

Forest sustainability in Western Australia

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1. Introduction

The combustion of wood for energy purpose is not considered to contribute to the augmentation of greenhouse gases concentration in the atmosphere, as long as the CO₂ emissions released during the combustion of wood are balanced by the growth of new trees. It is therefore essential to investigate if the forests in the region where the wood used for energy purpose are managed in a sustainable way, avoiding resources associated with overexploitation of forests, land use change, depletion of carbon stocks, etc...

In this framework, literature research was carried out to produce a summary of forest management in Western Australia, including general condition, management and sustainability assessment.

2. Western Australian forests overview

2.1. Location and distribution

Australia is a country, a continent and an island. It is considered the smallest continent as well as the sixth largest country with a total area of 7,686,850 km². It has no land border with any other country. The northernmost points of the country are the Cape York Peninsula in Queensland and the Top End of the Northern Territory.

The Western plateau takes the western half of the country; it rises to mountain heights near the west coast and falls to lower elevations near the continental centre, it is generally flat with various mountain ranges. Even though there are several larger rivers in the west and the north, surface water is poorly present in the Western plateau.

The Eastern highlands lie near the eastern coast of Australia, separating the relatively narrow eastern coastal plain from the rest of the country.

The Central Lowlands lie between the Western Plateau and the Eastern Highlands. They are made up of the Great Artesian Basin and Australia's largest river systems.

On the east, there is the Great Barrier Reef. In the south-east is the State of Tasmania, which is a large and mountainous island¹.

¹ https://en.wikipedia.org/wiki/Geography_of_Australia

Figure 1 : Physical map of Australia

Source: https://en.wikipedia.org/wiki/Geography_of_Australia#/media/File:Australia_relief_map.jpg

Australia is a federation of six states, together with federal territories. Five states and three of the federal territories form the Australian mainland, the sixth state being the state of Tasmania. The other territories are considered as external territories². Western Australia is the biggest territory in terms of area and is the fourth zone in terms of population.

Table 1 : States and territories of Australia

State/territory name	Capital (or largest settlement)	Type	Population	Area (km²)
Ashmore and Cartier Islands	(Offshore anchorage)	External	0	199
Australian Antarctic Territory	Davis Station	External	1,000	5,896,500
Australian Capital Territory	Canberra	Territory	395,200	2,358
Christmas Island	Flying Fish Cove	External	2,072	135

² https://en.wikipedia.org/wiki/States_and_territories_of_Australia

Cocos (Keeling) Islands	West Island	External	596	14
Coral Sea Islands	(Willis Island)	External	4	10
Heard Island and McDonald Islands	(Atlas Cove)	External	0	372
Jervis Bay Territory	(Jervis Bay Village)	Territory	377	70
New South Wales	Sydney	State	7,704,300	800,642
Norfolk Island	Kingston	External	2,302	35
Northern Territory	Darwin	Territory	244,000	1,349,129
Queensland	Brisbane	State	4,827,000	1,730,648
South Australia	Adelaide	State	1,706,500	983,482
Tasmania	Hobart	State	518,500	68,401
Victoria	Melbourne	State	6,039,100	227,416
<i>Western Australia</i>	<i>Perth</i>	<i>State</i>	<i>2,613,700</i>	<i>2,529,875</i>
Australia	Canberra	Country	24,054,651	7,692,021*

*without the external territories

Source : https://en.wikipedia.org/wiki/States_and_territories_of_Australia

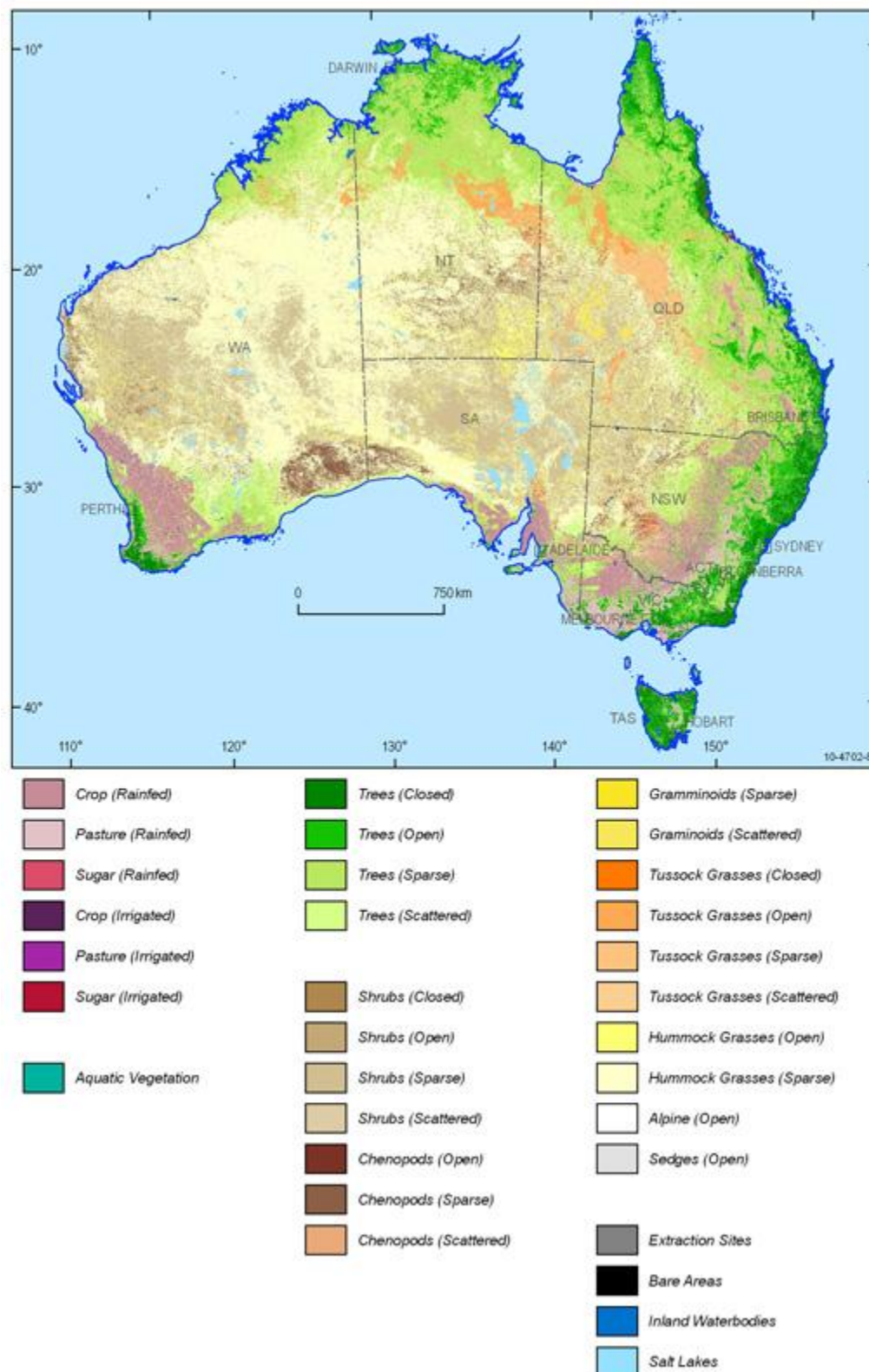
Figure 2 : Political map of Australia

Source: https://www.lib.utexas.edu/maps/australia/australia_pol99.jpg

According to the Australian Government Department of Agriculture and Water Resources, forests occupy 124.8 million ha or about 16% of the land area. As it is shown on Figure 3, most of the trees are found near the coasts of the continent, the center of the country being occupied by a desert. The crops and other agricultural activities are distributed along the southern and eastern coasts.

In Western Australia, forests have an area of 19.2 million ha, it represents 8% of the state territory. Forests are concentrated in the north and the south of Western Australia, with a higher density of trees in the south. Agriculture and pasture are developed near the southern forests. Most of the territory is occupied by the desert.

Figure 3 : Land cover of Australia



Source: <http://www.agriculture.gov.au/abares/aclump/PublishingImages/land-cover/ground%20cover.jpg>

Forests are defined by Australia's National Forest Inventory as follows:

*"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 meters and with existing or potential crown cover of over storey strata about equal to or greater than 20 per cent. This includes Australia's diverse native forests and plantations, regardless of age. It is also sufficiently broad to encompass areas of trees that are sometimes described as woodlands."*³

The forest areas per jurisdiction are presented in Table 2. Western Australia is the third jurisdiction in terms of total forest area. The forests in Australia consist of three categories: native forests, industrial plantations and other forests:

- *Native forests* are as its name states native wooded lands containing a wide array of mostly endemic species, combining to form unique and complex ecosystems.
- *Industrial plantations* primary purpose is commercial wood production; they produce the majority of the volume of logs harvested annually in Australia. They comprise both softwood species (predominantly radiata pine, *Pinus radiata*) and hardwood species (the most common species being the blue gum, *Eucalyptus globulus*).
- *Other forests* mostly consist of non-industrial plantations and planted forests of various types.

Victoria and Western Australia have the largest areas of Industrial plantations, each contributing more than 20% of the total area of Australia's Industrial plantations. Western Australia has the highest proportions of Australia's industrial hardwood plantation area: 31%.

Table 2 : Forest area per jurisdiction (2011)

State/territory name	Native forest		Industrial plantation		Other forest		Total forest		Total land	
	Area (thousand ha)	Percent of native forests (%)	Area (thousand ha)	Percent of Industrial plantation (%)	Area (thousand ha)	Percent of Other forest (%)	Area (thousand ha)	Percent of total forest (%)	Area (thousand ha)	Forest area as proportion of total land area (%)
Australian Capital Territory	129	0.1	8	0.4	1	1	138	0.1	243	57
New South Wales	22,281	18	392	19	8	5	22,681	18	80,064	25
Northern Territory	15,169	12	40	2	5	3	15,214	12	134,913	11
Queensland	50,782	41	232	12	22	14	51,036	41	173,065	29
South Australia	4,376	4	189	9	0	0	4,565	4	98,348	5
Tasmania	3,362	3	311	15	33	22	3,706	3	6,840	54
Victoria	7,727	6	433	21	30	20	8,190	7	22,742	36
<i>Western Australia</i>	<i>18,752</i>	<i>15</i>	<i>413</i>	<i>20</i>	<i>57</i>	<i>37</i>	<i>19,222</i>	<i>15</i>	<i>252,988</i>	<i>8</i>
Australia	122,581	100	2,017	100	153	100	124,751	100	769,202	16

Source : Australia's State of the Forests Report 2013

³ ABARES. Australia's State of the Forests Report 2013, p.13

2.2. Ecological zones

Australia's climate is governed by its size and by the hot, sinking air of the subtropical high pressure belt. It moves north and south with the seasons making the rainfall pattern highly seasonal. Most of Western Australia has a hot arid and semi-arid climate. The south-west part of the state has a Mediterranean climate; this area was originally heavily forested. Average annual rainfall varies from 300 mm at the edge of the Wheatbelt region (south-west) to 1,400 mm in the wettest areas near Northcliffe (southernmost point). The period between November and March sees the evaporation exceeding rainfall making it very dry. An exception to this pattern is the northern tropical regions; it has an extremely hot monsoonal climate with average rainfall ranging from 500 mm to 1,500 mm. Temperatures are presented in Table 3⁴.

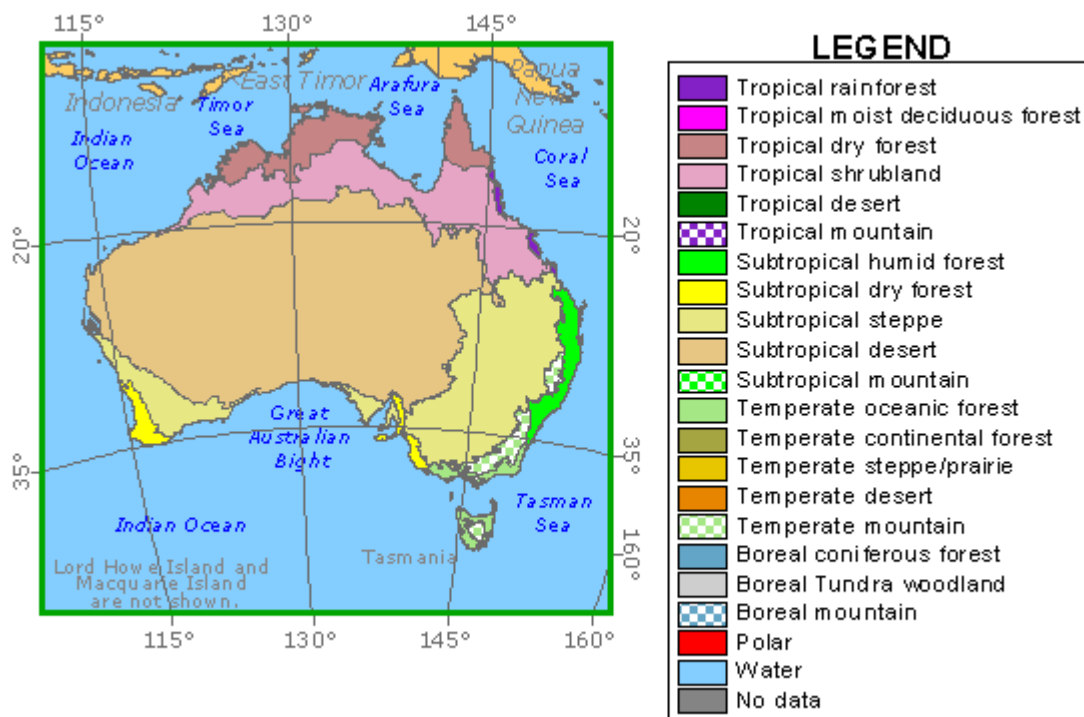
Table 3 : Climate in Western Australia

City	Jan. Max. Temp. (°C)	Jan. Min. Temp. (°C)	July Max. Temp. (°C)	July Min. Temp. (°C)	N° Clear days	Annual Rainfall (mm)
Perth	30	18	17	9	131	868
Albany	23	15	16	8	45	929
Kalgoorlie	34	18	17	5	151	266
Geraldton	32	18	19	9	164	441
Karratha	36	27	26	14	158	297
Broome	33	26	29	14	182	613

Source : https://en.wikipedia.org/wiki/Climate_of_Australia#Western_Australia

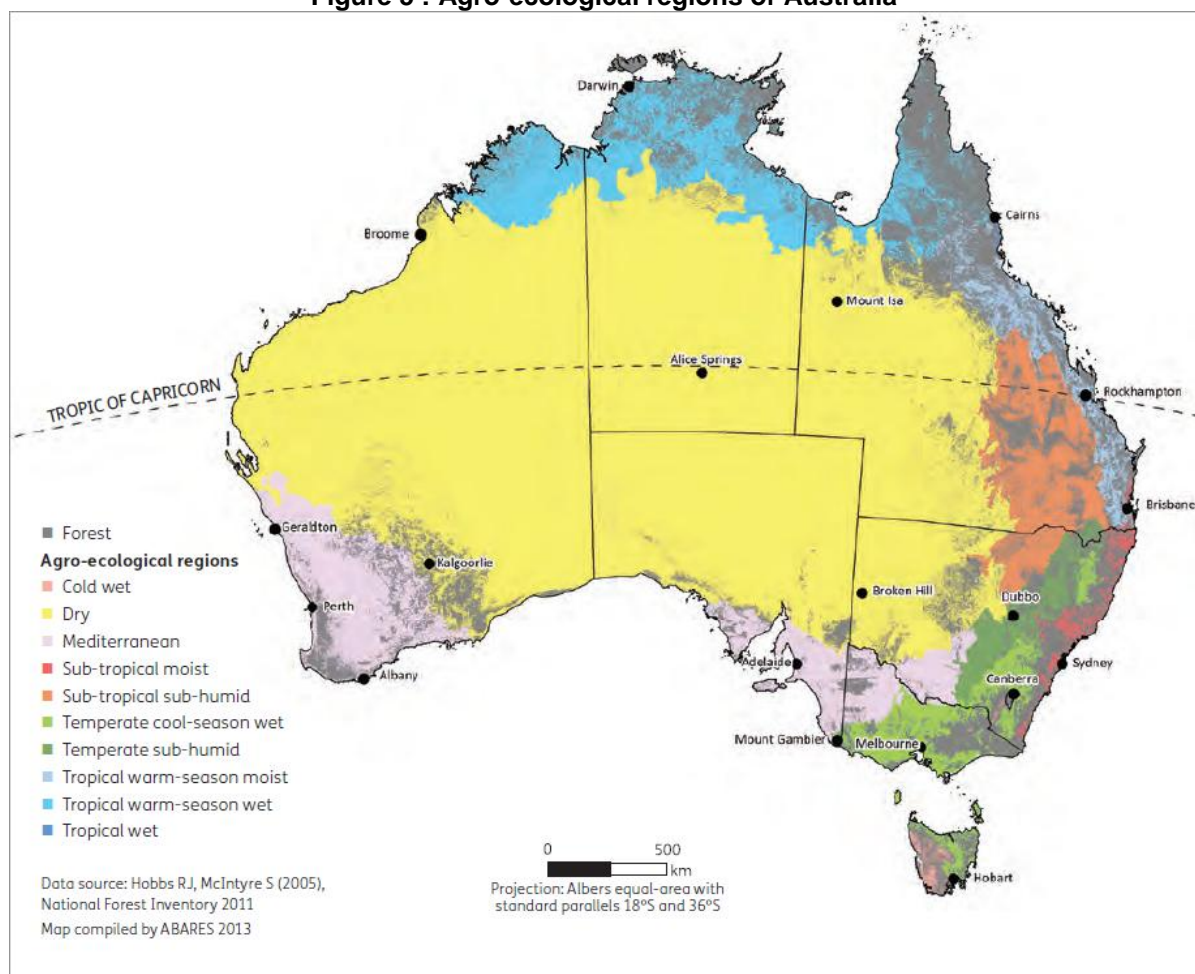
According to the FAO, the country's main land is divided in nine ecological zones. From north to south: Tropical dry forest, Tropical shrubland, Tropical rainforest, Subtropical desert, Subtropical steppe, subtropical humid forest, Subtropical mountain, Subtropical dry forest and temperate oceanic forest. Western Australia comprises Tropical forest, Tropical shrubland, Subtropical dry forest, Subtropical steppe and mostly Subtropical desert.

⁴ https://en.wikipedia.org/wiki/Climate_of_Australia#Western_Australia

Figure 4 : Ecological zones of Australia

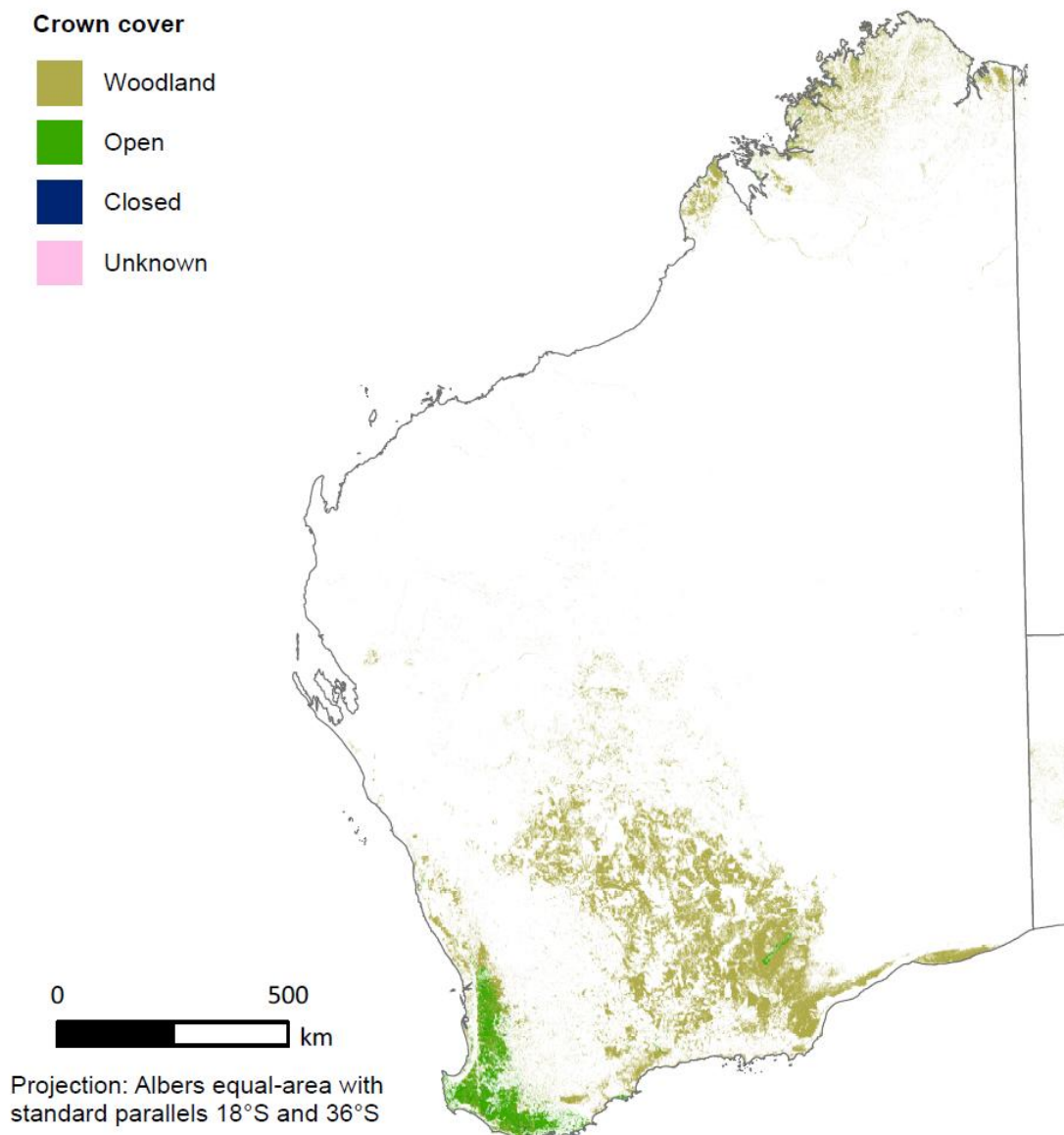
Source: <http://www.fao.org/forestry/country/19971/en/aus/>

The agro-ecological regions of Australia are shown in Figure 5. Western Australia consists of three categories: Tropical warm-season wet, Mediterranean and mostly Dry.

Figure 5 : Agro-ecological regions of Australia

Source: Australia's State of the Forests Report 2013

The native forest cover of Western Australia is presented in Figure 6. Except for the southern coastline forest, most of the forest cover consists in woodlands that are more or less sparse. Most of the forests are present in the southern part of the state. The center of Western Australia presents no wooded land. There are no closed forest in Western Australia.

Figure 6 : Native forest cover

Data source: National Forest Inventory 2011
Map compiled by ABARES 2013

© Commonwealth of Australia
Reference: Montreal Process Implementation Group for Australia and National Forest Inventory Steering Committee, 2013,
Australia's State of the Forests Report 2013, ABARES, Canberra, December. CC BY 3.0.

Source: <http://www.agriculture.gov.au/abares/forestsaustralia/forest-data-maps-and-tools/forest-maps> (modified by SGS)

The vast majority of Australia's native forest area consists of hardwood species (evergreen broadleaf tree species). For national reporting, the National Forest Inventory (NFI) groups Australia's native forests into eight broad forest types defined by dominant species and structure.

The Eucalypt forest type is dominant across most of Australia's forest area, with a total of 92 million hectares (74% of Australia's forest area). The second most common forest type is Acacia with a total of 9.8 million hectares (8%). Despite the overwhelming dominance of these two forest types, Australia's forests are nonetheless very diverse. There are more than 800 species of Eucalypt and almost 1,000 species of Acacia, as well as many other genera of trees. Rainforest covers only 3.6 million hectares (3% of Australia's forest area).

Concerning the tree species in Western Australia, the vast majority of it consists of Eucalypt; it has an area of 14.8 million ha and represents 77% of the total forest area. The second main tree species is the Acacia with 3 million ha. All the other tree species occupy an area of 1.2 million ha and represent 6.1% of the total forest area.

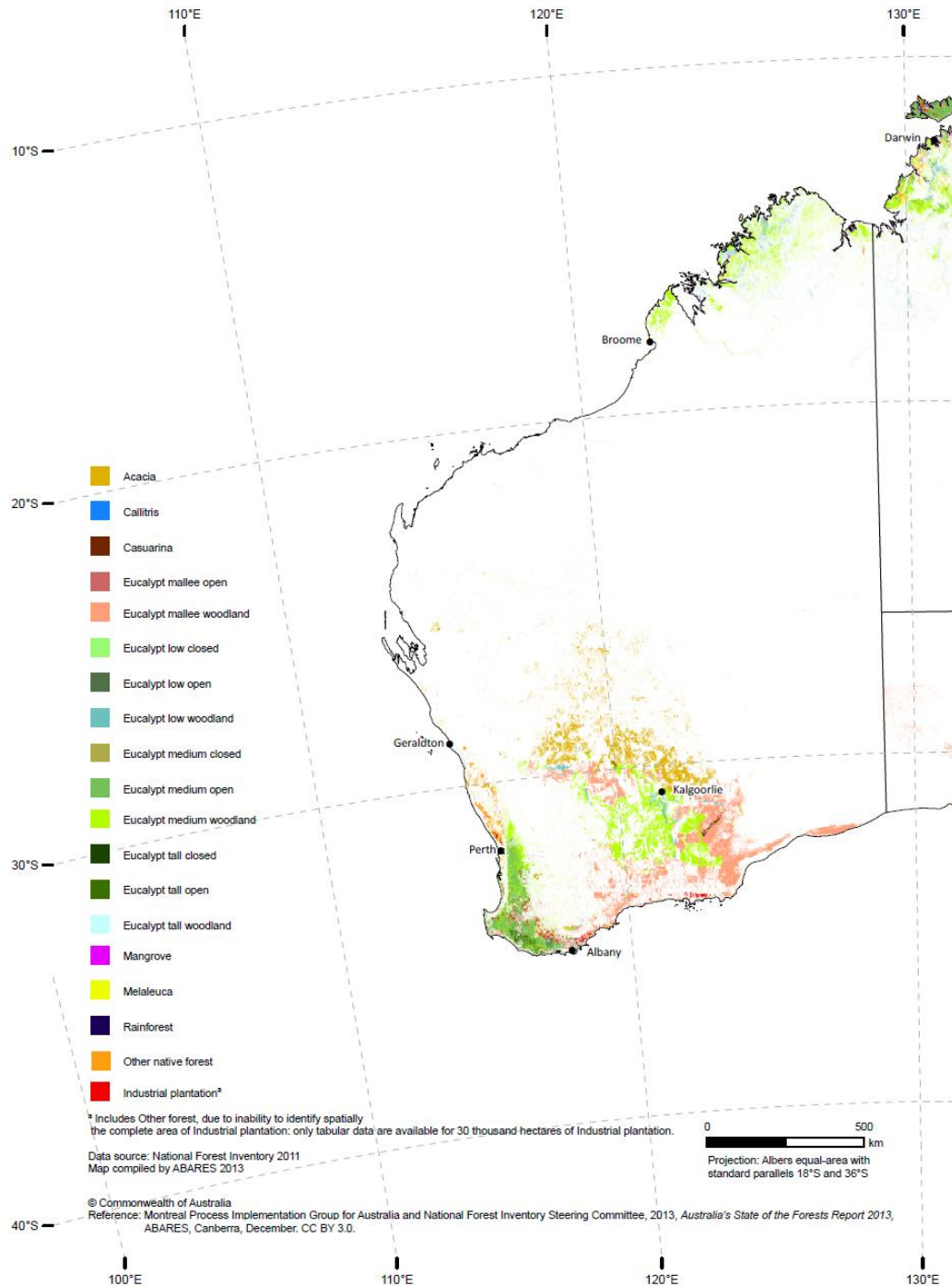
Table 4 : Forest area, by forest type

Forest type	Area (thousand ha)	
	Western Australia	Australia
Acacia	3,222	9,807
Callitris	0.08	2,136
Casuarina	94	1,288
Eucalypt	14,821	91,989
Eucalypt mallee open	5	813
Eucalypt mallee woodland	5,586	11,313
Eucalypt low closed	0.1	39
Eucalypt low open	169	2,173
Eucalypt low woodland	874	4,016
Eucalypt medium closed	20	247
Eucalypt medium open	1,590	19,450
Eucalypt medium woodland	6,363	48,246
Eucalypt tall closed	6	141
Eucalypt tall open	193	4,897
Eucalypt tall woodland	14	655
Mangrove	107	913
Melaleuca	53	6,302
Rainforest	0.3	3,598
Other native forest	456	6,547
Total native forest	18,752 (97,5%)	122,581
softwood	100	1,025
Hardwood	307	980
Unknown or mixed species	6	12
Total Industrial plantations	413	2,017
Other forest	57	153
Total forest	19,222 (100,0%)	124,751

Source : Australia's State of the Forests Report 2013

The distribution of the forest type is presented in Figure 7. Except for the acacia forest cover in the north of the southern part of the state, Eucalypt forest cover dominates. It is the most represented species in the north and the south. Near the south-eastern and southern coastlines, the little red dots near the southern coastline indicate the location of the Industrial plantations which are minor in terms of area.

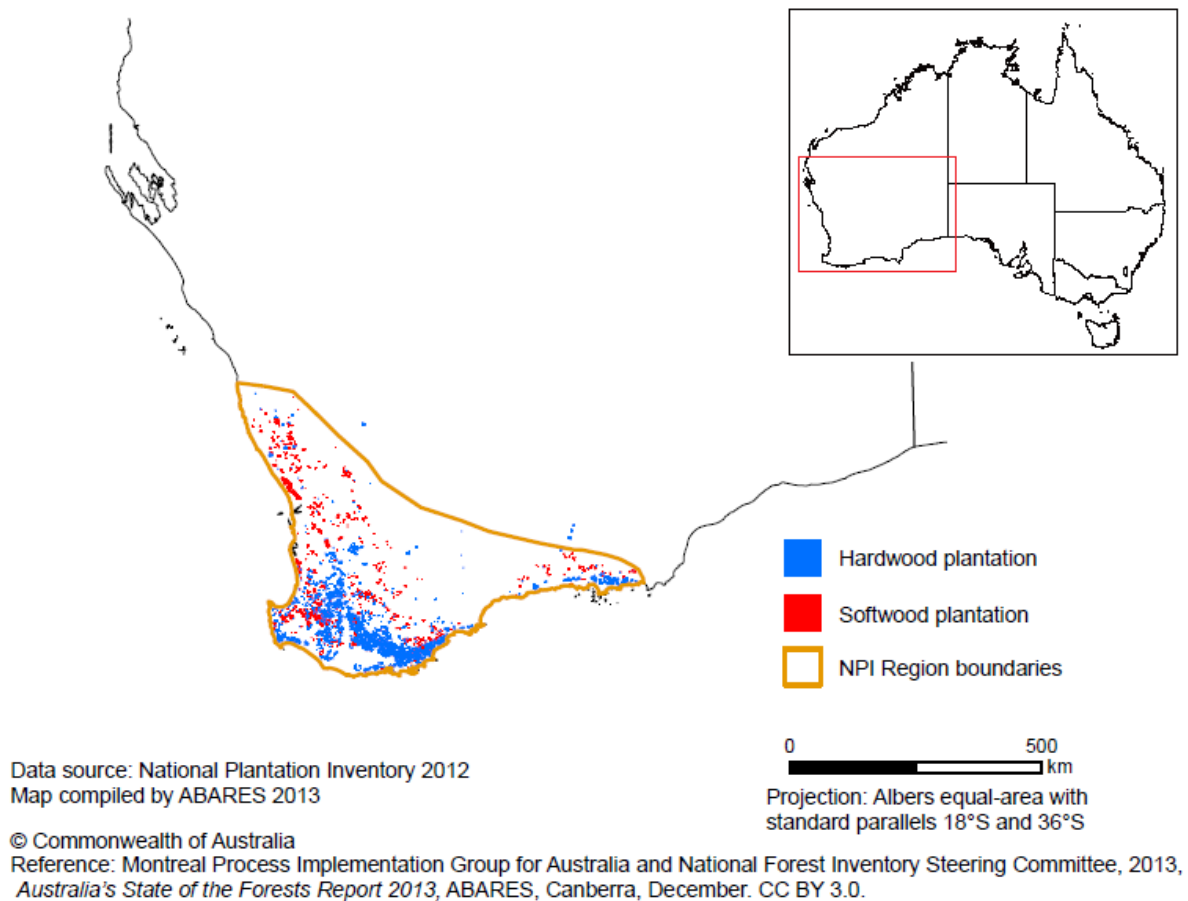
Figure 7 : Forest cover, by forest type



Source: <http://www.agriculture.gov.au/abares/forestsaustralia/forest-data-maps-and-tools/forest-maps> (modified by SGS)

The distribution of Industrial plantations in Western Australia can be seen in Figure 8. All plantations are located in the south of the state. The dominance of hardwood plantation can be witnessed with an aggregate near the southernmost point. The softwood plantations are fewer and sparser.

Figure 8 : Industrial plantations location



Source: <http://www.agriculture.gov.au/abares/forestsaustralia/forest-data-maps-and-tools/forest-maps> (modified by SGS)

2.3. Forest ownership

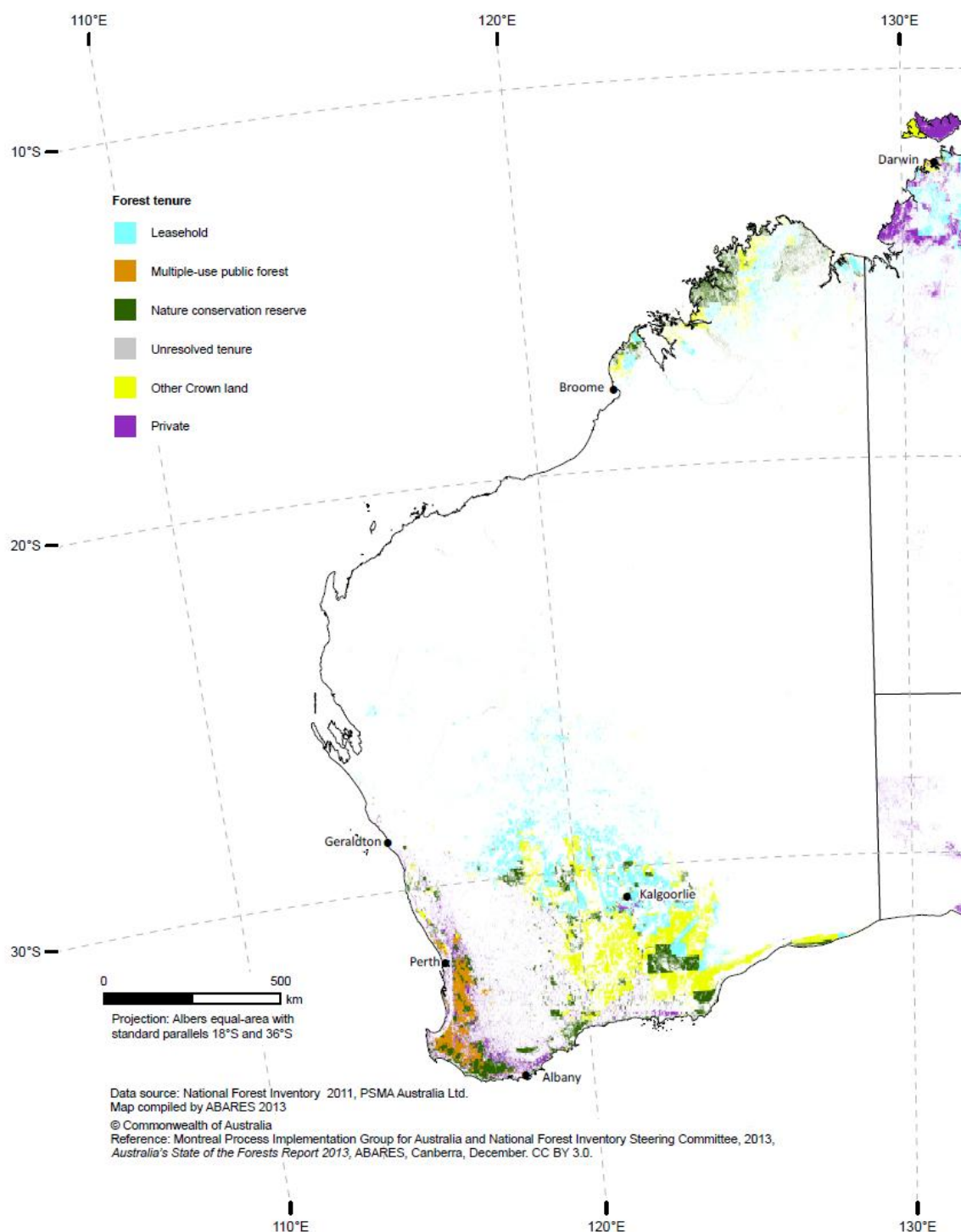
The ownership of forest is presented in Australia's State of the Forests Report 2013 as follows: “*The ownership of a forest, especially native forest, has a major bearing on its management. The six tenure classes used for forests in the National Forest Inventory are amalgamations of the wide range of classes used by various state and territory jurisdictions. The classes can be grouped on the basis of ownership as public or private, with a small area of unresolved tenure. Publicly owned forests include 'nature conservation reserve', 'multiple-use public forest' and 'other Crown land'. 'Leasehold forest' is forest on Crown land (land that belongs to a national, state or territory government) that is typically privately managed. Some forests on private land are publicly managed as conservation reserves. For Industrial plantations, the ownership of the land can be different from ownership of the trees, and management arrangements can be complex.*”

The six tenure classes are described as follows and can be seen in Figure 9:

- **Multiple-use public forest:** publicly owned state forest, timber reserves and other forest areas, managed by state and territory government agencies for a range of forest values, including wood harvesting, water supply, biodiversity conservation, recreation and environmental protection.
- **Nature conservation reserve:** publicly owned lands managed by state and territory government agencies that are formally reserved for environmental, conservation and recreational purposes, including national parks, nature reserves, state and territory recreation and conservation areas, and formal reserves within state forests. This class does not include informal reserves (areas protected by administrative instruments), areas protected by management prescription, or forest areas pending gazettal to this tenure. The harvesting of wood and non-wood forest products generally is not permitted in nature conservation reserves.
- **Other Crown land:** Crown land reserved for a variety of purposes, including utilities, scientific research, education, stock routes, mining and use by the defense forces, and to protect water-supply catchments, with some areas used by Aboriginal and Torres Strait Islander communities.
- **Private forest:** forest on land held under freehold title and private ownership, and usually privately managed. This class includes land with special conditions attached for designated Indigenous communities.
- **Leasehold forest:** forest on Crown land held under leasehold title, and generally privately managed. This class includes land held under leasehold title with special conditions attached for designated Indigenous communities.
- **Unresolved tenure:** forests where data are insufficient to determine land ownership status.

Multiple-use public forest, Nature conservation reserve, Other Crown land and Leasehold forest are considered public, only private forests are private.

Concerning Western Australia, in the north of the state, the tenure types consists of Leasehold, Nature conservation reserve and other crown land. In the south between Perth and Albany, most of the native forests are multiple-use public forests, nature conservation reserve and private forest. Going to the north-east, the three main tenure types are Leasehold, Nature conservation reserve and other crown land, some forests are private. The vast majority (93%) of native forests are public.

Figure 9 : Forest extent by tenure

Source: <http://www.agriculture.gov.au/abares/forestsaustralia/forest-data-maps-and-tools/forest-maps> (modified by SGS)

In terms of area, other crown land is the biggest tenure type, followed by Leasehold forest and Nature conservation reserve. Multiple-use forest and private land almost have the same area. Unresolved tenure is minimal compared to other tenure types (Table 5).

Table 5 : Forest area, by tenure type

Tenure type	Area (thousand ha)	
	Western Australia	Australia
Leasehold forest	5,559	48,533
Multiple-use public forest	1,291	10,159
Nature conservation reserve	4,610	21,478
Other crown land	6,010	8,146
Private land (including Indigenous)	1,281	33,394
Unresolved tenure	1	871
Total native forest	18,752	122,581

Source : Australia's State of the Forests Report 2013

Concerning the industrial plantations in Australia, the ownership situation is presented as follows⁵: “A significant change in Industrial plantation ownership (specifically, ownership of plantation trees) from public to private owners occurred over the period 2005–11 (Table 6). Government-owned plantations decreased from 37% of Australia's total plantation area to 24% over this period. Ownership by institutional investors (including international superannuation funding systems) increased from 12% in 2005 to 31% in 2011, as a result of transfer in 2010 and 2011 of tree ownership from managed investment schemes, and from state government plantations in Tasmania and Queensland. Plantation ownership by managed investment schemes rose from 23% in 2005 to a high of 36% in 2009, then fell to 24% in 2011. Ownership by farm foresters and other private owners (including small-scale plantation woodlots) declined from 13% to 8%. Timber industry company ownership fell from 15% in 2005 to 7% in 2009, and then rose to 13% in 2011.”

The total area of industrial plantations rose until 2009, it then began to stagnate.

Table 6 : Industrial plantation ownership in Australia

Area (%)	2005	2006	2007	2008	2009	2010	2011
Institutional investors	12	12	12	11	13	28	31
Timber industry companies	15	15	9	9	7	13	13
Farm foresters and other private owners	13	12	10	9	10	9	8
Managed investment schemes (MIS)	23	16	33	34	36	25	24
Governments	37	35	36	37	35	25	24
Total area of Industrial plantations (million ha)	1.74	1.82	1.9	1.97	2.02	2.01	2.02

Source : Australia's State of the Forests Report 2013

⁵ Australia's State of the Forests Report 2013

2.4. Competent authorities and policies

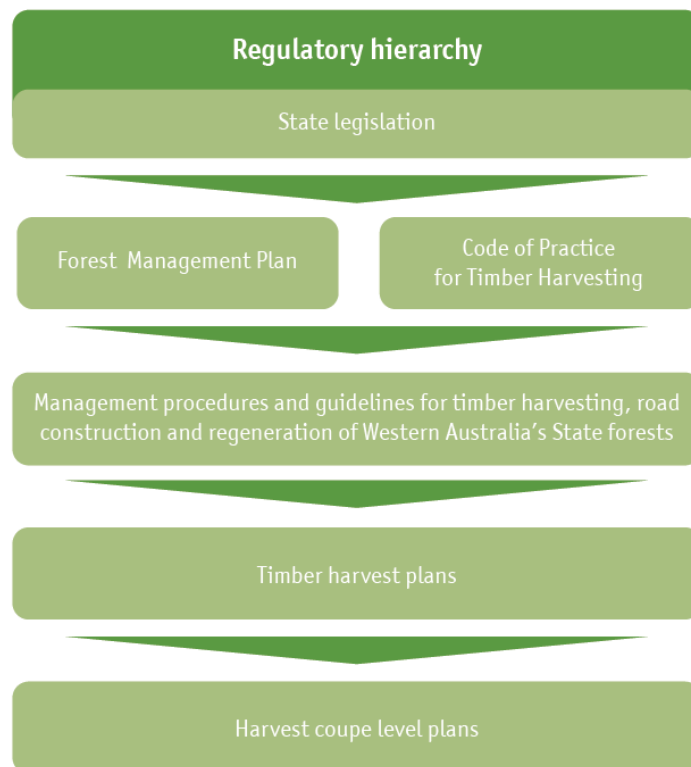
Administration of forests

In Australia, primary responsibility for land management, including forest management, lies at the state and territory level, while the Australian Government also has certain powers and responsibilities at the national level. All states and territories have Acts, and dependent Regulations, that are designed to ensure the conservation and sustainable management of forests. Some of this legislation is administered jointly by, and requires coordination between, state or territory and local governments, statutory authorities and regional management authorities. In the states and territories, comprehensive legislative provisions cover planning and review, public participation, and the regulation of forest management activities in multiple-use public forests, public nature conservation reserves and, to a lesser extent, private and leasehold 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, many of which are prescribed in legislation. Only a small number of nature conservation reserves are governed and managed by the Australian Government under Commonwealth legislation and management plans prescribed in that legislation. Australia's publicly managed plantation forests are also governed and managed under state or territory regulatory frameworks and management plans. Management plans provide guidance for sustainable forest management practices⁶.

The regulatory hierarchy for forest management in Western Australia can be seen in Figure 10.

⁶ Australia's State of the Forests Report 2013

Figure 10 : Regulatory hierarchy

Source: Forest management in Western Australia, information sheet

National Forest Policy Statement (NFPS)

The forests management is guided by the National Forest Policy Statement (1992), signed jointly by the Australian government and state and territory governments. The policy statement underpins a well-established policy and legislative framework for the conservation and sustainable management of Australia's forests, both nationally and at state and territory levels. Public native forest is governed and managed under state or territory regulatory frameworks and management plans. On private land, there is also various native vegetation Acts in application⁷.

Regional Forest Agreements (RFAs)

It is described as "A key outcome of the National Forest Policy Statement was the negotiation of Regional Forest Agreements (RFAs) between the Australian Government and some individual state governments. RFAs are 20-year plans for the conservation and sustainable management of specific regions of Australia's native forests, and resulted from substantial scientific study, consultation and negotiation with a diverse range of stakeholders. Science-based methodology and Comprehensive Regional Assessments (CRAs) were used to determine forest allocation for different uses and to underpin forest management strategies. The RFAs are designed to provide certainty for forest-based industries, forest-dependent communities and conservation. Certain obligations of the Commonwealth under RFAs were given effect through the Commonwealth Regional Forest Agreements Act 2002. Ten RFAs were negotiated bilaterally between the Australian Government and four of the six state governments (New South Wales, Tasmania, Victoria and Western Australia). The

⁷ Australia's State of the Forests Report 2013

*Australian and Queensland governments completed a CRA for south-east Queensland but did not sign an RFA.*⁸

Table 7 : Areas of forest in Regional Forest Agreement regions

RFA Region	Region area (thousand ha)	Native forest		Plantation		Total forest	
		Forest area (thousand ha)	Proportion of RFA region area (%)	Forest area (thousand ha)	Proportion of RFA region area (%)	Forest area (thousand ha)	Proportion of RFA region area (%)
South-West Forest region of Western Australia	4,257	2,672	63	228	5.4	2,900	68
Total RFA regions	39,185	20,998	54	1,338	3.4	22,336	57

Source : Australia's State of the Forests Report 2013

Sustainable forest management Plan

The most recent of forest management plan in Western Australia covers 2014-2023⁹. Western Australia's national parks, conservations parks, nature reserves, State forests and timber reserves are vested in the Conservation Commission of Western Australia.

It seeks to achieve environmental outcomes, economic development and social values of forests, to meet the needs of society without compromising the ability of future generations to meet their own needs. Australia's framework includes the following seven criteria for sustainable forest management based on Montreal Criteria (Commonwealth of Australia 2008):

- Conservation of biological diversity
- Maintenance of productive capacity of forest ecosystems
- Maintenance of ecosystem health and vitality
- Conservation and maintenance of soil and water resources
- Maintenance of forest contribution to global carbon cycles
- Maintenance and enhancement of long-term multiple socio-economic benefits to meet the needs of societies
- Legal, institutional and economic framework for forest conservation and sustainable management

The areas of forest under a management plan can be seen in the table hereunder. In Western Australia, 20% of the total forest areas are covered by a management plan. This plan deals with the management of around 79 % of total native vegetation and 81 % of the total native forest across private and public land within the plant area.

Table 8 : Area of forests covered by a management plan

Plan type	Area (thousand ha)	
	Western Australia	Australia
Forest area with a management plan	3,863	27,758
primarily conservation	2,344	17,249

⁸ Australia's State of the Forests Report 2013, p.23

⁹ Forest management plan 2014-2023, Conservation Commission of Western Australia, December 2013

primarily production	1,226	7,231
multiple or other values	293	3,279
Forest area without a management plan	15,359	96,994
Total	19,222	124,752

Source : Australia's State of the Forests Report 2013

2.5. Overview of wood-related industry

The Australian forest and wood products industry contributed to Australia's Gross Domestic Product at the level of 0.59% of the total GDP in 2010-11¹⁰.

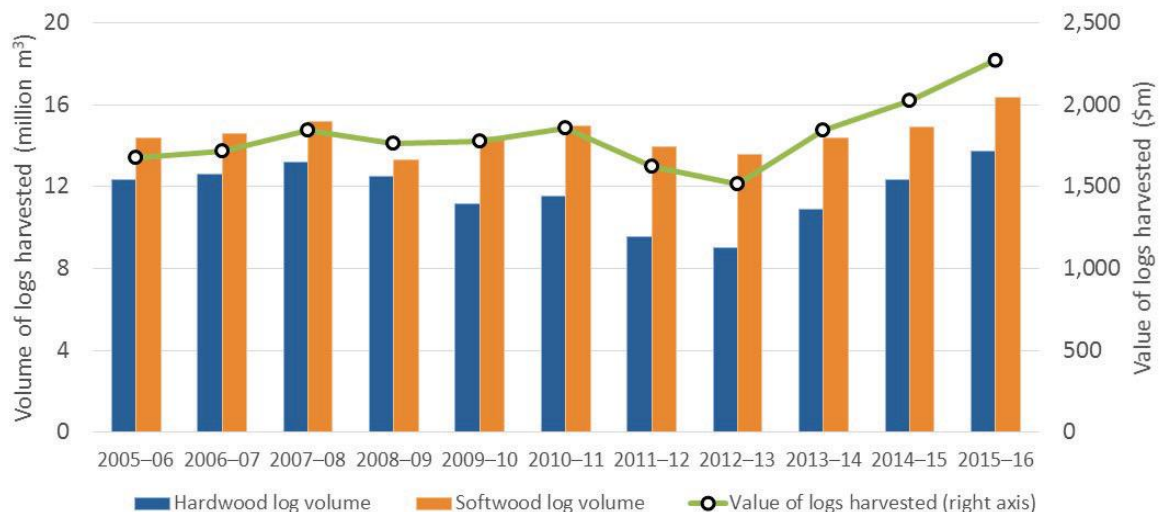
The Industrial plantations as well as native forests are harvested to provide raw material for the wood industry.

Harvest volume and value

In 2015-16, the total area of Industrial plantation was 2.0 million ha in Australia and 383.4 thousand ha in Western Australia¹¹. The net harvestable area of public native forest in 2010-11 was 5.5 million ha in Australia and 848 thousand ha in Western Australia¹².

The log harvest volumes for Australia are presented in Figure 11. On the decline until 2012-13, the volume and value of logs harvested attained its maximum in 2015-16 and exceeded 30 million m³ for the first time. For the same year, the estimated value of logs was around 2.5 billion \$.

Figure 11 : Volume and value of logs harvested in Australia (2005-2016)



Source: Australian forest and wood products statistics: September and December quarters 2016

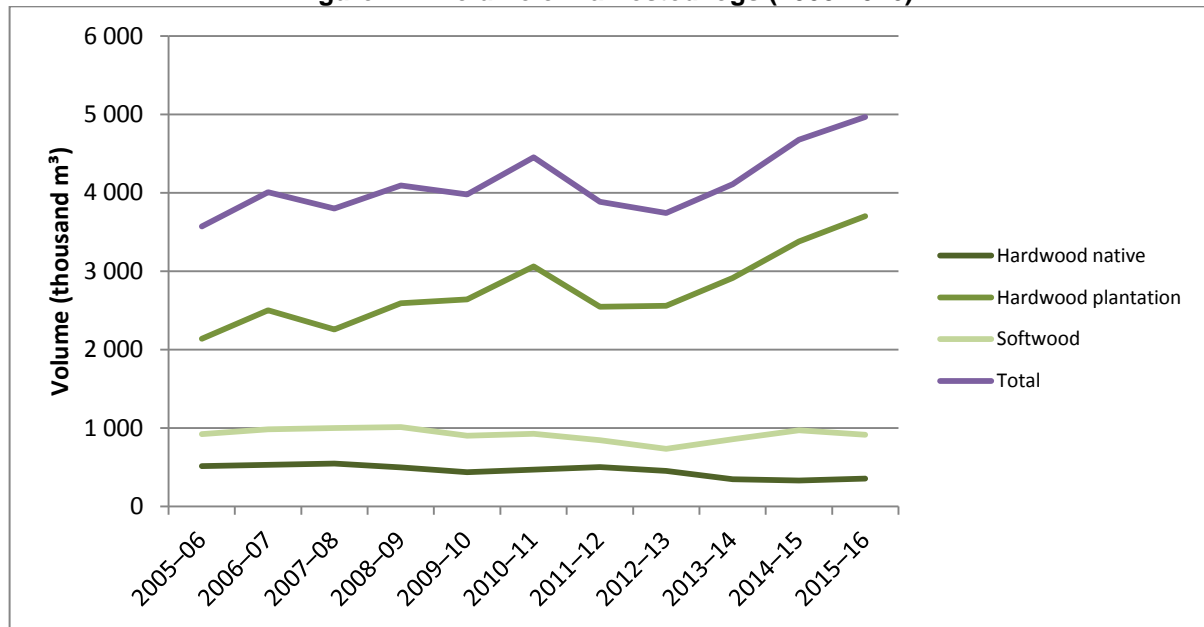
¹⁰ Australia's State of the Forests Report 2013

¹¹ forest and wood products statistics: September and December quarters 2016

¹² Australia's State of the Forests Report 2013

The harvest volumes for Western Australia are shown in Figure 12. Hardwood logs from native forests and softwood logs from plantations are minor compared to hardwood logs from plantations. Hardwood native is on a slow declining trend. Hardwood plantation trend is on the rise and being the biggest contributor, it influences the national value. Softwood shows a stagnation around 1 million m³. The majority of harvest in Western Australia comes from hardwood plantations.

Figure 12 : Volume of harvested logs (2005-2016)



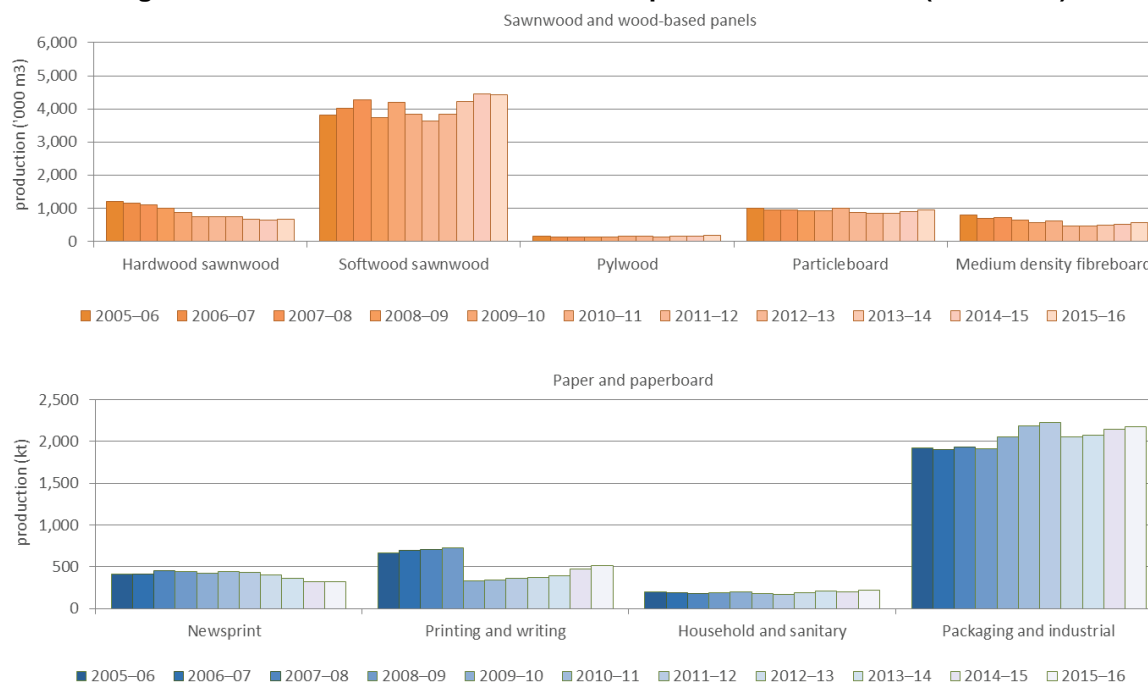
Source: ABARES

Production volume

The production volumes in Australia for the year 2015-16 are presented in Australian forest and wood products statistics: September and December quarters 2016:

- The production of sawnwood is estimated to be around 5.1 million m³.
- The domestic production of wood-based panels was 1.7 million m³. This comprises plywood, particleboard and medium density fibreboard.
- The production of paper and paperboard was 3.2 million tons.

The evolution of the production can be seen in Figure 13.

Figure 13 : Production of forest and wood products in Australia (2005-2016)

Source: Australian forest and wood products statistics: September and December quarters 2016

Employment

The employment of forestry, wood, pulp and paper manufacturing represents 0.54% of the total employment in Australia in 2015-16 with a total of 64.3 thousand employments¹³. According to Australia's State of the Forests Report 2013, the number of employees in Western Australia in 2011 was 5,580.

¹³ ABARES 2017

3. Sustainability of Western Australian forest

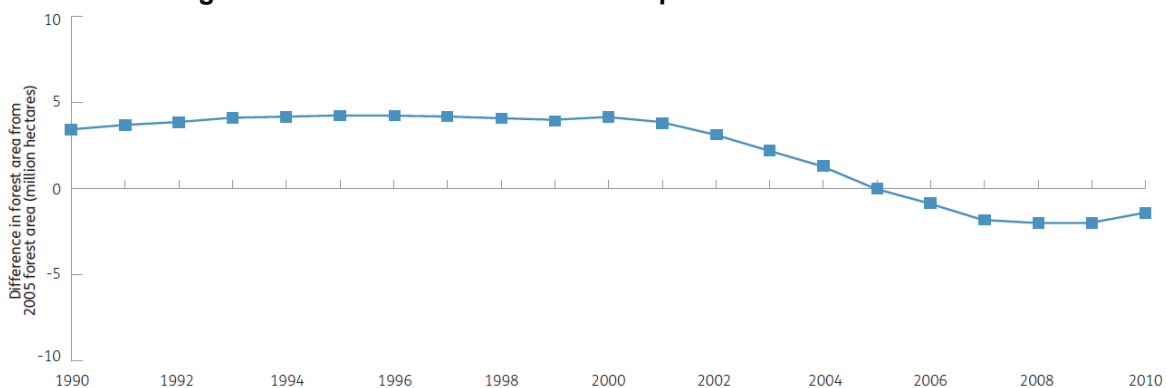
3.1. Evolution of forest area and risk of conversion

The evolution of the Australia's forest area can be seen in Figure 14. The situation was rather stable until 2000; it was followed by a gradual decline until approximately 2008. The area in 2005 was 107.5 million ha. From 2005 to 2008, the loss was 1.8 million ha, it then increased by 0.4 million ha between 2008 and 2010.

Australian National Greenhouse Accounts Report 2010 attributes the fluctuations in the reported forest area to a range of factors, including impacts of fire, floods and cyclones, and regrowth from these disturbances; vegetation thickening; climate variability; extraction of forest products; land-use change (both forest clearing, including clearing of recent regrowth, and forest establishment, including plantation establishment); and degradation from grazing.

There is no data available for the forest area change in Western Australia.

Figure 14 : Australia's forest area compared with 2005 forest area



Note: In SOFR 2008 data from the then Australian Government Department of Climate Change and Energy Efficiency (DCCEE) were used to report change in forest area to 2005 (DCCEE data are reported by calendar year). Values above are calculated as differences from 2005 forest area reported by the National Carbon Accounting System (107.5 million hectares), which is set as zero.

Source: Calculated by the Australian Bureau of Agricultural and Resource Economics and Sciences from DCCEE data.

Source: Australia's State of the Forests Report 2013

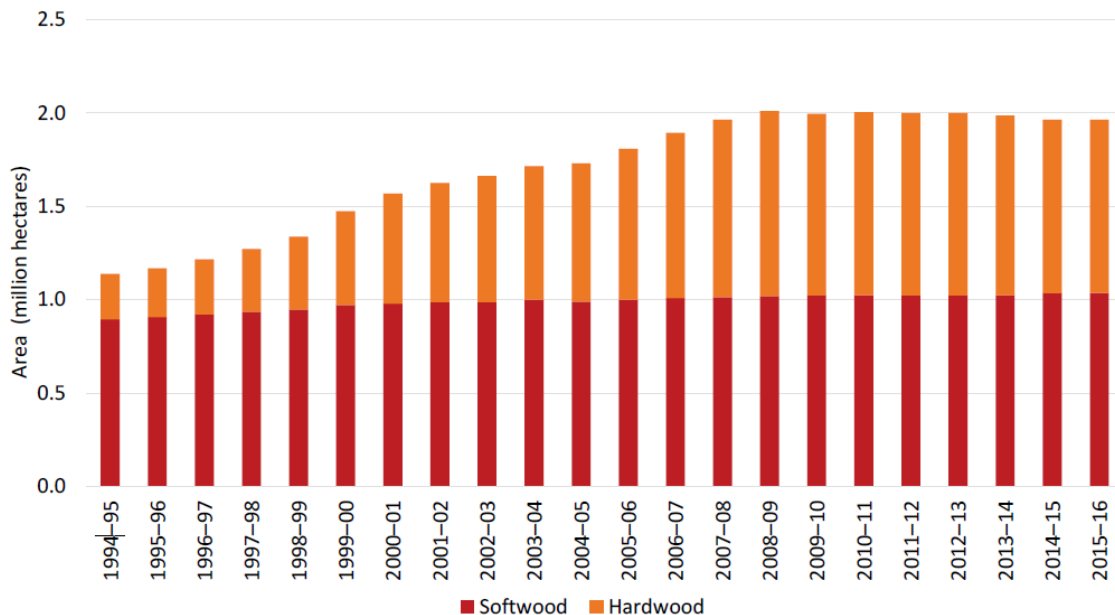
Concerning the Australian plantation area, it has continually grown until 2008-09 and reached its maximum value of more than 2 million ha. From 2008-09 until 2015-16, the area decreased slightly to an area of 1.97 million ha (Figure 15).

*"Until the 1990s, most plantations established in Australia were pines and other softwood species grown to produce sawn timber. Many were planted on land where there had previously been native eucalypt forests. However, the clearing of native vegetation (including native forests) for new plantation development is now prohibited or restricted by state and territory policies and legislation, and new plantations are now mostly established on cleared agricultural land. Most plantations established over the past 15 years have been hardwood plantations grown to produce pulp logs."*¹⁴

¹⁴ Australia's State of the Forests Report 2013, p. 131

In Western Australia, the Industrial plantation area follows the same trend as the national one, except for the decrease which is slightly bigger. It reached its maximum value in 2008-09, 422.8 thousand ha. For the period, Hardwood plantation is the main type of plantation with an average of 74.3% of the total plantation area.

Figure 15 : Total Australian plantation area, by type (1994-2016)

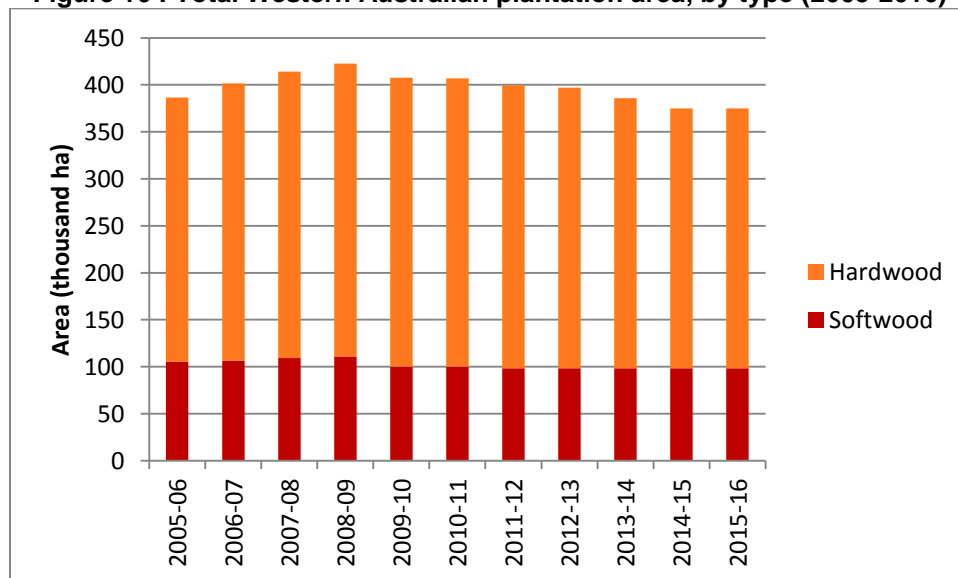


Note: Data for 1994-95 to 2004-05 are for calendar years representing 1994 to 2005; data for 2005-06 to 2015-16 are for financial years. 'Other' category plantations are not included.

Source: ABARES

Source: Australian plantation statistics 2017 update

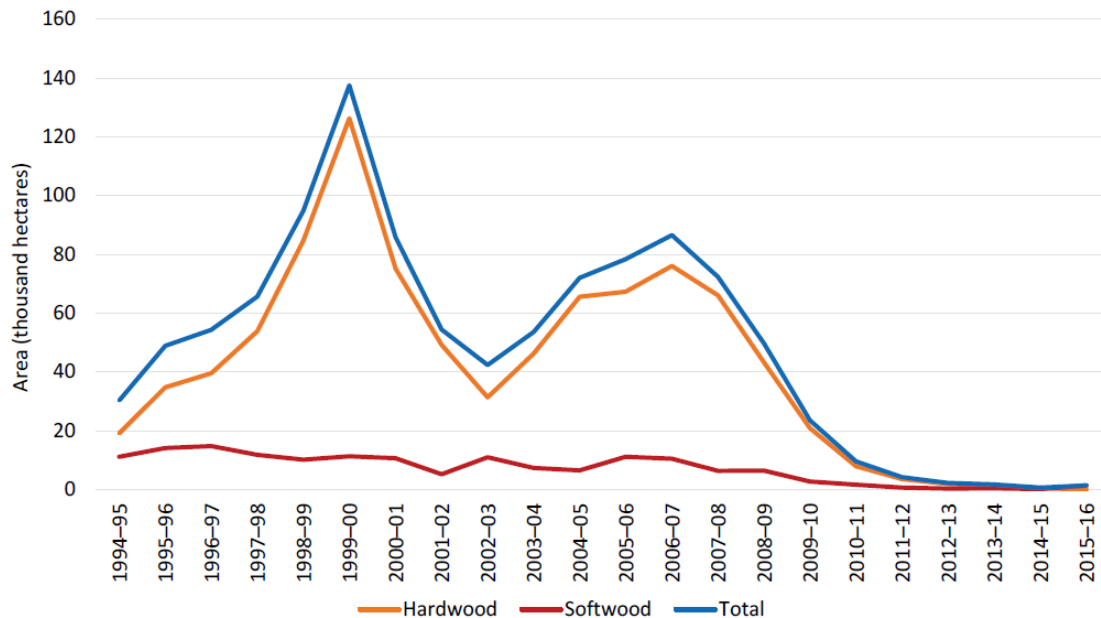
Figure 16 : Total Western Australian plantation area, by type (2005-2016)



Source: ABARES 2017

Industrial plantations in Australia seem to have reached its maximum capacity as the number and area of new plantations diminishes each year.

Figure 17 : New plantations (1994-2016)



Note: Data for 1994–95 to 2004–05 are for calendar years representing 1994 to 2005; data for 2005–06 to 2015–16 are for financial years.

Source: ABARES

Source: Australian plantation statistics 2017 update

The FSC risk assessment platform www.globalforestregistry.org considers that Western Australia is at low risk in terms of conversion of forest to other land uses, because the following criterion is verified at the country level:

- There is no net loss AND no significant rate of loss (> 0.5% per year) of natural forests and other naturally wooded ecosystems such as savannahs taking place in the eco-region in question.

3.2. Living wood volumes and removals

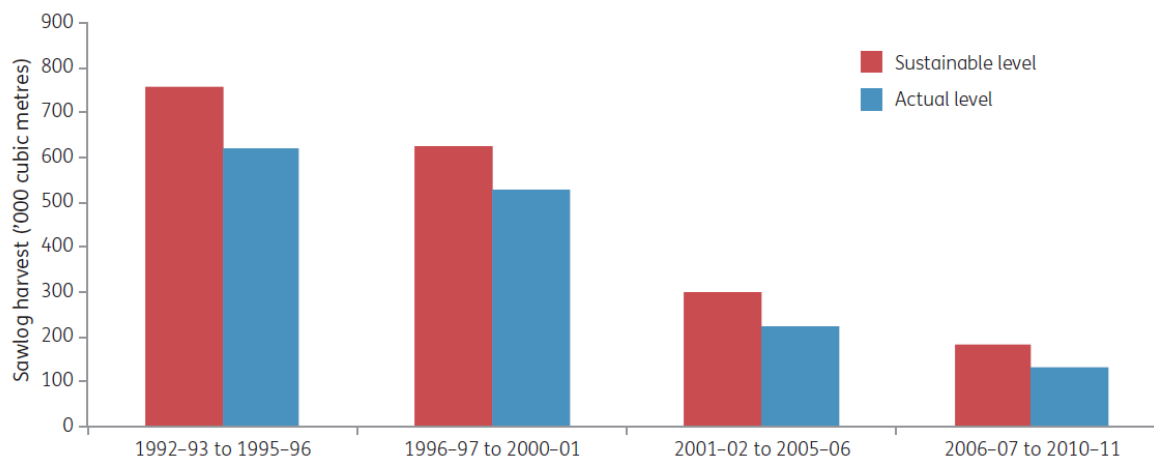
The Resource Assessment Commission (1992) compiled estimates of standing commercial wood growing stock. No national estimates have been made since.

In New South Wales, Tasmania, Victoria and Western Australia, assessments of the growing stock of merchantable wood and tree growth rates are used to estimate sustainable harvesting levels in multiple-use public native forests.

The average annual harvest and sustainable yield for multiple-use native forests in south-west Western Australia for several periods between 1992 and 2011 are presented in Figure 18. The saw log harvest in the multiple-use native forest regresses with the years and is always under the

sustainable level. Three intense broad scale wildfires contributed to the decline in sustainable harvest level in Victorian multiple-use public native forests. The wildfires will also affect long-term saw log supplies over a 100-year period¹⁵.

Figure 18 : Average annual harvest and sustainable yield for multiple-use public native forests in south-west Western Australia



Note: Sustainable yield and actual harvested level are of first and second grade karri and jarrah sawlogs.

Source: DEC 2012a, SOFR 2003, SOFR 2008, Western Australian Department of Environment and Conservation.

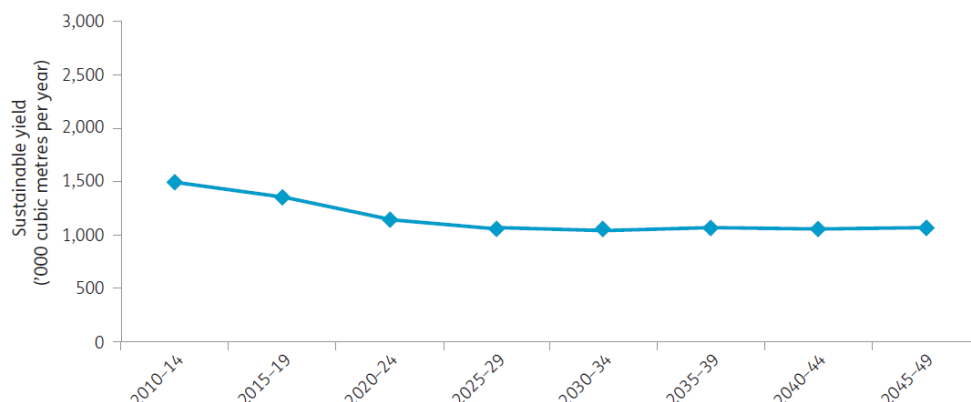
Note: by State of the Forests Report (SOFR) reporting period: SOFR 1998, SOFR 2003, SOFR 2008 and SOFR 2013

Source: Australia's State of the Forests Report 2013

Forest growth and wood production are highly sensitive to changes in climate. It is predicted that the temperatures will rise and the rainfall will diminish by 2050 (relative to 2005). Log availability is projected to decline under the climate change predictions (Figure 19).

¹⁵ Australia's State of the Forests Report 2013

Figure 19 : Forecast sustainable yield of high-quality native forest sawlogs from public production forest in Australia (2010-2049)



Notes:

Figures exclude changes resulting from the Tasmanian Forest Intergovernmental Agreement 2013 and supplementation with high-quality sawlogs from public hardwood plantations.

Figures include Queensland allowable cut estimates to 2025.

Source: ABARES (2012a-f), updates from Forests NSW (2010a) and VicForests (2011a), Australian Bureau of Agricultural and Resource Economics and Sciences database.

Source: Australia's State of the Forests Report 2013

After wood harvesting in multiple-use public forests, the effective regeneration is a fundamental process in sustainable forest management.

The area of regenerated multiple-use public native forest for Western Australia is shown in Table 9. The proportion of effectively regenerated multiple-use public forests is near perfect, the worst year being 2009-10 with a regeneration of 99.65% of the harvested area.

Table 9 : Area of multiple-use public native forest effectively regenerated (2001-2011)

Reporting year	Total area harvested and regenerated (ha)	Proportion of harvested area effectively regenerated (%)
2001-02	16,630	100
2002-03	13,950	100
2003-04	9,725	100
2004-05	9,610	99.94
2005-06	7,440	99.94
2006-07	9,670	99.98
2007-08	8,820	99.9
2008-09	7,640	100
2009-10	10,660	99.65
2010-11	6,140	-

Source : Australia's State of the Forests Report 2013

In a plantation, after the clear fell harvesting and at the end of the rotation, part of the area is re-established. The decision to re-establish plantations, especially short-rotation hardwood plantations,

depends on factors such as site suitability, previous yield, grower intent, market availability and alternative land uses. Re-establishment success of public softwood plantations in Western Australia is shown in Table 10. Most of the area is re-established each year. The average proportion of re-established softwood plantation for the period is 95%.

Table 10 : Annual area of public softwood plantation re-established, and area achieving stocking density standards specified in the silviculture guidelines

Year	Area regenerated in previous year (ha)	area surveyed (ha)	Area understocked (ha)	Proportion of area requiring remedial treatment (%)	Proportion of area that met standard (%)
2004	1,418	1,418	105	7.4	93
2005	1,456	1,456	143	9.8	90
2006	1,433	1,433	45	3.1	97
2007	1,512	1,512	52	3.4	97
2008	1,627	1,627	24	1.5	99
2009	2,106	2,106	95	4.5	95
2010	570	570	28	5.0	95

Source : Australia's State of the Forests Report 2013

In 2012, an article explained that Western Australia faced catastrophic forest collapse. It is stated that these forest collapses are climate-driven. The long-term climate shift, which results in dryer and hotter climate, impact the stream-flow and ground water levels. It deteriorates woodland and forest health. In several ecosystems, species have died out and not been replaced. Many plant and animal species are susceptible to similar collapses given the current climate trajectory¹⁶.

3.3. Protection of ecosystems and biodiversity

Under Australia's Strategy for the National Reserve System 2009-2030, protected area and management categories for protected areas have been defined along international standards. The categories are the ones used by the International Union for Conservation of Nature (IUCN). The official definition of a specially protected land is:

"...an area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means."

The different categories of the IUCN are:

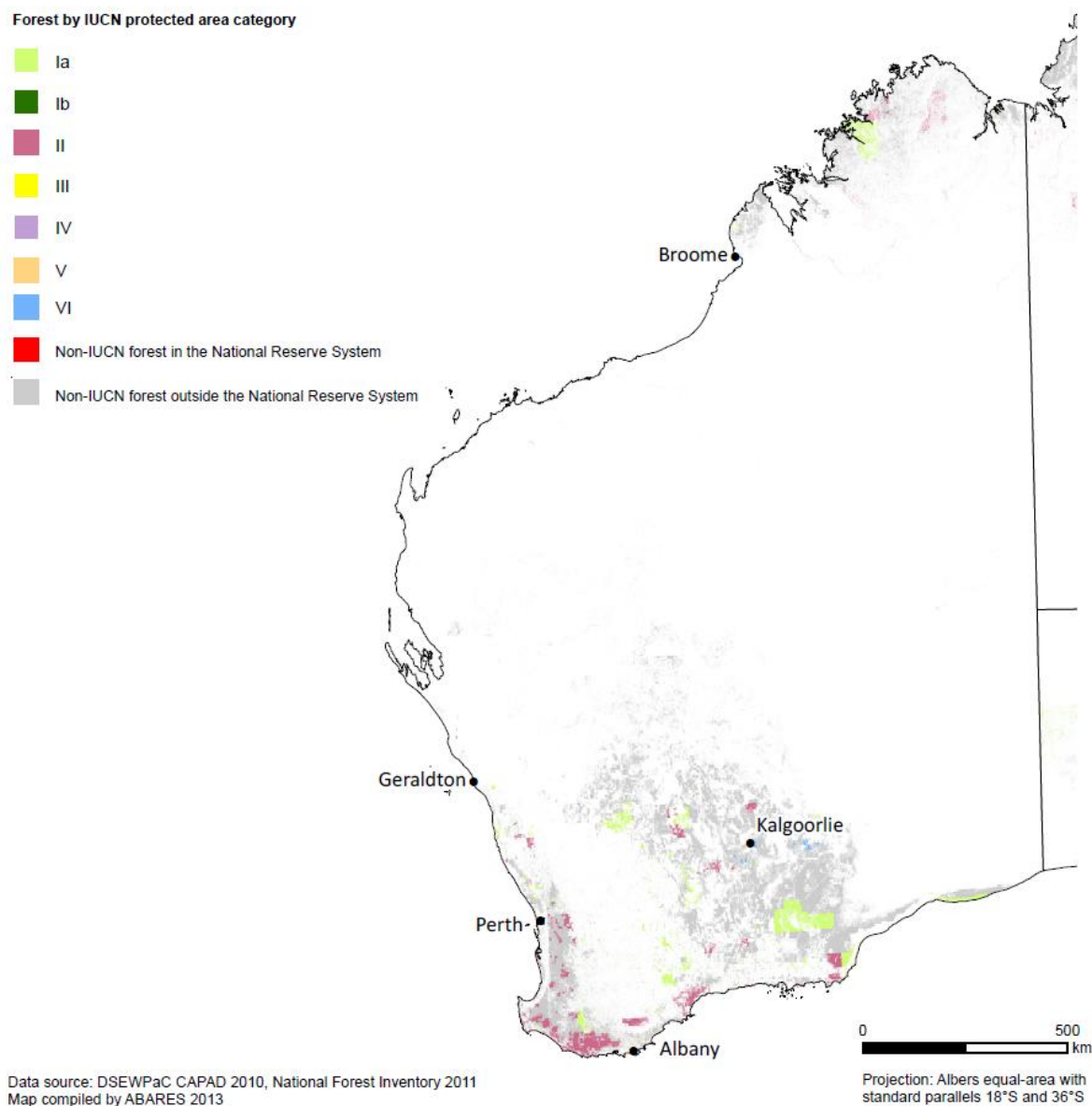
- **Ia Strict nature reserve:** protected area managed mainly for science.
- **Ib Wilderness area:** protected area managed mainly for wilderness protection.
- **II National park:** protected area managed mainly for ecosystem conservation and recreation
- **III Natural monument:** protected area managed for the conservation of specific natural features.
- **IV Habitat/species management area:** protected area managed mainly for landscape/seascape conservation and recreation.

¹⁶ <http://theconversation.com/western-australias-catastrophic-forest-collapse-6925>

- **V Protected landscape/seascape:** protected area managed mainly for landscape/seascape conservation and recreation.
- **VI Managed resource protected area:** protected area managed mainly for the sustainable use of natural ecosystems.

The areas of forest in IUCN protected-area categories are shown in Figure 20 and presented in Table 11. Almost all forests under an IUCN protection category are either under the category Strict nature reserve or National park (together 97.8% of forest in all categories). The protected forest area represents 18.0% of the total forest area. Protected forests are scattered in forest areas. There is no specific pattern in the repartition of protected forest land.

Figure 20 : Forest area, by IUCN protected area category



© Commonwealth of Australia
Reference: Montreal Process Implementation Group for Australia and National Forest Inventory Steering Committee, 2013, *Australia's State of the Forests Report 2013*, ABARES, Canberra, December. CC BY 3.0.

Source: <http://www.agriculture.gov.au/abares/forestsaustralia/forest-data-maps-and-tools/forest-maps> (modified by SGS)

Table 11 : Area of forest in IUCN protected-area categories

Jurisdiction	Area (thousand ha)											Proportion of forest in all IUCN categories (%)
	IUCN protection category								Forest in categories I-IV	Forest in all categories	Total forest	
	Ia	Ib	II	III	IV	V	VI	ND				
Western Australia	1,779	0	1,596	0	1	1	78	0	3,377	3,456	19,222	18
Australia	3,169	2,854	14,331	573	495	490	4,485	30	21,422	26,422	124,751	21

Source : Australia's State of the Forests Report 2013

The Collaborative Australian Protected Areas Database (CAPAD) includes and reports protected areas that meet IUCN categories and that have tangible evidence for being 'especially dedicated to the protection and maintenance of biological diversity', but there are other types of protected area where conservation and sustainable use of biodiversity is one of multiple objectives, or where the area does not otherwise satisfactorily meet the CAPAD criteria¹⁷.

The other protected areas include:

- Other nature conservation reserves and legally covenanted land that are managed for conservation of biodiversity.
- Multiple-use public native forests used for timber harvesting that are also regulated and managed for conservation of biodiversity.
- Crown land (either other Crown land or land leased by the Commonwealth) with another primary use that also has management objectives for the protection, conservation and maintenance of biodiversity (including defense training land such as Shoalwater Bay training area in Queensland, and the Buckland training area in Tasmania).

The area of native forest on land protected for conservation of biodiversity is presented in Table 12. With the areas included in IUCN categories and the ones described above, the total native forest protected for biodiversity conservation equals 6.1 million ha and represents 31.6% of the total forest area.

Table 12 : Area of native forest on land protected for conservation of biodiversity

Jurisdiction	Area (thousand ha)						Proportion of native forest protected for biodiversity conservation (%)
	Native forest not in CAPAD but protected for conservation diversity				Native forest in CAPAD	Total native forest protected for biodiversity conservation	
	Nature reserve	Legally covenanted land	Protected areas in multiple-use native forests	Other protected areas on Crown-managed land			
Western Australia	1,169	59	1,290	93	3,456	6,067	31.6
Australia	1,801	394	9,612	965	26,427	39,199	31.4

Source : Australia's State of the Forests Report 2013

¹⁷ Australia's State of the Forests Report 2013

3.4. Protection of soils¹⁸

Forests are important for soil conservation because they contribute directly to soil production and maintenance, prevent or reduce soil erosion and provide and protect water supplies.

The area of forest managed primarily for protective functions, specifically for the protection of soil or water, is calculated as all public nature conservation reserves, plus (for some states and territories) parts of multiple-use public forest in which harvesting and road construction are not permitted, plus catchments managed specifically for water supplies. Conservation of soil and water values is considered important for forest management in multiple-use public forests in general.

As the soil physical properties (soil structure, density, texture, permeability, and water-holding capacity) are degraded, it can affect germination of seeds, the growth and survival of trees, facilitate water runoff and soil erosion.

The main disturbances affecting soil and water in forests are wood harvesting (operation with the greatest potential to affect the physical structure of soils), road construction and maintenance, fire, grazing, recreation, and the activities of feral animals.

The Western Australian *Soil and Water Conservation Guideline* is the implementation guide for soil and water conservation aspects of the *Forest Management Plan 2014-2023*. It has ten guiding principles that are described to protect soils, including rehabilitation of damaged soil, and protection of soil from erosion as a result of wood harvesting and associated management activities. The guideline sets out the key requirements for protecting soil, based on the types of disturbance (using visible soil disturbance categories), and limits activities for various levels of disturbance. Together with associated manuals and reference material, the guideline provides a framework for, and guidance on, soil conservation associated with forestry operations in Western Australia.

In the management of risks to forest soils, soil erosion can be minimized by careful planning and management of road crossings and forestry operations, with detailed prescriptions depending on the nature of particular forest soils and the activities being undertaken.

The area of public forest from which wood harvesting was excluded in Australia was 29.8 million ha in 2011. In Western Australia, it was 5.0 million ha; it represented 26% of the total forested area in the state.

Government agencies, conservation organizations and community groups plant trees to provide wildlife corridors and prevent or minimize soil erosion. For example, between 2005 and 2010, the national environmental organization Greening Australia planted more than 15.5 million seedlings, direct-seeded 19 thousand kilometers of tree line, collected 18,250 kilograms of native seed, conserved more than 340 thousand hectares of native vegetation (including forest and non-forest areas) and constructed more than 8 thousand kilometers of protective fencing.

¹⁸ Australia's State of the Forests Report 2013

3.5. Protection of water¹⁹

Many forests provide quantities of clean water for human consumption, irrigation and industrial uses. The risk for water quantity and quality is lower when catchments are forested instead of being under another non-forest land use.

As the amount of water used by a forest stand depends on its age, density, species mix and growth rate, major fire events that change the age-class structure of native forest, and changes in stream-flow influence water yields. These changes can last for decades after severe fires.

In New South Wales, South Australia, Tasmania, Victoria and Western Australia, assessments of the potential risks to water quality are conducted for forest activities and roading operations in multiple-use public native forests and plantations. However, the assessments have varying levels of robustness. In the states and territories for which data were available, almost all the proposed activities were assessed for risks to water quality.

The *Forest Management Plan 2014-2023* in Western Australia includes requirements to maintain water quantity and places strong emphasis on the protection of water values.

Protective measures employed routinely in forests include maintaining forested streamside buffer zones to minimize sediment movement, and carefully planning and managing spray operations of fertilizer and herbicide.

The area of forest in catchments managed specifically to supply water for human or industrial use in 2011 was 1.4 million ha in Australia and 948 thousand ha in Western Australia. The latter only includes the public drinking water source areas on multiple-use public forest and conservation reserves in south-west part of the state.

In Western Australia, Catchments identified as sensitive to rises in saline groundwater are managed to minimize the risk by re-establishing deep-rooted perennial vegetation over significant areas. For example, the existing commercial pine plantation on Perth's Gnangara Mound will be replaced by other land uses to increase the recharge of that water resource over time.

Government agencies, conservation organizations and community groups plant trees to protect riparian zones and counter rising water tables and salinity.

3.6. Protection of carbon stocks

Carbon Stock

The amount of carbon stored in Australian forested landscapes can change over time because of:

- The natural developmental or successional dynamics of forests
- Natural disturbances such as wildfire (bushfire), dieback and storms
- Variation in climatic factors such as temperature and rainfall

¹⁹ Australia's State of the Forests Report 2013

- Human activities such as wood harvesting, or clearing for agriculture, urban expansion or other land uses
- Increases in forest area due to reforestation, or establishment of commercial plantations and environmental plantings.

Activities such as site preparation and planting, fertilizer application, spraying for pests and weeds, pruning and thinning, and preparation for harvesting influence the uptake and release of greenhouse gases by production plantation forests.

Once wood has left the forest, its role in the carbon cycle is determined by factors such as:

- Energy used and emissions produced during wood processing and transport
- Change in the stocks of wood and wood products in service and in landfill
- Reductions in greenhouse gas emissions from fossil fuels due to the use of wood for energy generation instead of fossil fuels, and the use of wood for structural purposes in place of more energy-intensive structural materials.

The carbon stock in Australian forests is presented in Table 13. For the whole period between 2001 and 2010, the carbon stock in forests diminished by 81 million tons of carbon. The final stock was 12.8 billion tons in 2010. During the first half of the period, losses in stock exceeded gains by 91 million tons of carbon. A key driver of the carbon stock decline was wildfire that caused a loss of carbon of 93 million tons of carbon. Over the second half of the period, forest carbon stocks recovered thanks to less reclassification of forest land to non-forest land, smaller wildfire losses and the regeneration of the forests that suffered from the wildfires during the period 2001-05.

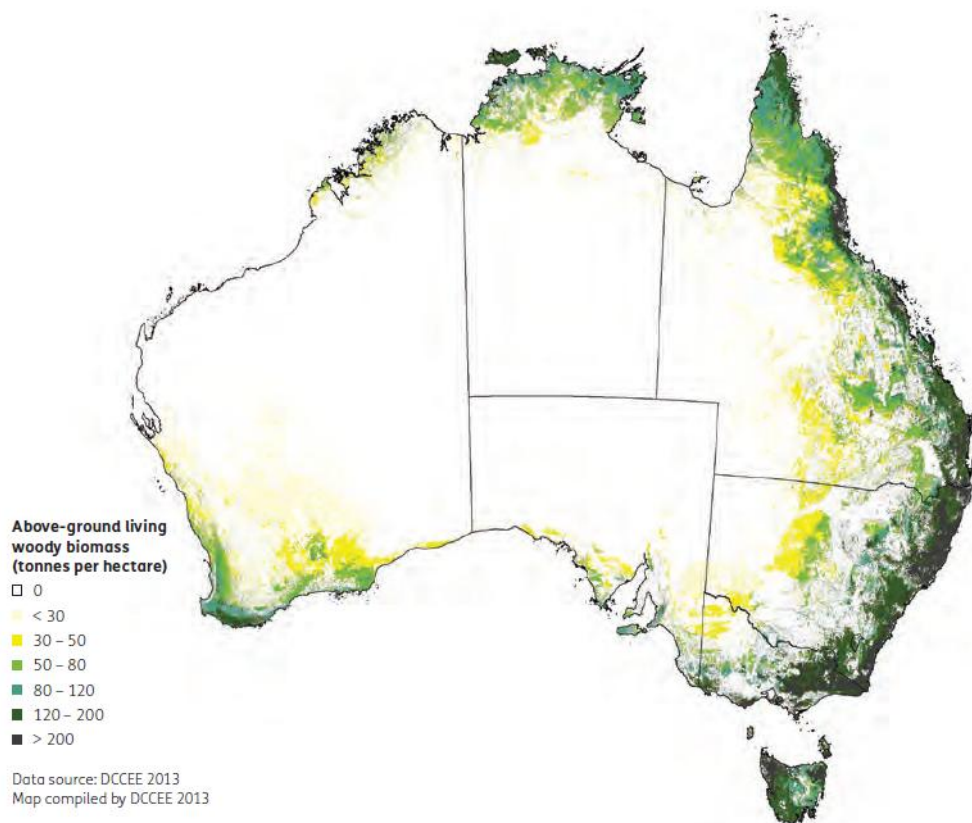
Table 13 : Carbon accounts for Australia's forests (2001-2010)

Parameter	Carbon stock (million tonnes)		
	2001-05	2006-10	2001-10
Initial stock	12,922	12,831	12,922
Gains in stock			
Growth in stock			
Native forests	175	182	357
Plantations	27	32	59
Total	202	214	416
Reclassification to forest			
Native forests	-	-	-
Plantations	8	5	12
Total	8	5	12
Total gains in stock	209	219	428
Losses from stock			
Transfer to product pools			
Native forests	35	31	66

Plantations	18	19	37
Total	53	50	103
Managed losses			
Native forests	58	32	90
Plantations	-	-	-
Total	58	32	90
Major disturbances			
Native forests	93	55	148
Plantations	0	0	0
Total	93	55	148
Reclassification to non-forest			
Native forests	97	72	169
Plantations	-	-	-
Total	97	72	169
Total losses in stock	300	209	509
Final stock	12,831	12,841	12,841
Net change	-91	10	-81
Net change from reclassification of land to and from forest and transfers to products	-142	-117	-259
Net exchange with atmosphere	51	127	178

Source : Australia's State of the Forests Report 2013

The biomass density in Australia and Western Australia for the year 2010 is presented Figure 21. Considering Western Australia, the highest biomass density is located in the southernmost part of the state, where the forest density is also higher. In general, the highest density areas are located near the coastline and as it goes towards the center of the island, the density declines.

Figure 21 : Biomass density of Australia's forests (2010)**Notes:**

Forest extent (106.4 million hectares) as determined for Australia's National Greenhouse Gas Inventory for greenhouse gas accounting as at the end of 2010 differs from that used elsewhere in this report because of methodological and measurement reasons: see Indicator 1.1a.

Forests with higher carbon densities are found in the wetter areas of the south-west, south-east and east of Australia; the northern and inland forests have lower carbon densities.

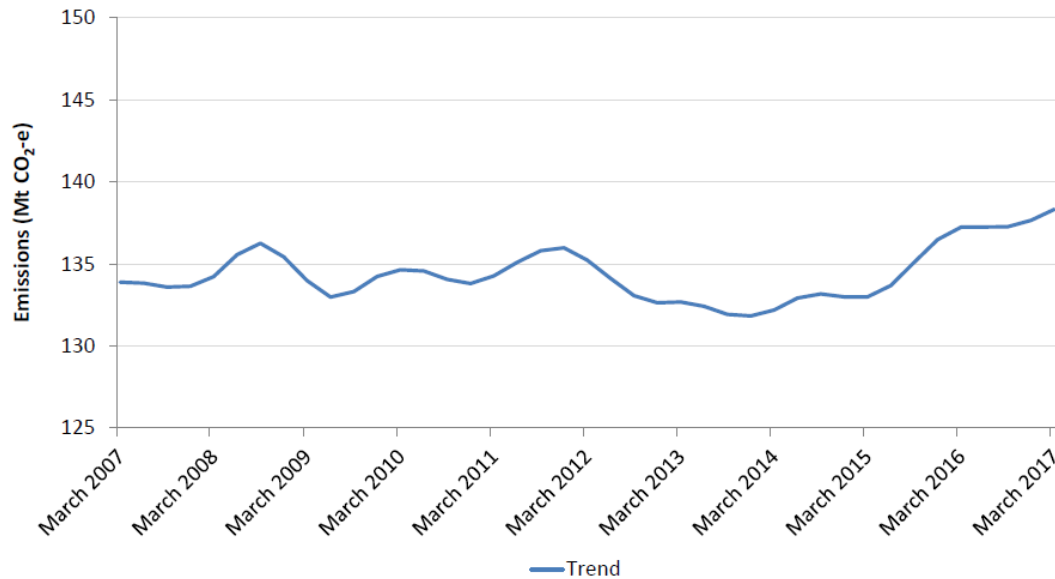
Source : <http://www.agriculture.gov.au/abares/forestsaustralia/forest-data-maps-and-tools/forest-maps>

Exchange with the atmosphere

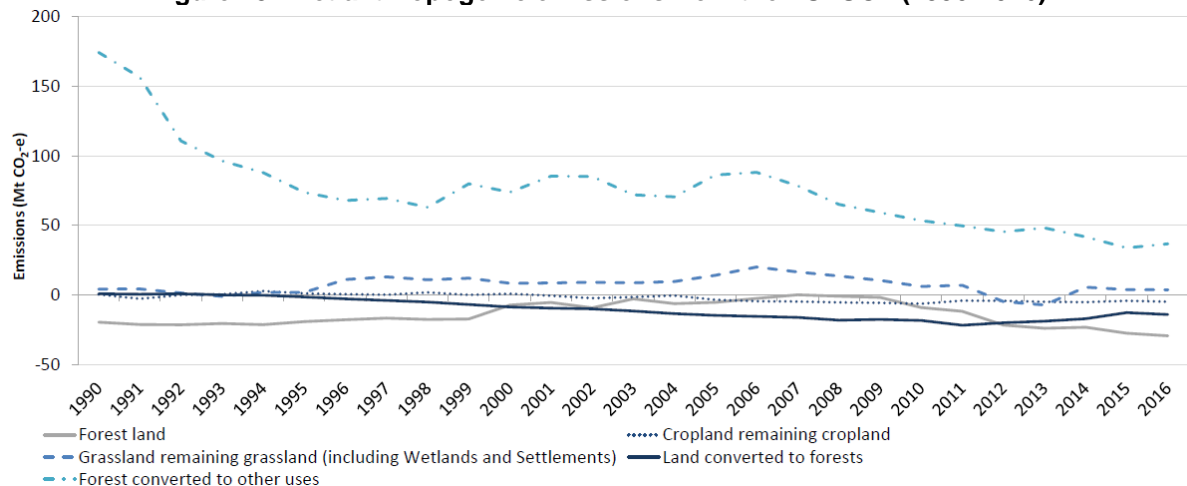
The national greenhouse gas inventory excluding land use, land use change and forestry (LULUCF) for the period 2007-2017 is shown in Figure 22. It was rather stable but since 2014, it follows an increasing trend.

The LULUCF are presented in Figure 23. Forest land has negative emissions for the whole period of 1990-2016 except for a near zero value around 2007. It is on a decreasing curve since 2009 indicating a higher absorption of carbon from the atmosphere. For the period, the conversion of forest to other uses diminishes influencing the LULUCF emissions drastically as it is the biggest source of emission for the LULUCF. In March 2017, the land use change and forestry was estimated to be a sink of 0.2 Mt CO₂-e²⁰. All the curves seem to be on a declining trend meaning the LULUCF emissions should be a bigger sink of greenhouse gases in the future.

²⁰ Quarterly Update of Australia's National Greenhouse Gas Inventory: March 2017

Figure 22 : National Greenhouse Gas Inventory (excluding LULUCF) (2007-2017)

Source : Department of the Environment and Energy

Figure 23 : Net anthropogenic emissions from the LULUCF (1990-2016)

Source : Department of the Environment and Energy

3.7. Protection of air quality

The biggest impact on air quality from the forested areas in Australia is wildfire.

As it is stated in Australia's State of the Forests Report 2013:

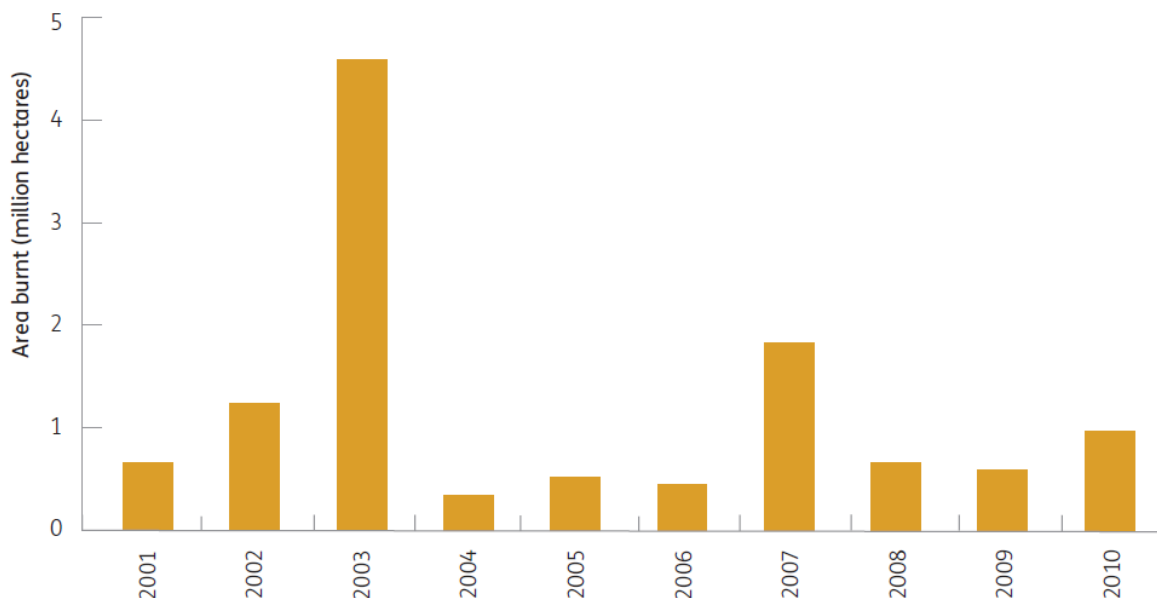
"Fire is a major component of the ecology of most Australian forests. Eucalypt forests, in particular, accumulate large amounts of flammable fuel, and the various types of eucalypt forest burn naturally with a characteristic seasonality, frequency and intensity (known collectively as the 'fire regime'), followed by regeneration and re-growth. Flora and fauna species have a range of adaptations for surviving fire, and the absence of fire or changed fire regimes are threats to many ecosystems and

specifically to forest health. However, wildfire can be very dangerous to life and property, especially in south-west and eastern Australia, where the combination of climate and vegetation is particularly conducive to producing catastrophic fire conditions.

Fire is also an important forest management tool in Australia. Planned fire of the appropriate intensity is used in fire-adapted forest types to reduce fuel loads and increase the ability to manage subsequent unplanned wildfire, to promote forest regeneration after wood harvesting, to promote the health of forest stands, and for biodiversity management.”

The total area of forest burnt by wildfire between 2001 and 2010 in Australia is shown in Figure 24. The drought period in the early 2000s can be witnessed as the biggest area burnt by wildfire was in 2003. Another peak can be seen in 2007, otherwise, the area burnt never exceeded 2 million ha between 2001 and 2010.

Figure 24 : Area of forest burnt by wildfire (2001-2010)



Note: Fire activity only in forests in southern Australia, as considered by DCCEE. Indicator 3.1b reports on fires across all of Australia's forests.

Source: DCCEE (2012b), states and territories.

Source : Australia's State of the Forests Report 2013

The forests area burnt by planned and unplanned fire in Western Australia between 2006 and 2011 is shown in Table 14. No pattern can be drawn from the figures. The planned fires seem to oscillate around 200 thousand ha per year (except for 2007-08) but unplanned fires (which in general burned larger areas) have no trend, it really depends on the climate conditions of that year.

Table 14 : Forest areas burnt by planned and unplanned fire in Western Australia (2006-2011)

Area (thousand ha)	2006-07	2007-08	2008-09	2009-10	2010-11
Planned	187	271	189	218	206
Unplanned	228	951	501	476	123

Total	415	1,221	689	693	329
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Source : Australia's State of the Forests Report 2013

3.8. *Illegal logging*

It is stated in Australia's State of the Forests Report 2013:

"The Illegal Logging Prohibition Act 2012 was passed by the Australian Parliament and came into effect in November 2012. The Act aims to support the trade in legally harvested wood and wood products by giving consumers and businesses greater certainty about the legality of the wood products they purchase.

The Act prohibits the importation of illegally logged timber and the processing of domestically grown raw logs that have been illegally logged. Criminal penalties apply for contraventions of the Act.

The Illegal Logging Prohibition Amendment Regulation 2013 that supports the Act was developed with stakeholders and was tabled in the Australian Parliament on 3 June 2013. The Regulation, which will commence on 30 November 2014, prescribes due diligence requirements to minimise the risk of sourcing illegally logged wood, and lists the wood products subject to those requirements. The due diligence requirements are intended for importers of the listed wood products and processors of domestically grown raw logs."

The FSC risk assessment platform www.globalforestregistry.org considers Australia as at low risk in terms of illegal logging, because the following criteria are all verified:

- Evidence of enforcement of logging related laws in the district²¹
- There is evidence in the district demonstrating the legality of harvests and wood purchases that includes robust and effective system for granting licenses and harvest permits²²
- There is little or no evidence or reporting of illegal harvesting in the district of origin²³
- There is a low perception of corruption related to the granting or issuing of harvesting permits and other areas of law enforcement related to harvesting and wood trade²⁴

3.9. *Civil rights and traditional rights*

The FSC risk assessment platform www.globalforestregistry.org considers Australia as at low risk in terms of violation of civil and traditional rights, because the following criteria are all verified:

- There is no UN Security Council ban on timber exports from the country concerned²⁵
- The country or district is not designated a source of conflict timber (e.g. USAID Type 1 conflict)²⁶

²¹ State based Codes of Practice for Forestry

²² State authority's records of forest audits

²³ State authority's records of forest audits

²⁴ Transparency International maintains regularly updated information on perceptions of corruption at the national level (<http://www.transparency.org>)

²⁵ Global Witness <http://www.globalwitness.org/pages/en/forests.html>

²⁶ Conflict Timber: Dimensions of the Problem in Asia and Africa Volume I Synthesis Report

- There is no evidence of child labor or violation of ILO Fundamental Principles and Rights at work taking place in forest areas in the district concerned ²⁷
- There are recognized and equitable processes in place to resolve conflicts of substantial magnitude pertaining to traditional rights including use rights, cultural interests or traditional cultural identity in the district concerned ²⁸
- There is no evidence of violation of the ILO Convention 169 on Indigenous and Tribal Peoples taking place in the forest areas in the district concerned ²⁹

²⁷ Global Child labor trends 2000 to 2004. ILO (International Labour Office).

²⁸ Indigenous cultural heritage is managed through state based agencies and state based regulations and legislation

²⁹ No evidence is known

3.10. Forest certification

The main forest certification schemes used in Australia are:

- PEFC (Programme for the Endorsement of Forest Certification), a global certification system that ensures sustainable forest management
- FSC (Forest Stewardship Council³⁰), which is specifically suitable for small private owners

Forest managers and owners have the option of certifying their forests under either the Australian Forest Certification Scheme (AFCS), which is recognized under the PEFC, or the FSC. The AFCS uses the Australian Forestry Standard (AFS) as the relevant standard for certifying forest management. FSC currently uses two interim, regionally adapted forest management standards in Australia but has committed to the development of a national FSC standard for Australia³¹.

In March 2017, there were 23.9 million ha of forest certified under PEFC³² in Australia. In August 2017, there were 1.2 million ha of forest certified under FSC³³. Part of the forests is under both certifications, PEFC and FSC.

³⁰ www.fsc.org

³¹ <http://www.agriculture.gov.au/forestry/australias-forests/certification>

³² <https://www.pefc.org/about-pefc/who-we-are/facts-a-figures>

³³ FSC Facts and Figures, August 4, 2017

4. Conclusions

Western Australia has an estimated forest area of 19.2 million hectares. It represents 7.6% of the total land area of the state. It comprises Native forests, Industrial plantations and other forests. Native forests are dominant compared to the other wooded land with 97.6% of the total forest area. Native forests mainly consist of Eucalypt (79%). Industrial plantations mainly consist of hardwood plantations.

In 2011, the majority of forests in Western Australia were public (93.2%). The tenure types included in the public ownership are Leasehold forest, Multiple-use public forest, Nature conservation reserve and other crown land. Concerning industrial plantations, 31% were owned by Institutional investors, 13% by timber industry companies, 8% by farm foresters and other private owners, 24% by managed investments schemes and 24% by governments.

In 2015-16, logs harvested exceeded 30 million m³, the gross value of log production exceeded 2.3 billion \$. The industry trend is on the rise.

After 2000, the total area of forested areas in Australia decreased until 2008. Since then, there is an increasing trend. The decrease is due to massive wildfires occurring in the country. Western Australia has not been spared by these fires. Concerning the plantations, it increased until 2008-09. Since that year, it showed signs of decrease until 2015-16. The harvest levels are under sustainable levels in native forests. A great proportion of areas are re-established in industrial plantations.

From 2001 to 2010, the carbon stock decreased, mainly because of wildfires and reclassification to non-forest areas. Nevertheless, the net exchange with the atmosphere is still positive meaning it absorbs more carbon than it rejects.

Australia follows the categories from the ICUN for protected lands. The categories are strict nature reserve, Wilderness area, National park, Natural monument, Habitat/species management area, Protected landscape/seascape and Managed resource protected area. The forests included in those categories in Western Australia have an area of 3.4 million ha and represent 18% of the total forest area. Other native forests are protected for conservation of biodiversity, which bring the total area to 6.1 million m³.

The protection of soil and water in forest land in Australia is seen as really important. The situation in Western Australia in 2011 was: 5 million ha of forests were excluded from harvesting for the protection of soil. 948 thousand ha of catchments in forests were managed specifically to supply water for human or industrial use.

The biggest threat to air quality in Australia is fires. Although it is a major component of the ecology of forests in the country, they are very dangerous to life and property. There are planned and unplanned fires and their importance depends on the climate situation.

The FSC risk assessment platform www.globalforestregistry.org considers Australia is at low risk in terms of violation of illegal logging and in terms of violation of traditional and civil rights.

The forest certifications FSC and PEFC are developed in Australia. In 2017, there were 23.9 million ha certified under PEFC and 1.2 million ha certified under FSC.

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