



Australian Government

Department of Agriculture
and Water Resources

ABARES

Australia's State of the Forests Report 2018

Executive summary



A five-yearly report prepared by the Montreal Process Implementation Group
for Australia and the National Forest Inventory Steering Committee
on behalf of the Australian, state and territory governments

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Cataloguing data

This publication (and any material sourced from it) should be attributed as:

Montreal Process Implementation Group for Australia and National Forest Inventory Steering Committee, 2018, *Australia's State of the Forests Report 2018 – Executive Summary*, ABARES, Canberra, December. CC BY 4.0.

ISBN 978-1-74323-419-8.

This publication, together with underpinning data, is available at www.agriculture.gov.au/abares/forestsaustralia/sofr/sofr-2018 and www.agriculture.gov.au/abares/publications.

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Design by Fusebox Design | Printed by Union Offset Printers

Cover page includes the logo of the Montreal Process Working Group on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests.

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Back cover images: Eastern Spinebill (*Acanthorhynchus tenuirostris*). Photo: Shutterstock/David Lade. Royal National Park and Hacking River. Photo: iStockphoto/Katharina13. Carpenters at work. Photo: Shutterstock/Tyler Olson. Beerburum State Forest, Sunshine Coast. Photo: Shutterstock/Visual Collective.

This page: Forest in Tasmania. Photo: iStockphoto/Gudella.

The Australian Government Department of Agriculture and Water Resources acknowledges the traditional custodians of country throughout Australia and their continuing connections to land, sea and community. We pay our respect to their cultures and elders past, present and future.

Australia's State of the Forests Report 2018

Executive summary

Australia's State of the Forests Report 2018 (SOFR 2018) is the fifth in a series of national five-yearly reports on Australia's forests, and covers a range of social, economic and environmental values. Previous national SOFR reports were published in 1998, 2003, 2008 and 2013.


As far as possible, SOFR 2018 presents data for the five-year period between July 2011 and June 2016. However, the varied nature of available data means that not all reported figures cover this range. SOFR 2018 also reports trends over longer periods of time where this is possible.

Australia's forests are recognised and valued for their diverse ecosystems and unique biodiversity; for their cultural heritage; for their provision of goods and services such as wood, carbon sequestration and storage, and soil and water protection; and for their aesthetic values and recreational opportunities. At the same time, Australia's forests are subject to a range of pressures, including extreme weather events, drought and climate change; invasive weeds, pests and diseases; changed fire regimes; clearing for urban development, mining, infrastructure or agriculture; and the legacy of previous land-management practices.

The sustainable management and conservation of Australia's forests, whether on public or on private land, requires a sound understanding of their extent, type, use and management. SOFR 2018 provides comprehensive information from a wide range of sources that can contribute to a better understanding of the broad range of values relating to Australia's forests and their current management.

The information presented in SOFR 2018 covers primarily the five-year period from 2011 to 2016, or otherwise using the best available data. The report is organised under a framework of seven criteria for sustainable forest management developed by the international-level Montreal Process Working Group on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests, and then under 44 separate indicators. This Executive Summary draws together data from the material presented under these 44 indicators into a number of key themes.

Australia's State of the Forests Report 2018 is available at www.agriculture.gov.au/abares/forestsaustralia/sofr/sofr-2018.

 This icon indicates data, maps or graphics from *Australia's State of the Forests Report 2018 – Executive Summary* that are available for electronic download. Data used in figures and tables, together with higher resolution versions of maps, are available via www.doi.org/10.25814/5be12aa83aa34 and www.doi.org/10.25814/5be3bc4321162.

Australia's forest area

The area, type, tenure and management category of forests provides the base data for describing the state of Australia's forests, and changes over time.

Australia's forest area as at 2016

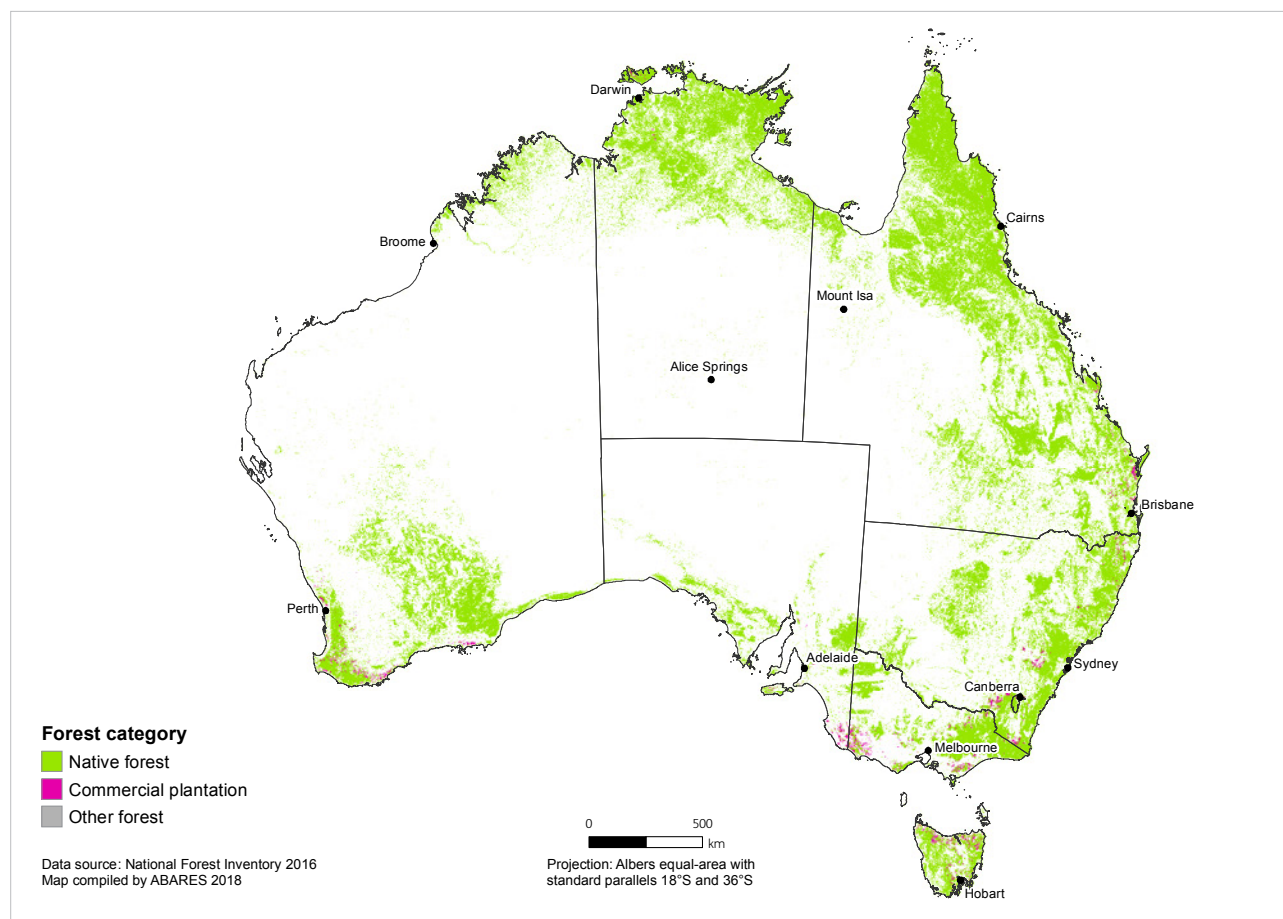
Australia has 134 million hectares of forest, covering 17% of Australia's land area. Australia has approximately 3% of the world's forests, and globally is the country with the seventh largest forest area.

Queensland has the largest area of forest (39% of Australia's forest), with the Northern Territory (18%), Western Australia (16%), and New South Wales (15%), making up much of the balance.

Australia's forests can be divided into three categories:

- 'Native forest' – 132 million hectares, 98% of Australia's forest area
- 'Commercial plantations' – 1.95 million hectares, 1.5% of Australia's forest area
- 'Other forest' – 0.47 million hectares, 0.4% of Australia's forest area, and comprising mostly non-commercial plantations, and planted forests of various types.

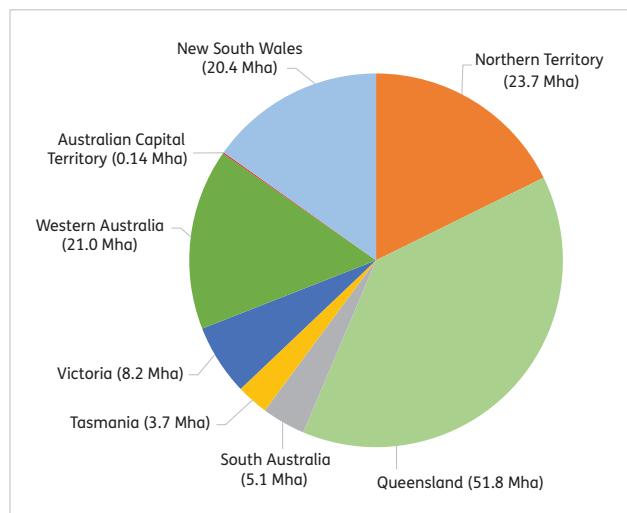
Australia's forests, by forest category



'Other forest' is not visible at this scale.

A higher resolution version of this map is available via www.doi.org/10.25814/5be3bc4321162

Australia's forest area, by jurisdiction



Mha, forest area in million hectares

The data used to create this figure are available in Microsoft Excel via www.doi.org/10.25814/5be12aa83aa34

The Indigenous forest estate

The area of forest over which Indigenous peoples and communities have ownership, management or special rights of access or use is known as the Indigenous forest estate. This is a total of 70 million hectares of forest (52% of Australia's forests), almost all of which is native forest.

The term 'Indigenous' is used throughout the SOFR series to encompass all Aboriginal and Torres Strait Islander peoples.

The Indigenous forest estate is classified into four broad ownership and management categories:

Indigenous owned and managed	Indigenous co-managed
Indigenous managed	Forest subject to 'Other special rights'

Native forest

Native forest is the most extensive category of Australia's forests, covering 132 million hectares.

Native forests are dominated by eucalypt forests (101 million hectares) and acacia forests (11 million hectares).

The majority of native forests (91 million hectares) are woodland forests, which have a canopy cover between 20% and 50%.

By ownership, most of Australia's native forests (88 million hectares) are in private and leasehold tenures. The area of native forest in formal nature conservation reserves is 22 million hectares, and the area of multiple-use public native forests is 10 million hectares.

The geographic distribution of these areas is presented later in this Executive Summary.

The area reported in SOFR 2018 for the Indigenous forest estate represents an increase of 28 million hectares over that previously reported.

- The increase has been driven primarily by an increase in the area of land over which Indigenous people have 'Other special rights', including through native title determinations and Indigenous Land Use Agreements.



Eucalyptus mannifera, Cuumbeun Nature Reserve, New South Wales.

Forest area change

Australia's forest area has increased progressively since 2008. The net increase in forest area over the period 2011 to 2016 was 3.9 million hectares.

This increase in forest area is due to the net effect of forest clearing or reclearing for agricultural use; regrowth of forest on areas previously cleared for agricultural use; expansion of forest onto areas not recently containing forest; establishment of environmental plantings; and changes in the commercial plantation estate.

- In each year of the period 2011–2016, the area of forest cleared or recleared was less than the area of forest regrowing from previous clearing.
- In the year 2015–16, first-time clearing was recorded for 60 thousand hectares of forest, 564 thousand hectares of forest regrew on land cleared after 1972, and reclearing of 395 thousand hectares of regrowth forest was recorded. The total area of forest recorded as cleared was 455 thousand hectares.

The change in forest area is determined from annual Landsat satellite data interpreted for Australia's National Greenhouse Gas Inventory.

- Temporary changes in forest area or canopy cover that result from a range of short-term factors, such as wildfire, wood harvesting, and regrowth or regeneration from these events, are not included in these area change figures.

Forest area data

The forest area dataset prepared for SOFR 2018 combines data from a wide range of different datasets, assembled using a Multiple Lines of Evidence methodology.

Data on Australia's forest area are assembled in the National Forest Inventory from a wide range of spatial datasets provided by states and territories, and from remotely sensed data sourced from various agencies. When these datasets disagree on whether an area is or is not forest, ABARES uses a formal process to determine the final allocation.

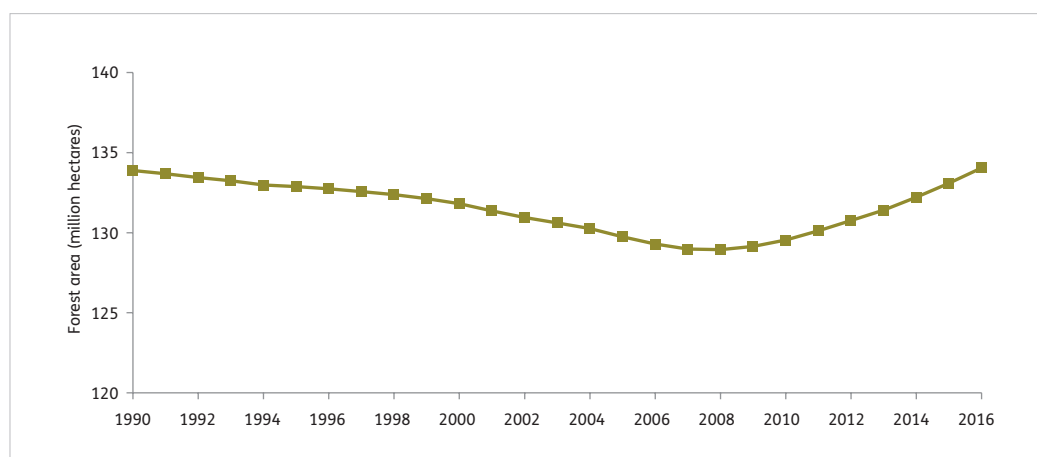
- The forest cover area statements in SOFR 2018 may therefore not align exactly with figures in individual datasets published in other Commonwealth reports or by individual states or territories.
- Spatial data for Commercial plantations are incorporated from the National Plantation Inventory.

SOFR 2013 reported a total forest area of 125 million hectares as at 2011, compared to the 134 million hectares of forest reported in SOFR 2018 as at 2016.

- Most of this difference in the understanding of Australia's forest extent derives from use of more accurate state, territory and national datasets and recent high-resolution imagery, not from actual on-ground changes in forest area.
- The change in reported forest area was greatest in the Northern Territory, where areas of woodland forest not reported as forest in SOFR 2013 have been identified, mapped, and reported as forest in SOFR 2018.

For further information on this theme, see Indicator 1.1a, Indicator 6.4a and Indicator 7.1d of *Australia's State of the Forests Report 2018*, available at www.agriculture.gov.au/abares/forestsaustralia/sofr/sofr-2018.

Australia's forest area since 1990



Calculated by ABARES from data in the National Inventory Report 2016, Australian Government Department of the Environment and Energy.

The data used to create this figure are available in Microsoft Excel via www.doi.org/10.25814/5be12aa83aa34

Forest biodiversity

In Australia, substantial emphasis is placed on the management of forest ecosystems for the conservation of biodiversity, including through the creation of reserves, development of management prescriptions, and identification and listing of threatened species.

Forest managed for protection of biodiversity

A total of 46 million hectares (35%) of Australia's native forest is on land protected for biodiversity conservation, or where biodiversity conservation is a specified management intent.

This area is the result of a range of formal and informal processes on both public and private land that are used to protect areas of forest for the conservation of biodiversity. Many areas of forest are protected by, and reported under, more than one process.

- Part of this area is contributed by Australia's National Reserve System, which includes 34 million hectares of forest (26% of Australia's native forests) that have a primary management intent of nature conservation.

Aichi Biodiversity Targets are articulated in the United Nations Strategic Plan for Biodiversity 2011–2020 under the international Convention on Biological Diversity, and include the target that at least 17% of terrestrial areas are protected. With 35% of Australia's native forest area managed for the protection of biodiversity, Australia has therefore met this Aichi Biodiversity Target with respect to native forests.

Forest biodiversity and threatened species

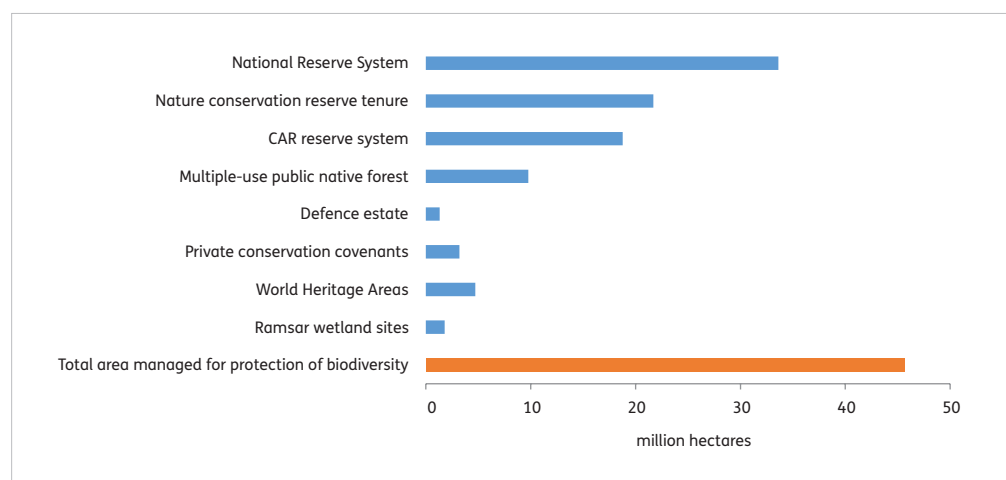
Australia's national lists of forest-dwelling species (species that use forests for part of their lifecycle) include 2,486 forest-dwelling native vertebrate fauna species (animals), and 16,836 forest-dwelling native vascular flora species (plants).

Of the forest-dwelling native vertebrate fauna species, 1,119 have been identified as forest-dependent species (species that require forest habitat for part of their lifecycle and could not survive or reproduce without it).

A total of 1,420 forest-dwelling fauna and flora species are listed as threatened species under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Of the listed threatened forest-dwelling fauna and flora species, 842 species are forest-dependent.

Area of native forest managed for protection of biodiversity, 2016, by protection process



Many areas of forest are protected under more than one process.

The data used to create this figure are available in Microsoft Excel via www.doi.org/10.25814/5be12aa83aa34

The most common threats to nationally listed forest-dwelling fauna and flora include forest loss from clearing for agriculture and urban and industrial development; impacts of predators; small population sizes; and unsuitable fire regimes.

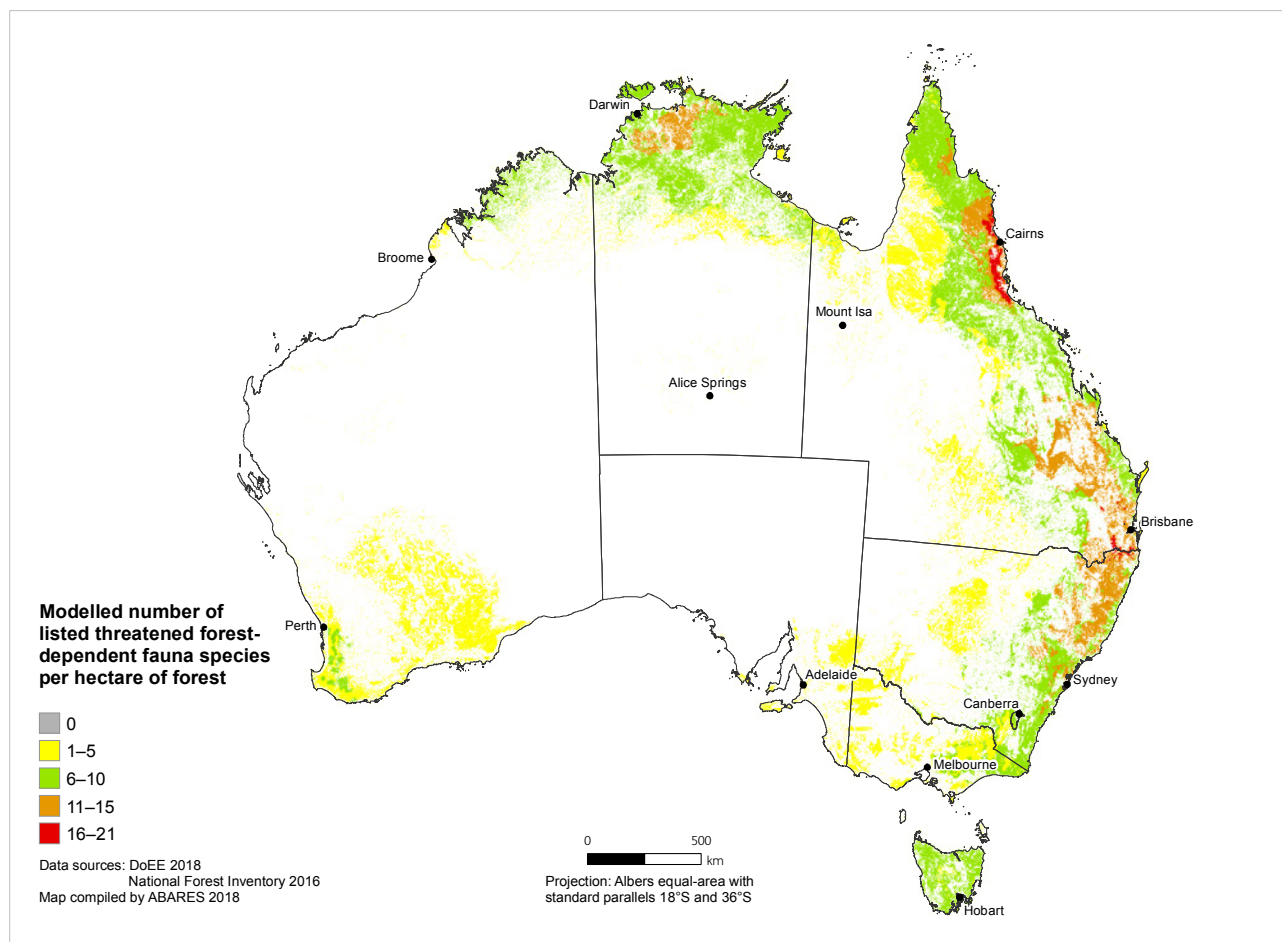
- For listed forest-dwelling fauna species, the most common threat categories are forest loss from clearing for agriculture and urban and industrial development, as well as predation by introduced predators.
- For listed forest-dwelling flora species, the most common threat categories are small population sizes, as well as mortality agents and unsuitable fire regimes.
- A total of 57% of Australia's listed threatened forest-dwelling fauna and flora species have genetic-related reasons contributing to their listing. This includes species with populations that are low in numbers or fragmented, or that have low genetic variability.
- Based on the emphasis given in listing advice documents in regard to their impacts, forestry operations pose a less significant threat to nationally listed forest-dwelling fauna and flora species compared with other threat categories.

The number of listed threatened forest-dwelling and forest-dependent flora and fauna species per hectare of forest have been separately modelled and mapped across Australia. As an example, the regions with the highest density of listed threatened forest-dependent fauna species are the coastal ranges between Townsville and Cooktown in north Queensland, and the border ranges between Queensland and New South Wales.

During the period 2011–16, a total of 68 forest-dwelling species were added to the national list of threatened species, and 77 forest-dwelling species were removed.

- Most additions were based on inherently small population sizes and/or ongoing impacts on habitat extent and quality, including impacts of introduced species and unsuitable fire regimes.
- Most removals of listed species were a result of improved information that indicated that species were no longer considered valid species or were not threatened.

Distribution of listed threatened forest-dependent fauna species



A higher resolution version of this map is available via www.doi.org/10.25814/5be3bc4321162



Rainbow Pitta (*Pitta iris*), a forest-dwelling bird, in Kakadu National Park, Northern Territory.

Australia's forest genetic resources are conserved by a variety of means, including in situ in Australia's native forest and in restoration plantings, as well as in commercial and environmental plantations, seed orchards, arboreta and seed banks.

- There are also tree-breeding and genetic improvement programs for at least 48 native wood-producing and oil-producing species and varieties
- Some Australian native forest species also form a dominant part of the hardwood plantation industry overseas.

For further information on this theme, see Indicator 1.1c, Indicators 1.2a–c and Indicators 1.3a–b of *Australia's State of the Forests Report 2018*, available at www.agriculture.gov.au/abares/forestsaustralia/sofr/sofr-2018.

Forest condition and function

Australia's forests provide a range of ecosystem services in regards to biodiversity, carbon, soil and water. The extent to which these ecosystem services are delivered varies with forest growth stage, with the degree of fragmentation of the forest area, and as a result of the impacts of fire, climatic conditions, and pests and diseases.

Forest growth stage and old-growth forest

Australia's native forests comprise stands at regeneration, regrowth, mature and senescent growth stages, as well as stands of uneven-aged forest.

Data collected over the period 1995–2000 as part of Comprehensive Regional Assessments for Regional Forest Agreements showed that all forest growth stages were present on all tenures, although in different proportions.

- Considering the long time-spans over which forest development occurs, the distribution of growth stages across tenures is unlikely to have changed since data on growth stage were collected.

Old-growth forest is not a specific growth stage, but is defined in relation to stand structure, as 'ecologically mature forest where the effects of disturbance are now negligible'.

- The area of old-growth forest in Regional Forest Agreement regions is calculated to have decreased by 0.5 million hectares between the signing of Regional Forest Agreements and 2016.
- The majority of this decrease occurred in Victoria, almost entirely due to bushfires in the decade to 2009.

Forest fragmentation

The majority of Australia's native forest is continuous, not fragmented.

Forest fragmentation describes the extent to which forest areas are separated by or adjoin non forest areas. It can be assessed as the proportion of forest that is completely bounded by other forest, or alternatively as forest patch size.

- At the 1-hectare scale, 72% of Australia's native forest area is comprised of areas that are completely bounded by forest.
- A total of 68% of Australia's native forest is in patches of over 100 thousand hectares.

Native forest that is not fragmented is found in forested areas of higher rainfall, as well as in regions that have experienced the least clearing for agricultural land use, and in nature conservation reserves.

The most fragmented forests occur in drier regions where woodland forest naturally borders areas of vegetation with lower tree canopy cover, as well as in areas with higher impacts from historical land clearing for agriculture and from urban development.

Forest fire

The total area of forest in Australia burnt one or more times during the period 2011–12 to 2015–16 was 55 million hectares (41% of Australia's total forest area). Areas that burnt more than once during this period were more likely to be in northern Australia.

Of the cumulative area of fire in forests over this period, 69% was unplanned fire.

The annual area of fire in Australia's forests in the period 2011–12 to 2015–16 varied from a high value of 27.4 million hectares in 2012–13, to a low value of 14.9 million hectares in 2015–16.

- The cumulative area of fire in forest across this period (the sum of the forest fire areas for each of the five years) was 106 million hectares.
- The largest cumulative areas of fire in forests were in northern Queensland and the Northern Territory.
- However, this figure includes large areas of forest, especially in northern Australia, that were burnt in more than one of the five years comprising this period.

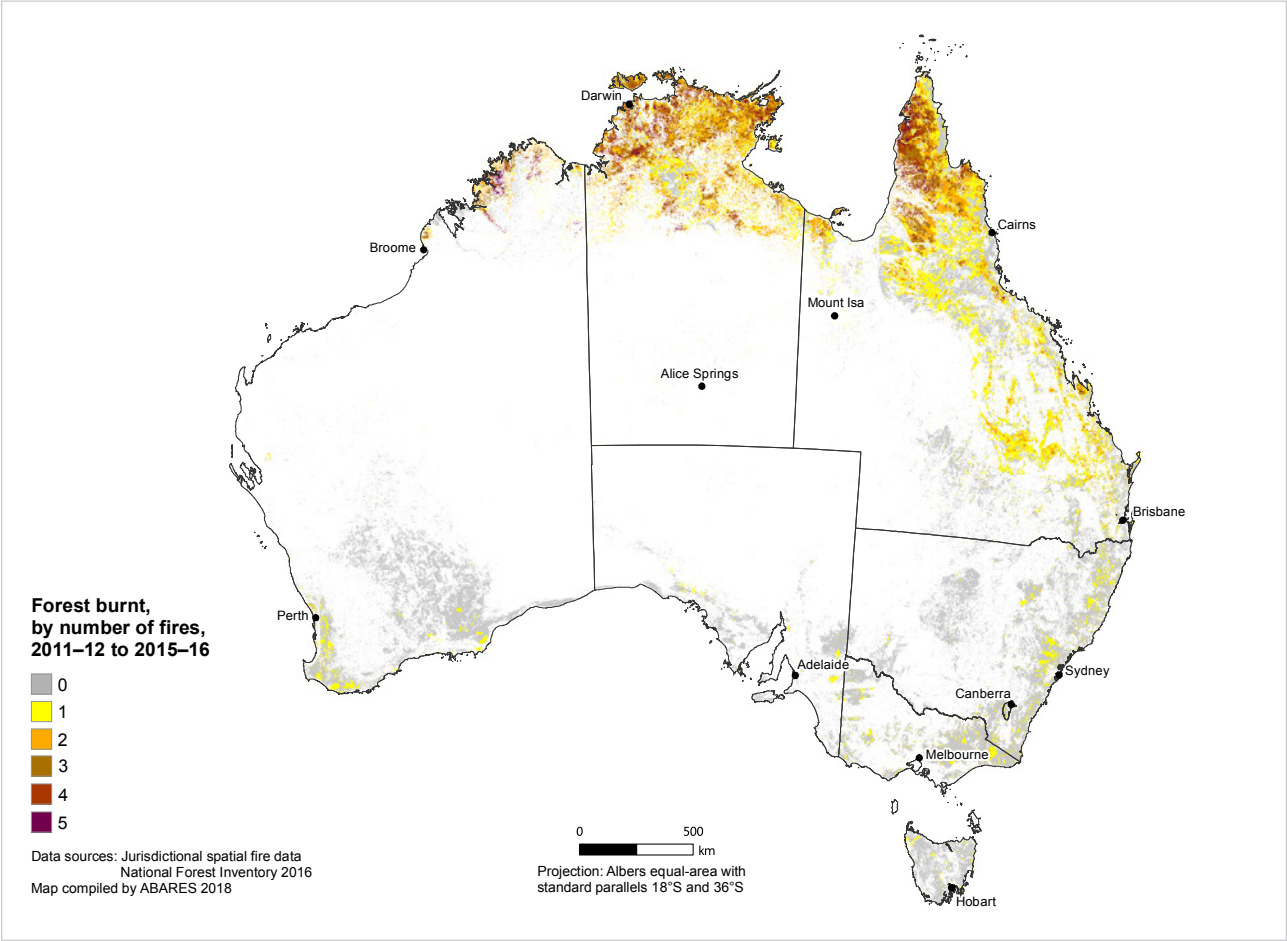
When areas of forest burnt in multiple years are allowed for, the total area of forest burnt one or more times during the period 2011–12 to 2015–16 was 55 million hectares (41% of Australia's total forest area). The balance (59% of Australia's forest area) did not experience fire in this period.

- Tasmania (6% of its forest area) and South Australia (6%) had the lowest proportions of forest area burnt one or more times during this period.
- The Northern Territory (84%) had the highest proportion of forest area burnt one or more times during this period.

Planned fire is used as a forest management tool in fire-adapted forest types for forest regeneration, to promote regeneration after harvest, to maintain forest health and ecological processes, and to reduce fuel loads and thereby increase the ability to manage bushfires and protect vulnerable communities.

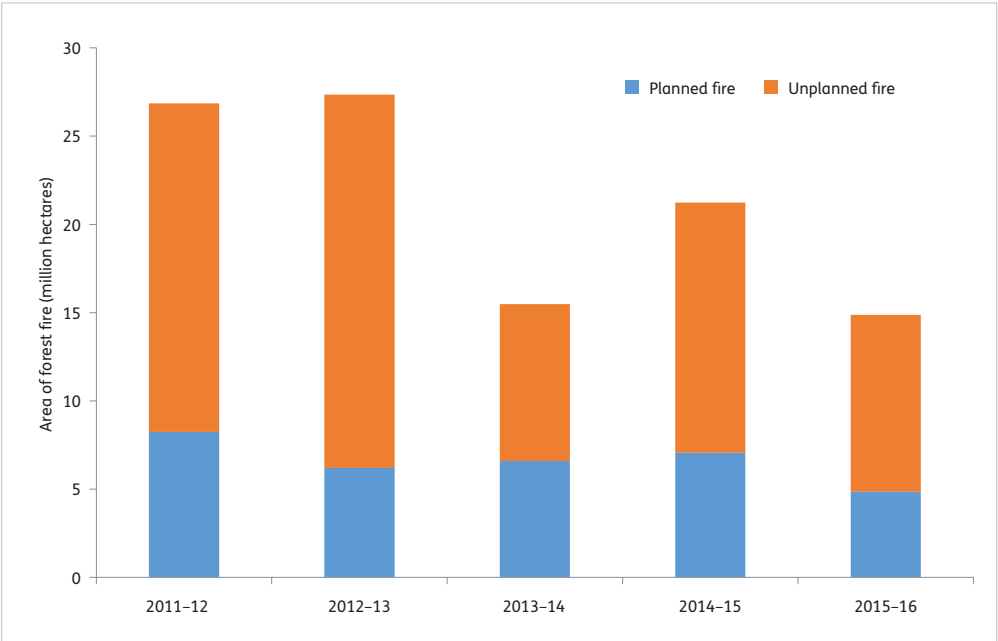
- Of the cumulative area of fire in Australia's forests in the period 2011–12 to 2015–16, 69% was unplanned fire and 31% was planned fire, as identified by state and territory fire management agencies.

Distribution of forest burnt by fire in the period 2011–12 to 2015–16, by fire frequency



A higher resolution version of this map is available via www.doi.org/10.25814/5be3bc4321162

Area of planned and unplanned forest fire



The data used to create this figure are available in Microsoft Excel via www.doi.org/10.25814/5be12aa83aa34

Forest carbon

Carbon stocks in Australia's forests increased by 0.6%, to 21,949 million tonnes, during the period 2011–16.

In addition, 94 million tonnes of carbon was present in wood and wood products in use in 2016, and 50 million tonnes of carbon in wood and wood products in landfill.

Forests contributed to the net sequestration by the land sector of an amount of carbon dioxide that offset 3.5% of total human-induced greenhouse gas emissions in Australia over this period.

A total stock of 21,949 Mt C (million tonnes of carbon) was stored in Australia's forests at the end of June 2016. Of this forest carbon store:

- 85% was stored in non-production native forests, 14% in production native forests and 1.2% in plantations¹⁰.
- 36% was in above-ground biomass and 64% was in below-ground biomass.

Over the period 2001–16, carbon stocks in forests have varied by no more than 0.7% of the total stock. Over the most recent five years (2011–16), forest carbon stocks increased by 129 Mt, due to a combination of recovery from past clearing, additional growth of plantations, reduced clearing of native forest, expansion of the area of native forests, and continued recovery from bushfire and drought.

In addition to carbon in forests, 94 Mt C was present in wood and wood products in use, and 50 Mt C in wood and wood products in landfill.

- Carbon stocks in both these pools increased steadily over the period 2001–16.
- Carbon stock in wood and wood products in use and in landfill increased by 25 Mt over the period 2001–16, which was greater than the 12 Mt decrease in carbon stocks in forests over this period.
- In total, 22,093 Mt C was held in Australia's forests plus harvested wood products at the end of June 2016.

These forest and wood products carbon stock figures are derived from the carbon stock data that are used to calculate emissions from the land-use, land-use change and forestry sector for Australia's National Greenhouse Gas Inventory. Those emissions values are determined according to the accounting rules specified under the United Nations Framework Convention on Climate Change or the Kyoto Protocol, and cannot simply be related to differences in forest carbon stocks over time.

During the period 2011–16, the land-use, land-use change and forestry sector contributed net sequestration of an amount of carbon dioxide that offset 3.5% of total human-induced greenhouse gas emissions for this period in Australia. This was primarily due to sequestration through forest growth and forest management practices exceeding emissions from activities such as land clearing.

Forest soil and water

A total of 27% of Australia's forests are managed primarily for protective functions, including protection of soil and water values.

The area of Australia's public forest managed primarily for protective functions, including protection of soil and water values, is 36.6 million hectares (27% of Australia's total forest area).

- This area includes formal nature conservation reserves, informal reserves in multiple-use public forests, forests protected by prescription (such as steep slopes, erodible soil types and riparian – streamside – zones where harvesting and road construction are not permitted), and forested catchments managed specifically for water supply.

The forest practices systems in Australia's states and territories contain regulations and guidelines designed to prevent or mitigate soil erosion, protect soil physical properties, manage activities that could affect water yields, and manage risks to water quality. Processes are also in place to monitor and ensure compliance with measures that protect forest soil and water resources.

Carbon stored in forests and harvested wood products, 2001 to 2016

Forest category	Carbon (million tonnes)			
	2001	2006	2011	2016
Native forests	21,765	21,583	21,557	21,676
Plantations	190	222	252	258
Other forests	6	8	11	15
Total forest	21,961	21,813	21,820	21,949
Wood products in use	77	83	89	94
Wood products in landfill	42	46	49	50
Total wood products	119	129	138	144
Total forests and wood products	22,080	21,943	21,958	22,093

Source of data: Australian Government Department of the Environment and Energy.

The data used to create this table are available in Microsoft Excel via www.doi.org/10.25814/5be12aa83aa34.

¹⁰ Land uses as defined for the National Greenhouse Gas Inventory

Forest health

The range of native and established introduced pathogens and insect pests active during the period 2011–16 is comparable with previous reporting periods.

Myrtle rust is present in all states and territories except the Australian Capital Territory, South Australia and Western Australia. Forests continue to be impacted by climatic conditions.

A total of 25 introduced vertebrate pest species, and 110 weed species, were reported as having an adverse effect on forests in one or more jurisdictions.

- Introduced vertebrate pests with widespread adverse impacts on forests in one or more jurisdictions were deer, cats, rabbits, pigs, foxes and cane toads.
- Weed species with widespread adverse impacts on forests in one or more jurisdictions were Gamba grass, bridal creeper, Mission grass, lantana, St Johns wort, prickly pear, and blackberry.
- In most jurisdictions, a greater number of vertebrate and weed species were reported as damaging to native forest in conservation reserves and in multiple-use public forests, than to plantations.

The range of native and established introduced pathogens and insect pests active during the period 2011–16 is comparable with previous reporting periods.

- However, for several of the insect pests of plantations previously reported to be most damaging, there were sharp declines over this period in the number of populations that required management.

Myrtle rust is present in all eastern states of Australia and in the Northern Territory.

- Subtropical wet sclerophyll forest or rainforest communities that have mid-storey and understorey layers rich in species of the Myrtaceae family are being severely altered by myrtle rust, with populations of two widespread species, *Rhodamnia rubescens* and *Rhodomyrtus psidioides*, in rapid local decline.

Forests affected by extended drought in southern Australia commenced recovery in the period 2011–16, and the activity of secondary pests and pathogens that attacked drought-stressed trees declined. However, the trend of increasing mean annual temperatures for Australia continued during the period 2011–16, with each year between 2013 and 2016 setting a new record for annual average temperature.



Historic water wheel, Lowden Forest Park, New South Wales.

Most of the forests that suffered extensive damage from tropical cyclone Yasi in 2011 are also recovering. In February 2015, tropical cyclone Marcia caused significant damage to pine plantations in the Byfield area, Queensland, and 600 thousand cubic metres of logs were salvaged from damaged plantations.

Extensive areas of mangrove along the southern coast of the Gulf of Carpentaria suffered rapid dieback and mortality in late 2015.

- The event coincided with unusually low sea-levels and several climate anomalies, which in combination are thought to have produced hypersaline conditions that were beyond levels tolerated by the mangrove species.

Australia has developed a Plantation Forest Biosecurity Plan and a National Forest Biosecurity Surveillance Strategy Implementation Plan to strengthen surveillance systems and minimise the threats from forest pests and pathogens.

For further information on this theme, see Indicator 1.1b, Indicator 1.1d, Indicators 3.1a–b, Indicators 4.1a–e, Indicator 5.1a and Indicator 6.1c of *Australia's State of the Forests Report 2018*, available at www.agriculture.gov.au/abares/forestsaustralia/sofr/sofr-2018.

Production forests

Australia's plantations and native forests provide for commercial production of wood products, under a range of silvicultural systems. Following harvest, areas are regenerated or replanted.

Commercial plantations

The area of commercial plantation was 1.95 million hectares in 2014–15. This area increased from 1990 to 2010, but reduced by 44 thousand hectares (2%) between 2010–11 and 2014–15.

The area proportion of commercial plantations where the trees are privately owned increased to 79% in 2014–15.

As determined from the National Forest Inventory spatial dataset, the area of commercial plantations in 2014–15 was 1.95 million hectares, comprising 1.0 million hectares of softwood species (mostly pines), 0.9 million hectares of hardwood species (mostly eucalypts), and 0.01 million hectares of unknown or mixed species plantations.

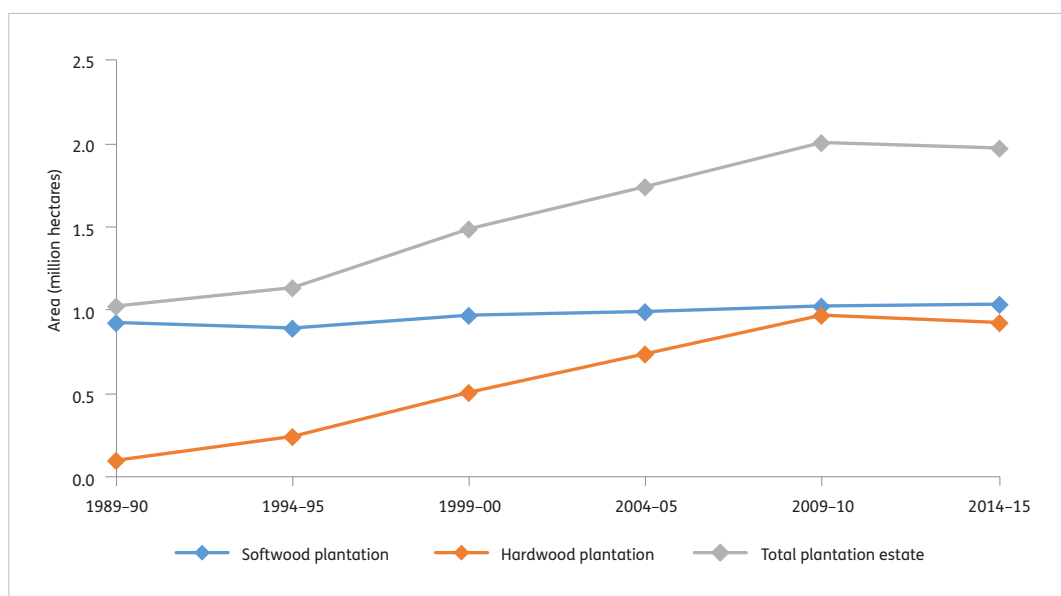
The area of commercial plantations reduced by 44 thousand hectares (2%) between 2010–11 and 2014–15.

- This change reflects a combination of plantation land that was not commercially productive being converted to agricultural or other land uses, and revisions of area figures on land use by plantation managers.
- The area of commercial softwood plantations increased by 1% between 2010–11 and 2014–15, while the area of commercial hardwood plantations decreased by 5%.

The area proportion of Australia's commercial plantation estate where the trees are owned by government organisations decreased from 24% to 21% between 2010–11 and 2014–15, while the proportion where the trees are privately owned increased from 76% to 79%.

The average rate of re-establishment of commercial plantations after harvest between 2011–12 and 2015–16 was 38,500 hectares per year. Across different jurisdictions over this period, the average area proportion of re-established commercial plantation that met stocking standards varied between 93% and 99%.

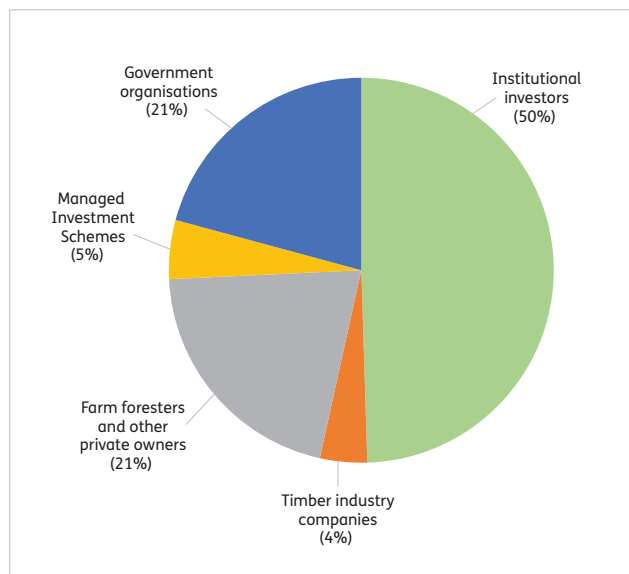
Australia's commercial plantation area, 1989–90 to 2014–15



Total plantation estate data for 1999–2000 to 2014–15 also includes plantations in the 'Unknown or mixed' category.

The data used to create this figure are available in Microsoft Excel via www.doi.org/10.25814/5be12aa83aa34

Ownership of Australia's commercial plantations, 2014–15



Ownership data refer to ownership of trees. Joint venture arrangements between government agencies and private owners are included under 'Government organisations' where government is the manager of the plantation resource.

Note: totals may not tally due to rounding.

The data used to create this figure are available in Microsoft Excel via www.doi.org/10.25814/5be12aa83aa34

Production native forest

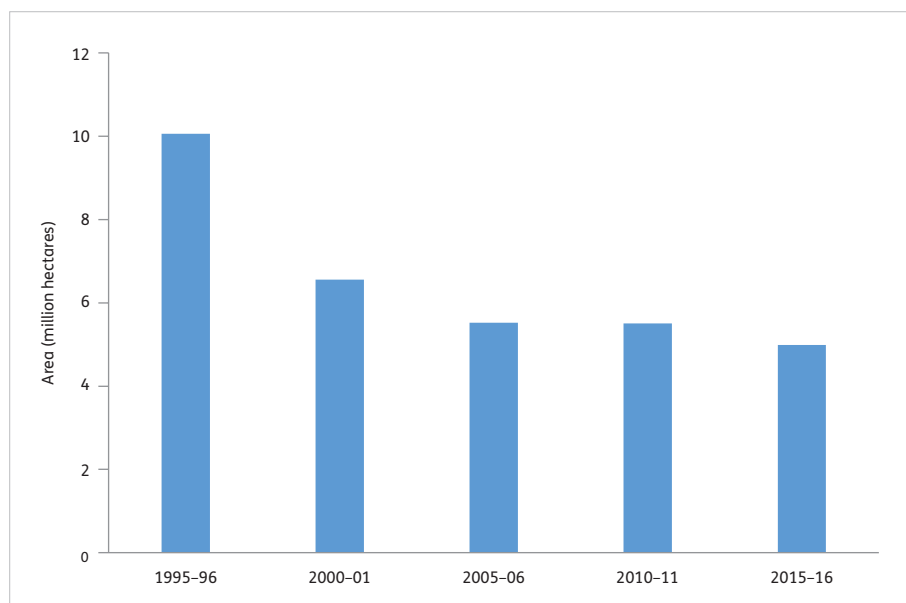
The extent of native forest that is available and suitable for commercial wood production on private and public land was 28.1 million hectares in 2015–16. This area decreased from 2011–12 to 2015–16.

The net harvestable area of multiple-use public native forests was 5.0 million hectares in 2015–16. This area also decreased from 2010–11 to 2015–16.

The extent of native forest that is available and suitable for commercial wood production was 28.1 million hectares in 2015–16. This is a decrease from 29.3 million hectares in 2010–11.

- This area of 28.1 million hectares includes 21.8 million hectares on leasehold and private tenure. However, much of this area is rated as low commerciality (on the basis of its suitability for commercial wood production), is isolated from markets, and harvesting is not financially viable, and is therefore used predominantly for grazing or for other purposes.
- This area of 28.1 million hectares also includes 6.3 million hectares of multiple-use public native forests, much of which is located in the higher rainfall areas of south-west, south-east and eastern Australia.
- When additional exclusions and restrictions to manage non-wood values are taken into account, this available and suitable area of multiple-use public native forests is further reduced to a 'net harvestable area' of 5.0 million hectares. This is a decrease from 5.5 million hectares in 2010–11.
- The decreases in these area measures from 2011–12 to 2015–16 mostly resulted from transfer of areas of multiple-use public native forest to nature conservation reserves, as well as increases in areas to which harvesting restrictions apply.

Net harvestable area of multiple-use public native forest



Area figures do not include harvestable areas on leasehold or private lands accessible to public forest agencies for wood harvesting.

The data used to create this figure are available in Microsoft Excel via www.doi.org/10.25814/5be12aa83aa34

The average annual area of multiple-use public native forest from which wood was harvested decreased to 78 thousand hectares over the period 2011–12 to 2015–16.

Within this area, the proportion harvested by clearfelling systems decreased to 9%.

The average annual area of multiple-use public native forests harvested in Australia in the period 2011–12 to 2015–16 was 78 thousand hectares.

- This is a 24% decrease from the annual average of 102 thousand hectares for the period 2006–07 to 2010–11, which in turn was a 21% decrease from the annual average of 129 thousand hectares for the period 2001–02 to 2005–06.
- The total area harvested on multiple-use public native forests in 2015–16, 73 thousand hectares, is 1.5% of the net harvestable area of public native forest, and 0.75% of the total area of multiple-use public native forest.

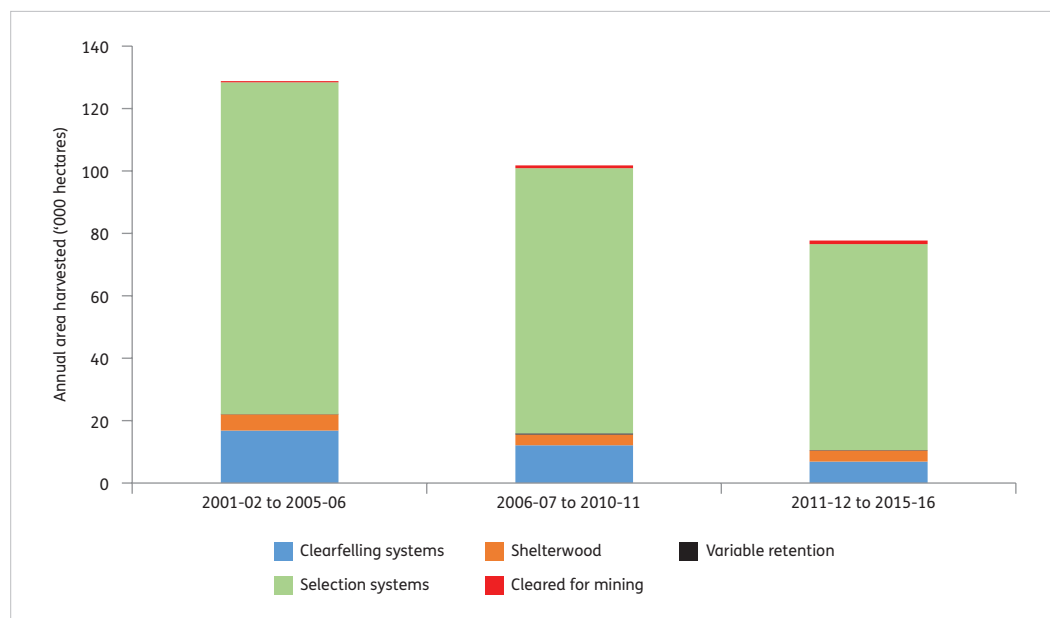
A range of silvicultural systems are used for forest harvesting.

- Of the area of multiple-use public native forest harvested over the period 2011–12 to 2015–16, 86% was harvested using selection systems (selection, native cypress pine silviculture and commercial thinning), 9% by clearfelling systems (clearfelling, fire-salvage clearfelling and intensive silviculture with retention), 5% by shelterwood systems, and 0.2% by variable retention systems.
- The annual average area harvested by clearfelling systems decreased from 17 thousand hectares in 2001–02 to 2005–06, to 12 thousand hectares in 2006–07 to 2011–12, to 7 thousand hectares in 2011–12 to 2015–16.

Across the period 2011–12 to 2015–16, the annual average proportion of harvested multiple-use public native forest that was effectively regenerated, as assessed against stocking standards, was 79% in New South Wales, 100% for Queensland, 95% for Tasmania and 92% for Victoria. For Western Australia, the level of regeneration was assessed as adequate, with more detailed reporting to be provided in the mid-term performance review of the *Forest Management Plan 2014–2023*.

For further information on this theme, see Introduction, Indicator 1.1a and Indicators 2.1a–c of *Australia's State of the Forests Report 2018*, available at www.agriculture.gov.au/abares/forestsaustralia/sofr/sofr-2018.

Average annual area harvested from multiple-use public native forest, by silvicultural system



The area of variable retention harvesting is not visible at this scale. Jarrah forests in Western Australia that are harvested as part of clearing for bauxite mining are shown as 'cleared for mining'. The three time-periods refer to the reporting periods for SOFR 2008, SOFR 2013 and SOFR 2018 respectively.

The data used to create this figure are available in Microsoft Excel via www.doi.org/10.25814/5be12aa83aa34

Harvested wood and non-wood products

Wood and non-wood products from Australia's forests make a substantial contribution to the economy and to society more generally. An increasing proportion of Australia's wood is produced in plantations.

Wood volumes harvested

Australia's log harvest in 2015–16 was 30.1 million cubic metres, a 13% increase from 2010–11.

The volume of logs harvested from commercial plantations increased over this period, and 86% of the total log harvest was derived from commercial plantations in 2015–16.

A progressive reduction in total native forest harvest volumes has occurred in all jurisdictions since the period 2001–06. The national harvest of sawlogs from private native forests has also declined progressively since that period.

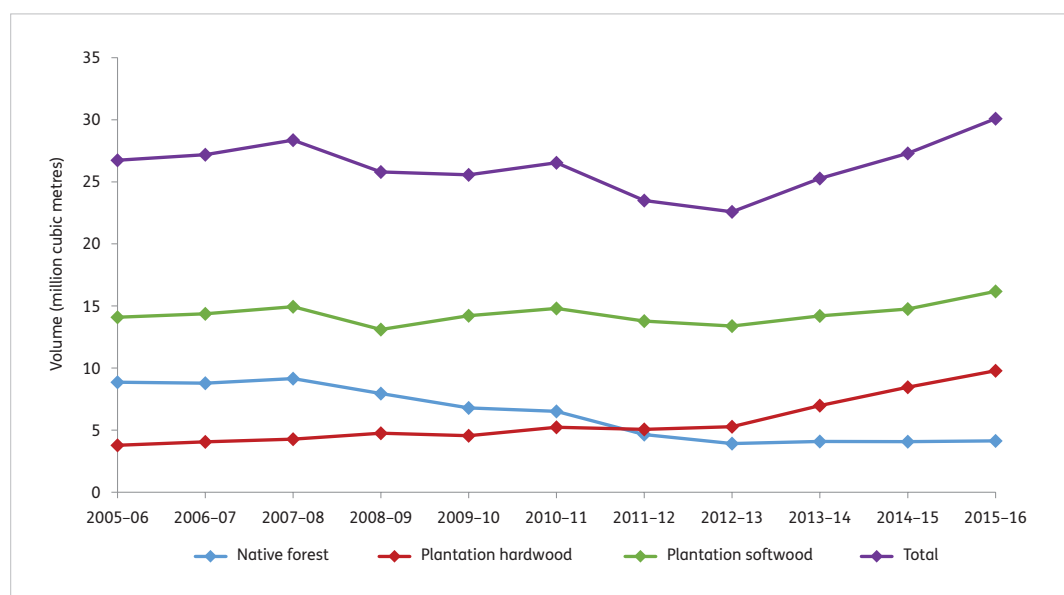
The total volume of Australia's log harvest in 2015–16 was 30.1 million cubic metres, a 13% increase from 26.5 million cubic metres in 2010–11.

Over the period 2010–11 to 2015–16, the volume of logs harvested from commercial hardwood and softwood plantations increased by 30%, from 20.0 million cubic metres to 26.0 million cubic metres.

- The volume of logs harvested in 2015–16 comprised 9.8 million cubic metres of plantation hardwood logs and 16.2 million cubic metres of plantation softwood logs.
- Over the period 2000–01 to 2015–16, the annual plantation hardwood pulplog harvest increased from 0.9 million cubic metres to 9.6 million cubic metres.
- Approximately 60% by volume of the total plantation log harvest in the period 2011–16 was sawlogs, and 39% by volume was pulplogs. However, of the total plantation hardwood log harvest in this period, only 2% by volume was sawlogs and 98% by volume was pulplogs.
- In 2015–16, 86% of the volume of logs harvested in Australia was from commercial plantations.

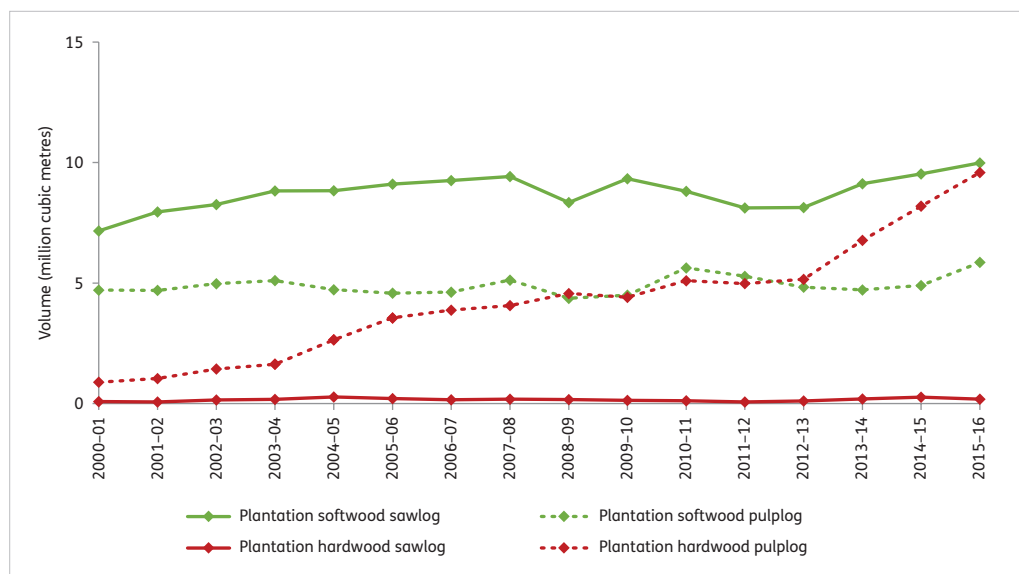
The availability of sawlogs and pulplogs for harvest from softwood plantations is expected to remain relatively constant over the period from 2015–19 to 2055–59. During the same period, the total availability of sawlog for harvest from hardwood plantations is expected to increase, while the total availability of pulplog for harvest from hardwood plantations is expected to decrease.

Volume of logs harvested from native forests and commercial plantations



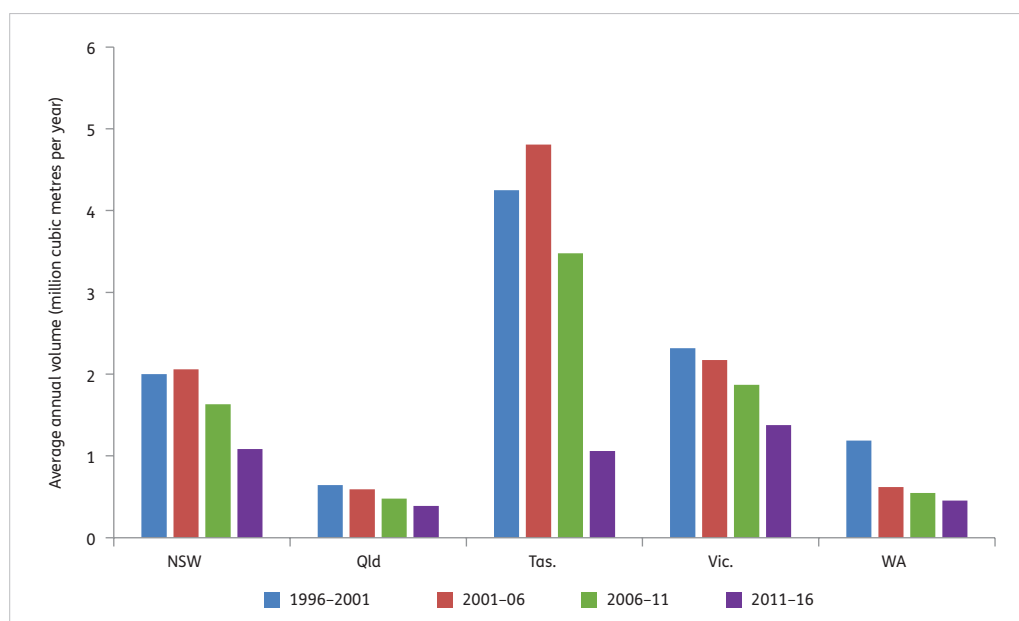
The data used to create this figure are available in Microsoft Excel via www.doi.org/10.25814/5be12aa83aa34

Volume of hardwood and softwood sawlogs and pulplogs harvested from plantations



The data used to create this figure are available in Microsoft Excel via www.doi.org/10.25814/5be12aa83aa34

Volume of logs harvested from native forests across Australia



No harvesting of public native forest occurs in Australian Capital Territory, the Northern Territory or South Australia.

The data used to create this figure are available in Microsoft Excel via www.doi.org/10.25814/5be12aa83aa34

Over the period 2010–11 to 2015–16, the volume of logs harvested from native forests declined by 37%, from 6.5 million cubic metres to 4.1 million cubic metres. A progressive reduction in native forest harvest volumes has occurred over the last 20 years in all jurisdictions in which there is harvesting of native forest, due to reduction in areas available for wood production, and changes in national and international markets.

The national harvest of sawlogs from private native forests has declined progressively since the period 2001–06. The reasons for this decline differ between states, and are not always clear.

Native forests remain the main source of hardwood sawlogs, because most hardwood plantations cannot be managed to produce sawlogs of comparable quality, although there

is on-going research on this topic. Native forest sawlogs are primarily used to make feature-grade sawn timber products.

Production from plantations and native forests can also be analysed as sawnwood, wood-based panels, and paper and paperboard. Over the period 2010–11 to 2015–16:

- The total volume of sawnwood production increased by 12%, from 4.6 to 5.1 million cubic metres.
- The total volume of wood-based panel production decreased by 2%, from 1.73 million cubic metres to 1.70 million cubic metres.
- The total weight of paper and paperboard production increased by 2%, from 3.16 million tonnes to 3.22 million tonnes.

In 2015–16, the value of logs harvested from native forests and commercial plantations was \$2.3 billion.

In 2015–16, the value of production of wood products industries was \$23.7 billion.

In 2015–16, the value added by the forest and wood products industries was \$8.6 billion, representing a contribution to Australia's gross domestic product of 0.52%.

The value of logs harvested from native forests and commercial plantations (calculated at the mill door) increased by 22% over the period 2010–11 to 2015–16, from \$1.9 billion to \$2.3 billion.

- The value of logs harvested from native forests decreased from \$0.50 billion to \$0.39 billion over this period.
- The value of logs harvested from commercial plantations increased from \$1.36 billion to \$1.88 billion over this period.

The value of production (total industry turnover, or sales and service income) of the wood products industries decreased by 2% over the period 2010–11 to 2015–16, from \$24.0 billion to \$23.7 billion.

- The value of sawnwood production decreased by 7%, from \$3.8 billion in 2010–11 to \$3.5 billion in 2014–15.
- The value of wood-based panel production decreased by 3%, from \$1.62 billion in 2010–11 to \$1.57 billion in 2015–16.
- The value of paper and paperboard production decreased by 4%, from \$10.9 billion in 2010–11 to \$10.5 billion in 2015–16.

The value added by the forest and wood products industries was \$8.6 billion in 2015–16, representing a contribution to Australia's gross domestic product of 0.52%. In 2010–11 the value added was \$8.3 billion, a contribution of 0.59%.

Sustainable harvest of native forests

The volume of sawlogs harvested from public native forests in the period 2011–12 to 2015–16 was within sustainable yield levels in New South Wales, Tasmania, Victoria and Western Australia, and was within the allowable cut in Queensland.

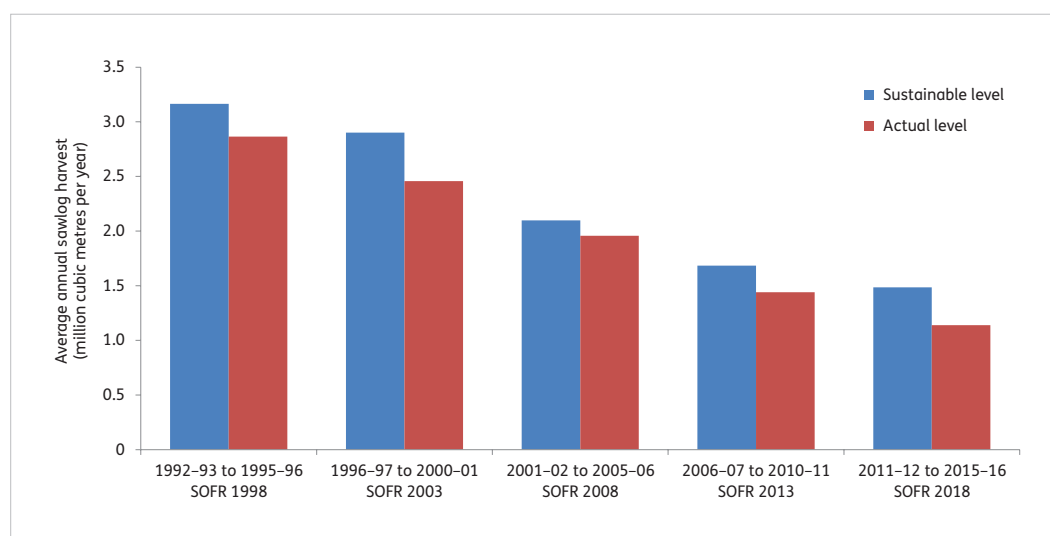
An average annual volume of 1.14 million cubic metres of high-quality sawlog was harvested from multiple-use public native forests (including other native forests where timber is owned by the Crown) nationally in the period 2011–12 to 2015–16.

- This is a 21% decrease from the annual average volume of 1.44 million cubic metres in the period 2006–07 to 2010–11, which in turn was a 26% decrease from the annual average of 1.96 million cubic metres for the period 2001–02 to 2005–06.

The sustainable annual yield of high-quality sawlogs from multiple-use public native forests is the yield that can be removed each year while ensuring maintenance of the functioning of the native forest system as a whole and the supply of wood products in perpetuity. This sustainable yield has declined by 53% from 1992–93 to 2015–16.

- Reasons for the decline in sustainable yield from multiple-use public native forests include the transfer of multiple-use public native forests into nature conservation reserves, increased restrictions on harvesting, revised estimates of growth and yield, and (especially in Victoria) impacts of occasional, intense broad-scale bushfires.

National average annual harvest and sustainable yield of sawlog from multiple-use public native forests



Includes harvest from private and leasehold native forests where timber rights are owned by the Crown.

The data used to create this figure are available in Microsoft Excel via www.doi.org/10.25814/5be12aa83aa34

However, the volume of sawlogs harvested from public native forests in each of the five reporting periods from 1992–93 to 2015–16 remained within sustainable yield levels in New South Wales, Tasmania, Victoria and Western Australia or within allowable tolerances, and was within the allowable cut in Queensland. No harvesting of public native forest occurs in the Australian Capital Territory, the Northern Territory, or South Australia.

Nationally, the sustainable yield of high-quality sawlogs from publicly managed native forests is forecast to continue to decline until the period 2030–34. After that time, it is forecast to increase slightly, given no further reductions in net harvestable area, and successful management of risk from wildfire, disease and climate change.

Non-wood forest products

Australia produces a wide range of non-wood forest products derived from forest fauna, flora and fungi, and many non-wood forest products supply commercial domestic and export markets. High-value non-wood forest products include wildflowers, seed, honey, and aromatic products derived from tea-tree and sandalwood.

Data on annual removals are limited for many non-wood forest products, but are available for some of the more commercially significant non-wood forest products such as tree ferns in Tasmania, eastern grey kangaroo and wallaroo in Queensland, Bennett's wallaby and brushtail possum in Tasmania, and honey nationally. Information on the production, consumption and trade of non-wood forest products is also often difficult to obtain because of the generally small size of industries based on these products and their dispersed nature.

Beekeeping is one of the largest non-wood forest product industries. Over the period 2011–16:

- an annual average of 20.8 thousand tonnes of honey was produced, much of which was derived from forested lands
- the annual volume of honey production declined by 17%
- the gross annual value of honey production increased by 39%, to \$110 million.



Banksia inflorescence, Queensland.

Consumption, trade and recycling of wood products

Australia's trade in wood products experienced strong growth over the past decade, with the sum of imports and exports (total merchandise trade) exceeding \$8 billion for the first time in 2015–16.

Australia continues to be a net importer of wood and wood products.

The patterns of annual consumption of forest products in Australia changed over the period 2010–11 to 2015–16.

- Annual consumption of sawnwood increased by 12%, to 5.6 million cubic metres.
- Annual consumption of wood-based panels increased by 5%, to 2.1 million cubic metres.
- Annual consumption of paper and paperboard fell by 8%, to 3.7 million cubic metres.

Australia's trade in wood products experienced strong growth over the past decade, with the sum of imports and exports (total merchandise trade) exceeding \$8 billion for the first time in 2015–16.

- Between 2010–11 and 2015–16, the total annual value of wood product imports increased from \$4.4 billion to \$5.5 billion, driven mainly by higher imports of miscellaneous forest products and wood-based panels.
- The total value of annual wood product exports increased from \$2.5 billion to \$3.1 billion over this period, primarily due to higher exports of roundwood, woodchips, and paper and paperboard.
- Australia continues to be a net importer of wood and wood products.

Residential use of firewood declined by 12% between 2006–11 and 2011–16, whereas industrial use of fuelwood increased by 19%.

- In the period 2011–16, industrial fuelwood was used to generate an annual average of 40 petajoules of energy.

In 2015–16, 1.7 million tonnes of recycled paper were used for domestic paper and paperboard production in Australia, contributing 53% of paper and paperboard produced.

- A total of 1.4 million tonnes of recycled paper were also exported in 2015–16.
- Altogether, in 2014–15 Australia recycled 60% of the 5.3 million tonnes of paper and cardboard waste generated.

For further information on this theme, see Indicators 2.1c–e, Indicators 6.1a–b and Indicators 6.1d–e of *Australia's State of the Forests Report 2018*, available at www.agriculture.gov.au/abares/forestsaustralia/sofr/sofr-2018.

Employment and education

The forest sector is a significant employer in rural and regional Australia. Educated workers are integral to the development of the forest and wood products industries, and economic diversity, community wellbeing and capital resources contribute to resilient communities.

Employment, wages and safety

Total national direct employment in the forest sector was 51,983 persons in 2016, a 24% decrease from 2011.

A total of 30 Local Government Areas are rated as dependent on forest and wood products industries through having 2% or more of their working population employed in the sector and containing more than 20 workers employed in these industries.

Total national direct employment in the forest sector was estimated at 51,983 persons in 2016, down by 24% from 68,596 persons in 2011. Forest sector employment decreased in all jurisdictions except the Northern Territory during this period.

- Between 2011 and 2016, national direct employment decreased in the wood product manufacturing subsector and the pulp, paper and converted paper product manufacturing subsector, but increased in the smaller forestry and logging and forestry support services subsectors.
- The key drivers for the reduction in total employment in the forest sector were consolidation of processing into larger facilities with higher labour efficiencies, and restructuring of the sector.
- The forestry and wood products sector also creates employment indirectly, in activities that support or depend on this sector.

In 2016, there were 30 Local Government Areas (LGAs) rated as dependent on forest and wood products industries through having 2% or more of their working population employed in the sector and containing more than 20 workers employed in these industries.

- Five of these LGAs had 8% or more of their workforce employed in the forest and wood products industries.
- Employment in forest and wood products industries declined in 21 of these 30 LGAs over the period 2011–16. With the exception of LGAs in Victoria, these declines were greater than the declines observed in total employment within each LGA.
- Large proportional increases in forest and wood products industries employment were in LGAs in south-west Victoria and northern Tasmania.

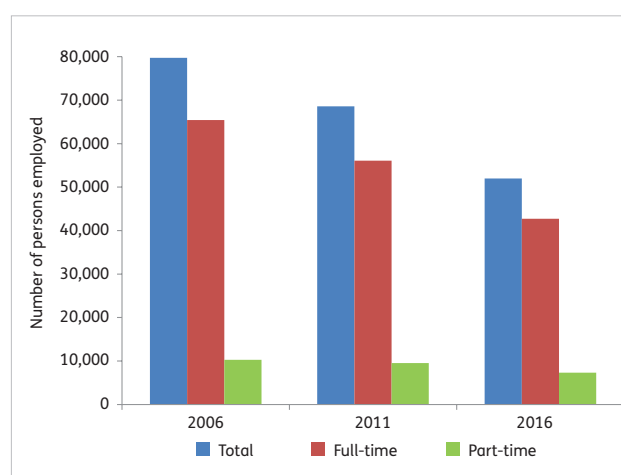
Total annual wages and salaries in the forest sector were between \$4.0 and \$4.3 billion over the period 2010–11 to 2015–16. In 2015–16:

- the average annual wage in the forestry and logging subsector was \$41,538
- the average annual wage in the wood product manufacturing subsector was \$53,233
- the average annual wage in the pulp, paper and converted paper product subsector was \$94,125.

Nationally, 28% of forest sector workers households had weekly incomes below \$800. This is slightly lower than the proportion for total workforce households.

- The proportion of households with weekly incomes below \$800 fell by more in the forest sector over the five years to 2016, than in the broader workforce.

Total national employment in the forest sector



Total employment is slightly higher than the sum of full-time and part-time employment because total employment also includes a relatively small number of persons employed but away from work.

The data used to create this figure are available in Microsoft Excel via www.doi.org/10.25814/5be12aa83aa34

Between 2010–11 and 2014–15, the number of serious injury claims rose by 5% in the forestry and logging subsector (from 137 to 144), and fell by 25% in the wood and paper product manufacturing subsector (from 1,826 to 1,371).

- The incidence of serious injury claims per thousand employees in each sector varied similarly.

Education and community resilience

Levels of community adaptive capacity varied considerably across the 30 Local Government Areas rated as dependent on forest and wood products industries.

Nationally, 54% of forestry workers had non-school qualifications in 2016, compared with 65% in the total workforce.

Community adaptive capacity can be represented as a combination of economic diversity, community wellbeing, and capital resources. Higher levels of adaptive capacity in communities can indicate greater resilience to industry change.

- Levels of community adaptive capacity varied considerably across the 30 Local Government Areas rated as dependent on forest and wood products industries.

In 2016, the median age of forest and wood products workers was from 40 to 50 years in 22 of the 30 LGAs dependent on forest and wood products industries.

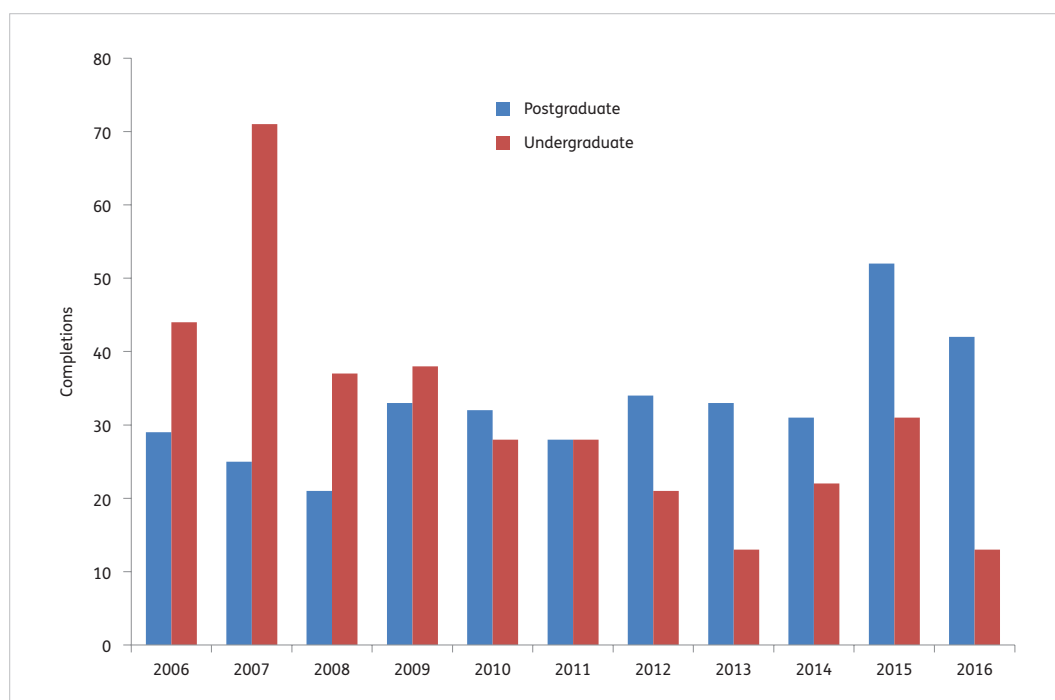
- There was a small increase in the median age of forest and wood products workers nationally between 2011 and 2016.
- In eight LGAs dependent on forest and wood products industries, four of which were in Tasmania, the median age of workers in this sector was lower in 2016 than in 2011.

Nationally, 54% of forestry workers had non-school qualifications in 2016 (such as certificates, diplomas or degrees), compared with 65% in the total workforce.

- In 25 of the 30 LGAs dependent on forest and wood products industries, the proportion of forestry workers with qualifications increased between 2011 and 2016.
- A range of training and education qualification options continues to be available in Australia across all areas relevant to sustainable forest management, from operational competency certificates, to coursework certificates and diplomas, and graduate and postgraduate degrees.
- Over time, there has been a decreasing trend in undergraduate degree completions, and an increasing trend in postgraduate degree completions.

For further information on this theme, see Indicators 6.5a–c and Indicators 7.1b–c of *Australia's State of the Forests Report 2018*, available at www.agriculture.gov.au/abares/forestsaustralia/sofr/sofr-2018.

Australian university degree completions in forest-related studies



Postgraduate degree completions include graduate diplomas.

The data used to create this figure are available in Microsoft Excel via www.doi.org/10.25814/5be12aa83aa34

Social and community

Australia's forests provide multiple social values to the community. They provide opportunities for tourism and recreation, and include many sites that provide evidence of the interactions between people and forest landscapes.

Heritage

In 2016, 11.0 million hectares of forest was on non-Indigenous heritage-listed sites. In addition, in 2016 there were an estimated 126 thousand registered Indigenous heritage sites within forest.

Heritage represents the tangible and intangible connections that people have with the past, through landscapes, landmarks, places, historic buildings, objects, significant events, customs and ceremonies. Heritage sites are widespread across Australia's forests.

In 2016, 11.0 million hectares of forest was on non-Indigenous heritage-listed sites across all jurisdictions.

- This is an increase of 3.7 million hectares since 2011, mainly due to the registration of new heritage places.

In addition, in 2016 there were an estimated 126 thousand registered Indigenous heritage sites within forest.

- Excluding the Australian Capital Territory and Victoria, for which spatial data were not available, there were 1.8 million hectares of forest in registered Indigenous heritage sites in 2016.

Visitation

Most forests in nature conservation reserves and multiple-use public native forests in Australia are available to the general public for recreation or tourism purposes. An annual average of 4.2 million visitors visited major forested tourism regions for bushwalking in the period 2011–12 to 2015–16.

The total areas of native forest in nature conservation reserves and multiple-use public native forests tenures are 21.7 million hectares and 9.8 million hectares, respectively. These are the tenures generally available to the general public for recreation or tourism.

- Some land in other tenure categories may be similarly available.
- Kakadu National Park in the Northern Territory is an example of reserved forest on private land tenure that is available for recreation and tourism.

Tourism Australia data indicate that an annual average of 4.2 million visitors visited major forested tourism regions for bushwalking in the period 2011–12 to 2015–16, with 10% of these visitors identifying as international visitors.

- Data are also available at the state and territory level on the number of sites and facilities for a diverse range of recreational activities in both nature conservation reserves and state forests (multiple-use public forests), and the number of visitors.
- For example, Forestry Corporation of New South Wales estimated that there were 28 million recreational visitors to New South Wales state forests during 2015–16. Forestry Corporation of New South Wales manage and maintain more than 150 designated visitor sites.

Indigenous participation and employment

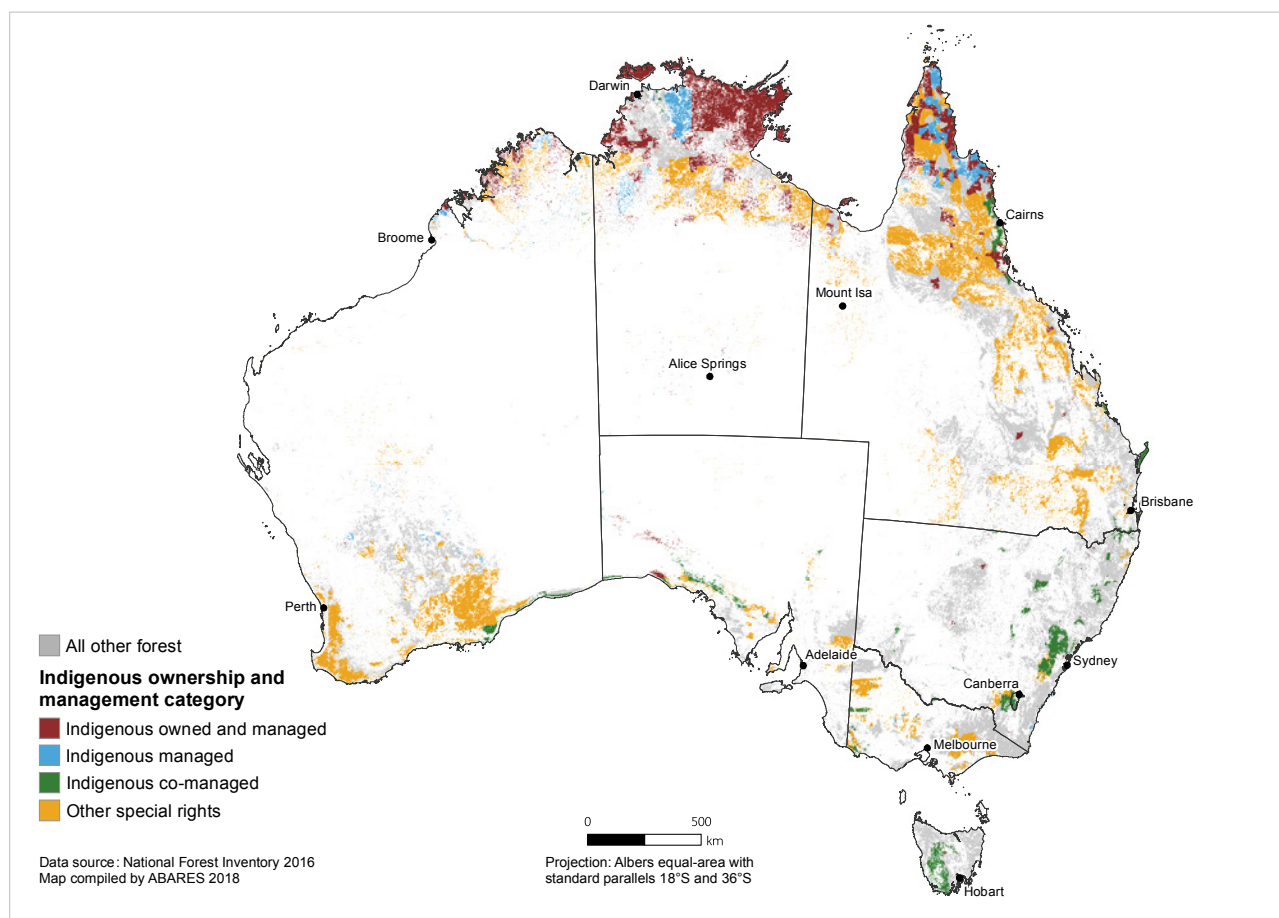
Four Indigenous ownership and management categories describe the degree of management control and influence that Indigenous people have over forest land.

In 2016, the forest and wood products industries directly employed 1,099 Indigenous people, while an estimated 337 Indigenous people were employed in conservation or park operation roles in areas with forested conservation reserves.

Access to native forests, and involvement in native forest management, enables Indigenous people to maintain or re-connect with cultural values, which in turn strengthens personal and community resilience.

- The degree of management control and influence that Indigenous people have over forest relates to the Indigenous ownership and management category into which the forest is classified: Indigenous owned and managed, Indigenous managed, Indigenous co managed, or covered by Other special rights. Together, land in these four categories comprises the Indigenous forest estate.
- This Indigenous forest estate covers a total of 70 million hectares of forest (52% of Australia's forests).
- The largest areas of forest in the Indigenous estate occur within Indigenous Land Use Agreement areas, and areas for which there has been a native title determination.
- Other large areas of forest occur within the Northern Territory Aboriginal Land Trusts, Queensland Aboriginal and Torres Strait Islander land trusts, Indigenous Protected Areas, and owned and leased-back conservation reserves.

Distribution of the Indigenous forest estate by land ownership and management categories



A higher resolution version of this map is available via www.doi.org/10.25814/5be3bc4321162

Indigenous participation in forest management occurs through a variety of mechanisms, including direct ownership, management, employment, co-management of reserve areas, consultation about cultural heritage, and programs for engagement of urban Indigenous people with forests.

- There are ongoing efforts to include Indigenous cultural, contemporary and aspirational values in forest management
- Over time, there has been increased Indigenous participation in the development and implementation of management plans for forest reserves, conservation reserves and regional conservation areas across Australia.

An estimated 337 Indigenous people were employed in conservation or park operation roles in areas with forested conservation reserves in 2016. Forest-related employment that draws on traditional activities and knowledge delivers both cultural and economic benefits.

Participation of Indigenous workers in the commercial forest and wood products industries can also support livelihoods through income, skills development, and a connection with forests through services and advice. In 2016, the forest and wood products industries directly employed 1,099 Indigenous people nationally.

- In seven Indigenous Locations across Australia, more than 10% of the Indigenous workforce was employed in the forest and wood products industries.

Public perceptions of forest management

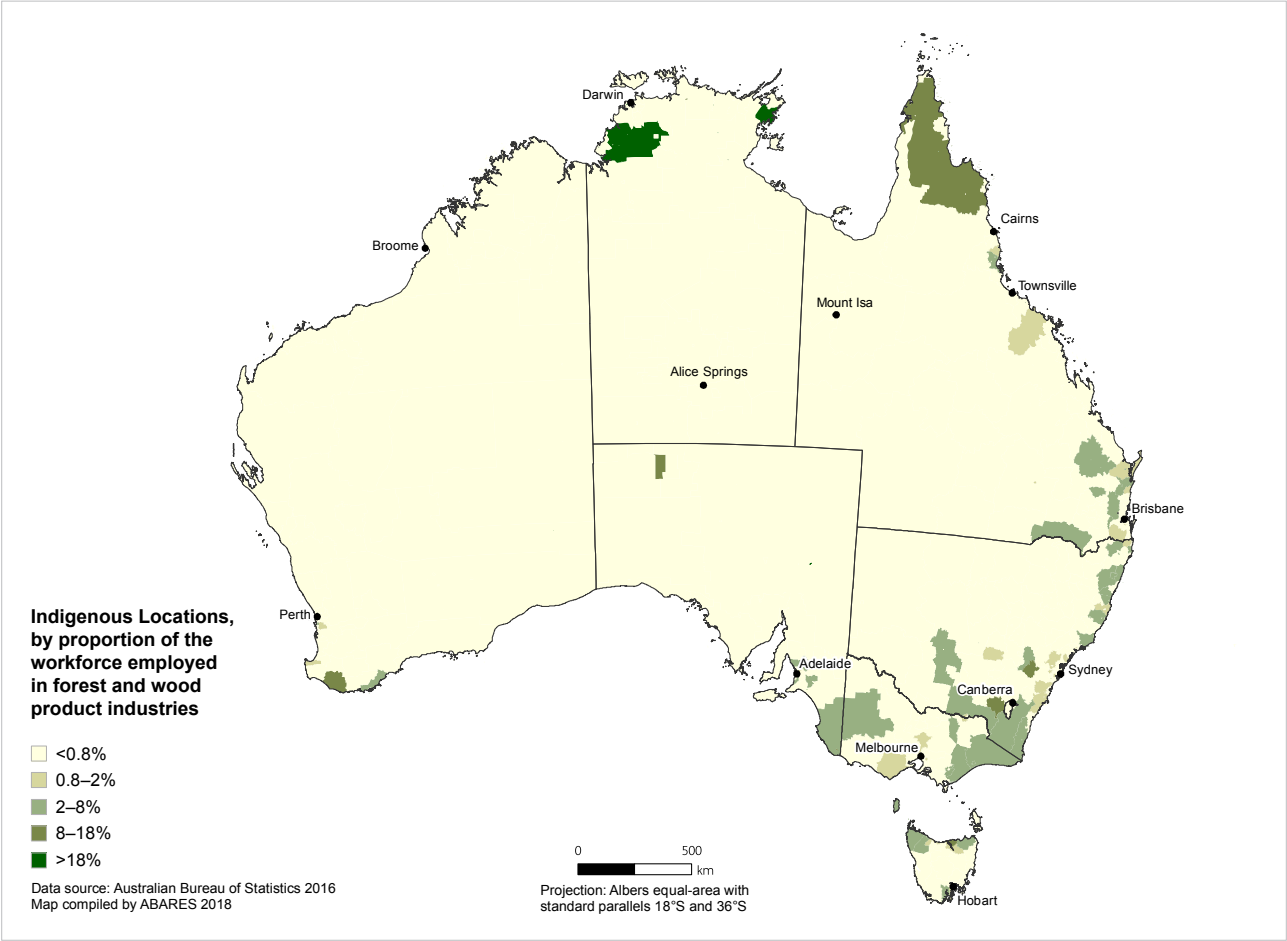
There is a range of public perceptions of forest management and of the acceptability of plantations.

Surveys conducted between 2008 and 2017 on behalf of Forest and Wood Products Australia indicate the attitudes of Australians to a range of forest-related issues. Averaged across these surveys:

- just under half of the respondents agreed that Australia's native forests are being managed sustainably
- a majority of respondents considered that wood is more environmentally friendly than alternative materials, and a large majority of respondents preferred the use of Australian trees rather than overseas trees to make wood products
- a majority of respondents also believed that harvesting trees is acceptable so long as the trees are replaced.

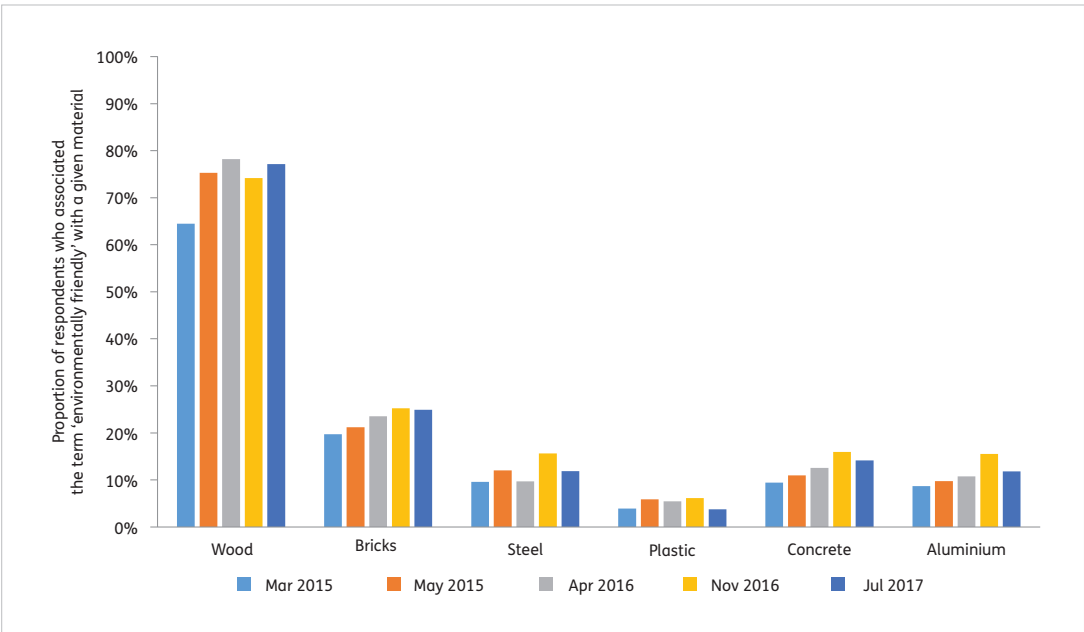
For further information on this theme, see Indicators 6.3a–b, Indicators 6.4a–d and Indicator 6.5d of Australia's *State of the Forests Report 2018*, available at www.agriculture.gov.au/abares/forestsaustralia/sofr/sofr-2018.

Indigenous Locations, by proportion of the Indigenous workforce employed in forest and wood products industries, 2016



A higher resolution version of this map is available via www.doi.org/10.25814/5be3bc4321162

Perceptions of whether materials are ‘environmentally friendly’



Average proportion of respondents who associated the term ‘environmentally friendly’ with a given material. Source: Forest and Wood Products Australia.

The data used to create this figure are available in Microsoft Excel via www.doi.org/10.25814/5be12aa83aa34

Investment, research and development

Investment in establishing and managing native forests and plantations is key to maintaining forest values and services. Research and development underpin improved management practices and new commercial technologies and facilities.

Investment

Between 2010–11 and 2014–15, funding for new commercial plantations was increasingly sourced from institutional investors. Capital investment in timber industry processing facilities was estimated at \$938 million for the period 2012 to 2017.

Investment in the establishment of new commercial plantations, as well as re-establishment of harvested commercial plantations, is important for future wood availability.

- The annual rate of establishment of new commercial plantations in Australia declined from 4,200 hectares in 2011–12, to 900 hectares in 2014–15, then increased to 1,600 hectares in 2015–16.
- During the period 2011–12 to 2014–15, new plantings comprised mostly hardwood plantations in Victoria, Queensland and the Northern Territory.
- During the period 2014–15 to 2015–16, new plantings comprised solely softwood plantations in New South Wales and Western Australia.

Between 2010–11 and 2014–15, funding for new commercial plantations was increasingly sourced from institutional investors. Institutions have also been involved in purchases of established commercial plantations.

- In 2014–15, institutional investors owned 50% of Australia's commercial plantations, compared to 31% in 2010–11.
- During the same period, farm foresters and other private owners increased their area share of total commercial plantation area from 8% to 21%.
- This shift reflects the increasing contribution of private investment capital to the growth and development of the sector.

Further structural adjustment and consolidation of the sawmill industry also occurred over this period. The domestic softwood sawmill industry is becoming significantly more capital-intensive, and larger in scale.

Capital investment in timber industry processing facilities was estimated at \$938 million for the period 2012 to 2017.

- The majority of these new investments targeted increased productivity, higher recovery and improved grade yield in the sawmilling sectors, and increased productivity and development of new products in the panel and plywood sectors.



Mangroves near Coffs Harbour, New South Wales.

Research and development

Two different surveys show that expenditure on research and development in forestry and forest products has declined over time, as has associated capacity. The number of people involved in research and development in forestry and forest products has also continue to decline.

Investment in research and development activities can lead to improvement in forest management practices, and to new technologies for commercial adoption. However, expenditure on research and development in forestry and forest products and associated capacity has declined.

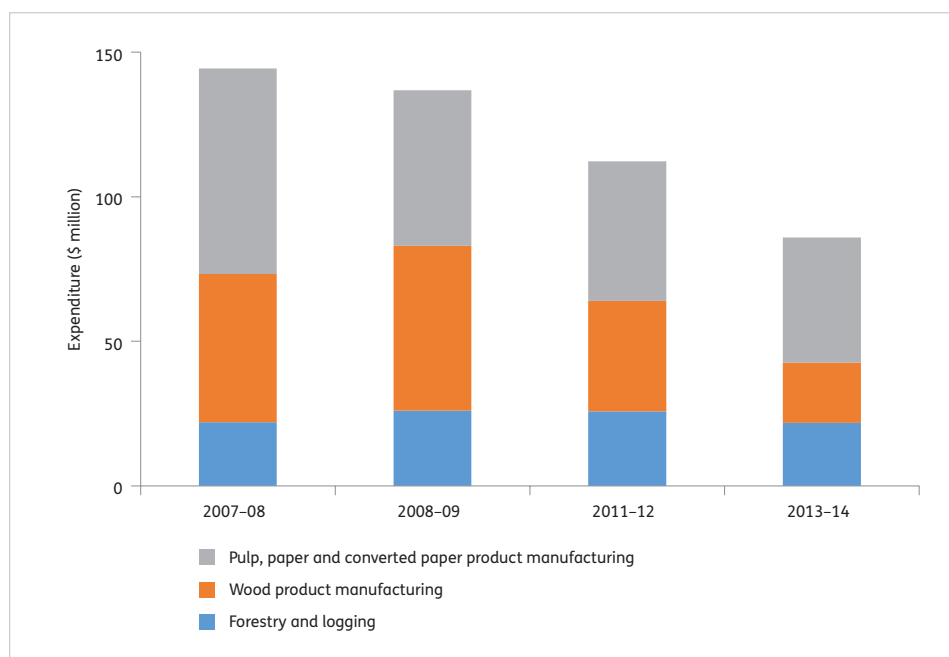
- Australian Bureau of Statistics data show that, from 2007–08 to 2013–14, total expenditure on research and development reported by businesses in the forest and wood products sector declined from \$144 million to \$86 million, although only partial data are available for some years.
- A separate series of surveys of the forest and forest products sector, using a different definition of the sector, reported that research and development expenditure on forestry and forest products decreased from \$88 million in 2007–08, to \$48 million in 2012–13.
- Ongoing changes in funding and delivery models reduced forest research and development capacity across a number of national organisations, but a number of new, university-based forestry and/or forest products research centres were also established during the period 2011–2016.

In parallel, the estimated number of researchers and technicians involved in research and development in forestry and forest products declined from 733 in 2008, to 455 in 2011, and to 276 in 2013.

- The decline has occurred across the public and private sectors, including government agencies and universities.
- The total number of forestry and forest products researchers employed by state and territory agencies was reported as 89.5 full-time-equivalent staff in 2015–16, approximately half the 171.8 full-time-equivalent reported for 2011–12.

For further information on this theme, see Indicators 6.2a–b, Indicator 7.1c and Indicator 7.1e of Australia's *State of the Forests Report 2018*, available at www.agriculture.gov.au/abares/forestsaustralia/sofr/sofr-2018.

Business research and development expenditure in the forest and wood products sector



Source of data: Australian Bureau of Statistics

The data used to create this figure are available in Microsoft Excel via www.doi.org/10.25814/5be12aa83aa34

Frameworks for forest policy, management, monitoring and reporting

Australia's forest policy and management is underpinned by legal, institutional and economic frameworks at the national and the state and territory levels. These frameworks provide for reporting to the community on the state of Australia's forests.

Australia has a well-established framework for forest management, guided by a National Forest Policy Statement, and including policy and legislative instruments, and codes of forest practice.

Two schemes certify forest management and provide chain-of-custody certificates for tracking wood products. At June 2018, approximately 8.9 million hectares of native forests and plantations were certified for forest management under either scheme.

Reporting to the community on Australia's forests occurs at the state level, nationally and internationally.

Legal and policy frameworks

All states and territories and the Australian Government have legislation that supports the conservation and sustainable management of Australia's forests.

- Australia's public native forests, including those held in nature conservation reserves and those available for wood production, are governed and managed under state or territory regulatory frameworks and management plans.
- Management of forests on private land is also regulated under various Acts of Parliament.

As at 2016, 43 million hectares (32% of Australia's forests) were covered by management plans relating to their conservation and sustainable management. Management plans are in place for 19 million hectares of forest in the National Reserve System (57% of the area of forest in the National Reserve System).

The effectiveness of government policies in promoting conservation and sustainable management of production forests and conservation reserves was assessed as effective or very effective by the Australia State of the Environment 2016 report.

Certification

At June 2018, approximately 8.9 million hectares of native forests and plantations were certified for forest management under either the Responsible Wood Certification Scheme or the Forest Stewardship Council scheme. Some forests and plantations were certified under both schemes.

In addition, at that date, a total of 189 chain-of-custody certificates for tracking wood from the forest to the final product were issued under the Responsible Wood Certification Scheme, and 258 chain-of-custody certificates were issued under the Forest Stewardship Council scheme.

Monitoring and reporting

Australia's *National Forest Policy Statement* (Commonwealth of Australia 1992) commits the Australian Government and state and territory governments to report on the state of the forests every five years. In addition, the Commonwealth *Regional Forest Agreements Act 2002* states that 'the Minister must cause to be established a comprehensive and publicly available source of information for national and regional monitoring and reporting in relation to all of Australia's forests'.

The *Australia's State of the Forests Report* (SOFR) series implements these commitments, and is the mechanism by which the state of Australia's forests, and changes over time in a range of social, economic and environmental forest-related indicators, are reported to government and industry stakeholders and the broader community.

Some states also publish five-yearly 'state of the forests' reports, based on a framework of criteria and indicators similar to the national SOFR series.

Australia also uses the data compiled for the SOFR series to report internationally on the state of its forests through:

- the Global Forest Resources Assessment and the State of the World's Forest Genetic Resources processes undertaken by the Food and Agriculture Organization of the United Nations
- the United Nations Sustainable Development Goals
- the Global Forest Goals of the United Nations Forum on Forests.



Eucalyptus delegatensis in the Australian Capital Territory.

The availability, coverage and currency of the data available for the national SOFR series vary considerably between indicators and also between reports in this series, but has improved overall for SOFR 2018 compared to SOFR 2013.

- The data available for SOFR 2018 were assessed as comprehensive in each of coverage, currency and frequency for 23 of the 44 national reporting indicators, and as comprehensive in two of these three aspects for a further 11 indicators.
- The most comprehensive information is available for multiple-use public forests, with less information on nature conservation reserves, and significant gaps in data collection and monitoring for leasehold and private forests and for other Crown land.
- A number of new and improved social, economic and environmental datasets compiled for the National Forest Inventory have been analysed and presented in SOFR 2018.
- There are also a number of topics for which data are missing or incomplete.

The national SOFR series presents data on all of Australia's forests, both public and private forests, and both forests managed for conservation and forests managed for production. Trends over time are reported when the data are of sufficient quality, and drivers of change are identified if these are clear.

However, SOFR 2018 does not present detailed analyses or interpretation in regard to the meaning or implications of the data. Such analyses are to be found in other publications by Commonwealth, state and territory government agencies, including ABARES, and by independent researchers.

Overall, *Australia's State of the Forests Report 2018* addresses its purpose of being a 'comprehensive national report', and provides the reader with information to assess progress towards sustainable forest management in Australia.

For further information on this theme, see Introduction and Indicators 7.1a–d of *Australia's State of the Forests Report 2018*, available at www.agriculture.gov.au/abares/forestsaustralia/sofr/sofr-2018.



Forest in Tasmania. Photo: iStockphoto/Gudella.





www.agriculture.gov.au/abares/forestsaustralia