn hardwood declined by about 31 per cent in the 10 years to 2009 to 1.0 million cubic metres. About 10 per cent of the sawn hardwood used is imported.

Softwood sawn timber is mainly used as a structural component of house frames and other buildings. The consumption of softwood sawn timber increased by about 33 per cent in the 10 years to 2009 to about 4.0 million cubic metres. Australian production increased by 82 per cent to 4.3 million cubic metres in that period.

Medium-density fibreboard and particleboard are mainly used for flooring and joinery (for example kitchen benches and cupboards) and together comprise over 80 per cent of the timber-based panels produced in Australia. As for sawn

timber, trends in domestic consumption of these products follow trends in the building industry, in particular the rate of house construction. Consumption of particleboard nearly equals Australian production. About 20 per cent of the medium-density fibreboard manufactured in Australia is exported.

Plywood and decorative veneers have been produced in Australia for many years. Veneer manufacture has soared since 2007 because of construction of two veneer mills in Tasmania. The logs used are from native regrowth forests and would otherwise be used for woodchips for paper manufacture because they are too small for sawmilling. The veneer is exported to plywood manufacturers in Malaysia.

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



## Recycling

About 6.5 million tonnes of wood products are discarded each year. An estimated 75 per cent of paper and 30 per cent of other wood products are recycled; the remainder ends up in landfill.



## Wood and paper products trade

The value of wood and paper products exports in 2010 was \$2.3 billion. The value of imports was \$4.2 billion, leaving a trade deficit of \$1.9 billion.

### Wood products exports (\$ millions)

	2000	2005	2010	10-year change %
Woodchips	646	858	856	32
Paper and paperboard <sup>a</sup>	426	627	649	52
Recovered paper	40	97	228	471
Sawn wood <sup>b</sup>	52	102	125	141
Wood based panels	149	153	87	-41
Other products	294	282	315	7
Total wood products exports	1 607	2 119	2 260	41

a Mainly packaging and industrial papers.

b There is a wide range of species and grades of sawn timber. Different species and grades are exported and imported to meet particular consumer requirements.

## Wood products imports (\$ millions)

	2000	2004	2009	10-year change %
Paper and paperboard <sup>a</sup>	1 998	2 184	2 175	9
Manufactured paper products	356	396	563	58
Sawn wood <sup>b</sup>	548	492	429	-22
Wood based panels	189	216	250	32
Wood pulp	220	225	178	-19
Other products	486	591	605	25
<b>Total wood product imports</b>	<b>3 797</b>	<b>4 104</b>	<b>4 200</b>	<b>11</b>

a Mainly printing and writing papers.

b There is a wide range of species and grades of sawn timber. Different species and grades are exported and imported to meet particular consumer requirements.

Source: Australian forest and wood products statistics, ABARES.

### Did you know?

Australia's trade deficit in wood products averages around \$2 billion each year.

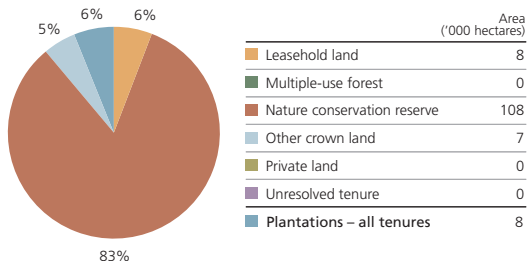


# State and territory summaries

# Australian Capital Territory

	Area ('000 hectares)	% Australian Capital Territory	% of national total
Land area	243	100	0.03
Native forest	123	51	<1
Plantation forest	8	3	<1
Forest cover	131	54	<1

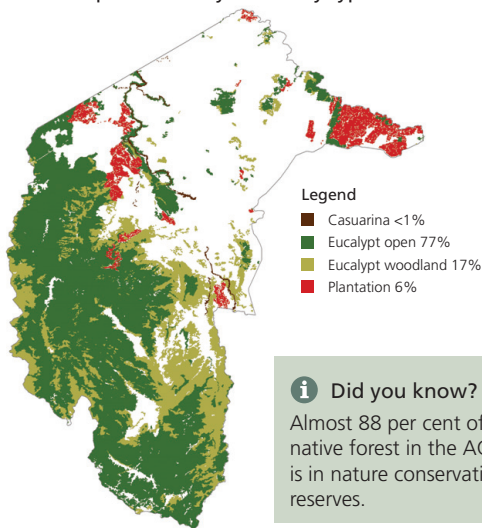
## Australian Capital Territory forest tenure



## ACT forestry and wood products industries

The ACT forest industries have contracted substantially since 2003, when bushfires destroyed two-thirds (10 500 hectares) of the territory's softwood plantations. About 1 563 people are employed in wood product manufacturing and marketing in the ACT.

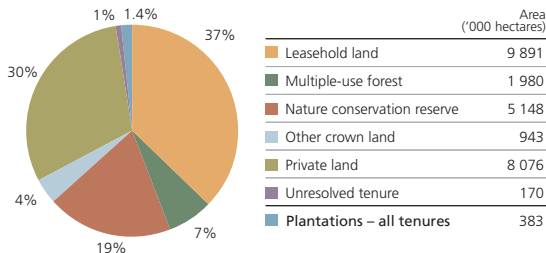
## Australian Capital Territory forests by type



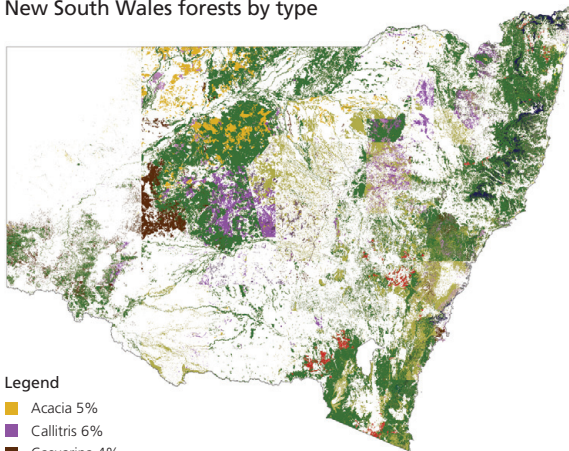
# New South Wales

	Area (‘000 hectares)	% New South Wales	% of national total
Land area	80 064	100	10
Native forest	26 208	33	18
Plantation forest	383	<1	19
Forest cover	26 591	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?

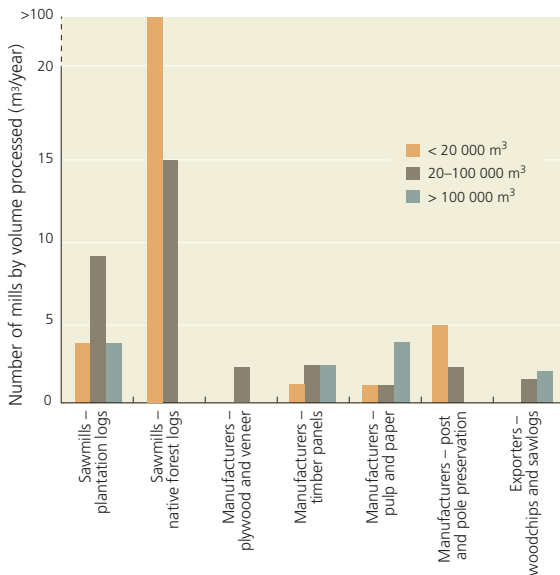
Forests NSW manages the largest plantation estate in Australia.

## **New South Wales forestry and wood products industries**

Census data for 2006 show a total of 23 792 people employed in the forestry and wood products manufacturing sectors in New South Wales. 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 and paper products industries are a major part of several regional communities in New South Wales. There are four local government areas (Oberon, Tumut, Bombala and Tumbarumba) in which more than 10 per cent of the labour force is directly employed in these industries.

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

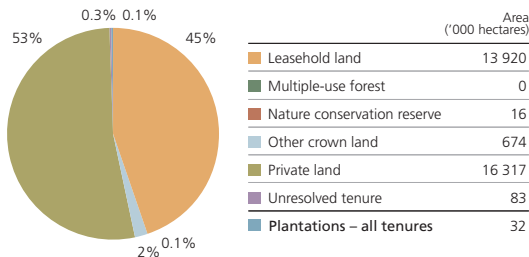


Note: More than 100 sawmills use native forest logs.

# Northern Territory

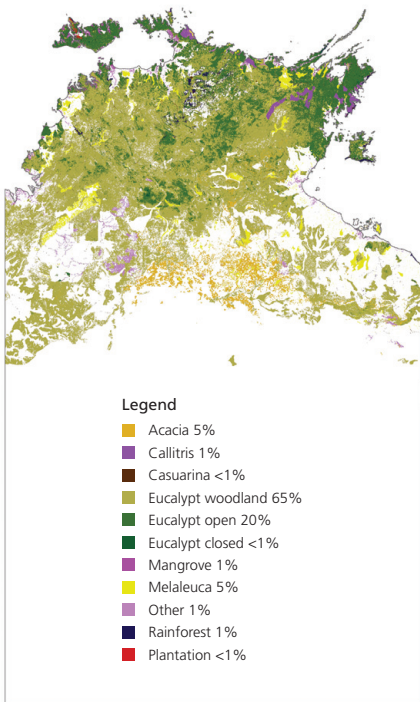
	Area (‘000 hectares)	% Northern Territory	% Australia
Land area	134 913	100	18
Native forest	31 010	23	21
Plantation forest	32	<1	2
Forest cover	31 042	23	21

## Northern Territory forest area by tenure





## Northern Territory forests by type



## Northern Territory forestry and wood products industries

The Northern Territory forest industry is largely based on hardwood plantations and the Indigenous arts and crafts industry, which uses material from native forests. A national survey identified 339 people employed in the timber industry in the Northern Territory. This is likely to be an underestimate because in Indigenous communities the art and crafts industry can amount to more than 40 per cent of a community's cash income.

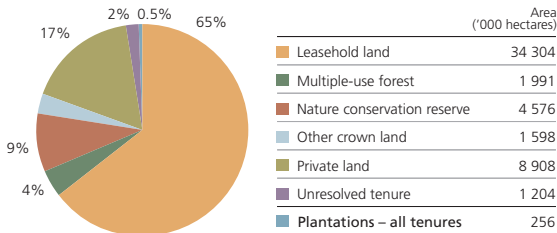
### Did you know?

Kakadu National Park in the Northern Territory is the largest nature conservation reserve in Australia, at nearly 2 million hectares.

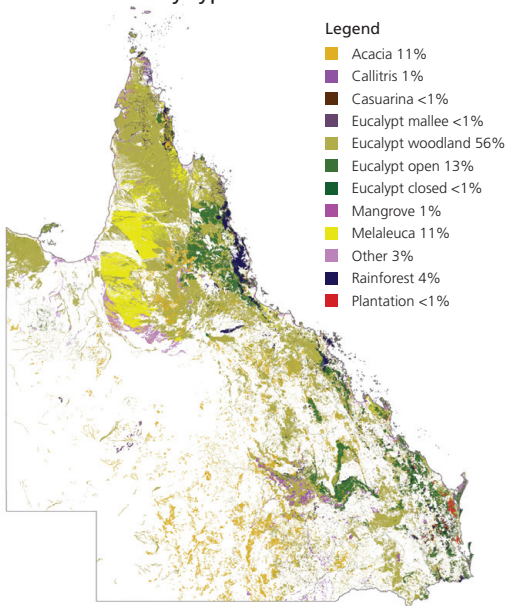
# Queensland

	Area (‘000 hectares)	% Queensland	% Australia
Land area	173 065	100	23
Native forest	52 582	30	36
Plantation forest	256	<1	13
Forest cover	52 838	31	35

## Queensland forest area by tenure



## Queensland forests by type



### **i** Did you know?

63 per cent of Australia's World Heritage rainforest is in Queensland.

## Queensland forestry and wood products industries

Census data for 2006 show a total of 14 825 people employed in the forestry and wood products manufacturing sectors in Queensland. When all businesses that depend on growing and using timber are included, total employment is estimated at nearly 20 000 people. There are 14 local government areas in which more than 3 per cent of the labour force is directly employed in these industries.

Some results from a survey of individual businesses that use logs from pine plantations are summarised below. No data about the hardwood plantation and native forest-based timber industries in Queensland are available.

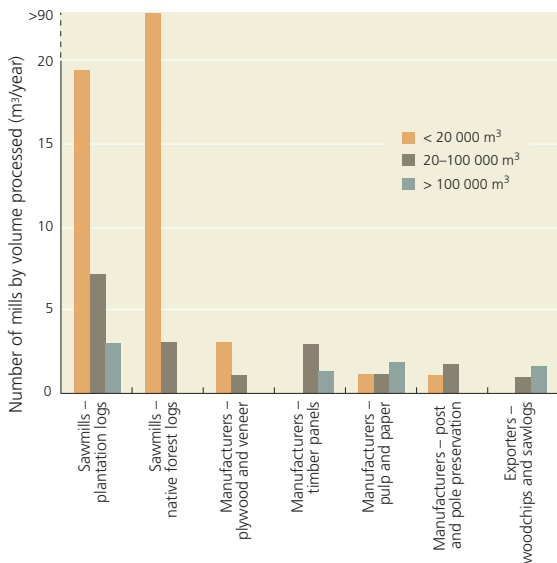


## Socioeconomic significance of Queensland's pine products industries

Socioeconomic indicator	Sawmills	Panel manufacturers	Other businesses	Total
Number of employees	847	775	131	1 754
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.

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

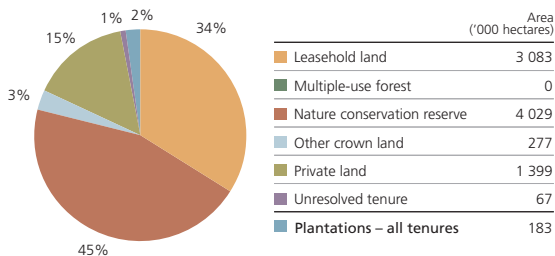


Note: More than 90 sawmills use native forest logs.

# South Australia

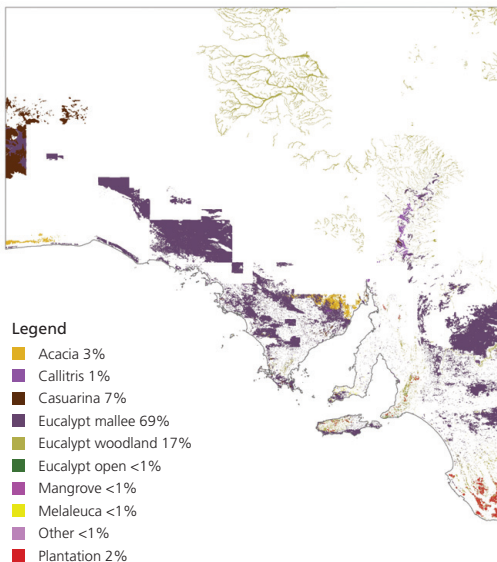
	Area (‘000 hectares)	% South Australia	% Australia
Land area	98 348	100	13
Native forest	8 855	9	6
Plantation forest	183	0.2	9
Forest cover	9 038	9	6

## South Australian forest area by tenure





## South Australian forests by type



### **i** Did you know?

All timber production in South Australia is from plantations.

## South Australian forestry and wood products industries

Census data for 2006 show a total of 7 470 people employed in the forestry and wood products manufacturing sectors in South Australia. 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 per cent of the region's land area, compared with about 72 per cent used for agriculture. Data on socioeconomic impacts are summarised in the following table.

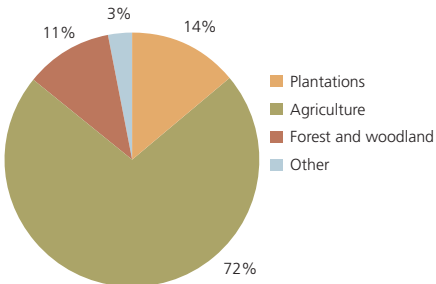
The value of output for forestry and wood products industries in the Green Triangle region was around \$1.2 billion in 2006–07. Gross regional product and employment data are shown in the following table.

## Socioeconomic significance of forestry and wood and paper products industries in the Green Triangle region, South Australia

Socioeconomic indicator	Contribution to gross regional production (\$ million)	Employment (number of jobs)	Household income (\$ million)
Direct impact	520	3 575	236
Proportion of regional total (%)	19	11	19
Total flow-on effects	239	3 921	148
Total impact (direct + flow-on)	759	7 496	384
Proportion of regional total (%)	28	22	30

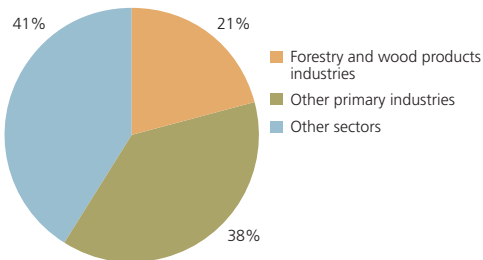
Source: EconSearch 2008, *The timber industry and lower Limestone Coast water allocation planning: socio-economic aspects*, EconSearch Pty Ltd, Marryatville, South Australia.

### Land use, south-eastern South Australia\*

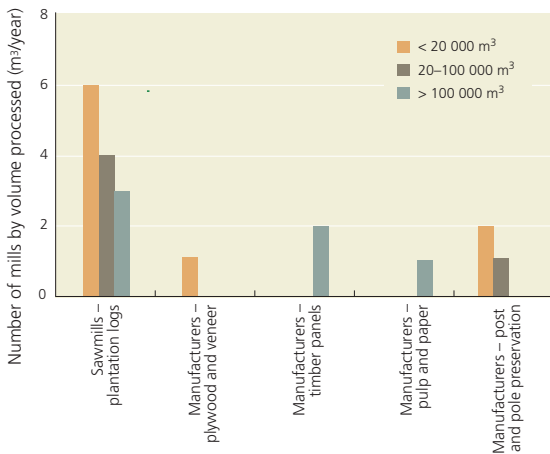


\* For Millicent Coast catchment land area with above 600 mm average annual rainfall.

### Employment, south-eastern South Australia, 2005



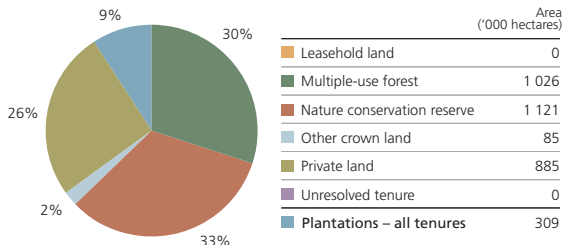
## Type, number and size of the main timber processing industries in South Australia



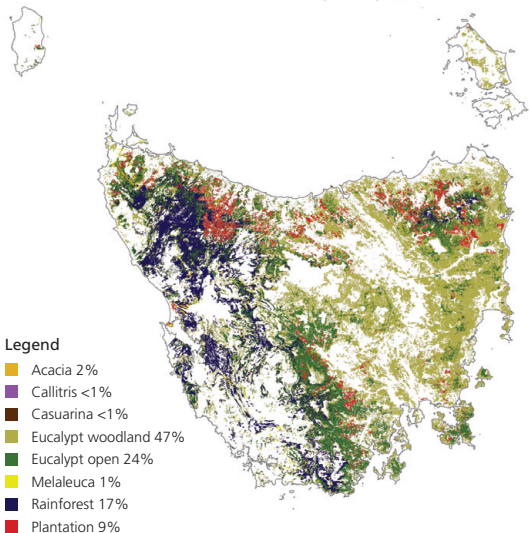
# Tasmania

	Area (‘000 hectares)	% Tasmania	% Australia
Land area	6 840	100	1
Native forest	3 116	46	2
Plantation forest	309	4	15
Forest cover	3 425	50	2

## Tasmanian forest area by tenure



## Tasmanian forests by type



### **i** Did you know?

Forty-seven per cent of Tasmania's native forests are in conservation reserves.

## Tasmanian forestry and wood products industries

Employment in Tasmania's forestry and wood products industries grew by 7.0 per cent between 2006 and 2008, from 6 510 people to 6 960 people. Between 2008 and 2010, there was a significant downturn in the industry and employment fell by 33.3 per cent. By September 2010, the number of people working in the forest industry had fallen to 4 650 people. Almost one-third of the reduction resulted from the closure of three processing facilities: the Burnie and Wesley Vale paper mills and a softwood sawmill at Scottsdale.

Employment in the forestry and wood products industries represented about 2 per cent of Tasmania's total employed labour force in 2010. Because most forestry and wood products industries employment is regionally based, employment in these industries exceeds 2 per cent of total employment in about 19 of the 26 Tasmanian local government areas.



Michael F. Ryan

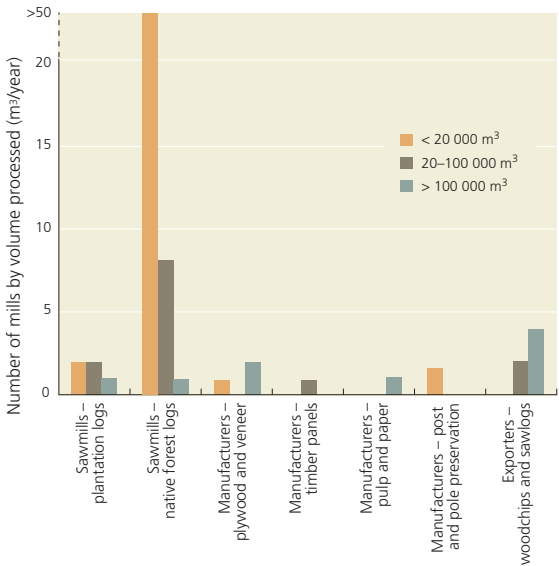


## Estimated employment by forest sector

	Number of people employed		Proportion of employment (%)
	2 006	2 008	2010
Native forest	3 459	3 172	2 033
Hardwood plantation	831	1 188	686
Softwood plantation	1 174	1 397	957
Unknown	1 044	1 207	972
Total	6 510	6 960	4 650
			100

Sources: Schirmer, J 2008, *Forestry, jobs and spending: Forest industry employment and expenditure in Tasmania, 2005–2006*, CRC for Forestry, Hobart. Schirmer, J 2010, *Tasmania's forest industry – Trends in forest industry employment and turnover 2006 to 2010*, CRC for Forestry, Hobart.

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

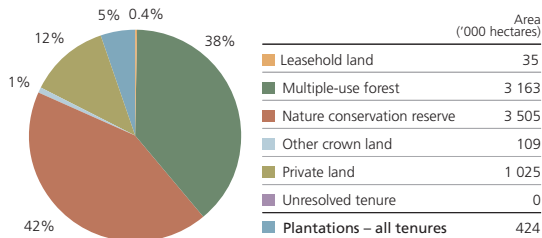


Note: More than 50 sawmills use native forest logs.

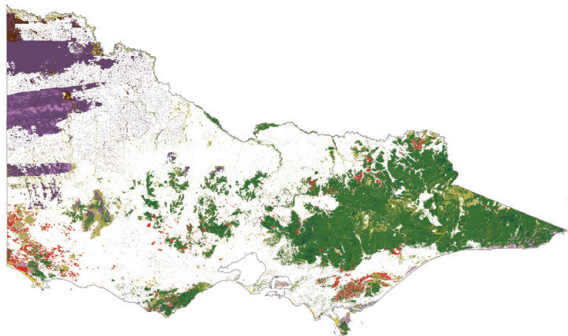
# Victoria

	Area (‘000 hectares)	% Victoria	% Australia
Land area	22 742	100	3
Native forest	7 837	34	5
Plantation forest	424	2	21
Forest cover	8 261	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%

### **i** Did you know?

Victoria has one of the longest running forest monitoring and research programs in the world. It has been operating in the mountain ash (*Eucalyptus regnans*) forests of the Central Highlands since 1983.

## Victorian forestry and wood products industries

Census data for 2006 show a total of 21 941 people employed in the forestry and wood products manufacturing industries in Victoria. When all businesses that depend on growing and using timber are included, total employment is estimated at about 32 000 people. There are 13 local areas in which more than 3 per cent of the labour force is directly employed in these industries.

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 socioeconomic effects in Gippsland are summarised below.



Mark Parsons

## Socioeconomic significance of Gippsland's wood products industries<sup>a</sup>

Socioeconomic indicator	Hardwood sawmills	Softwood sawmills	Pulp and paper mills	Total <sup>b</sup>
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

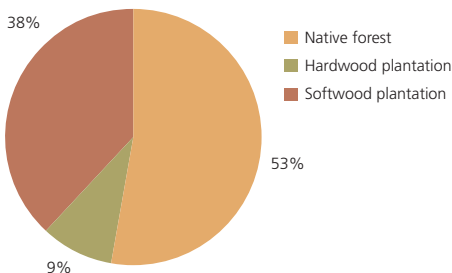
a The values shown are for primary processing. The annual value of production of processing logs and chips exported from the region was estimated at an additional \$315 million.

b Totals include other wood products industries.

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.

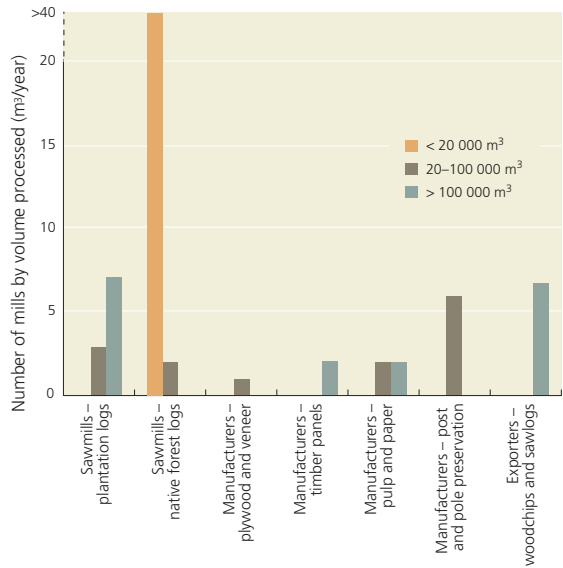
Employment in Gippsland's forestry and wood products industries was estimated to be 3 124 people. The proportions employed in the native forest, hardwood plantation and softwood plantation sectors are shown below. Adding flow-on effects, total employment was estimated to be 6 200 people.

### 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.

# Type, number, and size of the main wood processing industries in Victoria



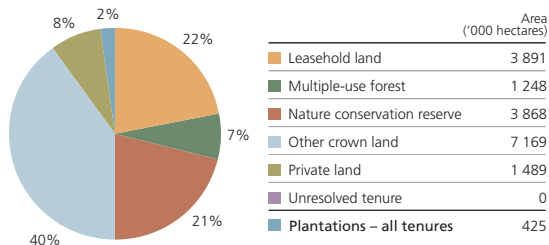
Note: More than 40 sawmills use native forest logs.



# Western Australia

	Area (‘000 hectares)	% Western Australia	% Australia
Land area	252 988	100	33
Native forest	17 664	7	12
Plantation forest	425	<1	21
Forest cover	18 089	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 wood products industries

Western Australian forestry and wood products industries employed an estimated total of 5 570 people in 2006. After allowing for part-time employment, the total number of full-time equivalent jobs was 5 090. The industries are concentrated in the Perth, Bunbury, Albany, Manjimup and Dardanup areas. The proportions employed in different industry sectors are shown in the following tables.



Sandalwood harvested in Western Australia is used to make incense and other products.

## Employment in Western Australian forestry and wood products industries

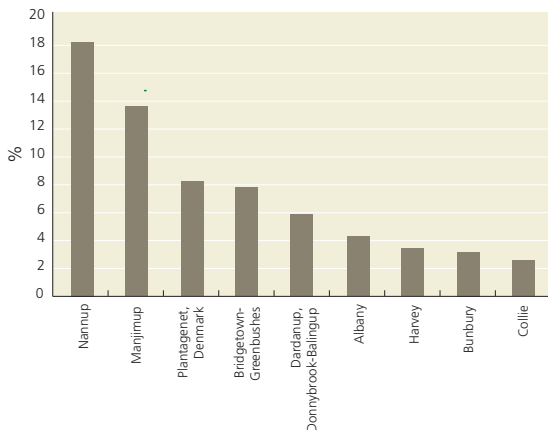
Employment by forestry industry sector	Proportion of total employment (%)
Forest growers	3.1
Combined forest growers and log processors	3.9
Log processors	62.7
Contractors, service providers and nurseries	30.3
Total	100.0

Employment by forest sector	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.

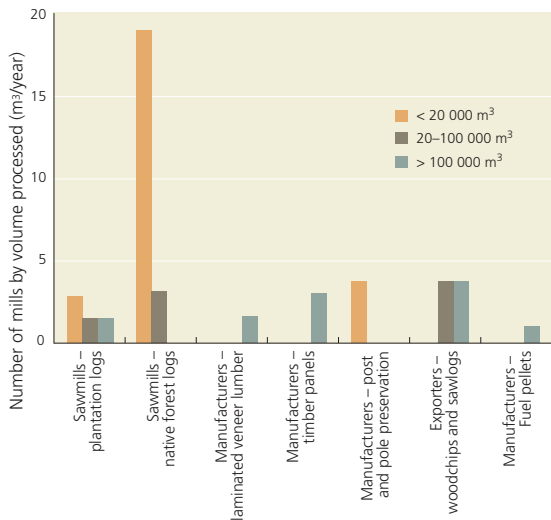
The local government areas where the largest proportions of the workforce are directly dependent on the forestry and wood products industries are shown on the following graph. Forest industry employment is less than 3 per cent of total employment in all other local government areas in Western Australia.

### 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*, CRC 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 are 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 and Sciences (ABARES) compiles and publishes quarterly forest and wood products statistics derived from a range of sources. Production data are from ABARES 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

ABARE-BRS 2010, *Australian forest and wood products statistics*, March and June quarters 2010, Australian Bureau of Agricultural and Resource Economics – Bureau of Rural Sciences, Canberra.

BRS 2008, *State of Australia's forests*, fact sheet series of eight titles: Type and extent, Carbon, Certification, Conservation, Employment, Fire, Sustainable yield and Water. Bureau of Rural Sciences, Canberra.

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.

Gavran, M and Parsons, M, 2010, *Australia's Plantations 2010 Inventory Update*, Bureau of Rural Sciences, Canberra.

Montreal Process Implementation Group for Australia 2008, *Australia's State of the Forests Report 2008*, Bureau of Rural Sciences, Canberra.

Parsons, M, Gavran, M and Davidson, J, 2006, *Australia's Plantations 2006*, Bureau of Rural Sciences, Canberra.

Parsons, M, Frakes, I, and Gavran, M, 2007, *Australia's Plantation Log Supply 2005–2049*, Bureau of Rural Sciences, Canberra.



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For more information about Australia's forests:

[www.abares.gov.au/forestsaustralia](http://www.abares.gov.au/forestsaustralia).

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