Forest Conservation

Edited by Justin Healey

ISSUES IN SOCIETY

Volume 345
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Exploring issues – worksheets and activities  
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Forest Conservation is Volume 345 in the ‘Issues in Society’ series of educational resource books. The aim of this series is to offer current, diverse information about important issues in our world, from an Australian perspective.

KEY ISSUES IN THIS TOPIC
Australia’s unique forests are a major natural asset in terms of biodiversity conservation, the global carbon cycle, fresh water supplies, and the maintenance of environmental and social values. Forests are also a key economic asset to Australia, providing essential timber and wood products and recreation, and employing thousands of people in the forestry and tourism industries. What policy and regulatory measures are in place to conserve Australia’s forests?

This book examines how the Australian government and the community as a whole are trying to strike a balance between forest conservation and sustainable forest management through such measures as the reserve system and regional agreements.

Issues addressed also include illegal logging overseas, forest products certification, and the heated debate over logging Tasmania’s old growth forests. How do we produce renewable timber for present and future generations, but also preserve our forests’ environmental, social and economic values?

SOURCES OF INFORMATION
Titles in the ‘Issues in Society’ series are individual resource books which provide an overview on a specific subject comprised of facts and opinions.

The information in this resource book is not from any single author, publication or organisation. The unique value of the ‘Issues in Society’ series lies in its diversity of content and perspectives.

The content comes from a wide variety of sources and includes:
➤ Newspaper reports and opinion pieces
➤ Website fact sheets
➤ Magazine and journal articles
➤ Statistics and surveys
➤ Government reports
➤ Literature from special interest groups

CRITICAL EVALUATION
As the information reproduced in this book is from a number of different sources, readers should always be aware of the origin of the text and whether or not the source is likely to be expressing a particular bias or agenda.

It is hoped that, as you read about the many aspects of the issues explored in this book, you will critically evaluate the information presented. In some cases, it is important that you decide whether you are being presented with facts or opinions. Does the writer give a biased or an unbiased report? If an opinion is being expressed, do you agree with the writer?

EXPLORING ISSUES
The ‘Exploring issues’ section at the back of this book features a range of ready-to-use worksheets relating to the articles and issues raised in this book. The activities and exercises in these worksheets are suitable for use by students at middle secondary school level and beyond.

FURTHER RESEARCH
This title offers a useful starting point for those who need convenient access to information about the issues involved. However, it is only a starting point. The ‘Web links’ section at the back of this book contains a list of useful websites which you can access for more reading on the topic.
Chapter 1

Forest conservation

STATE OF THE WORLD’S FORESTS

The executive summary from a report by the Food and Agriculture Organization of the United Nations

This ninth biennial issue of State of the World’s Forests was launched at the outset of 2011, the International Year of Forests. The Year aimed to promote awareness and understanding of forests and forestry issues.

The chapters assembled for the State of the World’s Forests draw attention to four key areas that warranted greater attention during the International Year of Forests and beyond:

➤ Regional trends on forest resources
➤ The development of sustainable forest industries
➤ Climate change adaptation and mitigation, and
➤ The local value of forests.

Each of these themes has implications for the various upcoming assessments of progress towards sustainable development, including the Rio+20 Summit in 2012 and the Millennium Development Goals Review Conference in 2015.

Forests have unrecognised potential in furthering the development agenda. To maximise the contribution of forests to poverty eradication, this year’s State of the World’s Forests identifies some of the areas that can enhance or challenge the sustainability of people’s livelihoods. Forest industries have the opportunity to maximise energy efficiency, spur innovation, create a reliable fibre supply and contribute to local economies.

Negotiators designing climate change policies and actions recognise that, to be successful, efforts related to reducing emissions from deforestation and forest degradation and the role of conservation and enhancement of forest carbon stocks (REDD+) in developing countries must, at the same time, address poverty alleviation. They also recognise that the long-term implications of forest carbon tenure need to be examined more critically to ensure equitable benefit sharing and long-term management of local resources and rights.

The contribution of forests to local livelihoods also needs further consideration and research, for example on traditional forest-related knowledge, non-wood forest product (NWFP) governance, the non-cash value of forests, small and medium enterprises and community-based forest management (CBFM). Taken together, these themes can maximise the contribution of forests to the creation of sustainable livelihoods and alleviation of poverty.

This report is divided into four chapters, addressing the four key areas highlighted above.

Chapter 1: The state of forest resources: a regional analysis

The Global Forest Resources Assessment 2010 – Main Report (FAO, 2010a), which was released in October 2010, noted that the overall rate of deforestation remained alarmingly high, although the rate was slowing. Major trends in the extent of forests, and changes in the rates of forest loss, as well as the current state of productive and protective forests, show disparities between the six regions: Africa, Asia and the Pacific,
Europe, Latin America and the Caribbean, the Near East and North America. The highest forest area worldwide was found in Europe, primarily because of the vast swaths of forest in the Russian Federation, while Latin America and the Caribbean had the highest net forest loss over the last decade.

**Africa**

Although continued forest loss was reported in Africa, the overall trend in net forest loss in the region slowed between 1990 and 2010. The area of planted forests was increasing in Africa, in particular in West and North Africa. Some forest planting programmes were established to combat desertification, while others were created in an effort to secure industrial wood and energy sources.

There were notable increases in the area designated for conservation of biodiversity, mostly as a result of changes in the designation of some forests in Central and East Africa. However, there were declines in productive forest areas.

Woodfuel removals jumped as a result of the rising population in the region. Nevertheless, Africa’s share of global wood removals by value remained significantly lower than its potential. Nearly half a million people were employed in the primary production of forest goods, although countries in the region provided few data on employment, and particularly on informal sector activities where much employment occurs.

**Asia and the Pacific**

The extent of forests in Asia and the Pacific has changed dramatically over the past two decades. In the 1990s, the region experienced a net forest loss of 0.7 million hectares per year, while in the last decade the forest area increased by an average of 1.4 million hectares per year. The planted forest area also substantially increased through afforestation programmes, mainly as a result of programmes in China, India and Viet Nam.

The area of primary forests decreased in all Asia and the Pacific subregions in the last decade, despite the fact that the area designated for conservation of biodiversity increased in the same period. Mixed trends were observed in the subregions in the extent to which forests were set aside for soil and water protection.

With the exception of the South Asia and Oceania subregions, the area of productive forests declined over the last decade. Falling levels of wood removals were also observed throughout the region, largely as a result of the reduction in woodfuel removals. Employment in the primary production of forest goods was very high in the region when compared with the global total.

**Europe**

Europe contained the largest area of forests compared with other regions, totalling 1 billion hectares. Europe's forest area continued to grow between 1990 and 2000, although the overall rate of increase slowed during the last decade. The Russian Federation, which contained 80 per cent of Europe's forest area, showed minimal declines in forest area after 2000. The rate of expansion of planted forest area also decreased in the last decade when compared with global trends.

Europe had a relatively high percentage of forest area classified as primary forest (26 per cent) when compared with the global primary forest area (36 per cent). Over the last 20 years, forest area designated for conservation purposes doubled in the region. There were also positive trends in the areas designated for the protection of soil and water, mostly as a result of actions taken by the Russian Federation.

A greater proportion of forest area was designated for productive functions in Europe than in the rest of the world. The area designated for productive functions declined in the 1990s, although this trend reversed in the last decade. Wood removals in Europe also showed variable trends over the last 20 years and have declined as a result of the 2008-2009 recession in Europe, which lowered demand for wood. Finally, employment in the primary production of forest goods declined, and this trend is expected to continue in the near future.

**Latin America and the Caribbean**

Nearly half of the Latin American and Caribbean region was covered by forests in 2010. Forest area declined in Central and South America over the last two decades, with the leading cause of deforestation being the conversion of forest land to agriculture. Although the overall planted forest area was relatively small, it expanded at a rate of 3.2 per cent per year over the last decade.

The region contained over half of the world’s primary forests (57 per cent), which was mostly located in inaccessible areas. The area of forest set aside for biodiversity conservation has increased by about 3 million hectares annually since 2000, with a vast amount of this area located in South America.

About 14 per cent of all forest area
in the region was designated primarily for production. Wood removals continued to rise with more than half removed for woodfuel. In common with other regions, it was difficult to quantify the extent and type of NWFPs removed in the Latin American and Caribbean region. Employment trends in the primary production of forest goods showed an upward swing of 30 per cent in the first few years of the last decade.

The Near East

The Near East region has a small forest area, with 26 countries in the region categorised as low forest cover countries. Although the region showed a net gain in forest area over the last decade, an analysis further back in time is constrained by changes in assessment methodologies over time in some larger countries in the region. Planted forest area increased by about 14 per cent in the region in the last 20 years, particularly as a result of expansion of these areas in West Asia and North Africa.

During the last decade, the area of primary forests has remained largely stable, with Sudan containing the largest area of primary forest. There was an increase in area of forest for biodiversity conservation, with an additional 85,000 ha designated for this purpose each year (on average) in the last 10 years. The region also enlarged the area devoted to soil and water conservation over the last 20 years.

The Near East saw a decline in the area designated for productive functions in the 1990s, although the trend reversed slightly in the last decade. The region represented a very small portion of global wood removals. It was difficult to determine a trend for the annual value of wood products, as data were missing from some countries’ submissions for the Global Forest Resources Assessment 2010 (FRA 2010).

North America

North America showed a slight increase in forest area between 1990 and 2010. The planted forest area also increased, and the region showed a relatively stable, positive trend in the level of biomass it contained. This region accounted for about 25 per cent of global primary forests. The area of forest designated primarily for soil and water conservation was less than in other regions, as the management of these areas is largely embedded in national and local laws and other forest management guidance.

In contrast with other regions, very small amount of wood (about 10 per cent) was removed for woodfuel, with the remaining amount removed for industrial roundwood. Employment trends in the United States of America and Canada’s forest sectors showed a decline over the last decade.

Chapter 2: Developing sustainable forest industries

Over the last decade, there has been little analysis of what constitutes a ‘sustainable forest industry’ and the drivers that affect this sustainability. Of the factors identified for this report, increasing population and economic growth, expansion of markets, and social trends related to social and environmental performance were found to be the most important drivers for the sustainability of the industry. However, some of the same factors also have the potential to negatively impact markets where the industry faces a greater level of complexity and competition for resources.

Governments and industry have responded to the opportunities and threats presented by these drivers by making strategic choices to improve the industry’s sustainability. Many of these strategies include similar features such as: analyses of competitiveness, and strength and weaknesses in the sector; measures to increase and cover costs for fibre supply; support for research, development and innovation; and development of new products (e.g. biofuels), which may signal a move to a ‘greener’ economy.

As a response to the economic downturn that began in 2008 and negatively affected most developed countries, industry has consolidated and restructured, reduced overcapacity and reconciled production in areas where countries were competitive. Typically, this has been done by innovating or creating new partnerships. Governments have also strengthened policies and regulations to improve social and environmental performance. FAO will continue to research these trends and will produce a more thorough research product on the theme of sustainable forest industries in 2011.

Chapter 3: Climate change mitigation and adaptation

Over the last few years, forestry has become a critical part of the international climate change agenda. Governments have already agreed on the potential importance of REDD+, and have provided large financial resources to initiate pilot activities. Nevertheless, the long-term sustainability of climate change and forestry activities will depend on a number of factors, including effective forest governance, secure forest carbon tenure and equitable benefit sharing, and integration of adaptation actions into climate change policies and projects, among others.

The United Nations Framework Convention on Climate Change (UNFCCC) highlighted REDD+ and adopted a decision on REDD+ in Cancun, Mexico in December 2010. The decision outlines the scope of REDD+, which includes reducing emissions from deforestation and forest degradation, and the conservation, sustainable management of forests and the enhancement of carbon stocks, as well as the principles and safeguards for REDD+. Further work on methodological issues, including on monitoring, reporting and verification, will continue throughout 2011 and perhaps beyond.

One of the most difficult aspects of ensuring the sustainability of REDD activities is defining the ownership of forest carbon rights. As this report shows, a number of countries in the Asia and the Pacific region have created legislation establishing property rights in carbon and formalising carbon rights. Some have taken this measure a step further to establish carbon rights as a separate interest in the land. The cases presented in this report show the diversity of established guidelines and laws on forest carbon rights at the country level, and provide clear examples that have the potential to be
While the issue of REDD in the climate change mitigation debate is being addressed at the highest levels, the subject of adaptation has not been as widely discussed or integrated into policies and programmes. Adaptation is complex and requires actions at multiple scales. Current international agreements take adaptation into account to a limited extent, but lack appropriate mechanisms to incorporate adaptation and related forest activities in the context of REDD+. More work is needed to consider the role of forests in adaptation in climate change policies and actions.

Chapter 4: The local value of forests
Chapter 4 provides an introduction to the local value of forests, in preparation for further discussions on the theme ‘Forests for People’ during the International Year of Forests in 2011. To expand upon this theme, the topics of traditional knowledge, community-based forest management (CBFM), small and medium forest enterprises (SMFEs) and the non-cash value of forests are explored.

Traditional knowledge (TK) contributes to local incomes, typically through the use of commercialised products. While there is some protection of traditional knowledge in the international policy arena, further awareness and integration of traditional knowledge into policies is needed, particularly as REDD activities take shape.

Community-based forest management and SMFEs are important for the production and marketing of wood and NWFPs. The drivers of CBFM include decentralisation, enabling policy frameworks, national poverty reduction agendas, rural development and emerging grassroots and global networks. Under favourable conditions, CBFM benefits can be seen over the long term and can lead to greater participation, reduced poverty, increased productivity and diversity of vegetation, and the protection of forest species. As forests become more productive, they can also lead to the development of SMFEs, which are known to have clear benefits for local livelihoods but require a sound enabling environment to attract continued flows of investment.

Non-wood forest products remain critical to the success of SMFEs. Legislation and regulation of NWFPs are increasing to ensure the sustainable use of these resources, through both international arrangements and domestic policies and laws. Despite the known cash values of NWFPs and their promotion through CBFM and SMFEs, the ‘non-cash’ values of forests also need to be further explored. Non-cash values often provide important support for households in or near forests and can sometimes make a larger contribution to households than cash income. Particularly in remote, rural areas, non-cash income is an essential part of sustainable livelihoods, especially for women and the rural poor.

ENDNOTE
1. Low forest cover countries are countries with less than 10 per cent forest cover.

Forests and people: a historical relationship
A FORESTS FOR PEOPLE FACT SHEET FROM THE UNITED NATIONS

The history of human existence and civilisations is intertwined with forests and trees. Forests are crucial for the goods and services they provide, which people all over the world depend on. Strategies to enhance the contributions of the world’s forests to social development, livelihoods and poverty eradication are vital at a time when unsustainable practices and economic crises continue to threaten healthy forests and the people who depend upon them.

Forests are home to 300 million people around the world
➤ Many farming, silvopastoral, hunter-gatherer and other land-based livelihoods are linked with forests and forest health
➤ A number of religions, faiths and spiritual traditions have links to trees, plants, forests and animals. Forests and wildlife are also a source of folklore and spirituality
➤ Traditional forest-related knowledge accumulated over thousands of years is deeply linked with the cultures of indigenous and forest-dependent peoples
➤ For the rural poor, access to food, fuel, water and medicine is vital; forest products often help meet these basic subsistence needs.

80 per cent of the world’s forests are publicly owned, but ownership and management of forests by communities, individuals and private companies is on the rise
➤ Rights to access and benefit-sharing for local people is a fundamental requirement for sustainable forest management and poverty reduction of rural forested areas
➤ More than 1 billion hectares of degraded areas throughout the world are suitable for forest landscape restoration, providing an opportunity for community-based forest management to be woven into other existing rural economic activities
➤ There is a need to reconcile traditional forest-related knowledge, intellectual property rights and the equitable sharing of benefits between indigenous and local communities and external agents operating in forests.

More than 60 million people are employed by forest-based industries
➤ Where forests are sustainably managed and utilised, they can contribute significantly to alleviating poverty and creating forest-based enterprises and services
➤ Forests play a critical role in ensuring a sustainable water supply and in the transition of society towards green economies. Wood energy, green infrastructure and buildings, and forests as carbon sinks represent opportunities for the forest sector
➤ A number of “payment for ecosystem services” initiatives have shown the possibilities of valuing and paying for forest ecosystem services such as carbon sequestration, water-quality, biodiversity conservation and soil conservation, all of which are vital for human wellbeing.

Every one of us, all 7 billion of us, are connected to forests
➤ Forests contribute to the balance of oxygen, carbon dioxide and humidity in the air
➤ Over 40 per cent of the world’s oxygen is produced from rainforests
➤ A tree releases 8-10 times more moisture into the atmosphere than the equivalent area of the ocean
➤ Forests protect watersheds which supply fresh water to rivers – a critical source of the water we drink and use in our daily lives.

Healthy forests sustain healthy people
➤ Tropical forests provide a vast array of medicinal plants used in healing and healthcare, worth an estimated $108 billion a year
➤ More than a quarter of modern medicines originate from tropical forest plants
➤ Forests curb transmission of infectious diseases. Undisturbed tropical forests can have a moderating effect on the spread of insect- and animal-borne disease
➤ 40 per cent of the world’s population lives in malaria infested regions. Heavily deforested areas can see a 300-fold increase in the risk of malaria infection compared to areas of intact forest
➤ 72 per cent of emerging infectious diseases transmitted from animals to humans come from wildlife as opposed to domesticated animals. Deforested areas increase contact between wildlife and humans and affect pathogen transmission.
Australian forest profiles: Australia’s forests

Following is a national overview compiled by the Bureau of Rural Sciences from the latest Australia’s State of the Forests report series

Australia has just over 147 million hectares of native forest and about 1.82 million hectares of plantations. With an estimated 4% of the global forest estate, Australia has the world’s sixth-largest forest area and the fourth-largest area of forest in nature conservation reserves.

Australia’s forests play an essential role in biodiversity conservation, the global carbon cycle, the supply of fresh water, and the maintenance of many cultural, social and environmental values. Forests also provide the resource base for economic activities that employ thousands of people across Australia, particularly in rural and regional areas.

The Australian Government, in cooperation with state and territory governments and other stakeholders, collects, compiles and analyses national information on forests and prepares comprehensive national reports on the state of Australia’s forests, most recently in 2008. The Australian forest profiles series presents information on each of Australia’s eight major forest types (eucalypts, acacia, callitris, casuarina, mangroves, melaleuca, plantations and rainforest). This profile provides an overview of all forests.

What is a forest?

In Australia, a forest is defined as an area, incorporating all living and non-living components, that is dominated by trees having usually a single stem and a mature or potentially mature stand height exceeding two metres and with existing or potential crown cover of overstorey strata about equal to or greater than 20%.

Under this definition, a large part of Australia’s mallee qualifies as forest, as do very large areas of tropical savanna and woodland, where trees are spread out in the landscape. What many people would traditionally regard as forests – expanses of tall, closely spaced trees – comprise a relatively small part of Australia’s total forest area.

Origins

The origins of Australia’s forests can be traced to the beginning of the Cretaceous period, at least 135 million years ago, when the supercontinent Gondwana began to fragment into Africa, South America, India, Australia/Antarctica and many smaller islands. During the intervening millennia, Australia evolved a new and unique biota.

About 38 million years ago, the Australian continent broke away from Antarctica and shifted northwards, colliding with Asia about 13 million years ago. As it drifted northward, the climate became progressively warmer and drier and the vegetation adapted accordingly. Cool and warm rainforests were replaced by sclerophyllous genera such as Eucalyptus and Acacia – plants that have hard, spiky or shiny leaves to reduce moisture loss and are adapted to a regime of frequent fire. Nevertheless, Gondwanan flora continued to survive in isolated pockets, such as in remnant cool temperate rainforests in eastern Australia, the wet tropical rainforests of northeastern Queensland, isolated areas of the Northern Territory, and the Kimberley in Western Australia.

Over the past two million years, the forest estate has expanded and contracted as the climate has fluctuated.

<table>
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<th>FOREST TYPE</th>
<th>Total ('000 hectares)</th>
<th>% of total</th>
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<td>Native forest</td>
<td>147,397</td>
<td>99</td>
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<tr>
<td>Acacia</td>
<td>10,365</td>
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<tr>
<td>Callitris</td>
<td>2,597</td>
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<tr>
<td>Casuarina</td>
<td>2,229</td>
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<tr>
<td>Eucalypt</td>
<td>116,449</td>
<td>78</td>
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<tr>
<td>Mangrove</td>
<td>980</td>
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<tr>
<td>Melaleuca</td>
<td>7,556</td>
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<tr>
<td>Rainforest</td>
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<tr>
<td>Other</td>
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<td>Native forest total</td>
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<td>Plantation</td>
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<td>Australian forest total</td>
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TABLE 1: AUSTRALIA’S FOREST AREA, BY FOREST TYPE, 2008

Note: Totals may not tally due to rounding.

Source: MIG (2008)
between warm-and-wet and cool-and-dry periods. New species have also arrived, first from Asia and later from almost all parts of the world.

Humans have undoubtedly had the biggest impact. Indigenous Australians are thought to have occupied the continent for at least 60,000 years. Over millennia, their use of fire as a land management and hunting tool probably had a major effect on the structure and composition of the vegetation, including forests, although the extent of this effect is still debated.

Europeans settled continuously in Australia in 1788. In the decades that followed, the new arrivals sought out and cleared land for agriculture and urban development, introduced intensive cropping and grazing and many new plant and animal species, and altered fire regimes. Much of Australia is now affected in some way by the impacts of European settlement.

Forest types

The distribution of forests is broadly determined by climate and soil properties, although other factors such as fire regimes are also important. By far the most common forest in Australia is eucalypt forest, which comprises 78% of Australia’s total forest estate, followed by acacia, melaleuca, rainforest, casuarina, mangrove and callitris (Table 1 and Figure 1). Native conifers (cone-bearing trees, commonly called softwoods) such as Araucaria cunninghamii (hoop pine), Araucaria bidwillii (bunya pine) and Athrotaxis selaginoides (King Billy pine) dominate some forests, but their total area is insufficient to constitute major forest types. Plantation forests comprise just over 1% of Australia’s forests and are mostly composed of eucalypts and non-native pine species, especially radiata pine (Pinus radiata).

Figure 2 shows the percentage of Australia’s total native forest estate in each state and territory. Queensland has the largest proportion (35% of the total), followed by the Northern Territory (20%). Queensland and the Northern Territory also contain almost all (98%) of the melaleuca forest. New South Wales has 18% of the total forest area, while Tasmania contains only 2%. Table 2 shows the area of forest in each jurisdiction.

Crown cover and height classes

Crown cover is the area of ground covered by tree canopies, ignoring overlaps and gaps within individual canopies. Within the three crown cover classes of woodland, open and closed there are three height classes – tall, medium and low (Figure 3).

Table 3 shows the area of each native forest type by crown cover class. The distribution of crown cover class varies across the continent (Figure 4 and Figure 5) depending on climate, soil type and land use. It is often related to the soil moisture regime and declines with lower water availability. Almost 100 million hectares, or two-thirds of the native forest estate, is classified as woodland and almost one-third as open forest.

Tenure

About 70% of Australia’s forests is under private management – 44% on leasehold land and 26% on land either held under freehold private title or managed by indigenous communities. About half the 65.1 million hectares of forest on leasehold land is in Queensland and there are also significant areas in the Northern Territory and New South Wales (Figure 7). More than 80% of forests classified as private are in Queensland, New South Wales and the Northern Territory.

Sixteen per cent of Australia’s forest is now formally protected in public nature conservation reserves. Multiple-use public forests, where timber harvesting is generally permitted, cover 9.43 million hectares, or about 6% of Australia’s total native forest estate.

There are notable differences in the ownership of different forest types. About half of the drier and sparser woodland forests is on leasehold land and another quarter is on private land. The open forest types are distributed...
more-or-less evenly between public and private owners, while closed forests, comprising rainforest and mangroves, are mostly in public ownership.

State of Australia’s forests

Forests are complex ecosystems that provide a wide and dynamic array of environmental and socioeconomic benefits and services. The aim of sustainable forest management is to maintain the broad range of forest values in perpetuity, but assessing progress towards this aim is difficult. Criteria and indicators are used to simplify the task by characterising the essential components of sustainable forest management. They are intended to provide a common understanding of what is meant by sustainable forest management and a common framework for describing, assessing and evaluating a country’s progress towards sustainability at the national level.

Australia’s 2008 report on the state of the nation’s forests drew conclusions under seven broad criteria.

Criterion 1: Conservation of biological diversity

About 23 million hectares of forest (16% of the total forest estate) is now in formal nature conservation reserves. It is difficult to measure the change that has occurred in the extent and distribution of forests since European colonisation. One estimate suggests that about 25% of the total forest estate existing before European settlement has been cleared for agricultural and urban development. Australia therefore retains about three-quarters of its original forest estate, although in many cases in a highly modified form.

The rate of clearing has been higher in the intensively managed agricultural and urban zones, where an estimated one-third of the native vegetation has been cleared or substantially modified.

In some regions, this percentage is much higher. As a result, those areas exhibit a relatively high level of fragmentation. The cessation of broadscale tree clearing in much of Australia and increased protection of forests

Forest Conservation Issues in Society | Volume 345

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FIGURE 3: CROWN COVER AND HEIGHT CLASSES

WOODLAND FOREST
Sparse crown cover (20-50%)

OPEN FOREST
Dense crown cover (51-80%)

CLOSED FOREST
Closed crown cover (81-100%)

Potential mature stand height (m)

TALL
(greater than 30 m)

MEDIUM
(10-30 m)

LOW
(less than 10 m)


FIGURE 4: NATIVE FOREST, BY CROWN COVER CLASS

Legend
Woodland
Open
Closed

Source: MIG (2008)
have been critical in reducing forest fragmentation in recent times.

The net loss of woody vegetation (mostly forest) in Australia was 260,000 hectares (0.25%) a year between 2000 and 2004, mainly because of clearing for agriculture and urban development. This rate is declining in response to changed land management practices and increased legislative controls.

Criterion 2: Maintenance of productive capacity of forest ecosystems

Plantations produce about two-thirds of Australia’s log supply.

Overall, the volume of timber harvested from multiple-use public native forests is declining, as a result of reductions in the area allocated to timber extraction and other restrictions on harvesting, and revised downward estimates of sustainable yield.

A number of non-wood native forest species are subject to commercial harvesting regimes. Approaches to assessing the sustainability of the Australian non-wood forest product sector are being developed.

Criterion 3: Maintenance of ecosystem health and vitality

Drought has recently affected large areas of Australia, with significant impacts on forest health. Drought contributed to a series of intense wildfires that affected large areas of forest in southeastern Australia, especially in 2002-03 and 2006-07. There is evidence that global climate change could further exacerbate the risk of wildfire in southeastern Australia.

Planned fire is an important forest management tool in Australia because many forested ecosystems are ecologically adapted to fire and require it for regeneration, and it can also reduce the severity of wildfire.

Although damage to forest ecosystems from most native insect pests and pathogens is widespread, it is usually of low severity. Occasional outbreaks and epidemics occur and the resultant damage can adversely affect commercial values, particularly in plantations.

Criterion 4: Conservation and maintenance of soil and water resources

Forests are important to many communities as a source

---

TABLE 3: AREA OF NATIVE FOREST, BY CROWN COVER CLASS, 2008 (’000 HECTARES)

<table>
<thead>
<tr>
<th>FOREST TYPE</th>
<th>WOODLAND</th>
<th>OPEN</th>
<th>CLOSED</th>
<th>TOTAL</th>
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<tbody>
<tr>
<td>Acacia</td>
<td>7,059</td>
<td>3,306</td>
<td>–</td>
<td>10,365</td>
</tr>
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<td>Callitris</td>
<td>803</td>
<td>1,793</td>
<td>–</td>
<td>2,597</td>
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<td>Casuarina</td>
<td>2,082</td>
<td>191</td>
<td>–</td>
<td>2,274</td>
</tr>
<tr>
<td>Eucalypt</td>
<td>79,878</td>
<td>37,050</td>
<td>421</td>
<td>117,349</td>
</tr>
<tr>
<td>Mangrove</td>
<td>99</td>
<td>331</td>
<td>552</td>
<td>980</td>
</tr>
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<td>Melaleuca</td>
<td>6,654</td>
<td>878</td>
<td>26</td>
<td>7,556</td>
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<td>Rainforest</td>
<td>–</td>
<td>–</td>
<td>3,280</td>
<td>3,280</td>
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<td>Other</td>
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<td>3,942</td>
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<td>44,120</td>
<td>4,270</td>
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Note: Total may not tally due to rounding. Source: MIG (2008)
of clean drinking water. In catchments managed specifically for water supply, activities that cause disturbances are either not permitted or are stringently controlled.

In most states and territories, forest harvesting is subject to codes of practice or other instruments that specify the measures that must be taken to mitigate soil erosion and their impacts on soil physical properties, and to maintain water quantity and quality. Recent major wildfires have affected water quality in some catchments.

**Criterion 5: Maintenance of forest contribution to global carbon cycles**

Forests are an important component of the global carbon cycle. Australia’s forests sequester (absorb) more greenhouse gases from the atmosphere than they emit (release) and therefore help to offset Australia’s contribution to global greenhouse gas emissions. In 2005, plantations offset about 3.5% and managed native forests about 5.5% of total Australian greenhouse gas emissions. Additional storage in wood products offset a further 1% of emissions. Deforestation, mainly for agriculture but also for urban development, was responsible for about 9% of total Australian greenhouse gas emissions in 2005.

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

In 2005–06, the turnover of Australia’s forest product industries was more than $19 billion, which was 5.3% of total manufacturing industry turnover. The annual production of non-wood forest products is worth hundreds of millions of dollars to the Australian economy. Total national employment in businesses dependent on growing and using timber in 2006 was estimated to be about 120,000 people.

Just under 21 million hectares (14%) of Australia’s forests are under indigenous ownership, the vast majority (98%) in the Northern Territory, Queensland and Western Australia. About 471,000 hectares of nationally listed non-indigenous heritage places in forests is protected under the provisions of the national Environment Protection and Biodiversity Conservation Act 1999.

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

A comprehensive legal, institutional and economic framework designed to achieve the conservation and sustainable management of forests is in place at the state, territory and national levels.

There has been rapid growth in forest certification as a means of verifying the quality of forest management and maintaining access to markets. In addition, most multiple-use public forests and some private forests are now managed in accordance with codes of forest practice and externally accredited environmental management systems, which provide a structured approach to the planning and implementation of measures to protect the environment.

**ENDNOTES**

1. Australia’s National Forest Policy Statement defines old growth as ‘forest that is ecologically mature and has been subject to negligible unnatural disturbance such as logging, roading and clearing’.

**REFERENCES AND FURTHER READING**


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This is one in a series of profiles on Australia’s major forest types. It has been compiled by the Bureau of Rural Sciences using information from the Australia’s State of the Forests Report series. The latest in this series, Australia’s State of the Forests Report 2008, and the profiles, can be obtained from www.daff.gov.au/forestsaustralia

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The protection of forest ecosystems and environmental and heritage values is fundamental to Australia’s approach to forest conservation as contained in national forest policy.

Forest conservation was a critical component of the NFPS and the RFAs, which effectively led to the allocation of significant areas of forests to Australia’s reserve system.

The proportion of Australia’s native forests formally protected in public nature conservation reserves has increased significantly over the past decade, from 1 per cent (17.6 million hectares) in 1998, to 16 per cent (23 million hectares) in 2008. There have also been significant increases in the informal reserve system on both public and private land.

➤ ➤ Australia’s native forests formally protected in public nature conservation reserves has increased over the past decade, from 1% to 16%.

Internationally, Australia compares favourably with respect to forest conservation. The International Union for The Conservation of Nature (IUCN) recommends at least 10 per cent of each forest biome should be reserved. Most of Australia’s broad forest types are protected above these targets and in RFA areas, the IUCN target has been significantly exceeded.

➤ ➤ Australia’s Comprehensive, Adequate and Representative (CAR) reserve system

One of the key objectives of the RFA process was to use a set of nationally agreed criteria for the establishment of a Comprehensive, Adequate and Representative (CAR) reserve system in Australia based on the JANIS criteria to protect, in nature conservation reserves:

➤ 15 per cent of the pre-1750 distribution of each forest type
➤ 60 per cent of the existing distribution of each forest type, if vulnerable
➤ 60 per cent of existing old-growth forest
➤ 90 per cent or more of high-quality wilderness forests, and
➤ All remaining occurrences of rare and endangered forest ecosystems.

The RFA process resulted in the transfer of more than 2 million hectares of forest from the broad tenure category of multiple-use public forest to nature conservation reserves. Subsequent decisions taken by relevant states and territories have further increased the area of forests in reserves.

Further details on the nationally agreed criteria for Australia’s CAR reserve system, can be found at www.daff.gov.au/ rfa/publications/reserve-system

Forest biodiversity

Biodiversity is the variety of all forms of life; the different plants, animals and microorganisms, the genes they contain and the ecosystems they form. The ultimate objective of the conservation of biodiversity is the survival of species and the genetic variability within those species.

Australia has very diverse flora and fauna and a high proportion of our species are not found anywhere else in the world. Most (80 per cent) of Australia’s flowering plants, mammals, reptiles, frog and fish species, and about half the bird species are only found in Australia.

Information and lists of forest-dwelling vertebrates and vascular plant species throughout Australia continues to improve. Significantly better information is available for species in regions that have been subjected to formal assessment processes, such as the Comprehensive Regional Assessments that preceded the RFAs.

The protection of biodiversity is a fundamental principle in the conservation and sustainable management of Australia’s forests.

The NFPS gives high priority to the conservation of old-growth forests, with specific provisions to protect more than 60% of identified areas.

Old-growth forests

Old-growth forests are ecologically mature forests where the effects of past disturbances are now negligible. They provide important habitat for particular species, valuable wood products and a range of aesthetic and cultural values.

The protection of biodiversity is a fundamental principle in the conservation and sustainable management of Australia’s forests.

Further detail on old-growth forests can be found in Australia’s State of the Forests Report 2008.

Further detail on forest biodiversity can be found in Australia’s State of the Forests Report 2008.

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www.daff.gov.au
The area of Australia’s native forest in formal nature conservation reserves is increasing. In the five years to 2005-06 it grew by about 1.5 million hectares to 23 million hectares, or from 13% to 16% of Australia’s total area of native forests. At the same time, the area of multiple-use public forests, in which wood production is an objective, declined from 11.4 to 9.4 million hectares.

The increase in nature conservation reserves and decrease in multiple-use public forests continue a longer-term trend (see figure below).

In the main native-forest timber production areas, the Australian and some state governments have negotiated regional forest agreements, which are 20-year plans for the conservation and sustainable management of Australia’s native forests. They include provisions to establish comprehensive, adequate and representative (CAR) reserve systems. Overall, the aim is to place in nature conservation reserves 15% of the pre-1750 distribution of each forest type, 60% of the existing distribution of each forest type if vulnerable, 60% of existing old-growth forest, 90% or more of high-quality wilderness forests, and all remaining occurrences of rare and endangered forest ecosystems (including rare, old-growth forests).

In the five years to 2005-06, representation in formal nature conservation reserves increased for most forest types. There were notable increases in some, including rainforest (from 33% to 55% of the forest type) and mangroves (from 13% to 18% of the forest type).

The network of formal nature conservation reserves is complemented by informal forest reserves. Informal reserves are areas set aside for conservation purposes in forests used for the production of timber and other forest products, and by areas of private forest managed for conservation objectives. The area of informal forest reserves has been increasing in recent years, although the full extent of the increase has not been reported nationally.

Old-growth forests are ecologically mature forests that have been subjected to little or no timber harvesting, road construction or clearing.

Old-growth forest

Old-growth forests are ecologically mature forests that have been subjected to little or no timber harvesting, road construction or clearing. They usually comprise large overstorey trees, a well-developed understorey of other tree species and shrubs, and ecological features such as dead standing trees, large logs on the forest floor, and many nesting hollows. A number of wildlife species rely on old-growth forests for their long-term survival.

An estimated 5.03 million hectares of Australia’s tall, wet forests are old-growth. This is a decline of 200,000 hectares over the five years to 2005-06, mainly due to the impact of severe fires and re-mapping. About 73% of these old-growth forests are within formal nature conservation reserves.

Forest loss

The net rate of loss of woody vegetation (mostly forest) between 2000 and 2004 was estimated by the Australian Greenhouse Office to be 260,000 hectares (0.25%) per year, due mainly to clearing for agriculture and urban development. A large part of this loss occurred in Queensland in two forest types: open acacia, and eucalypt medium...
woodland. Australia’s long-term rate of woody vegetation loss is declining in response to changed land management practices and increased legislative controls.

A total of 1,287 forest dwelling species are listed as vulnerable, endangered or threatened under the Environment Protection and Biodiversity Conservation Act 1999.

Forest dwelling species
The number of forest dwelling species – species known to use forests for all or part of their lifecycles – is increasing as ecological studies add to our knowledge. Ecological information is comprehensive for at least 10% of mammal, bird and amphibian species, while partial ecological information is available for about 60% of known forest dwelling vertebrate and vascular plant species. Ecological information is very limited for most forest dwelling invertebrates, fungi, algae and lichens.

A total of 1,287 forest dwelling species are listed as vulnerable, endangered or threatened under the Environment Protection and Biodiversity Conservation Act 1999 (Cwlth). Thirty-nine species or subspecies were removed from the list during the reporting period, and 67 were added. Most additions of forest dwelling species to the list were made based on inherently small population sizes and ongoing impacts on habitat extent and quality, including the impacts of introduced species and unsuitable fire regimes. Most removals were made as a result of improved information.

The number of forest species for which data on genetic variation are available has also increased but is still very small. Several studies have documented genetic variation and distribution patterns within existing populations of a relatively small number of forest dwelling species. Conservation measures focus on increasing connectivity between isolated patches of native vegetation, increasing the area of forest contained in public and private nature conservation reserves, managing threats to native species, and assisting the recovery of threatened species.

FURTHER READING
The recent history of Australia’s native forest management is rife with conflict. No one disagreed that the forests were important to us all. The stumbling block was the diverse range of opinions on their management and use.

The first comprehensive national attempt to settle the conflict was the 1992 National Forest Policy Statement. Governments then identified the concept of RFAs as the best means to achieve a win-win outcome for all stakeholders.

The Commonwealth and four State Governments progressively signed the 10 RFAs between 1997 and 2001. The RFAs achieved a middle ground. They lay down guidelines, tasks and responsibilities for sustainable forest management. The 20-year agreements are ongoing, not static.

The forest debate ranges over a variety of topics. They include:
- Regeneration and regrowth forest
- Old-growth forests
- Woodchips
- Management on and off reserves
- Private land
- Plantations
- Fire
- Regulation of forest operations
- Other uses, including multiple use, and
- Endangered, threatened, vulnerable and rare species and ecological communities.

The RFA process added considerably to our storehouse of knowledge of forest uses and values. It covered the entire spectrum – from their complex ecosystems to their mineral deposits, their heritage values and their importance to tourism and recreation. The information is available on this site and other linked websites.

**Regeneration and regrowth forest**

Regeneration is the re-establishment of a forest following disturbance, such as a bushfire or forest harvesting. Forests regenerate either naturally or from prepared seed beds. Regeneration can occur after the removal of selected trees. In other instances nearly all the trees are felled to expose seedlings to sunlight to assist the regeneration process. These approaches vary depending on the type of forest and help to develop new forests.

**Australia’s national forest reserve criteria call for the protection from timber harvesting of 60% or more of existing old growth forests.**

Regrowth forest describes the plants, particularly trees of similar age, that grow in an area following disturbance. Forests create different fauna and flora habitats as they grow and develop. Each stage of forest growth, including regrowth, provides a suite of conservation values. A range of forest growth stages is essential to maintain the full set of values that they provide.
Old-growth forests
Many people believe that there is wholesale destruction of our old-growth forests by the timber industry. This is not so. Australia’s national forest reserve criteria (known as the ‘CAR criteria’) call for the protection from timber harvesting of 60 per cent or more of existing old-growth forests. This increases to 100 per cent where the old-growth forest is rare or depleted. The application of the CAR criteria in the RFA process has resulted in around 68 per cent of the extent of old-growth forest identified in 1997 or 1998 being protected in reserves in RFA regions.

Woodchips
Woodchips are increasingly being produced from eucalypt plantations grown specifically to produce high quality fibre for papermaking. They are also produced as a by-product from thinning production forests, timber harvesting and sawmilling.

Management on and off reserves
State Governments manage native forest on public land, in conservation reserves and in production forests. The forests are managed according to systems and processes for achieving ESFM. ESFM covers the whole range of forest management values, including harvesting at sustainable rates, protecting biodiversity across the forest landscape, protecting wildlife habitats and watercourses, and preventing soil erosion and land degradation. Each of the RFAs included accreditation by the Commonwealth Government of the State Government’s ESFM systems, based on the recommendations of independent panels of eminent scientific experts.

Private land
Native forests are found on private as well as public land. Management of native forests on private land is provided for in the establishment of ESFM systems that cover the whole range of forest management values on private and public land. These ESFM systems require that adequate steps be taken to protect native forest on private land. The RFAs established the CAR reserve system from public forests and attempted to meet all reservation targets from public land. Private native forests can also contribute to the CAR reserve system.

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Plantations
Plants supply more than 50 per cent of Australia’s domestic wood needs. This will increase to around 70 per cent by 2015.

Plantations
Plants supply more than 50 per cent of Australia’s domestic wood needs. This will increase to around 70 per cent by 2015, as more recently established plantations start producing timber. This proportion could increase as we move closer to the goal agreed by governments under Plantations for Australia – the 2020 Vision. This goal is to treble the 1996 area of Australia’s plantation estate by 2020. Plantations are good for the environment. They can help reduce soil salinity, wind and water erosion and waterlogging on agricultural land. Because they absorb carbon dioxide, they can help reduce Australia’s greenhouse gas levels.

Plantations can provide an alternative source of income for farmers. They create jobs in planting, maintaining, harvesting and processing in regional areas. However, they can only ever supplement, rather than replace, timber from native forests. The range of species suitable to establish commercial plantations is limited, restricting their output. Timber is taken from native forests to meet requirements...
for species not grown in plantations. Examples include high quality ironbark-based structural timbers; craftwood; and specialised appearance products (e.g. furniture for which “timber faults” are a distinctive feature).

Fire
Despite the hazards, fire is a part of the Australian landscape and plays an important part in many regeneration processes in our ecosystems. Forest managers are responsible for ensuring the health of our forests and preventing bushfires. The main way they do this is by using planned burns: burning small areas of forest under specific conditions (e.g. on days that aren’t too hot, dry or windy). These burns, in harvested areas, have several benefits. Planned burns reduce the fuel on the forest floor by removing inflammable branches and leaves, creating potential seedbeds for forest regeneration.

Regulation of forest operations
The timber industry is one of the most restricted and tightly regulated industries in Australia. State agencies impose strict limits on both the areas in which the industry can operate and also the amount of wood it is allowed to remove from native forests. More than 40 per cent of the forest in RFA regions is protected from logging. Additionally, the amount of wood that can be removed is strictly defined in ‘sustainable yield’ calculations designed to ensure the forest will re-grow at the same or even a faster rate than it is harvested. As a result, less than 1 per cent of the available area for harvesting is actually harvested each year. A further control is provided by codes of practice that define how and where the forest may be harvested, what must be protected during harvesting and what other precautions are to be taken to safeguard the environment. This level of control over forest operations is an important aspect of Australia’s reputation for supplying wood from forests managed in an ecologically sustainable manner.

Other uses, including multiple use
Forests mean different things to different people. They are important to the environment because they support a variety of plant, animal and other living organisms. They are important to the economy because they support more than 86,000 jobs both directly and indirectly. They also provide a wide range of recreational activities from camping, bushwalking, rock climbing, caving, boating and rafting to four-wheel driving, horse riding, fishing, hunting and prospecting.

Forests are important, to the environment because they support a variety of plant, animal and other living organisms, and to the economy because they support more than 86,000 jobs.

Forests not only provide timber but also provide a variety of other forest products and services, such as honey, wildflowers, natural oils, firewood, recreation, tourism, craft wood, fodder, minerals, water, water filtration and carbon cycling.
All activities in multiple-use forests affect the environment in some way. It is important when managing timber harvesting in these forests that the management practices be adaptable and carefully monitored to avoid seriously degrading other forest values.
Multiple-use forests are vital to all Australians. Managed carefully, they will be available for generations to come.

Endangered, threatened, vulnerable and rare species and ecological communities
The RFAs offer protection for endangered, threatened, vulnerable and rare species and ecological communities.

The Agreements list the priority species and ecological communities within each region and specify ways to protect them. These include:
➤ Protection within the CAR reserve system
➤ Protection of key habitats, such as rainforest, heaths and swamps, as well as their components, and
➤ Development of recovery plans and threat abatement plans.
Chapter 2

Forestry in Australia

An extract from the latest Australian Bureau of Statistics year book

Australia's native and plantation forests are an important natural resource providing a wide range of products and valuable services to the community.

Australia is a biologically diverse country and the forests of south-western Australia are one of the world's 34 recognised biodiversity 'hotspots'. Forests protect soil and water resources, and are increasingly being recognised for their potential as carbon sinks through their ability to absorb carbon from the atmosphere. They are also the foundation for a broad range of cultural and spiritual experiences for diverse groups of people and a major tourist attraction for Australian and overseas visitors, providing for a vast array of recreational and educational activities.

Australia's native and plantation forests provide the majority of the timber and a significant proportion of the paper products used by Australians. Employment and wealth flow directly from manufacturing wood products, such as sawn timber, fibreboard, plywood and paper, derived from the forests. Forests and plantations also support a variety of other products and services, such as honey, wildflowers, natural oils, firewood and craft wood.

Forests protect soil and water resources, and are increasingly being recognised for their potential as carbon sinks through their ability to absorb carbon from the atmosphere.

The National Forest Policy Statement, agreed by Australian state and territory governments in 1992, sets out a vision for management of Australia's forests that integrates environmental, commercial and community values and uses. These values are embodied in regional forest agreements negotiated for New South Wales, Victoria, Western Australia and Tasmania.

As a member of the international forest initiative – the Montreal Process – Australia has contributed to the development of the criteria and indicators for the conservation and sustainable management of temperate and boreal forests. Australia has adopted the internationally agreed criteria, and revised the indicator set to reflect its own unique forests, providing a consistent framework for monitoring and reporting on the status of its forests.

Information is reported covering themes relating to biological diversity, productive capacity, forest health, soil and water values, and carbon as well as data on socioeconomic, legal and institutional frameworks. The information is compiled every five years by the National Forest Inventory (NFI), within the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES), to produce Australia’s State of the Forests Report. Preparation of the fourth report in the series, due for release in 2013, is underway.

Australia's forestry and forest products industries are important components of Australia's primary and secondary industry sectors. They contribute to economic development and employment in many regions.
of rural Australia. The industries include native forest and plantation management, log harvesting and transport, hardwood and softwood sawmilling, plywood and panels manufacturing, woodchip production and export and the pulp and paper industries.

Hardwood and softwood sawmilling uses mills of diverse sizes and types that process wood into sawn timber and other products such as mouldings and flooring. The hardwood mills are generally small scale and scattered. The softwood mills are generally larger and more integrated with other wood-processing facilities.

### TABLE 17.6: NATIVE FOREST AREAS – 2008

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<thead>
<tr>
<th></th>
<th>NSW '000 ha</th>
<th>VIC '000 ha</th>
<th>QLD '000 ha</th>
<th>SA '000 ha</th>
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<td>164</td>
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<td>359</td>
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<tr>
<td>Other</td>
<td>473</td>
<td>314</td>
<td>1,397</td>
<td>7</td>
<td>1,400</td>
<td>–</td>
<td>344</td>
<td>7</td>
<td>3,942</td>
</tr>
<tr>
<td>Total</td>
<td>26,208</td>
<td>7,837</td>
<td>52,581</td>
<td>8,855</td>
<td>17,665</td>
<td>3,116</td>
<td>31,010</td>
<td>123</td>
<td>147,397</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TENURE</th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Public</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiple use forest(a)</td>
<td>1,980</td>
<td>3,163</td>
<td>1,991</td>
<td>–</td>
<td>1,248</td>
<td>1,026</td>
<td>–</td>
<td>9,408</td>
<td></td>
</tr>
<tr>
<td>Nature Conservation Reserve(b)</td>
<td>5,148</td>
<td>3,505</td>
<td>4,576</td>
<td>4,029</td>
<td>3,868</td>
<td>1,121</td>
<td>16</td>
<td>108</td>
<td>22,371</td>
</tr>
<tr>
<td>Other Crown land(c)</td>
<td>943</td>
<td>109</td>
<td>1,598</td>
<td>277</td>
<td>7,169</td>
<td>85</td>
<td>674</td>
<td>7</td>
<td>10,862</td>
</tr>
<tr>
<td>Leasehold(d)</td>
<td>9,891</td>
<td>35</td>
<td>34,304</td>
<td>3,083</td>
<td>3,891</td>
<td>–</td>
<td>13,920</td>
<td>8</td>
<td>65,132</td>
</tr>
<tr>
<td>Total</td>
<td>17,962</td>
<td>6,812</td>
<td>42,469</td>
<td>7,389</td>
<td>16,176</td>
<td>2,232</td>
<td>14,610</td>
<td>123</td>
<td>107,773</td>
</tr>
<tr>
<td>Private(e)</td>
<td>8,076</td>
<td>1,025</td>
<td>8,908</td>
<td>1,399</td>
<td>1,489</td>
<td>885</td>
<td>16,317</td>
<td>–</td>
<td>38,099</td>
</tr>
<tr>
<td>Unresolved tenure</td>
<td>170</td>
<td>–</td>
<td>1,204</td>
<td>67</td>
<td>–</td>
<td>83</td>
<td>–</td>
<td>1,524</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>26,208</td>
<td>7,837</td>
<td>52,581</td>
<td>8,855</td>
<td>17,665</td>
<td>3,116</td>
<td>31,010</td>
<td>123</td>
<td>147,397</td>
</tr>
</tbody>
</table>

– nil or rounded to zero (including null cells)
(a) Publicly-owned land managed for multiple use including wood production.
(b) Public land on which wood production is excluded (e.g. national parks).
(c) Reserved areas of educational, scientific and other public institutional land, including easements, Defence land, and other minor tenure classifications.
(d) Crown land leased for private use where the right to harvest or clear land must be approved by state/territory governments. Often known as pastoral leases.
(e) Land held under freehold title and private ownership including land held by designated Aboriginal and Torres Strait Islander communities under freehold title with special conditions attached.


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Native forest

A forest is defined by the National Forestry Inventory as an area incorporating all living and non-living components, dominated by trees having usually a single stem and a mature or potentially mature stand height exceeding two metres, and with an existing or potential crown cover of over-storey strata about equal to or greater than 20%. This definition includes Australia’s diverse native forests, regardless of age. It is also sufficiently broad to encompass areas of trees that are sometimes described as woodlands.

Based on this definition, the total area of native forest reported in the latest Australia’s State of the Forests Report is estimated at 147.4 million hectares, which is about 19% of Australia’s land area (Table 17.6).

An estimated 107.8 million hectares (73%) of native forest area is on public land and 38.1 million hectares (26%) is on private land. Forests growing on public land consist of 65.1 million hectares (60%) on leasehold tenure, 22.4 million hectares (21%) in nature conservation reserves, 10.9 million hectares (10%) on other Crown land, and 9.4 million hectares (9%) managed by state forest authorities for multiple uses including wood production, recreation and informal reserves.

Including forested leasehold land and private freehold forest, about 103.2 million hectares, or 70% of Australia’s native forests, are privately managed.

Australia’s forests are very diverse ... and vary widely in their species composition, structure and in the fauna they support.

Most of Australia’s forests are dominated by eucalypts, which include trees in the genera Eucalyptus, Corymbia and Angophora (Table 17.6). The second most extensive forest type is Acacia. Despite the predominance of these genera, Australia’s forests are very diverse, with more than 700 species of eucalypts, almost 1,000 Acacia species, and many other genera of forest trees. As a result, forests vary widely in their species composition, structure and in the fauna they support.
After having expanded for many years, the area of Australia’s plantation estate appeared to stabilise in 2010 at 2.0 million hectares (Table 17.7). The area of coniferous (softwood) plantations increased by 16% between 1994 and 2010, while the area of broadleaved (hardwood) plantations increased six-fold over the same period (Graph 17.8). The area of plantations in each state and territory in 2010 is shown in Table 17.7.

The plantation estate is dominated by a few species: about three-quarters of softwood plantations by area are radiata pine (Pinus radiata). Over half of the hardwood plantations by area are Tasmanian blue gum (Eucalyptus globulus) and a further one-quarter are shining gum (Eucalyptus nitens). These proportions are similar to those in previous years.

Nearly all softwood plantations in Australia are managed primarily to produce sawlogs to make sawn timber for building and construction (Table 17.10). Pulpwood, produced from thinnings and low quality parts of the stems in stands managed primarily to produce sawlogs, is used to make particleboard, medium density fibreboard and paper products. Most hardwood plantations are managed to produce pulpwood for paper manufacturing. A small proportion are managed to produce sawlogs, although most are too young to produce significant volumes.

For the first hundred years of plantation development in Australia, most of the investment was by governments. The proportion of plantations privately owned has been increasing steadily for many years but increased substantially in 2010 because government-owned plantations in Queensland were sold to superannuation funds (Graph 17.9). The proportion of plantations owned by managed investment scheme investors decreased substantially in 2010 as many were taken over by timber companies and other private investors and some have been written-off following drought and recurring disease problems.

Wood and paper products

On average, each year, every Australian consumes the equivalent of about 1 cubic metre of harvested log in the form of timber products, including timber for home building, joinery, furniture and paper products. Those products are supplied from domestic production and imports.

Apart from sawnwood, other timber products include plywood, wood-based panels and reconstituted wood panels. Australian-made wood-based panels include particleboard, medium-density fibreboard and hardboard. These are made from softwood or hardwood pulps, sawmill residues and thinnings.

A total of 25.1 million cubic metres of logs was harvested from Australian native forests and plantations in 2009-10; that volume was 1% less than the previous year but 3% more than ten years earlier. The volume harvested from native forests has almost halved (43% or 4.8 million cubic metres) over ten years, while the volume harvested from plantations has increased five-fold (3.5 million cubic metres).

The total value of exports of forest products in 2009-10 was $2.3 billion. Woodchips comprised 38% of that total and paper and paperboard products (primarily packaging and
TABLE 17.10: PRODUCTION OF WOOD AND SELECTED WOOD PRODUCTS

<table>
<thead>
<tr>
<th>COMMODITY</th>
<th>UNITS</th>
<th>2005-06</th>
<th>2006-07</th>
<th>2007-08</th>
<th>2008-09</th>
<th>2009-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sawn Australian-grown timber</td>
<td>'000 m³</td>
<td>3,821</td>
<td>4,012</td>
<td>4,263</td>
<td>3,740</td>
<td>na</td>
</tr>
<tr>
<td>Softwood</td>
<td>'000 m³</td>
<td>1,211</td>
<td>1,152</td>
<td>1,109</td>
<td>990</td>
<td>na</td>
</tr>
<tr>
<td>Total</td>
<td>'000 m³</td>
<td>5,032</td>
<td>5,163</td>
<td>5,371</td>
<td>4,730</td>
<td>na</td>
</tr>
<tr>
<td>Plywood</td>
<td>'000 m³</td>
<td>145</td>
<td>130</td>
<td>134</td>
<td>118</td>
<td>120</td>
</tr>
<tr>
<td>Particle board</td>
<td>'000 m³</td>
<td>1,002</td>
<td>933</td>
<td>957</td>
<td>911</td>
<td>928</td>
</tr>
<tr>
<td>Medium-density fibreboard</td>
<td>'000 m³</td>
<td>798</td>
<td>680</td>
<td>710</td>
<td>632</td>
<td>558</td>
</tr>
<tr>
<td>Plywood</td>
<td>'000 m³</td>
<td>145</td>
<td>130</td>
<td>134</td>
<td>118</td>
<td>120</td>
</tr>
<tr>
<td>Particle board</td>
<td>'000 m³</td>
<td>1,002</td>
<td>933</td>
<td>957</td>
<td>911</td>
<td>928</td>
</tr>
<tr>
<td>Medium-density fibreboard</td>
<td>'000 m³</td>
<td>798</td>
<td>680</td>
<td>710</td>
<td>632</td>
<td>558</td>
</tr>
<tr>
<td>Paper and paperboard</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Newsprint</td>
<td>'000 t</td>
<td>415</td>
<td>411</td>
<td>456</td>
<td>444</td>
<td>427</td>
</tr>
<tr>
<td>Printing and writing</td>
<td>'000 t</td>
<td>663</td>
<td>693</td>
<td>706</td>
<td>723</td>
<td>496</td>
</tr>
<tr>
<td>Household and sanitary</td>
<td>'000 t</td>
<td>203</td>
<td>190</td>
<td>186</td>
<td>196</td>
<td>194</td>
</tr>
<tr>
<td>Packaging and industrial</td>
<td>'000 t</td>
<td>1,926</td>
<td>1,907</td>
<td>1,933</td>
<td>1,915</td>
<td>2,058</td>
</tr>
<tr>
<td>na = not available</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


Industrial paper) comprised 29%. The value of imports of forest products in 2009-10 was $4.2 billion, of which 52% were paper and paperboard products (primarily printing and writing paper). This indicates a trade deficit in forest products of $1.9 billion in 2009-10, down from the previous year’s level of $2.1 billion. Pulp and paper mills use roundwood thinnings, low-quality logs, harvesting residues and sawmill waste, recycled paper and paperboard to produce a broad range of pulp and paper products. Over the past five years, the volume of pulpwood for paper and paperboard harvested from eucalypt plantations has increased by a third while the volume harvested from native forests has declined by 20%.

Woodchips are used to produce paper and paper products. The woodchip export industry uses sawmill residues and native forest logs that are unsuitable for sawmilling. Sawmill waste material, which would...
otherwise be burnt, is also chipped for local pulpwood-using industries. Woodchips are also produced from thinnings from softwood plantations and from hardwood plantations grown especially for the purpose.

The Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) reported that about 7.7 million cubic metres of logs were used for woodchip production for export in 2009-10, a decrease of 18% from five years ago. This was mainly due to a fall over the period of 2.5 million cubic metres (45%) in production from native hardwood forests not being matched by the increase of only 1.5 million cubic metres from hardwood plantations. Production of woodchips for export from coniferous logs has declined from 1.3 million cubic metres to 0.6 million cubic metres over the last five years.
WHAT ARE THE BENEFITS OF FORESTRY?

Forests are living, they are renewable, and they provide a wide range of benefits to all who interact with them, according to the Forest Learning online portal from Forest and Wood Products Australia Limited

Forests are important to our ecological, economic and social wellbeing. They provide wood and non-wood products, recreational opportunities and other non-market goods and services such as water and clean air.

Forests make an important contribution to our economy through supporting regional communities involved in resource-use industries, and by providing excellent opportunities for recreation and tourism. In fact, more people visit our forests for recreation than for any other purpose.

They also perform important environmental functions, such as protecting the health of our water catchments, and providing habitats for plant and animal species, thereby playing a vital role in the conservation of biodiversity.

Forests can have considerable indigenous and cultural heritage values. They are used for education, and their aesthetic values are also highly valued.

The provision of clean water, conversion of carbon dioxide (atmospheric carbon) into wood (stored carbon) through the process of photosynthesis (carbon sequestration), and the maintenance of fertile soils that support healthy and productive ecosystems are critical processes performed by our forests.

The community expects its forest ecosystems to be protected for current and future generations to enjoy, while continuing to provide sustainably derived products such as wood for construction and furniture, reconstituted products like paper, and even food sources such as honey. Finding a balance between these multiple uses, while sustaining and conserving forests for the future, is the basis of Sustainable Forest Management (SFM).

SOCIAL AND ECONOMIC CONTRIBUTION

Forests provide many social and economic benefits to the communities that regularly interact with them, particularly regional and indigenous communities.

Forests can contribute to sustainable economic growth as well as community development. For example, forests near residential areas provide our large and growing urban population with opportunities for spiritual renewal and strengthening. Within urban areas, forests are planted by community groups to transform degraded areas, reduce wind and noise, and help improve air quality. While in rural regions, farmers plant trees to provide livestock with shelter and to stabilise and improve degraded agricultural land.

Forests have been found to improve the wellbeing of those who use them for recreation and relaxation. Added benefits can come from observing wildlife and flora in natural habitats.
Forestry also helps to conserve Australia’s rich cultural heritage. This includes helping protect remnant rainforests, old-growth forests, and protected area forests that include archaeological and aboriginal sacred sites.

PRODUCTS FROM TREES

Wood and timber harvested from native forests and plantations can be used for many purposes, including house construction, infrastructure (e.g. bridges and railways), fencing, heating fuel, and fibre for paper-making.

High quality timber from our native forests is highly prized by furniture makers and as hardwood flooring and decking.

Woodchips are a by-product of timber harvesting in native forests and plantations, and are sought after both locally and internationally for use in high quality paper products. The majority of our current eucalypt plantations are being purpose-grown for woodchips using species selected especially for their high fibre yield and suitability for pulping as the base ingredient in paper manufacturing.

While other building materials can provide shelter, warmth and comfort, none are renewable like wood. Once trees are harvested, the same areas can be replanted and new trees grown. Other resources, such as clay for bricks, iron ore for steel, or bauxite for aluminium require a much greater energy input to transform them from raw material to usable products. Compared to these other common building materials, timber not only stores carbon, but it embodies much less energy in its processing and manufacture.

Wood is not the only useful product that can be obtained from trees; the leaves can provide chemicals with useful medicinal properties, while the flowers and fruit produce seed which can be used for land rehabilitation and revegetation, or even food in some cases.

RECREATION AND TOURISM

Forests also provide a broad range of opportunities for recreation and tourism in a variety of settings. These opportunities range from high visitation sites with significant infrastructure and accommodation facilities, to remote sites that may only be accessible via walking tracks.

State forests cater for a broader range of recreational opportunities than are available in most National Parks, including horse riding, dog walking, hunting, mountain biking and rally car driving. National Parks generally provide for lower impact nature-based tourism such as bush walking. Many of our Parks and State forest areas make an important contribution to nature-based tourism, with significant potential for further growth in commercial tour operations.

CULTURAL, SOCIAL AND SPIRITUAL NEEDS AND VALUES

The social and cultural values provided by our forests are generally intangible, as they relate to the personal enjoyment of being among the trees. Indigenous people have close ties to their land and forests are integral to expressing their cultural, social and spiritual values. For non-indigenous Australians there are also many places of significance located in forest areas.

The sustainable management of our forests is aimed at ensuring there are enough resources for our generation, while laying the foundations for future generations.

EMPLOYMENT AND COMMUNITY NEEDS

The number of direct and indirect jobs provided by the forestry sector is vital to the future of many regional towns. The timber industry is often a major employer in rural areas and integral to the long-term viability of regional communities. These regions often have processing and manufacturing businesses based on value-adding logs into sawn timber and products like fibre board and pulp for paper manufacturing.

In addition, indirect employment includes suppliers of services to the industry (fuel, mechanical repairs and contractors) and the flow-on businesses and services such as doctors, and schools that serve any economically-viable community.

Forests are living, they are renewable, and provide a wide range of benefits to all who interact with them. A tree can be harvested and a new tree grown in its place in the space of a single human lifetime. The sustainable management of our forests is aimed at ensuring there are enough resources for our generation, while laying the foundations for future generations.
What is SFM?

Sustainable Forest Management (SFM) entails the management of forests to maintain their full range of environmental, social and economic values.

The concept of SFM has a long and evolving history in Australia. As our understanding of forest ecology has increased and community attitudes have changed, management practices have also changed to meet sustainable timber yields and maintain and protect other forest values.

Australia’s framework for SFM

Australia now has a comprehensive framework designed to achieve the conservation and sustainable management of its forests.

This framework includes:

➤ A national policy framework – Australia’s 1992 National Forest Policy Statement (NFPS) promotes the conservation and sustainable management of forests
➤ Regional Forest Agreements (RFAs) – 20 year agreements underpinning regional approaches to balance conservation and production from native forests
➤ Australia’s Sustainable Forest Management Framework of Criteria and Indicators 2008 – internationally recognised framework for sustainable forest management applied to Australia’s forests
➤ State and territory frameworks – jurisdictional legislation and codes of practice are applied to ensure environmentally responsible forestry practices
➤ Forest certification – independent third party forest certification to credible forest management standards applies to most of Australia’s production forests.

How is SFM measured?

Since the Rio Earth Summit in 1992, several national and international initiatives have been launched to improve our understanding of and measure progress towards SFM.

At the national level, Australia uses the international Montreal Process Criteria and Indicators (C&I) as the basis framework for monitoring and measuring how well our forests are being managed.

As every forest region of Australia is different, the application and importance of the criteria and their respective indicators varies between tenures and broad forest types.

As such, Australia developed a ‘framework’ for assessing the sustainability of forest management which could be applied across all Australian forests. This was achieved through the national-level Montreal Process Implementation Group for Australia (MIG), compromising representatives of the Australian, state and territory governments, which devised the 44 indicators used to track progress across the criteria.

Australia reports on its progress towards SFM as measured by the Montreal Process C&I, through the five-yearly release of its State of the Forests Report, the most recent of which was produced in 2008.

Further details on ‘Australia’s Sustainable Forest Management Framework of Criteria and Indicators 2008’ is available at http://adl.brs.gov.au

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Sustainable forest management (SFM) refers to the management of our private and public forests to ensure they continue to provide not only a sound supply of renewable timber for present and future generations, but also maintain their environmental values and social services.

SFM is dependent on credible science and professional commitment to improving the nature of forest management by responsible agencies and forest managers. In Australia, governments set policies and targets to guide the application of sustainable forestry, particularly on public land.

Nationally we have adopted principles and measures that are based on international level criteria widely agreed among nations with strong, long-term forestry industries.

Some of the criteria for SFM are:

➤ Conservation of biological diversity
➤ Maintenance of productive capacity of forest ecosystems and their 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 socioeconomic benefits to meet needs of societies.

State forest and land management agencies and corporate forestry organisations often use the term ESFM – i.e. ecologically sustainable forest management, to describe the approach outlined above. A reputable forest and environmental consultant recently proclaimed, “The language of sustainability is now being spoken from the boardroom to the bush”, suggesting that the message of SFM is now widely accepted.

In summary, ESFM is aimed at achieving a continuing balance of timber supply, economic and social benefits, while retaining a range of environmental values.

Some contrasting realities that Australians should consider in the sustainable management of our forests include:

➤ Our indigenous communities had, and some still have, a wealth of awareness and knowledge on how to look after woodlands and forests in a sustained way for a variety of values. Aboriginal people lived in balance with their wooded environment, drawing on only as many resources as it would sustain, for thousands of years
➤ In parts of Asia-Pacific countries to our north, and on the South America and African continents, forests are still being cut down without proper management to ensure their regeneration, sometimes illegally. They are not regarded as being sustainably managed and natural forest resources are being greatly diminished and in some cases continue to decline.

Fortunately, in an affluent country such as Australia, forest management is highly evolved and our forest scientists and practitioners are constantly striving to improve and apply sustainable forestry practices.

**Sustainable yield**

In relation to native forests, sustainable yield is a technical term which relates to harvesting timber where the volume of wood removed from a forest each year must at least be equalled by the forest’s renewal of itself through natural regeneration and growth of trees in unharvested areas.

Determining what the level of sustained yield is, and then monitoring and potentially altering it over time, is a complex matter. Usually it is expressed in tonnes or cubic metres of logs taken annually from a defined forest area. Predicting what a forest can sustain over 10, 20 and 30 year periods, and beyond, is subject to considerable uncertainty due to the impact on growth of changing rainfall patterns, wildfire and disease, the potential need for additional conservation reserves, community demands or other scientific reasons.

Forest managers have become skilled in sustained yield determinations and have many tools with which to validate predictions and monitor progress over time.
Forest certification has developed around the world as a way of demonstrating the implementation of sustainable forest management practices. To have a forest certified as being sustainably managed, an audit is undertaken by an independent, third party certification body. The audit assesses the forest management practices of a forest manager or owner against the standard for certification. Both native forests and plantations can be certified.

To have a forest certified as being sustainably managed, an audit is undertaken by an independent third party.

The two major global forest certification bodies are the Programme for the Endorsement of Forest Certification (PEFC) schemes and the Forest Stewardship Council (FSC). Both the PEFC and FSC are internationally recognised forest certification networks that provide for the mutual recognition of regional and national standards that meet their criteria for sustainable forest management.

In Australia, forest managers and owners have the option of certifying their forests under either the Australian Forest Certification Scheme (AFCS), which is recognised under the PEFC, or the FSC. The AFCS uses the Australian Forestry Standard (APS) 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 Australia. The AFCS is administered by AFS Ltd whereas FSC certification in Australia is administered by FSC Australia.

Presently there are around 10.3 million hectares of native and plantation forests certified in Australia. This consists of 10.2 million hectares certified under the AFCS and just over 0.6 million hectares under FSC. Some plantation managers have dual certification i.e. are certified under the AFCS and FSC which explains the national figure.

Wood and wood-based products sourced from certified forests can also be tracked (via labelling) through the supply chain using chain-of-custody certification provided by both forest certification schemes. This provides consumers with an assurance that the wood product they are purchasing comes from a sustainably managed and certified forest.

The Australian Government supports all credible internationally recognised forest certification schemes that provide for legal and sustainable forest management and believes that the choice of forest certification scheme(s) is a decision for forest owners/managers.

Presently there are around 10.3 million hectares of native and plantation forests certified in Australia.
If the illegal logs cut each year were laid end to end they would stretch 10 times around the Earth, according to this information from the World Wildlife Fund

What is illegal logging?
Illegal logging is the harvesting, transporting, processing, buying or selling of timber in violation of national laws. It also applies to harvesting wood from protected areas, exporting threatened plant/tree species, and falsifying official documents. Less obvious acts of illegal logging include breaking licence agreements, tax evasion, corrupting government officials and interfering with access and rights to forest areas.

What causes illegal logging?
Illegal logging exists because of increasing demand for timber, paper and derivative products (including packaging) – a trend that is likely to continue. Illegal logging can also happen when forests are cleared for plantations such as oil palm.

But not all wood removal is due to trade. In fact, 40% of wood taken from forests globally is used for basic energy needs such as cooking and heating. In tropical regions, wood removal (often illegal) for fuel can be as high as 80%.

Illegal logging is a major problem in the Congo Basin and the Amazon. Lesser known is the fact that it also occurs in Canada and Europe.

What’s the problem?
The world’s huge demand for timber and paper products has led, in some places, to increasingly unsustainable forest management – removing too many trees too quickly or logging entire forests. In order to provide a future for species and sustain natural forests, as well as ensuring wood resources into the future, there are now laws to control logging in key areas and to stop the trade in products from illegal sources.

Unfortunately, these laws are often broken.
Illegal logging poses a serious threat to forests, people and wildlife. It puts pressure on all the forests WWF works in, whether they be in South-East Asia, Papua New Guinea or South America. It contributes to global deforestation and climate change. It threatens many species with extinction and denies forest-dependent communities access to resources.

Illegal logging undermines legitimate business by undercutting timber companies that act responsibly. It also diverts income away from sustainable development, and causes social conflicts and financial losses for forest-rich developing countries. Illegal logging is often linked to organised crime, money-laundering and civil war.

Up until now, there’s been nothing to stop the illegal timber trade playing an active part in the Australian market. The Department of Agriculture, Fisheries and Forestry (DAFF) estimates that each year around $400 million worth of Australia’s forest product imports (totalling around $4 billion in 2008) carry some risk of having been illegally logged.

REPORT ESTIMATES: % OF ILLEGAL LOGGING

1. INDONESIA: 70-80%
2. MALAYSIA: UP TO 35%
3. GABON: 50-70%
4. CAMEROON: 50%
5. LIBERIA: 80%
6. BRAZIL: UP TO 90%
7. PAPUA NEW GUINEA: 70%
8. MYANMAR: 50%
9. CAMBODIA: 90%
10. LAOS: 45%
11. THAILAND: 40%
12. VIETNAM: 20-40%
13. LATVIA: 20%
14. ESTONIA: 50%

© WWF-Aus
Illegal logging and the timber trade

Extract from an environmental crime report published by the Australian Institute of Criminology

Illegal logging and the associated timber trade is synonymous with corruption. Illegal activity envelops the whole chain-of-custody. It extends from the cutting down of tree species from protected forest, illegally obtained concessions or outside mandated concession perimeters, to the processing of, and trade in, illegal logs, and their sale in consumer nations. Along with the generation of significant financial rewards, it also facilitates other environmental crimes, primarily the illegal trade in wildlife.

While not unknown, illegal logging is not endemic nor systematically performed in Australia (Schloenhardt 2008). Forestry, like fishing, is a tightly-regulated (and lucrative) enterprise in Australia and most illegal activity is likely to be small-scale or consist of minor acts of regulatory non-compliance. The concern for Australia is in its role as a consumer of illegal timber that has been harvested overseas and the current absence of a nationally-applied scheme to identify the importation of such timber.

Estimates of the proportion of illegal timber entering Australia are confined to the one study. Up to nine per cent of all timber products imported into Australia in 2003-04 were considered of doubtful origin (Jaakko Pöyry Consulting 2004). Wooden furniture was particularly suspect, with an estimated 22 per cent deemed of suspicious origin. While the type of timber being imported was not verified, other import data indicates that around a fifth of timber products imported into Australia are tropical woods (ITTO 2007), including the popular hardwood merbau, which is logged at unsustainable rates in countries such as Indonesia and Papua New Guinea.

Alongside tackling illegal logging at its source, consumer nations (such as the United States and the European Union) have responded by introducing measures to block or criminalise the importation of illegal timber and timber products. An amendment to the US Lacey Act 1900 now enables criminal or civil prosecution of any company knowingly or unknowingly importing illegal timber into the United States. The EU, among other instruments, are establishing licensing schemes with partner nations involved in timber harvesting to verify the legality (and sustainability of extraction) of imported timber.

Australia relies on forest certification schemes to assess forest management practices but has not introduced a formal means to identify illegal timber or curb its importation. A 2004 survey of timber importers, wholesalers, industries and hardware suppliers found no ‘structured system’ to assist identifying ‘suspect’ timber products (Jaakko Pöyry Consulting 2004) and this situation continues today. In January 2010, an Australian Government commissioned regulation impact statement concluded that the costs of regulating timber imports would outweigh the benefits gained and recommended Australia adopt a non-regulatory response (The Centre for International Economics 2010). In the absence of a national approach, a small number of Australian companies have independently introduced verification schemes to authenticate timber imported into the country.

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ENDNOTE

Ever wondered where your outdoor furniture came from? Ever pondered on the story behind your lovely new decking? Or how about the journey your toilet paper took to arrive at your loo?

ABC Environment report by Reece Turner

Most Australians assume that everyday purchases such as dining chairs and toilet paper don’t come from illegally operated logging operations. And fair enough – despite nice images of green ticks, trees or frogs – there is no requirement to know, much less reveal, the origins of the timber and timber products we use every day.

This is all about to change. The Labor Government has just tabled a new law to stop illegal timber products entering Australia.

Currently, there are no laws to stop illegally logged timber estimated to be worth between $480 million to $840 million coming into Australia every year. The most common dodgy products that make their way into the country include outdoor timber furniture and decking as well as plywood and hardwoods used in construction. But even everyday products such as tissues, toilet paper, notepads and diaries could come from an illegal source.

Under the new laws, it will be a criminal offence to import products made from timber logged illegally. Importers will also be required to take a number of steps to determine whether their merbau decking or mahogany tables come from legal sources. Offenders could go to jail for five years if they are found selling or importing illegal timber products.

Sound tough? Not as tough as the devastating effects of illegal logging.

Illegal logging is a crime. It fuels corruption and human rights abuse and destroys rainforests and biodiversity. Every day, forests and communities in countries across the world are directly affected by the unregulated way that we import products from their forests. Illegal logging is also a major driver of global climate change as part of the 20 per cent of global greenhouse gas emissions caused by deforestation.

The World Bank has estimated that illegal logging costs timber producing countries between US$ 10 to 15 billion per year in lost revenue, accounting for over a tenth of the total timber trade worldwide estimated to be more than US$ 150 billion a year. This lost revenue is desperately required for much needed public services such as schools and hospitals.

Figures from last year reveal that about half of all logging in Indonesia and 70-90% in Papua New Guinea was illegal.

Illegal logging is particularly rife in our region. Figures from last year reveal that about half of all logging undertaken in Indonesia was illegal and in PNG – the largest recipient of Australian aid – it is estimated that 70 to 90 per cent of all logging is illegal.

And whilst illegal logging is on the decline in some countries, in PNG, the situation is getting steadily worse. Today, over five million hectares of PNG’s remaining rainforests are slated for destruction under a new lease system which is being seen as one of the largest land grabs in PNG’s recent history. Most of this logging is illegal as the leases have been fraudulently obtained. One lease in the remote province of East New Britain has been ‘approved’ by children as young as three and four, by the deceased and by people that do not exist at all. When the villagers protested the logging, task force police were paid by the logging company to intimidate and abuse them.

These villagers have had their forests and livelihoods stolen to make cheap timber products in China that are then shipped to markets like Australia. Similar cases of illegal logging devastating communities and forests are reported every day in countries like Indonesia, Malaysia, the Congo and Brazil.

A recent Greenpeace report using on-the-ground investigations by UK NGO Earthsight revealed that illegal timber from the rainforests of Sarawak in Malaysia is bought and sold in hardware and timber yards across Australia.

Many of Sarawak’s rural communities are affected by illegal logging. The Penan people, for example, claim
Illegal logging destroys more than beautiful forests. It destroys economies and livelihoods too. The above image is of a forest in Papua New Guinea.

that illegal logging has contaminated rivers causing pollution and illness. They also claim that loss of their traditional forested land has caused loss of game and medicines causing hunger and sickness.

A report released in July 2010 by three human rights groups verified allegations that Penan women and girls were raped by logging company workers. Workers from the notorious Malaysian based company Samling were among those the Penan accused of abuse. Samling own a major timber distribution company in Australia which they use to import and distribute products around the country.

This year, Greenpeace exposed illegal plywood from Samling in a well-known ‘green building’ development in Sydney’s CBD. In response, the development company immediately announced an audit and it is understood the illegal timber was sent back. The scandal proved how hard it is to detect illegal timber without effective national laws – even for a developer seeking to use the very best green standards.

While corruption, bribery and greed are often at the root of illegal practices in timber producing countries, importing countries like Australia share the responsibility for continuing to import illegal timber at great cost to the environment and forest communities. And decisions we make as purchasers can have profound impacts on policies and practices in other countries.

Illegal logging also undermines the Australian companies trading in legal and well-managed timber, by undercutting their prices and making the market less competitive.

Some responsible Australian timber retailers and importers have put their own procurement policies in place to detect and eliminate illegal timber. But unscrupulous competitors continue to trade in often cheaper, illegal and unsustainable products and undermine the market.

In 2009 an unlikely alliance was forged to bring in the illegal timber ban promised by Labor in the lead up to the 2007 election. The biggest names in the timber industry and Australia’s leading social justice, environment and church groups joined forces to make sure the best laws were passed. Most recently these groups signed a Common Platform to outline the key elements needed in laws to effectively stop illegal timber imports.

Finally, this legislation has been tabled in Parliament and will be debated and hopefully passed early next year when Parliament resumes.

Illegal logging undermines Australian companies trading in legal and well-managed timber, by undercutting their prices and making the market less competitive.

The Bill is not perfect, and will likely require changes over the coming months. Perhaps the most critical next step, however, is to ensure that there is proper enforcement. That means a commitment to training and sufficient resources, particularly at the border, so that illegal timber imports can be found and stopped. This will ensure border controls are rigorous in much the same way as customs and quarantine monitor for imports such as illegal drugs and pests.

If these laws are properly implemented we can then hope the trade of illegal timber products in Australia will end and systematic changes to the forest industries in producer countries will occur. This will benefit communities and species that rely upon the world’s remaining forests for their survival – and that includes every one of us.

Reece Turner is Forests Campaigner for Greenpeace.

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The Tasmanian forest industry directly employs more than 10,000 people and contributes about $1.3 billion to the Tasmanian economy each year.

The Australian and Tasmanian governments both share an overriding commitment to maintaining jobs in Tasmania’s forest and timber industries. The overall package has been developed to ensure this commitment is met in full.

Both governments are confident that the investment of over $200 million in forest industries will lead to sustained jobs growth in Tasmania’s forest and timber industries. Specific measures will be introduced to ensure mills, industries and regions potentially affected by new conservation reserves will continue to flourish. The Tasmanian Community Forest Agreement will provide specific assistance to specialty timber mills in the north-west and west coasts affected by the reservation of substantial special species timber resources. This assistance includes support for retooling and capital investment and new wood supply arrangements to provide security of supply during the transition period and going forward. The Forest Agreement also provides support to improve access to forest areas for the special species and beekeeping industries. Refer to Fact Sheet No 22 for further information concerning special species timbers.

The Tasmanian Forests Intergovernmental Agreement is designed to support the forest industry to progressively transition to a more sustainable and diversified footing and to build regional economic diversity and community resilience. Signed by the Prime Minister Julia Gillard and Tasmanian Premier Lara Giddings on 7 August 2011 the landmark agreement aims to provide certainty for Tasmania’s forestry industry, support local jobs and communities, and protect the state’s ancient forests. It will help the forest industry adapt to market changes while protecting the communities and families that rely on the sector to survive.

Under the agreement a total of $276 million, including $15 million from the State Government, will be provided in the following key areas:

- $85 million to support contractors and their families affected by the downturn in the industry, and in particular Gunns Limited’s decision to exit native forest harvesting.
- Including $45 million under the Tasmanian Forests Intergovernmental Agreement Contractors Voluntary Exit Grants Program.
- $43 million to facilitate protection of new areas of high conservation value forests.
- $120 million over 15 years, including an initial payment of $20 million to identify and fund appropriate regional development projects.
- $7 million per annum ongoing to manage new reserves.

An Independent Verification Group has been established to provide advice to the Prime Minister and the Tasmanian Premier on sustainable timber supply requirements and areas and boundaries of reserves from within the ENGO-nominated 572,000 hectares of High Conservation Value native forest.
management programs to establish new plantations and improve the productivity of existing plantations and regrowth forest, and a $29.5 million investment in roads and other infrastructure to support the implementation of changed harvesting programs agreed under the package.

Other elements of the Forest Agreement that will contribute positively to jobs and industry growth include the $10 million softwood industry development proposal, and the $4 million forestry training initiative.

Both governments are confident that the socio-economic impact of the package will be positive.

Overall, the Tasmanian Community Forest Agreement secures the future viability of the Tasmanian forest industries by ensuring a sustainable balance between protecting Tasmania’s unique environment and providing for the needs of forest and timber industries and workers.

The broader Tasmanian economy will also benefit from the creation of the new reserves. The tourism industry already contributes more than $1 billion each year to the State’s economy and directly employs more than 22,500 people (Tourism Council Tasmania). Tasmania’s ancient forests and other natural features are at the core of Tasmania’s attraction for tourists. The new reserves in the Tarkine and the Styx Valley in particular will boost the attractiveness of these areas as significant tourist destinations. The $5 million investment in new forest tourism facilities will also help attract additional visitors and contribute to the growth of the tourism industry and the growth of the surrounding regions.
Obituaries are already being written for the Tasmanian forests peace agreement after the state’s peak timber industry body, the Forest Industry Association, announced this week it was suspending its support for the groundbreaking accord.

If the agreement is dead, this will be a tragedy for Tasmania, for the forests and for the industry. Many, including myself, see the Intergovernmental Agreement signed in August 2011, as the last chance to resolve the long running war over the future of Tasmania’s magnificent native forests.

The forest war in Tasmania has been a war without end and without any obvious victors. It is one that has now raged for nearly 30 years.

But the portents are not good and tensions are again rising throughout the state. A few days ago in Huonville, south of Hobart, angry timber workers rallied outside and pounded on the doors of the office of the local environment group whose actions they believed were responsible for the standing down of 40 workers at the local timber mill.

And deep in the forests, protestors continue to attempt to stop work in the forests they believe have been promised protection by the Intergovernmental Agreement. These events could represent a small but significant step back to the barricades and the failed path of confrontation and contestation.

A 30-YEAR WAR

The forest war in Tasmania has been a war without end and without any obvious victors. It is one that has now raged for nearly 30 years. It is a war that has destroyed governments. It has changed the course of elections, rewarded and emboldened the warriors and sidelined the peace makers, it has entrenched divisions in Tasmanian society, corrupted the institutions of government and business, and has held back the state from realising its potential.

All the while, hundreds of thousands of hectares of magnificent forests have been razed and sold for a pittance, thousands of jobs have been lost, investors have been burnt and governments have repeatedly poured hundreds of millions of taxpayers dollars down the drain in unsuccessful attempts to revive the fortunes of an industry that has been in steady, and now accelerating decline.

Rhetoric, vitriol, personal attack and embellishment has once again re-entered the public debate, dragging it backwards into the divisive place it has dwelled over recent decades.

Embattled governments have started to point the finger, to run from responsibility and have reactivated the recital of the tired old lines of the blame game whilst the Tasmanian and Federal Opposition revel in the chaos without seemingly realising that the mess that will come from their urgings will soon be theirs to manage.

COOL HEADS REQUIRED

It must end. Cool heads are required and it is time to step back from the brink. In a few weeks the results of a range of independent reports commissioned as part of the Intergovernmental Agreement will be publicly released.

These reports aim to answer two long-standing questions about the actual amount of wood available in the public native forest estate and how much of that forest estate has high conservation values and should be permanently protected in secure reserves. In this context, it is not surprising that tensions are rising at precisely the time that some hard data about what can be logged and what should be protected is about to be inserted into this emotive debate.

Publicly available information already published reveals
that the amount of commercially loggable timber available is significantly less than previously claimed by the state’s forest manager, Forestry Tasmania. It is feared that the new reports will confirm an even bigger problem – that the industry is about to face a wood supply crisis that will require radical, rather than gradual reform to be properly resolved.

The promise of peace in Tasmania, first pursued through the Statement of Principles between industry, unions and environment groups in October 2010, and then the subsequent Intergovernmental Agreement, was predicated on the opportunity presented by the collapse of timber giant, Gunns Ltd.

**GUNNS EXIT**

Until last year, over 65 per cent of the native forests logged each year in Tasmania were allocated to Gunns. With the exit of Gunns, a once-in-a-generation opportunity was opened in which a secure supply of timber would be made available to a smaller, but more sustainable industry, and long-term aspirations to protect high conservation value forests would finally be realised.

However, if the timber isn’t there, despite the exit of Gunns, then there is a problem. It now appears that many believe that the additional timber required to keep the industry at its present size should come from the high conservation value forests earmarked for protection. This has been the mantra from the Tasmanian Premier for months and was echoed by a roll call of five Gillard Government Ministers on Monday.

Yet the industry and the Government want real and binding peace to rebuild market confidence. They want environmentalists to stop prosecuting highly effective campaigns that appear to have convinced international buyers to stop buying timber sourced from high conservation forests.

This desire to have their cake and eat it represents a profound misunderstanding by governments and the industry of why they are in their present predicament. Whether they like it or not, hundreds of thousands of Australians hold a deep commitment to the protection of these forests, including the 45,000 members of the Wilderness Society, and will continue to agitate for their protection.

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**PEACE CLOSE TO HAND**

Peace will come when these forests are at last protected. Already there has been give and take, and there may need to be more, particularly if the wood supply crisis is real.

Yet simply expecting business as usual with the forests bearing the brunt of the past mistakes of overcutting, over-allocation and creative accounting is not going to fly.

Major reforms are needed now, starting with the failed experiment which is Forestry Tasmania, the all-powerful Government-owned business that is supposed to both manage the forests and all its values and also turn a profit through finding markets and signing contracts for the timber.

Irrespective of whether the forests have been overcut and contracts signed that can’t be honoured – because the timber isn’t there, Forestry Tasmania must be abolished and the regulatory and commercial functions must be permanently separated.

The environmental movement will also need to accept that in any negotiation there is going to be more to give and take before a real and lasting peace is reached. This will be painful, but so is losing your job and missing your mortgage repayment.

In turn, industry and governments will only be deluding themselves if they believe that an outcome that involves a native forest industry based on the ongoing and large scale destruction of demonstrated high conservation values is a real peace and can deliver the desired market confidence.

Peace is possible, and necessary, but will only come with real change and a real commitment by all involved, directly and indirectly, to move on from the battles of the past and deliver for everyone.
The peace talks underway about Tasmania’s forests are as rich in ironies and paradoxes as Tasmania’s old-growth forests are in carbon. The current direction of the peace talks locks Tasmania into a pulpwood future, the very situation critics of Tasmanian forestry have been arguing against since woodchipping started in the 1970s.

This future ignores Tasmania’s comparative advantages in forestry and the bigger global picture. It delivers marginal carbon and biodiversity gains at unnecessary economic and social cost.

There are certainly elements of the peace deal that should endure, but the current package throws the forests baby out with the proposed pulpmill effluent water.

**Plantations are good for pulpmills**

The first irony is that critics of Tasmanian forestry have long argued that the state’s forest and industry policies gave too much weight to the interests of one dominant company, Gunns Ltd.

The peace deal continues that tradition. It disproportionally reflects the interests of one corporation, not those of the forestry sector or the community more broadly.

The second irony is related. Tasmania’s Regional Forest Agreement, signed between the Australian and Tasmanian Governments in 1997, traded off an increase in national parks against an increase in turning other native forests into plantations.

Many environment groups, with a narrow focus on protecting old-growth forests, effectively acquiesced. 150,000 ha of native forests valuable for biodiversity, carbon, and wood were converted to plantations before December 2007.

A good process doesn’t happen behind closed doors

A third irony is that the peace process has breached the principles of good forest governance. Environment groups have argued persuasively that these should be the foundation of Tasmanian forest policy and management.

Those principles include inclusivity and transparency. Both of these are difficult to achieve in invitation-only closed-door talks convened by the two parties with the most extreme interests – no logging, on the one side, and logging on the other.

Those with positions that don’t align with those interests, and who might see the situation in rather less black-and-white terms, have no voice.

**Reserving forests won’t solve our problems**

Protagonists have found common ground by excluding or silencing those with other views. They are seeking substantial public funding to solve a concocted problem. Tasmania’s forests are not, in fact, under any imminent threat from which they need to be “saved”.

The carbon emissions associated with harvesting all of Australia’s native forests form a trivial proportion – a few per cent – of national greenhouse gas emissions.

The overwhelming majority of forest-related emissions and biodiversity loss are associated with clearing forests to make way for farms, houses and plantations. (Over the decade to 2008, 90% of this clearing was for agriculture and urban development,
and 10% for plantation conversion – another double whammy).

The paradox is that Tasmania does have a global comparative advantage in growing native forest timber.

The global comparative advantage in plantation production is in South America, where the growth rates of eucalypts in pest-free exotic environments and the scale of plantation development deliver extraordinary production advantages.

Indonesia’s advantage is that deforestation associated with forest products appears of little concern to Australians who consume them. There, plantation forestry generates the stinging critiques we usually associate with Tasmanian native forest politics.

Get the trees out of the woods

There is a bigger global picture, which received a little national airing before the global financial crisis intervened. There are looming crises in global food, energy and water supplies. With the added impact of climate change, we will have to change the way we manage rural landscapes to survive these.

These issues are rightly the focus of growing concern and strategising globally, but have so far received scant attention in Australia’s peculiar electorally– rather than policy-focused contemporary politics.

The broader international consensus is that we need to transition to carbon- and energy-positive landscapes. These must use less water for food and fibre production than do current systems.

They must maintain biodiversity across the landscape rather than just in reserves. They must be resilient to climate change. They need to spread rather than concentrate risks.

One solution: forested landscapes which are well, but not completely, reserved, and farming landscapes with more trees.

Plantation forests, as relatively energy- and water-intensive, and biodiversity-poor, production systems, have only a partial role in such a future.

Extensively-managed self-regenerating native forests, with low inputs and many co-benefits, are a better fit. So are other forms of tree growing more integrated with agriculture.

Ironically, Tasmania is well down some parts of this path – a third of its native forests are already reserved, there is strong focus on conservation of private as well as public forests, and it has a forest practices system that scores highly in global comparisons.

However, like the rest of Australia, it needs coherent and sustained public policy supporting integrated and sustainable management of predominantly agricultural landscapes.

A curate’s egg: good in parts

The peace deal on the table has elements that the Australian and Tasmanian Governments should support: an end to old-growth harvesting, reducing the volume of sawlogs that Forestry Tasmania is legally required to deliver, and ample exit packages for those whose employment depended on an earlier era of native forest harvesting.

But there’s no need to fund a transition away from harvesting native forests for high-value wood products. Tasmania has a natural advantage in this industry.

What’s needed is a harvesting regime where biodiversity and carbon stocks are protected in an adequate reserve system and valued by the market. This, in turn, requires a price on carbon.

Rather than buying out businesses that don’t need to close, the Australian and Tasmanian Governments would do better to direct public funding to developing and supporting integrated production systems that address the real issues in sustainable management of Australia’s landscapes.

These are in our agricultural, not our forested, landscapes, both in Tasmania and mainland Australia. That’s where building a lasting peace most needs our attention and public funding.

Helping develop Tasmania as a global showcase for that environmentally-friendly future would be a public investment worth making.

Peter Kanowski is Professor of Forestry at Australian National University.

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The Conversation | http://theconversation.edu.au
Can’t see the trees for the wood

Forests are for more than simply manufacturing timber, argues Rod Keenan

This year, Australia is celebrating 100 years of forest science and education. Forests ecosystems have always been dynamic, shifting across the landscape in response to changing climatic, geological and atmospheric forces.

Long before humans evolved, natural processes such as fire played a major part in shaping forest composition and structure. But as humans began to colonise forest areas, they also started to have an impact on the forests through their use of fire and later through clearing for agriculture and grazing.

The early development of professional forestry in Australia was driven by the need to supply timber and to restore landscapes ravaged by uncontrolled mining and clearing. In reserving forests for the Crown, indigenous and local inhabitants were displaced and traditional access rights annulled. The first foresters faced challenges in protecting forests in the face of an expanding population; significant demand for further agricultural clearance; and an often recalcitrant bureaucracy. Their skills were basic and available tools relatively simple.

The 1930s depression and the 1939 wildfires presented different challenges and providing wood to a growing population became a major driver of forest management after World War II. This was met through increased harvesting in native forests and the development of exotic pine plantations to replace imports.

Increased education and wealth in urban populations and the rise of environmental consciousness had major implications for forest managers. Foresters were originally seen as protectors of the forest but became viewed by many as supporting forest exploitation.

In reality, foresters had to juggle competing social and political pressures on forests to provide timber, water, soil protection, labour opportunities, recreation and biodiversity conservation. Sometimes they kept their political masters, the timber industry and the wider public satisfied, much of the time they have not. Forestry continues to represent a ‘wicked’ policy challenge, where there are few simple solutions or win-win management options.

Increasingly, forests are becoming more highly valued for environmental services they provide, such as clean water and fresh air.

Internationally, there is considerable concern with continuing forest loss and conversion to agriculture. Addressing these issues will require societies to value forests very much more highly than they do now. This will require reforms beyond the forestry sector: in land-use planning, agriculture, energy and infrastructure policies and in international finance and development.

Many see the answer to providing for forest protection in climate policy and carbon trading. However, as Thomas Lovejoy was quoted as saying in The Economist recently, “appreciating forests just for their carbon, is like valuing a computer chip only for its silicon”. If the many things we value in forests are to be sustained in the longer term, management for these values will need to be explicitly recognised and resourced.

Traditional forestry training in Australia has provided the scientific basis for measuring and managing many forest values including timber, carbon, biodiversity and water. Future foresters will face a wider set of challenges than those first graduates 100 years ago. Their education has been informed by a century of developments in research and education. However, these technical skills will be insufficient to effectively address future challenges.

In focusing on providing environmental services, foresters will need improved understanding of ecosystem functions and a sound knowledge of social science, economics and policy. They will also need the capacity to both facilitate dialogues with the public and policy makers to understand the continually changing values that our society places on forests and to effectively communicate how forest managers are providing for these values.

Rod Keenan is Professor of Forestry at the University of Melbourne.
We live in an age of vanishing rainforests. Half of the world's tropical forests have disappeared since World War II and roughly another 10 million hectares are being felled each year – the equivalent of 40 football fields every minute.

It's a bit of a no-brainer to say this is bad for biodiversity. After all, rainforests are the biologically richest real estate on the planet, sustaining at least half of all known species of plants and animals in just 7 per cent of the Earth's land area.

Despite these facts, biologists are far from certain about how many species are imperiled by rainforest destruction. Some believe as many as two-thirds of all species could disappear in the coming century, largely because of tropical deforestation.

Others reckon the figure will be a lot lower – perhaps just 5-10 per cent of all species will eventually disappear.

Why the big difference in these numbers? A key reason is that we're still unsure about how many species can survive in degraded forests.

Degraded forests come in lots of flavours.

There are selectively logged forests, fragmented forests, forests that are scorched by ground fires, and forests that are overhunted.

In many areas, forests are regenerating after being completely felled or burned. In other areas plantations of exotic species, such as acacia or oil palm trees, are spreading across the landscape.

Degraded forests are the future. All across the tropical world, old-growth rainforests are vanishing and being transformed into human-dominated landscapes. These landscapes might sustain a few isolated patches of old-growth rainforest surrounded by expanses of farmland, human settlements, plantations and degraded forests.

So will most species survive in these wounded landscapes, or just a few?

The debate about species extinctions and degraded forests has polarised the scientific community. A leader of the extinctions-won't-really-be-that-bad-camp, Joe Wright of the Smithsonian Institution in Panama, has upset a lot of people by arguing that most species will be able to survive in regenerating rainforests.

Some biologists think this is bunk.

If we can't save enough old-growth forest to sustain nature, then selectively logged forests are pretty good as well.

Based on an analysis of 138 different studies, our research suggests that old-growth forests are pretty good as well.

At a large international meeting in Darwin a few years ago, one well-known scientist got so upset with Joe that he told him to perform a rude physical act that is technically impossible. Joe was mortified but the audience loved it. They felt Joe wasn't taking the extinction crisis seriously enough.

This week my colleagues and I jumped into the middle of this debate. We did so by publishing a research paper in the journal Nature today, synthesising 138 different studies around the tropics.

These studies were used to contrast the biodiversity in old-growth forests with that in many different kinds of degraded forests.

In broad terms we found that the old-growth forests won, hands down. For the species we are most concerned about – those most vulnerable to extinction – you just can't beat an undisturbed rainforest.

There was, however, one kind of degraded forest that fared better than the others: those that have been selectively logged.

In logged forests, bulldozers are used to extract a few large logs per hectare of forest. The bulldozers do quite a lot of damage, but the forest itself largely remains. In logged forests, some disturbance-sensitive species decline in abundance, but only a few vanish altogether.

This means we shouldn't write off logged rainforests as being unimportant. They're not pristine, but from a biodiversity perspective they're a heck of a lot better than farmland, regenerating forest or plantations.

This conclusion has some vital implications.

Earlier this year, the Indonesian government designated a vast area of logged forest – around 35 million hectares, a dozen times the size of Belgium – to be cleared for farmland or exotic tree plantations. They've done so because logged forests, they argue, are too badly degraded to be of much importance.

Our findings suggest the Indonesian government is flatly wrong: logged forests have a great deal of biological value. Instead of clearing logged forests, they should be expanding agriculture onto degraded grasslands and abandoned farmlands, which exist in abundance in the country.

Biologists like myself are not anti-development. But we are anti-foolish development. The thing that irks me and others is to see biological travesties still occurring in an era when we should (and do) know better.

The bottom line is that old-growth rainforests are the greatest celebration of life on earth. We should do everything we can to preserve them.

But if we can't save enough old-growth forest to sustain nature, then selectively logged forests are pretty good as well.

Bill Laurance is Distinguished Research Professor, Marine and Tropical Biology at James Cook University.
In Australia, too often we’re told the solution to all environmental problems is locking all native forests in unmanaged reserves, where they’ll be immortal, grow forever and continuously suck large amounts of greenhouse gases from the atmosphere.

We’re led to believe all forested landscapes can become old growth, and that forest management destroys forests. This is simplistic, flawed and represents missed opportunities for the environment, society and the economy.

Most of Australia’s forests aren’t full of enormous old trees and most of our old-growth is already in reserves. Just six per cent of Australia’s forests are managed for wood production.

The use of metal, concrete and plastic in construction produces more greenhouse gases than when wood is used in their place.

Managed forests maintain biodiversity, water quantity and quality and produce a variety of other goods and services, including carbon sequestration, employment, income and other opportunities to society.

Sure, photosynthesis takes carbon from carbon dioxide, an atmospheric gas, to form wood. Dry wood is half carbon by weight and each tonne of carbon absorbed from the atmosphere into wood came from about four tonnes of carbon dioxide.

So wood products store carbon in them and trees can absorb some carbon dioxide from the burning of fossil fuels. But trees can’t absorb all the carbon released from the burning of fossil fuels. To do so would require us to produce enough wood to form a 30-cubic-kilometre block of wood almost four times the height of Mount Everest, from forests each year. This is impossible. We must focus on reducing the burning of fossil fuels.

Growing forests absorb carbon dioxide from the atmosphere, but as they die they emit it. Wildfires frequently burn our forests releasing huge amounts of carbon dioxide back to the atmosphere and preventing many forests from becoming old-growth.

Since 2003, 3.5 million hectares have burnt in Victoria. Many of our prime forests require high-intensity wildfires to regenerate – they cannot remain as old-growth indefinitely. Valuable as it may be, storing carbon in forests doesn’t change our use of fossil fuels.

Cutting trees down is the only way forests can reduce our use of fossil fuels. This is done by using wood instead of fossil fuels for heat or electricity and, most effectively, using wood instead of products associated with large emissions.

For example, the use of metal, concrete and plastic in construction produces more greenhouse gases than when wood is used in their place.

Ideally, we should substitute fossil fuels and emission-intensive materials with renewable alternatives like wood.

Globally, wood products store an additional 150 million tonnes of carbon annually and landfill another 44 million tonnes, equivalent to removing 700 million tonnes of carbon dioxide from the atmosphere.

Wood use in residential house construction instead of non-wood alternatives prevented 483 million tonnes of carbon dioxide from being emitted in 2007. By 2030 the global use of forest bio-energy will prevent 1,000 million tonnes of fossil fuel carbon emissions annually.

These initiatives lack support in Australia where we are missing easy, proven opportunities to reduce greenhouse gas emissions with forests, unlike their rapid uptake in Europe and North America.

Wood products are traded on the global market. Australia has an annual $2 billion deficit in wood products, annually importing 600,000 to 900,000 cubic metres of sawn wood extracted from thousands of hectares of international forests each year, much of which are managed to lesser standards than Australia’s forests.

Withdrawal of more Australian native forests from management can be expected to increase greenhouse gas emissions from more intensive harvesting elsewhere, and from increased transportation of imports. That is not a green outcome. Sustainable management of Australia’s native regrowth forests is.

Dr Martin Moroni is Senior Research Scientist, Forest Carbon, at Forestry Tasmania, and Ian Ferguson is Professor Emeritus of Forest Science, University of Melbourne.

Article first published in The Age, 5 September 2011
Forty years ago, the NSW Government agreed to supply 5,000 tons of waste from saw logs to the newly established export woodchip mill at Eden. A Japanese and an Australian company, Harris Daishowa, then jointly owned the mill.

By 2008, the Eden chip mill had become South East Fibre Exports and was wholly owned by Nippon Paper and Itochu, exporting around 200 times the original quantity, one million tonnes of woodchips.

Make no mistake, these days woodchips are not waste from saw logging, woodchips are the main game.

Forty years of heavy industrial logging has taken its toll on the forests, their water catchments, their wildlife and soils. Threatened and endangered species numbers have dropped alarmingly. Even once common species like the koala are in danger of imminent regional extinction.

Logging has changed the character of the south-east forests – from wet to dry sclerophyll, with dangerously wildfire-prone regrowth. And climate change will exacerbate the dangers. Under the NSW Forestry Act, the State government is charged with protecting the character of forests.

But in the face of plummeting yields it is condoning short logging rotations, even though we know that it takes 180 years to restore water and carbon levels and more than 400 years to restore forests to their former glory – if the complex interrelationships of species from higher order, koalas, greater gliders, powerful owls, down to soil microbes can ever be recovered.

We know that it takes 180 years to restore water and carbon levels and more than 400 years to restore forests to their former glory.

In recent years consumer preferences for plantation chips and the global financial crisis have reduced demand for Australian native forest chips from the Japanese paper-makers by around 30 per cent.

This should be good news for our native forests. However the industry now seeks a new income stream supplying native forests for electricity generation, in Australia and abroad. South East Fibre Exports currently has an application before the NSW...
Government to build a wood-fired power station, and its wood pellet plant approved by local government is close to completion. Both projects will use mainly native forest inputs.

As part of its Clean Energy Futures package, the Commonwealth ruled out native forest biomass as a renewable energy fuel that was eligible to earn Renewable Energy Credits. However this welcome decision does not necessarily reduce the threat to our south-east forests.

The chip mill says it intends to go ahead with constructing the power plant once it is approved, regardless of losing the economic benefit of earning RECs. Moreover there is nothing to stop the Eden chipmill exporting chips or pellets for electricity generation overseas.

The group to which I belong, South East Region Conservation Alliance represents around 12 groups and is affiliated with Environment East Gippsland. It is also a founding member of Australian Forests and Climate Alliance. SERCA led the way in alerting the public and campaigning against burning native forest wood for electricity. SERCA applauds the Federal Government for ruling out eligibility to earn RECs, the inclusion of native forests in the Carbon Farming Initiative and the Biodiversity Fund. However none of these initiatives will force the much needed restructuring of the industry in this region.

The Eden chip mill claims its exports are now back to pre-GFC levels. Currently Forests NSW is seeking to recruit more logging contractors on long-term contracts, including from Victoria as numbers there are cut by 30 per cent; already we have seen a crew from Tasmania relocated in SE NSW, despite its having received a $830,000 payout for exiting the industry in Tasmania.

The forest’s value as carbon and water stores is vastly greater than the value of the logs produced.

It looks as if both Forests NSW and the Eden chip mill intend to intensify their logging/chipping/pelletising.

The forests of South-East Australia are now acknowledged to be the most carbon-dense in the world. Their value as carbon and water stores is vastly greater than the value of the logs produced.

Who is winning here? Not the environment, and not the taxpayer.

Last year NSW Forests lost $15 million from its native forest sector, and across the border Vic Forests made a small profit only because of a grant for its bushfire recovery services. Taxpayers are effectively subsidising the industry and workers’ jobs.

The logging industry provides 214 direct jobs in SE NSW and 138 in East Gippsland, including logging crews, truck drivers and chip mill workers – a minute proportion of jobs in the South-East region.

Logging for the Eden chip mill alone produces the equivalent of around 3 per cent of Australia’s annual greenhouse gas emissions – similar in extent to the emissions from the brown coal fired Hazelwood power station in Victoria, that the Commonwealth considers to be unacceptably high.

Natural forests are resilient, diverse – evolutionary masterpieces – it is time we changed from mining ecosystems such as forests to valuing them in the 21st century for climate, water, wildlife and beauty.

Prue Acton is an Australian fashion designer who has received an OBE for her work. She is a member of the South East Region Conservation Alliance, and has a passion for the forests of South-East NSW.
Yes, there is more to forestry than jobs

Forests are not just about trees, they are the cornerstone of many rural communities. It is time that the debate matured and the environmental, social and economic roles that forests play are recognised, asserts Shaun Ratcliff

Australia is the seventh most forested nation on Earth. We have the ability to sustainably manage our forests for a range of values, including those of an ecological and social nature; as well as for timber production to ensure Australia can meet its domestic needs.

Nationally the total forest and wood products industry employs more than 120,000 people. The domestic furniture industry employs nearly the same number again. The turnover of Australia’s forest products industries was estimated to be worth approximately $22 billion in 2009.

However, beyond the jobs it creates and the value it generates, the industry is important for the rural and regional communities it supports, the low-carbon products it provides and the renewable energy it can generate.

Anti-forestry campaigners have made a number of claims – that the industry is woodchip-driven, that it does not employ many people, that there are simple alternatives to sustainably harvesting native forests – that are simply not true. A recent example from this very site was that the industry only generates 214 direct jobs in South-East NSW and a further 138 in East Gippsland; missing the huge number of jobs created by the industry beyond harvest and haulage occupations.

Looking at East Gippsland, research by Coakes Consulting estimated forestry businesses using resources from the East Gippsland Forest Management Area generated approximately $150 million in revenue; keeping around 2,000 people in the region. These businesses brought $22.16 million worth of expenditure into the town of Bairnsdale (population 11,284); $21.08 million into Orbost (population 2,096); $14.33 million into Cann River (population 223); and $7.79 million into Heyfield (population 1,460), indirectly supporting many more businesses and jobs.

Many communities in these areas are highly dependent on forestry for their ongoing survival and are vulnerable to changes in the industry. For instance, towns such as Heyfield rely on native forestry for 56.65 per cent of available jobs.

The study found that most of these workers appear to have strong links to their communities, living in them for an average of 27 years. Many forestry workers (65.4 per cent) are involved in community groups and organisations within their respective communities. However, 40.5 per cent also stated they would leave the area to find employment if there were no jobs in the forest and wood products industry in the local area.

These figures only include workers in occupations up to and including secondary processing activities, and do not include people employed in wholesale trade, furniture making or other value adding activities.

All of this is achieved from a very small resource base. In Victoria around 90 per cent of the public native forest estate is off limits to forests. Less than 0.1 per cent of this is harvested and then regenerated each year.

Nationally only around 0.06 per cent of our native forest estate is available for timber production each year.

Timber production occurring in Australia’s natural forests is certified as being sustainably managed; with 90 per cent of our mixed-use native forests are recognised as such by third-party forest certification schemes, compared to the average of nine per cent internationally.

Indeed, forestry can actually provide environmental benefits. The National Greenhouse Gas Inventory found forestry to be the only carbon positive sector of Australia’s economy. In 2008 plantations and native forests sequestered a net 23 million tonnes of carbon. This reduced net national CO2 emissions by 3.8 per cent.

Forest and wood products continue to store carbon for their lifetimes. They are also less carbon intensive than products made from metal, plastic or concrete. The small portion of Australia’s public native forests available for timber production is by law regenerated following harvest. This means the trees are replanted and allowed to regrow, absorbing more carbon.

There are also innovative, environmentally beneficial ways that forest and wood products can help provide Australians with power and heating. According to the United Nations Food and Agriculture Organization, the use of wood for bioenergy and products may be one of the most effective ways to achieve “sustainable reductions of CO2 emissions through land-based activities”.

This form of power generation can assist in providing security of supply to meet the baseload power needs of the Australian economy, and minimise the price impacts of reducing carbon emissions on households and businesses. The promise of such technology has been recognised and the process of using wood residues to power bioenergy plants has already been trialled in Australia, with 650 megawatts of electricity from biomass already being generated.

This was acknowledged in the Federal Government’s original Carbon Pollution Reduction Scheme, which granted biomass a zero emissions rating.

The industry has an important and long-term role to play in reducing carbon emissions and supporting vibrant regional communities and it is time that the debate matured and the multiple roles that forests play – environmental, social and economic – were recognised.

Shaun Ratcliff is the Public Affairs Manager of the Victorian Association of Forest Industries, the peak body for the Victorian forest and wood products industry.

ABC Environment, Opinion, 29 September 2011
www.abc.net.au/environment
Australia’s forest conflict gets easier to solve as every day passes. In reality, the conflict will solve itself if the government can just resist reviving the environmentally and economically inferior native forest part of Australia’s “forest” industry. The government must not open native forest wood to the energy market, warns economist Judith Ajani.

Some are proposing that Australia’s forest future lies in burning native timber to produce electricity. Proponents argue this “bioenergy” is a sustainable energy source. But just as Australia’s forest wars seem to be coming to an end, conflict over bioenergy could restart the fight.

Why are we fighting over forests?
We cannot understand Australia’s forest conflict and its solution without unpacking the word ‘forest’. To environmentalists, ‘forest’ means native forests – self-regenerating ecosystems. To the forestry industry, forests are both native forests and plantations (agricultural crops).

Understanding the solution to Australia’s native forest conflict lies in seeing the industry’s two competing parts: native logging and plantation logging.

Between 85 and 90 per cent of Australia’s production of sawn timber and wood panels is now plantation based. Native forests represent a small and declining market share. The future of native logging was set in the 1960s when the Australian Government, skilfully lobbied by the forestry industry and foresters, embarked on a nationwide softwood planting program geared for sawn timber.

A couple of decades later the maturing plantations drove unrelenting structural change in sawmilling: a benefit for the economy and for workers. But rather than coming up with a new non-extractive use for native forests (enjoyment, biodiversity conservation, carbon and water sinks), governments opened native forests to woodchip exports. Australia’s forest conflict erupted. It has never subsided.

The rise of plantations
In the early 1990s, the forestry industry lobbied for a new wave of subsidised planting, this time for hardwood chip exports. The Australian Government responded with tax minimisation plantation-managed investment schemes. These schemes were a predictable economic disaster but the trees keep growing despite the wave of company collapses (Timbercorp, Great Southern Plantations, Willmott and so on).

And so the story repeats. Today, plantations have already displaced slightly more than half of Australia’s hardwood chip exports. We can expect a near-complete cessation of native forest chip exports in the near future.
Demand is the other side of this industry story. Japan’s demand for hardwood chips has been flat since the mid-1990s and China is implementing a sophisticated forest policy to avoid liquidating global forests.

**Should bioenergy be on the forest agenda?**

Australia’s plantation industry success is a pragmatic opportunity to resolve our native forest conflict. The forestry industry, however, wants to burn native forest wood for energy in Australia or export as pellets to feed overseas power stations. This would retain some native forest logging businesses, state forestry agencies and associated employment.

Environmentalists want native forests protected. Ecological scientists advise that we have the opportunity to avoid large greenhouse gas emissions and achieve substantial removals of atmospheric greenhouse gases by ceasing native forest logging and letting previously logged native forests regrow and not log them again.

Fewer and fewer people buy native timber products. Energy is the only immediate and substantial market if native forest logging is to effectively continue. The contemporary question is: what is the climate implication of using native forests for energy?

Time is of the essence. In Australia, we log native forest on roughly 60-year cycles. If we log a 60-year-old stand of native forest for energy production today, the carbon emissions from logging will occur soon after. The forest will not regrow enough to return to today’s carbon stock level until 2070. It took this long to grow: it takes this long to replace.

**Logging native forests for energy is climate negative for virtually the entire logging cycle.**

Logging native forests for energy is climate negative for virtually the entire logging cycle. Furthermore, the emissions from enacting this scenario today would max out over the next ten to 20 years: a critical time in our climate challenge.

**Native forest bioenergy is all pain and no climate gain**

The Australian Government remains spooked by decades of politically challenging forest conflict. But more recently it has made some good policy decisions.

In particular, it said that domestic electricity made using native forest wood would be ineligible for renewable energy certificates. This stopped a (government-engineered) revenue stream enhancing its commercial viability.

But the government ignores the essence of time and maintains its contradictory position that logging native forests is carbon neutral. This means that selling native forest wood pellets to Europe, China, Japan or any other country is carbon price free.

If this becomes the future for Australia’s native forests, the climate will be negatively impacted and Australia’s forest conflict will keep raging. All pain for no gain.

Ending Australian’s native forest conflict takes a government that can make that wise and strategic stitch in time – now – and rule out native forest wood from the energy market.

Judith Ajani is Economist at the Fenner School at Australian National University.

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The Conversation | http://theconversation.edu.au
Since 2003, more than 3 million hectares, or close to half, of Victoria’s native forests have been burnt by severe summer bushfires causing inestimable environmental damage. This, plus the release of the Victorian Bushfires Royal Commission’s Final Report, confirms that unnatural fire regimes pose the gravest threat to the environmental integrity of Australia’s native forests.

This is not news to anyone who has worked or lived in and around Australia’s eucalypt forests, but the wider community has been effectively duped by decades of environmental campaigning into an unwarranted belief that timber harvesting is the great threat.

In reality, just 6 per cent of Australia’s native forests are contained in multiple-use State Forests in which sustainable timber harvesting is permitted – and less than half of this area is actually being used due to further reservations and unsuitable forest types. Accordingly, opposition to the practice is based far more on conservation ideology than on-ground environmental impact.

Despite their professed concern for the environment, most ‘green’ groups had until “Black Saturday” never acknowledged the need to protect forests from severe fire. Nevertheless, the campaign to completely end timber production endures as a potent motivator for Australia’s environmentalists. Indeed, it was central to the formation of their political arm, the Australian Greens, and remains a key plank of their policy platform during the current Federal Election campaign.

Unlike timber production, the damage visited upon soil, water, and wildlife by severe bushfire has never been on the radar of the environment movement. Yet, as occurred on “Black Saturday”, an out-of-control bushfire can, in a single day, decimate an area that would take decades to harvest and regenerate at current logging rates.

Despite their professed concern for the environment, most ‘green’ groups had until “Black Saturday” never acknowledged the need to protect forests from severe fire. What little attention they gave to this issue was to express disquiet about prescribed fuel reduction burning despite it being the only land management tool that can mitigate bushfire damage.

Unlike logging, bushfire presents a difficulty for environmental activists because it cannot be physically opposed by direct on-ground protests or emotional media releases. There is no easy way to oppose the damage that it causes apart from enlisting as fire-fighters; while campaigning for better bushfire outcomes would mean supporting the very government agencies which are hated for managing the timber harvest.

It has been far simpler for environmentalists to just dismiss bushfire as a “natural” phenomenon even though the condition of our forests is far from their natural state. In pre-European times, fires from lightning strikes and Aboriginal burning spread freely across the landscape for months each year. This maintained all but the wettest mountain forests in a perpetual low fuel state and made excessively hot fires very rare. Prescribed burning aims to replicate this.

The misunderstanding of what is “natural” essentially drives the campaigns of environmentalists and the forest policies of the Australian Greens. Their notion of protecting forests is based on a misplaced assumption that excluding human uses and leaving forests to their own devices will allow them to revert to their natural state. However, far from protecting forests, it is clear that this would be a recipe for fuels to keep building to levels that

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**The Greens: fuelling the forest debate**

Opposition to timber harvesting is based far more on conservation ideology than on-ground environmental impacts, observes Mark Poynter.
will feed further hugely damaging conflagrations.

Fortunately, the Victorian Bushfires Royal Commission has recognised this and recommended a tripling of prescribed fuel reduction burning. This is a welcome objective which would do infinitely more to protect Victoria’s forests. However, its implementation will be problematic given the extent to which economic uses have already been removed from more than half of Victoria’s public forests to create national parks and conservation reserves.

Reserving substantial areas for conservation is a worthy development which need not necessarily impede good fire management. Although supposed to protect forests, the Australian Greens no-logging policy would actually make forests far more vulnerable to environmental degradation by completely dismantling the forest management system that is best placed to effectively deal with the infinitely greater threat of fire. This would make it difficult to maintain existing levels of prescribed burning, and virtually impossible to do substantially more as the Royal Commission recommended for Victoria.

A “perfect storm” of financial and political circumstances has put the Australian Greens in a position whereby it is expected to hold the balance of power after the upcoming Federal Election. This may give them the power to implement their long-held desire to end timber production in Australian native forests. If so, it would be one of the most disastrous environmental decisions ever made. The great irony is that it would be done in the name of conservation.

Mark Poynter is a professional forester with 30 years experience. He is a Fellow of the Institute of Foresters of Australia and acts for it in a voluntary capacity as a media spokesperson. His book ‘Saving Australia’s Forests and its Implications’ was published in 2007.
EXPLORING ISSUES

ABOUT THIS SECTION

‘Exploring issues’ features a range of ready-to-use worksheets relating to the articles and issues raised in this book.

The activities and exercises in these worksheets are suitable for use by students at middle secondary school level and beyond.

As the information in this book is gathered from a number of different sources, readers are prompted to consider the origin of the text and to critically evaluate the questions presented.

Does the source have a particular bias or agenda? Are you being presented with facts or opinions? Do you agree with the writer?

The types of ‘Exploring issues’ questions posed in each Issues in Society title differ according to their relevance to the topic at hand.

‘Exploring issues’ sections in each Issues in Society title may include any combination of the following worksheets: Brainstorm, Research activities, Written activities, Discussion activities, Quotes of note, Ethical dilemmas, Cartoon comments, Pros and cons, Case studies, Design activities, Statistics and spin, and Multiple choice.

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WORKSHEETS AND ACTIVITIES
Brainstorm, individually or as a group, to find out what you know about forest management and conservation.

1. What is a forest?

2. List the 7 major Australian native forest types.

3. Explain what the global carbon cycle is, and the part forests play in it.

4. What are the main features of Australia’s formal forest reserves?
5. What are old-growth forests?

6. What are the major causes of forest loss in Australia?

7. What are regrowth forests?

8. Explain what is meant by the term ‘sustainable forest management’.
Outline the impacts on Australia’s native forests of the following human activities:

*Indigenous Australians:*

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*European settlement:*

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*Forest clearing:*

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*Fire management:*

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RESEARCH ACTIVITIES

Forests provide many social and economic benefits to the communities that regularly interact with them, particularly regional and indigenous communities. Forests can contribute to sustainable economic growth as well as community development.

In detail, explain the social and economic benefits of forestry in Australia.

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The forest debate ranges over a variety of topics. Choose one of the topics below and compile at least 3 pros and 3 cons.

In pairs, or in a group, discuss the pros and cons of your chosen forest-related topic.

- Regeneration and regrowth forest
- Old-growth forests
- Woodchips
- Management on and off reserves
- Private land
- Plantation forests
- Fire management
- Regulation of forest operations
- Multiple-use forests
- Endangered, threatened, vulnerable and rare species and ecological communities
- Bioenergy

ARGUMENTS IN FAVOUR OF ...

ARGUMENTS OPPOSED TO ...
Complete the following multiple choice questionnaire by circling or matching your preferred responses. The answers are at the end of the next page.

1. How much of the world's land surface is forest?
   a. 21%
   b. 31%
   c. 41%
   d. 51%
   e. 61%

2. What is the value of wood removed from the world's forests per year?
   a. $10 billion
   b. $30 billion
   c. $80 billion
   d. $100 billion
   e. $110 billion

3. How much of Australia's forests are in formal nature conservation reserves?
   a. 6%
   b. 16%
   c. 26%
   d. 36%
   e. 66%

4. Respond to the following statements by circling either 'True' or 'False':
   a. Over 1.6 billion people's livelihoods depend on forests. True / False
   b. Forests are home to 30 million people around the world. True / False
   c. 80% of the world's forests are publicly owned. True / False
   d. Australia is among the 10 countries with the largest annual net loss of forest area in 2000-2010. True / False
   e. Australia has the world's sixth-largest forest area. True / False
   f. Australia has the world's fourth-largest area of forest in nature conservation reserves. True / False
   g. Plantation forests comprise just over 10% of Australia's forest estate. True / False
   h. Plantations produce less than half of Australia's domestic wood needs. True / False
   i. The most common forest in Australia is acacia. True / False
   j. The value of Australia's forest product imports is greater than its exports, resulting in a trade deficit. True / False
   k. The Australian government has banned the import of illegal timber products. True / False
MULTIPLE CHOICE

Complete the following multiple choice questionnaire by circling or matching your preferred responses. The answers are at the end of this page.

5. Match the following terms to their correct definitions:

1. Agroforestry
2. Biodiversity
3. Clearfelling
4. Deforestation
5. Ecosystem
6. Forest
7. Forestry
8. Logging
9. Native forest
10. Old-growth forest
11. Plantation forest
12. Reforestation
13. Regrowth forest
14. Regional Forest Agreement
15. Reserves
16. Wilderness
17. Sustainable forest management

a. Twenty-year plan for the conservation and sustainable management of Australia’s native forests.
c. Permanent removal of forest, when the forest is cleared and the land is then used for another purpose, such as agriculture or urban development.
d. Vegetation type dominated by woody vegetation having a mature or potential mature stand height exceeding 5 metres, with an overstorey canopy cover greater than twenty per cent.
e. Variety of all life forms – plants, animals and micro-organisms, their genes and the ecosystems they inhabit.
f. Indigenous forest types, dominated by eucalypts in Australia.
g. Process of removing all trees in a stand in one cutting operation.
h. Forests in which the upper stratum is ecologically mature and has been subjected to negligible unnatural disturbance such as logging, road building and clearing.
i. Replanting of a forest on cleared, degraded or destroyed forest areas.
j. Intensively managed stands of trees of either native or exotic species, created by the regular placement of seedlings or seed.
k. Felling of trees in an operation involving either group selection, thinning or clearfelling. Also referred to as harvesting.
l. Area of land that has been least modified by modern technological society. The most undisturbed expanses of our natural landscapes.
m. Management of forests, for a variety of values.
n. Native forest containing a substantial proportion of trees in a younger growth phase, actively growing in height and diameter.
o. Incorporation of tree growing into farming systems for a range of commercial and environmental benefits.
p. Forests set aside from timber production, either by formal means, such as national parks, or by informal means, such as management decisions in a management plan.
q. Management of private and public forests to ensure forests continue to provide a sound supply of renewable timber for present and future generations.

MULTIPLE CHOICE ANSWERS

1. b
2. d
3. b
4. a
5. o
6. e
7. g
8. c
9. b
10. b
11. d
12. m
13. k
14. a
15. p = 16 = l
17. q.
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Australia is a biologically diverse country and the forests of Australia are home to 300 million people around the world. (p.5)

More than 1 billion ha of degraded areas throughout the world are suitable for forest landscape restoration. (p.5)

More than 60 million people are employed by forest-based industries. (p.5)

Over 40% of the world’s oxygen is produced from rainforests. (p.5)

Australia has just over 147 million ha of native forest and about 1.82 million ha of plantations. (p.6)

By far the most common forest in Australia is eucalypt forest, which comprises 78% of Australia’s total forest estate. (p.7)

Plantation forests comprise just over 1% of Australia’s forests and are mostly composed of eucalypts and non-native pine species. (p.7)

About 70% of Australia’s forests is under private management. (pp.7, 20)

About 23 million ha of forest (16% of the total forest estate) is now in formal nature conservation reserves. (p.8)

Of the 23 million ha of forest assessed for old-growth, 5.03 million ha (22%) is classified as old-growth. (pp.10, 12)

More than 70% of known old-growth forest is in nature conservation reserves. (pp.10, 12, 13)

The net loss of woody vegetation in Australia was 260,000 ha (0.25%) a year between 2000 and 2004, mainly because of clearing for agriculture and urban development. (pp.10, 13)

Australia’s forests absorb more greenhouse gases from the atmosphere than they release and therefore help to offset Australia’s contribution to global greenhouse gas emissions. (p.11)

About 16% of Australia’s native forests are in formal nature conservation reserves, including nearly three-quarters of all known old-growth forests. (p.13)

A number of wildlife species rely on old-growth forests for their long-term survival. (p.13)

A total of 1,287 forest dwelling species are listed as vulnerable, endangered or threatened. (p.14)

Plantations supply more than 50% of Australia’s domestic wood needs. (p.16)

Forests are important to the economy because they support more than 86,000 jobs both directly and indirectly. (p.17)

Australia is a biologically diverse country and the forests of south-western Australia are one of the world’s 34 recognised biodiversity ‘hotspots’. (p.18)

Australia’s native and plantation forests provide the majority of timber and a significant proportion of the paper products used by Australians. (p.18)

A total of 25.1 million cubic metres of logs was harvested from Australian native forests and plantations in 2009-10. (p.21)

Production of woodchips for export from coniferous logs has declined from 1.3 million cubic metres to 0.6 million cubic metres over the last 5 years. (p.23)

Australia uses the international Montreal Process Criteria and Indicators (C&I) as the basis for monitoring and measuring how well our forests are being managed. (p.26)

Presently there are around 10.3 million ha of native and plantation forests certified in Australia. (p.28)

It is estimated that each year around $400 million worth of Australia’s forest product imports (totalling around $4 billion in 2008) carry some risk of having been illegally logged. (p.29)

73% of timber production in Indonesia is thought to stem from illegal logging, according to the OECD. (p.29)

Up to 9% of all timber products imported into Australia in 2003-04 were considered of doubtful origin. (p.30)

Illegal logging is also a major driver of global climate change as part of the 20% of global greenhouse gas emissions caused by deforestation. (p.31)

The World Bank has estimated that illegal logging costs timber producing countries between US$ 10-15 billion per year in lost revenue. (p.31)

Half of the world’s tropical forests have disappeared since World War II and around 10 million ha are being felled each year. (p.40)

In 2011, the Indonesian government designated a vast area of logged forest – around 35 million ha – to be cleared for farmland or exotic tree plantations. (p.40)

Globally, wood products store an additional 150 million tonnes of carbon annually and landfills another 44 million tonnes, equivalent to removing 700 million tonnes of carbon dioxide from the atmosphere. (p.41)

Australia has an annual $2 billion deficit in wood products, annually importing 600,000-900,000 cubic metres of sawn wood extracted from thousands of hectares of international forests each year. (p.41)

Australia is the 7th most forested nation on Earth. (p.44)

Australia’s forest products industries was estimated to be worth approximately $22 billion in 2009. (p.44)

Between 85-90% of Australia’s production of sawn timber and wood panels is now plantation based. (p.45)

In Australia, we log native forests on roughly 60-year cycles. (p.46)

If a 60-year-old stand of native forest is logged for energy production today, the forest will not regrow enough to return to today’s carbon stock level until 2070. (p.46)

Just 6% of Australia’s native forests are contained in multiple-use State Forests in which sustainable timber harvesting is permitted. (p.47)
**Afforestation**  
The establishment of new forest in an area that was not previously covered by forest.

**Biodiversity**  
Biological diversity (biodiversity) is the variety of all life forms – plants, animals and micro-organisms, their genes and the ecosystems they inhabit.

**Canopy cover**  
The forest cover of branches and foliage formed by tree crowns.

**CAR reserve system**  
CAR stands for comprehensive, adequate and representative.

**Clearfelling**  
The process of removing all trees, large and small, in a stand in one cutting operation.

**Deforestation**  
The permanent removal of forest, when the forest is cleared and the land is then used for another purpose, such as agriculture or urban development.

**Ecosystem**  
A dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.

**Farm forestry**  
The incorporation of tree growing into farming systems for a range of commercial and environmental benefits. Also known as agroforestry.

**Fire management**  
Fire management is the planned burning of vegetation on land selected in advance of forest management applications such as weed suppression, fire hazard reduction, habitat management and regeneration.

**Forest**  
A vegetation type dominated by woody vegetation having a mature or potential mature stand height exceeding 5 metres, with an overstorey canopy cover greater than 20%.

**Forest products**  
Raw materials from forests, including timber, timber products and other forest materials (such as rock, stone, clay, sand, gravel).

**Forest type**  
A classification of a forest according to the dominant tree species, or group of species.

**Forest workers**  
The people whose livelihood is directly dependent on working in forests, such as tree fellers, apiarists, rangers, truck drivers.

**Forestry**  
The management of forests, for a variety of values.

**Hardwood**  
Tree species that have hard and dense wood, and include eucalypts. Timber from natural hardwood forests is frequently used in hardwood flooring and furniture.

**Harvesting**  
The felling of trees, either as a group selection operation or a thinning or a clearfelling operation. Also referred to as logging.

**Native forests**  
Indigenous forest types. Eucalypts represent the great majority of Australia’s native forests.

**Old-growth forests**  
Forests in which the upper stratum is ecologically mature and has been subjected to negligible unnatural disturbance such as logging, road building and clearing.

**Plantations**  
Intensively managed stands of trees of either native or exotic species, created by the regular placement of seedlings or seed.

**Reforestation**  
Replanting of a forest on cleared, degraded or destroyed forest areas.

**Regrowth forest**  
Native forest containing a substantial proportion of trees in a younger growth phase, actively growing in height and diameter.

**Regional Forest Agreements**  
Twenty-year plans for the conservation and sustainable management of Australia’s native forests.

**Reserves**  
Reserves are forests that are set aside from timber production, either by formal means, such as national parks, or by informal means, such as management decisions in a management plan.

**Softwood**  
Tree species, including radiata pine and cypress pine, that have soft wood that is useful in making newspapers, toilet paper and tissues as well as house frames and furniture.

**Sustainable forest management**  
SFM is the management of private and public forests to ensure forests continue to provide a sound supply of renewable timber for present and future generations.

**Sustainable yield**  
Amount of trees removed from a forest must at least equal the amount a forest is able to replace naturally.

**Wilderness**  
An area of land that has been least modified by modern technological society. The most undisturbed expanses of our natural landscapes.

**Woodchips**  
Small pieces of wood used for making paper and composite boards like fibreboard (MDF) and particle board, as well as garden uses.
Websites with further information on the topic

Australian Bureau of Statistics  www.abs.gov.au
Australian Conservation Foundation  www.acfonline.org.au
Department of Agriculture, Fisheries and Forestry  www.daff.gov.au/forestry
Forest Learning (Forest and Wood Products Australia Ltd)  www.forestlearning.edu.au
Forests NSW (Department of Primary Industries)  www.dpi.nsw.gov.au/forests
Friends of the Earth Australia  www.foe.org.au
Greenpeace Australia  www.greenpeace.org/australia
International Union for Conservation of Nature  www.iucn.org
WWF Australia  www.wwf.org.au
WWF Global  wwf.panda.org

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