AUSTRALIA

Submission to the SBI and SBSTA | February 2011

Forest Management Reference Level Submission

I. Overview

This submission contains estimates of Forest Management reference levels for Australia as requested by Emissions Decision -/CMP.6 (Land use, land use change and forestry).

Australia welcomes the opportunity to submit estimates for the Forest Management reference level and looks forward to the expert review process as set out in that decision.

In overview, Australia has provided information on:

- Australia's forest characteristics;
- The system of practices that identify forest lands subject to Forest Management;
- methods, models and data used to prepare the estimates;
- background to the variables which must be forecast to support the reference level;
- details of the construction of the reference level estimate; and
- additional information in support of the reference level estimate, including a reconciliation with emissions estimates provided in Australia's latest UNFCCC national inventory.

Australia has updated its reference level using the latest inventory methods and the most recent data available to the end of December 2009. Australia has also estimated a number of reference levels to reflect a range of possible outcomes on the force majeure provision as the final form of this provision is not yet clear. Contingent on the final form of the force majeure provision, Australia's estimated forest reference level ranges from -0.2 Mt CO_2-e yr^{-1} to 4.1 Mt CO_2-e yr^{-1}. In the absence of a force majeure provision, Australia's reference level would be 8.5 Mt CO_2-e yr^{-1}.

A description of the reasons for the updates to the reference level submitted in 2009 (-9.16 Mt CO_2-e yr^{-1}) is presented in section 8. The principal reason for the change relates to an update to the area of Multiple Use Forests identified as Forest Management land based on information from the most recent *State of the Forests Report (2008)* prepared by the Montreal Process Implementation Group. The update has led to the reallocation of around 1.7 Mha of forest lands from Multiple use forests to conservation areas. As these conservation areas currently generate net removals, the reallocation of these lands has led to an increase in the estimated Forest Management reference level.

Critically, this update does not change the impact of the reference level on Australia's incentives to generate emission reductions under Forest Management. This is because in the first commitment period of the Kyoto Protocol, Forest Management performance relied on the level of the estimated

net sink in the reporting period as the basis for the calculation of RMUs. However, in the current context, the reference level provides a baseline against which only enhancements to net sink performance relative to the reference level would be estimated as the basis for the calculation of credits or debits. Consequently an equivalent change to both the reference level and estimated sink performance in the reporting period can be considered to have a neutral impact.

Table A1: Explanations for update to Forest Management Reference level submitted in 2009

Recalculation	2009 submission	2011 submission	Difference (Mt CO_2)	Description
Total Reference level (a) + (b)	-9.2 a	-0.2 a	9.0	
a) Emissions from forests (excluding emissions and sinks associated with wildfire)	-14.2	-4.2	10.0	
Comprising:				
Change in area of multiple use forests			7.8	Since the previous submission the area under multiple use forest has been adjusted to match that reported in the *State of the Forests Report (2008).* This resulted in a reduction from 11.1 M ha to 9.4 M ha.
Updated models and data			2.2	Since the previous submission Australia has updated its model and data for harvested native forests and pre-1990 plantations as used in the *National Inventory Report 2008 and 2009 (in prep)*. Harvested wood products were not required for the previous submission but were modelled as required for this submission.
b) Force majeure construct: excluded sinks from lands subject to force majeure	5.0	4.0	-1.0	Updated data on the area of native forest burnt by wildfire

a Contingent on a force majeure provision under which a party is not accountable for emissions from wildfire (only excluded sinks).

Draft decision -/CMP.6 (Land use, land use change and forestry) requires that policies in place as at December 2009 underpin the projected reference levels to ensure that emission reductions (or increases) from Forest Management during the period 2013-2020 will be the result of policies implemented after the 31st December 2009. This also means that the effects of policies such as Regional Forest Agreements implemented between 1990 and 2009 have been incorporated into the reference level and, therefore, that past policies will not cause changes in the performance of Forest Management relative to the estimates provided in the reference level.

Contents

1 GENERAL DESCRIPTION OF AUSTRALIA'S REFERENCE LEVEL

This submission presents estimates of Australia's Forest Management reference level using projected estimates of emissions and removals from Forest Management activities for 2013-2020.

The use of a projected reference level to underpin Australia's Forest Management activity provides strong incentives for a more comprehensive treatment of forest lands that allows the full mitigation potential of the land sector to be realised.

The Forest Management reference levels presented in this submission were estimated taking into account the best available information on a number of key factors including:

(a) removals or emissions from Forest Management based on Australia's greenhouse gas inventory and relevant historical data (see section 4);

(b) age-class structure (section 5);

(c) Forest Management activities already undertaken (section 7);

(d) projected Forest Management activities under a business as usual scenario (section 7);

(e) continuity with the treatment of Forest Management in the first commitment period (section 7);

(f) the need to factor out removals due to CO_2 fertilisation and nitrogen deposition from accounting in accordance with decision 16/CMP.1, paragraph 1 (section 8).

The estimation of the reference levels has utilised the models and methods used for reporting under the UNFCCC and as described in Australia's *National Inventory Report (2008 and in 2009 in prep.)* (http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5270.php). The following additional factors have also been important in the estimation of the forest reference levels:

- identifying the system of practices that lead to lands being classified as Forest Management land;
- projected areas of harvesting from forest lands over time;
- the historical and projected quantities of harvested wood products produced and exported from Australian forests (excluding Article 3.3 forests); and,
- the effect of natural disturbance such as wildfire on emissions and the subsequent loss of sink potential under proposed force majeure provisions.

The construction of the Forest Management reference level assumes existing domestic policies, as at December 2009, are unchanged.

Parties have been requested to submit reference levels with and without a force majeure provision. The former request has presented some difficulties in practice as the rules governing the Article 3.4 activity accounting framework for a second commitment period are not yet clear. Australia has addressed this difficulty through the provision of a number of reference levels in this submission where each estimated reference level is contingent on the details of any final agreement on the force majeure provision. These reference levels are presented in section 6.

To facilitate review, Australia has presented a number of reference levels contingent on possible negotiated outcomes on the force majeure provision. For the period 2013 to 2020 the projected reference levels range between -0.2 and 4.1 Mt CO_2-e yr^{-1}. Without a provision for force majeure, Australia's reference level would be 8.5 Mt CO_2-e yr^{-1}. These reference levels are presented in section 6.

Australia's reference level includes an estimate of emissions from harvested wood products produced since 1990. An estimate of emissions with assumptions about emissions from harvested wood products for the period since 1900 (a period for which data are not available) was also constructed and is provided for information purposes as the net difference between the 1900 and 1990 estimate is minimal.

The area of forest land accounted for under Forest Management will differ from the area reported under Forest land remaining forest land for the UNFCCC inventory and a reconciliation is provided in section 8. The presented estimate also differs from the estimate provided in Australia's previous reference level submission, principally because of the use of updated data on conservation areas that are not included within the scope of the Forest Management activity (see section 8).

Projected activities must assume that the policy stance of Forest Management is unchanged from December 2009 and, consequently, to a large degree, projections of key variables have been largely developed from recent activity data.

2 INTRODUCTION TO AUSTRALIA'S FORESTS

Australia has a land area of 769 million hectares containing unique land, water, vegetation and biodiversity resources. Of this land area 106 million hectares contains forest (*National Inventory Report (2008 and 2009 in prep.*). Native forests make up 104 million hectares while the remaining approximately 2 million hectares are plantations (Figure 1).

The definition of forest used by Australia for the first commitment period of the Kyoto Protocol is consistent with the definition used for Australia's National Forest Inventory and Australia's reporting to the FAO and Montreal Process. A forest is defined as vegetation that has a height of 2 metres, crown canopy cover of 20% and a minimum forest area of 0.2 hectares. Forest cover is identified by remote sensing techniques and is explained in detail in Australia's *National Inventory Report 2008 and 2009 (in prep)*.

2.A Native forests

Australia's native forests are dominated by eucalypts (78%), followed by acacias (7%) and melaleucas (5%). The distribution of forest types is mainly determined by climate and soil properties. Other factors, especially fire frequency and intensity, are also important.

In Australia, native forests exist within a range of land tenures that have a range of social, economic and ecological values. These include:

- Public forest land which are managed using a system of practices for a variety of purposes, including timber production and are known as Multiple Use Forests;
- Public reserve estate which is set aside from intensive management such as timber production. These lands may have been subject to past management but are no longer available for the production of forest products and are now managed primarily for protection,

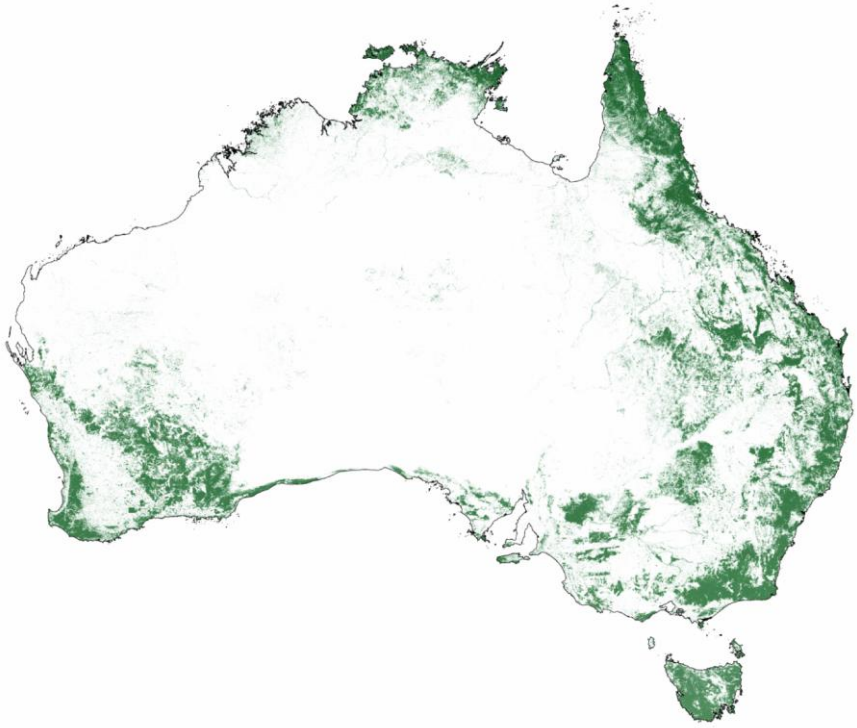
including ecological, soil and water values and includes those areas in public nature conservation reserves; and,

- Privately managed native forests, which are areas outside of the public forest estate and include leasehold or other lands. The area of private native forests is much greater than the other forest areas combined. Activities on this land are generally extensive with a predominant use for grazing. Much of these lands do not contain marketable timber species, are too far from markets for commercial viability, or are not feasible to harvest. Where harvesting of private native forests may be commercially viable, private harvesting typically will occur. The majority of private native forest managers respond to short term needs and market conditions (Montreal Implementation Group (MIG, 2008)). The vast majority of these forests are not managed for the production of forest products and there is little information available on future management intent.

These privately managed forests are generally subject to low management intensity. Australia is unusual in that large areas of its native forests are used primarily for grazing stock. As these forest tenures are not subject to forest harvesting, the emissions and removals on these lands are driven by natural rather than anthropogenic factors, particularly climate variability.

The majority of wood and wood products sourced from native forests in Australia are sourced from public Multiple use forests. Management practices within Multiple use forests are regulated by legislation and codes of forest practice. In a significant proportion of this tenure harvesting is not permitted in order to protect biodiversity or cultural heritage values or is limited by slope restrictions, or is restricted in certain soil types or in riparian zones or under certain climatic conditions. The anthropogenic emissions and removals in Multiple use forests are dominated by the activities that occur on those areas within Multiple use forests on which harvesting is permitted.

Figure 1 Forest area in Australia in 2008 (Source: National Inventory Report (2008 and 2009 in prep.))



2.B Plantations established prior to 1990 (non-Article 3.3 forests)

Plantations, which may be in either public or private ownership, which are managed using a system of practices focussed on timber production, although other social and environmental factors are taken into account in their management.

Plantation establishment began in a minor way in Australia in the 1870s. From the 1960s to the 1980s, the area of pine plantations (softwood) increased rapidly because of investment by government and by the end of 1989 817,000 hectares of pine had been established (*National Inventory Report (2008 and 209 in prep.*). After 1990, the area of hardwood plantations began to increase rapidly because of private investment, while the rate of establishment of new pine plantations slowed.

By 2009, plantations (including article 3.3 afforestation and reforestation plantations) produced about two-thirds of the 27 million cubic metres of logs harvested in Australia each year.

3 IDENTIFICATION OF FOREST LANDS UNDER THE FOREST MANAGEMENT ACTIVITY

Australia did not elect Forest Management for the first commitment period. Consequently, the lands that will be subject to the Forest Management activity, if elected, are identified in this submission.

In Australia, forest lands that are managed for the purpose of sustainable production of wood and wood fibre are subject to a system of forest practices that include:

- harvesting of forests, including thinning, selective harvesting and clearfell;
- silvicultural practices used for Forest Management;
- slash management, pest control, fertilisation;
- protection of natural resources within the areas of land available for harvesting; and,
- the application of codes of forest practice.

Australia has used this system of practices to define Forest Management lands. Under this definition, Australia has identified the following forest lands as being subject to the Forest Management activity:

- all commercial plantations not included under Article 3.3;
- all public land available for timber harvesting as at December 2009, specifically Multiple use forests as identified by the Montreal Process Implementation Group 2008; and
- for other forest lands (comprising forest lands that were in formal conservation reserves as at December 2009, privately managed native forests and extensively grazed woodlands) where the following activities are identified:
    - harvesting since 1990; and,

- direct human induced activities which aim to recover the forest from a degraded state, such as enrichment planting, conducted after December 2009.

All other forest lands (comprising forest lands that were in formal conservation reserves as at December 2009, privately managed native forests; and extensively grazed woodlands) will be monitored for harvesting since 1990 and for human induced activities which aim to recover forest land from a degraded state, such as enrichment planting, since December 2009. Once an activity is identified, the lands will be transferred to the Forest Management lands account. This approach is designed to ensure balanced accounting and the consistent representation of lands. Consistent with *good practice*, the area of land subject to Forest Management would be expected to increase over time as the specific practices are implemented on new areas.

Some actions take precedence over Forest Management which would trigger the transfer of these lands from Forest Management to the appropriate category (ie. Deforestation).

A reconciliation of lands subject to Forest Management activity with the lands included under 'managed forests' in the inventory reported under the UNFCCC is provided in section 8.

4. APPROACHES, METHODS AND MODELS USED

The methods used to calculate the emissions and removals underpinning the calculation of the reference level are those used by Australia to develop the *National Inventory Report (2008 and 2009 in prep.)* prepared under the UNFCCC and Kyoto Protocol. A brief summary is provided in this submission.

Methods have been developed in the national inventory for the following sub-categories of forest lands:

- Multiple use forests – public native forests managed for multiple uses that include timber production (see section 4.A.1);
- Plantations – plantations established prior to 1990 (section 4.A.2); and
- Private harvest native forests - privately owned forests that have been harvested since 1990 (section 4.A.3).

4.A. METHODS USED TO ESTIMATE EMISSIONS AND REMOVALS FROM FOREST LANDS

4.A.1 Multiple use forests

Multiple use forests are a subset of the existing *harvested native forests* reported under Australia's UNFCCC submission. The emissions and removals from Multiple Use Forest have been estimated using the *harvested native forests* model reported in Australia's *National Inventory Report (2008 and 2009 in prep)*. A summary of the model is provided below.

Multiple use forests are modelled using the non-spatially explicit Tier 2 capabilities of the Full Carbon Accounting Model (*FullCAM)*. *FullCAM* enables the use of age-based growth data, modelling of dead organic matter accumulation, and incorporates the effects of differing silvicultural treatments on the generation and management of harvest slash. The Multiple use forests model

considers living above and belowground biomass, and dead organic matter from both turnover and slash.

The growth rates of Multiple use forests (in t C ha^{-1} yr^{-1}) are modelled by broad forest types and age classes based on work done under the National Forest Inventory by Lucas *et al*., (1997).

Ten broad silvicultural systems are represented in the model. These systems are designed to represent the range of harvesting systems employed in Australia from the 1990s to the present. Each silvicultural system is modelled based on the unique combinations of forest age and forest type to which it is associated. This produces 73 unique silviculture, forest age, and forest type combinations. These are simulated annually according to the area that was estimated to be occurring under each particular combination.

Consistent with the treatment of mineral soils in *forest land remaining forest land* in the IPCC *Good Practice Guidance* (IPCC, 2003) a Tier 1 method is applied for soil carbon. This method assumes that soil organic carbon in mineral soils is stable when averaged over the Multiple use forests through time, with any losses due to harvesting compensated by uptake in areas recovering from previous harvesting.

4.A.2 Pre 1990 Plantations

Estimation of plantation growth and the effect of management on emissions and removals for the pre-1990 *plantations* sub-category have been modelled using the *FullCAM* as described in the *National Inventory Report (2008 and 2009 in prep.)*.

Thirtyfour models have been developed to represent key species and management practices in the 14 National Plantation Inventory regions. Tree growth is modelled using the volume growth increment tables of Turner and James (2002) as developed from the National Forest Inventory wood flow estimates (National Forest Inventory 1997a and 1997b).

In addition to the growth tables and thinning regimes of Turner and James (2002) the models require parameters for:

• wood basic density;

• stem to whole tree mass conversion;

• carbon contents;

• wood product destinations; and,

• leaf and root turnover and decay rates.

The relevant inputs and the resultant carbon balances on a per hectare basis from each of the plantation types for 2008 are reported in Table 7.C1 of the *National Inventory Report (2008 and 2009 in prep.)*.

The per hectare outcome of each model, by the relevant age (as determined by the year of planting for each plantation type), is multiplied by the number of hectares planted in the corresponding year to calculate the change for the whole of the estate in any one year. An in depth discussion of this model can be found in Richards and Evans (2000).

4.A.3 Private harvest native forests

Harvesting in private native forests is significant in New South Wales, Tasmania and Queensland. To estimate the emissions from private harvest native forests for the period 2013 to 2020 two methods were applied.

Areas of private native forest harvesting are available for Tasmania as used for the National Inventory Submission. The emissions and removals from these areas and the projected harvested areas through 2013 to 2020 were estimated using the model developed for the reporting of *harvested native forests* under the UNFCCC inventory. This is consistent with the methodology applied for the estimation of emissions from Multiple use forests.

The emissions from harvesting in private native forests in New South Wales and Queensland were estimated using the Tier 2 comparison model used to verify the *harvested native forests* model described in Australia's 2008 national inventory submission. This model estimates emissions based on harvest volumes and expansion factors to account for emissions from harvest slash. The harvest volume of private native forests in New South Wales and Queensland was estimated using the average annual sawlog volumes removed from private native forests between 1992/93 and 2006/2007 (RIRDC 2009).

4.A.1.3 Estimated quantities of wood harvested

Wood removed from the forest through harvest is represented as a deduction of carbon against the stock of carbon in forest lands and an increment to the pool of harvested wood products.

The estimated quantities of wood harvested for historical periods are available from ABARE 2010 and are as used in the *National Inventory Report 2009 (in prep)*.

Descriptions of the derivation of projected supply of wood products from Article 3.4 forests under Forest Management in 2020 are provided in section 5.D.

4.B METHODS USED TO ESTIMATE EMISSIONS FROM THE POOL OF HARVESTED WOOD PRODUCTS

Emissions from the use and disposal of harvested wood products consumed in domestic markets have been estimated using the model described in the *National Inventory Report 2008* and in the *National Inventory Report 2009 (in prep.)*.

Emissions from the use and disposal of harvested wood products consumed in export markets have been estimated using the model parameters agreed in Decision -/CMP.6 (Land use, land use change and forestry).

Differences will be observed between the outcomes reported here and those reported in the *National Inventory Report (2008 and 2009 in prep.)* because the accounting structure for reporting of harvested wood products for this submission differs from the structure required for the National Inventory Report. In the *National Inventory Report (2008 and 2009 in prep.)*, Australia accounts for emissions from the use of harvested wood products in Australia - ie including from the use of imported wood products but excluding emissions from the use of exported wood products. The approach adopted in the *National Inventory Report (2008 and 2009 (in prep.))* is consistent with the IPCC Guidelines and consistent with an accounting structure that ensures that a country is accountable for emissions that occur within their boundaries (as is the case for all other emission

sources). It also ensures that the emission processes may be more accurately modelled given the information requirements necessary to support accurate estimates of emissions from exported wood products. Under this submission, emissions from imported wood products are not accountable

Australia has also modelled two different scenarios in relation to harvested wood products, based on option A in Chapter II of the Revised Proposal by the Chair (pg 43)[1]. Within this option, two scenarios were used, one that includes the harvested wood products pool back to 1900 and one from 1990 onwards. The differences in projected outcomes are small and, when compared with actual reported levels in 2020, any differences in emissions estimates under these two scenarios will be factored out through the comparison of the projected reference level and estimates derived for the reporting period.

4.C POOLS AND GASES INCLUDED IN THE REFERENCE LEVEL

The carbon pools included in the reference level are shown in Table 1. For Australia soil carbon is reported for the plantation estate, but is not included in the native forests. It is assumed that soil carbon in the native forest estate is in equilibrium. This is consistent with the treatment of soil carbon under UNFCCC forest land remaining forest land. Under the ongoing development of modelling of Multiple use forests and harvesting in private native forests, Australia would seek to utilise the provision for technical review of the reference level to incorporate higher Tier modelling of soils on all Forest Management lands.

Table 1 Carbon pools included in the reference level

Above ground biomass	Below ground biomass	Litter	deadwood	Soil	
				mineral	organic
Yes	Yes	Yes	Yes	Plantations	Not Occurring

Table 2 GHG sources included in the reference level

Fertilisation N_2O	Drainage of soils N_20	Liming CO_2	Biomass burning		
			CO_2	CH_4	N_2O
Included elsewhere (agriculture)	Not Occurring	Not estimated	Yes	Yes	Yes

5. FACTORS AND KEY ASSUMPTIONS INCLUDED IN THE REFERENCE LEVEL CALCULATIONS

Key factors addressed in this section include:

- the definition of area under Forest Management;
- forest characteristics including area and age class of differing elements of forest;
- harvested areas;
- harvested wood products; and

[1] *FCCC/KP/AWG/2010/18/Add.1,*

- the treatment of natural disturbances in the context of draft force majeure provisions.

5.A FOREST CHARACTERISTICS

5.A.1 Area and age class of plantations under the Forest Management activity

Commercial plantations (hardwood and softwood) not accounted for under Article 3.3 are included under Article 3.4 lands subject to the Forest Management activity. These forest lands include plantations established up until 31st December 1989.

Softwood plantations make up the vast majority of pre-1990 plantations while hardwood plantations (primarily eucalypt species) make up the minor component of the pre 1990 plantation estate. Until the mid-1960s most new areas of softwood plantation were derived from clearing of native forest or scrublands and in later years, some of the hardwood plantations were also established after clearing native forest (Snowdon and James, 2008). By the mid 1980s, clearing of native forests for the establishment of plantations had largely ceased in most states and most new plantations were established on farmland.

Activity data for *plantations* are sourced from the National Plantation Inventory (NPI) and are as reported in the *National Inventory Report (2008 and 2009 in prep)* (Table 3).

As at 2008, Australia had approximately 2 M ha of plantations of which only 0.817 million hectares was planted before 1990 and classifies as forest management. This area is included in the calculation of Australia's Reference Level. The remainder of the plantation estate which has been planted since 1990 is counted as afforestation and reforestation under Article 3.3.

Areas of establishment

The year of establishment of plantations established prior to 1990 are presented in Australia's *National Inventory Report*. The data is provided in the National Plantation Inventory in 5 year periods. This data is subsequently annualised (cumulative area divided by number of years) from within the blocks of years as reported by Spencer *et al.*, (2001). These plantations are managed on 30 to 40 year rotations, therefore plantations established prior to 1970 will have been harvested at least once.

Table 3 Area of land converted to plantation from 1940 to 1989

Year	Area (ha)	Year	Area (ha)	Year	Area (ha)
1940	787	1957	2,914	1974	29,686
1941	787	1958	2,914	1975	32,280
1942	787	1959	2,914	1976	32,280
1943	787	1960	10,987	1977	32,280
1944	787	1961	10,987	1978	32,280
1945	1,596	1962	10,987	1979	32,280
1946	1,596	1963	10,987	1980	27,852
1947	1,596	1964	10,987	1981	27,852
1948	1,596	1965	20,350	1982	27,852
1949	1,596	1966	20,350	1983	27,852
1950	2,580	1967	20,350	1984	27,852
1951	2,580	1968	20,350	1985	34,400
1952	2,580	1969	20,350	1986	34,400
1953	2,580	1970	29,686	1987	34,400
1954	2,580	1971	29,686	1988	34,400
1955	2,914	1972	29,686	1989	34,400
1956	2,914	1973	29,686		

Source: Department of Climate Change and Energy Efficiency, *National Inventory Report 2008* Volume 2 Table 7.C4 and in the *National Inventory Report 2009 (in prep.)*

5.A.2 Area and growth stage of multiple use forests

Multiple use forests include all public land available for timber harvesting as at December 2009, including associated areas within the Multiple use forest tenure that are subject to protection and ongoing management under codes of practice or are in informal reserves.

Australia's State of the Forests Report (MIG, 2008) identifies 9.41 M ha of multiple use public forests. This area is the basis for the emissions and removals used for the reference level.

The age classes of this forest area are derived from the age class information used for the reporting of *harvested native forests* in Australia's National Inventory Submission.

The area under each of the age classes were reduced on a pro-rata basis from the 1990 *harvested native forests* estate (14.89 M ha) to account for the area of forest that is identified as Multiple use forests in 2008 (9.41 M ha). This reduction in area is largely due to the transfer of forest to land tenures with the primary objective of protection, largely to conservation reserves between 1990 and 2008 (MIG, 2008).

In modelling growth for the National Inventory Submission Australia uses broad forest types and age classes based on the work done under the National Forest Inventory by Lucas *et al* (1997). These areas estimated as Multiple use forests are as contained in Table 4.

Table 4. Estimated area (ha) and age class of Multiple Use Forest Classes

Forest Type	Establishment 1-10 yrs	Juvenile 11-30 yrs	Immature 31-100 yrs	Mature 100-200 yrs	Senescent > 200 yrs	Forests of unknown age	Two Aged	Three or More Aged	Total
Rainforests				842,580					842,580
Tall Dense Eucalypt Forests	46,728	95,470	234,898	292,095	230,102	641,646	115,683	388,188	2,044,810
Medium Dense Eucalypt Forests	14,576	97,742	173,424	829,088	168,152	1,659,839	273,720	1,022,136	4,238,677
Medium Sparse Eucalypt Forests					345,153	274,270		663,366	1,282,789
Cypress pine Forests						42,258		144,182	186,440
Other Forests						673,019		141,686	814,705
Totals	61,304	193,212	408,321	1,963,763	743,407	3,291,031	389,404	2,359,558	9,410,000

Source: Derived from Department of Climate Change and Energy Efficiency, *National Inventory Report, 2008 and 2009 (in prep.)*

5.A.3 Private native forest lands that are subject to harvesting since 1990

These lands primarily relate to harvesting of privately owned native forests. Lands subject to harvest will be identified using remote sensing techniques and, once identified, will enter the Article 3.4 Forest Management activity account.

5.A.4 Fuelwood consumed

Fuelwood is extracted from dead organic matter across all forest categories and as such the CO_2 emissions associated with the consumption of *fuelwood* are reported as a separate item under UNFCCC reporting rather than against any specific sub-category of *forest land*. It is estimated that approximately 19% of fuelwood that is not extracted during forest harvesting occurs on lands

identified as Forest Management. This has been factored into Australia's reference level under the assumption that fuelwood extraction that extraction from Forest Management lands will be constant through the period 2013-2020. The fuelwood model described in Australia's *National Inventory Report (2008 and 2009 in prep.)* was used.

5.B HARVESTING AREAS

A principal catalyst for changes in the net emissions from Article 3.4 forest lands subject to Forest Management activity is the amount and type of harvest activity.

In Australia, harvesting in multiple-use public forests is subject to a regulatory framework designed to maintain environmental values and the productive capacity of forests. Harvesting volumes are set according to a calculated sustainable yield, which is the estimated volume of timber that can be removed each year while ensuring the functioning of the forest system continues as a whole.

Those jurisdictions in which native forest harvesting occurs have formal processes, backed by legislation or codes of practice, to calculate sustainable sawlog yields. Sustainable volumes vary over time according to management strategies, improved resource data and utilisation standards, and the area of land available for harvesting. Estimates are therefore reviewed periodically, usually every five years.

5.B.1.1 Data

Historical data are taken from State agency reports and are as reported in the *National Inventory Report 2009 (in prep.)*.

5.B.1.2 Recent Trends

Areas identified as harvested from native forests experienced a significant decline in 2002 due to the implementation of state and commonwealth policies on sustainable forest management. Since that time, the area harvested has been relatively stable, averaging 104,000 ha a year.

Table 5 Area of harvesting in Multiple use forests and where known for private native forests

Year	Area harvested (ha)
1990	141,441
1991	135,928
1992	140,734
1993	144,259
1994	152,082
1995	149,306
1996	142,646
1997	137,893
1998	138,709
1999	132,550
2000	136,206
2001	148,557
2002	114,504
2003	111,090
2004	111,620
2005	99,363
2006	99,977
2007	103,686
2008	112,433
2009	81,387

5.B.1.3 Projected areas of harvest for forest lands subject to Forest Management activity

The rate of harvest for public multiple use forests for the reporting period is assumed to be consistent with recent levels. This reflects the assumption that the policy stance governing the harvest of forests remains constant at the position of December 2009. The projected harvest rate for 2013-2020 for public native forests is assumed to be the average of the harvest rates for 2002-2009, reflecting the period of harvesting following the sharp decline in harvesting rates experienced in 2002 due to increased harvesting restrictions. This data also includes a sharp decline in harvesting in 2009 that was a result of short term economic conditions, rather than a result of policy.

Harvest rates for commercial plantations subject to Forest Management activity are also assumed to be consistent with recent rates of harvest. The harvesting rates for pre 1990 plantations are determined by the standard rotation lengths for each species. There is some potential for small variation around the rotation lengths that reflect economic, and other management decisions, however, in general the rotation length will not vary substantially. Standard rotation lengths are used to determine harvesting in the pre 1990 plantations.

5.C SUPPLY, USE AND DISPOSAL OF HARVESTED WOOD PRODUCTS

5.C.1 Supply of wood products

5.C.1.1 Data

Historical data on the volume of wood production are published each year by the Australian Bureau of Agricultural and Resource Economics (ABARE 2010). These data are available for Australia for production from both native and plantation forests and for production from 'broadleaved' and 'coniferous' forests.

A number of additional assumptions were necessary to allocate these data on wood production between Article 3.3 and Article 3.4 forests.

Article 3.4 forest lands subject to Forest Management activity are assumed to be the source of harvested wood products for the following data classifications identified by ABARE:

- production from 'broadleaved native forests' category;
- production from 'broadleaved plantations' prior to 2000; and
- production from the 'coniferous plantation' category.

All coniferous production in 2008-09 is assumed to be sourced from Forest Management (ie pre-1990 plantations) on the assumption of a standard life cycle of 30-40 years in Australia.

Production of harvested wood products from Article 3.3 forests is assumed to be equivalent to production from broadleaved plantations from 2000 onwards on the assumption that these plantations are harvested on a minimum 10 year cycle. The majority of coniferous plantations are managed on a 30-40 year rotation with two or three thins beginning from age 12. Although some of the post 1990 coniferous plantations may be producing wood products due to thinning, the quantity would be minimal compared to overall production.

5.C.1.2 Recent trends

5.C.1.2.1 Recent trends in total production of wood products

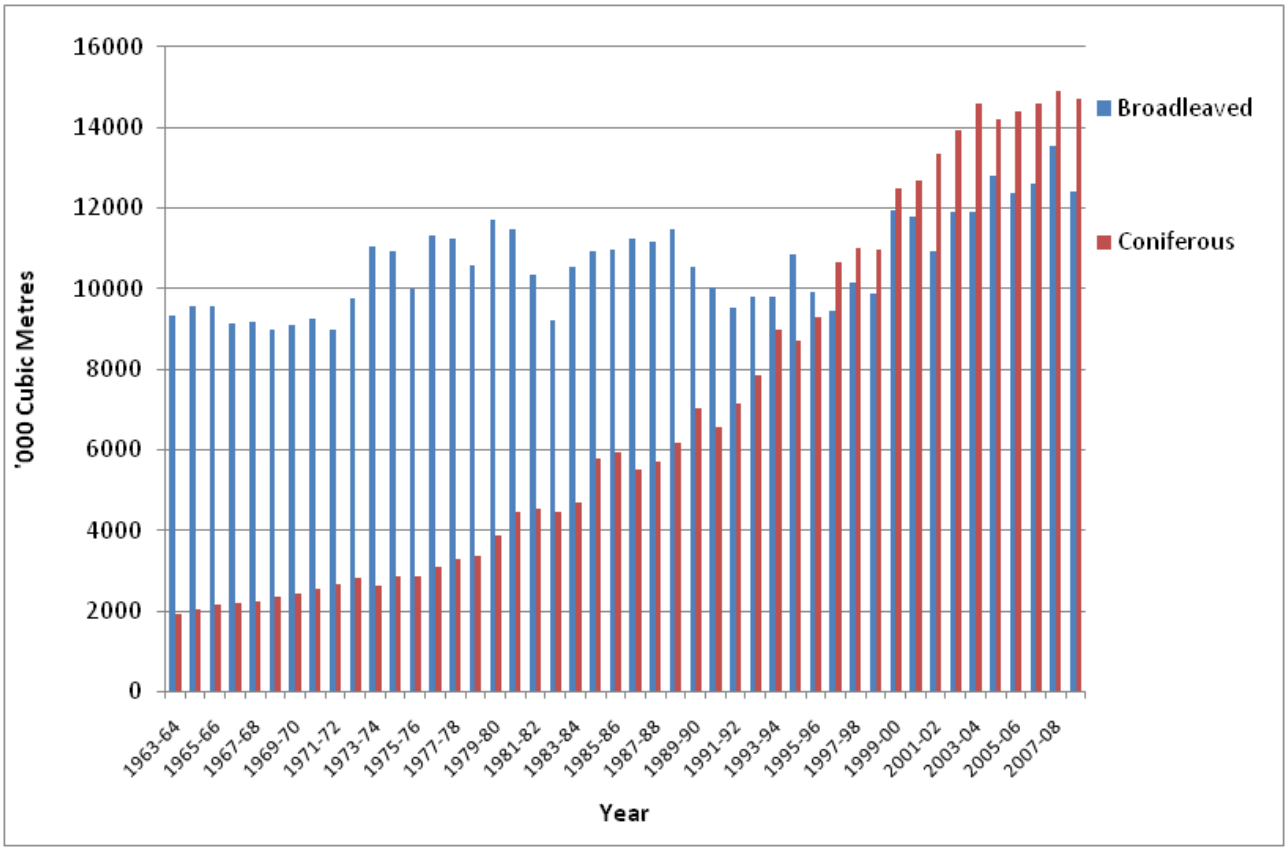
The production of Australian wood products from all forests increased significantly between 1970 and around 2000 before slowing and, more or less, stabilising for the period since 2000.

The increase in production from 1970 was primarily sourced from increased production from the 'coniferous' category.

Production from the broadleaved category has been relatively stable over the longer term, although some growth has been observed over the last decade.

The production of wood products from Article 3.4 forests subject to Forest Management activity is declining relative to total production from all forests, the difference reflects the increasing output from plantations established since 1990.

Figure 2 Removals of Australian Roundwood



Source: Australian Bureau of Agricultural and Resource Economics, Australian Forest and Wood Product Statistics – September and December Quarters 2009.

The focus of plantation establishment before 1990 had been on coniferous plantations, and so very little planting of broadleaved plantations occurred before 1990, therefore there is very little production from these plantation types prior to 2000. A significant portion of the growth in total Australian production since 2000 has been sourced from broadleaved plantations and, in particular, from broadleaved plantations established since 1990.

As production from broadleaved plantations since 2000 has been allocated to Article 3.3 forests, the total production from Article 3.4 forests has been decreasing as a percentage of the total Australian production.

Table 6 Production volume from Australian forests

Year	Total production from softwood plantations	Total production from native forests	Total production from hardwood plantations
	'000m^3	'000m^3	'000m^3
2002-03	13 911	10 314	1 594
2003-04	14 589	10 090	1 819
2004-05	14 196	9 866	2 936
2005-06	14 379	8 575	3 779
2006-07	14 590	8 551	4 052
2007-08	15 010	8 940	4 260
2008-09	12 941	7 749	4 506

Source: Derived from ABARE 2010. a) Estimated as production from broadleaved plantations from 2002-03.

5.C.1.2.1 Recent trends in composition of wood products

Volumes of wood produced from Australian forests that have been classified as Article 3.4 forests by intended use are reported in Table 7. The data shows the mix of woodchips for paper production and saw and veneer logs as the primary products from Australian broadleaved native forests and pre-1990 plantations. Coniferous plantations also produce a large amount of pulpwood for a variety of product uses.

Table 7 Log volume harvested by log type from Article 3.4 forests

	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
	'000 m^3					
Broadleaved native						
Saw and veneer logs	3,543	3,444	3,320	3,204	2,939	2,966
Pulpwood for						
Wood-based panels	19	19	22	22	21	28
Woodchips for domestic paper	689	802	769	570	612	600
Woodchips for export	5,896	5,641	5,563	4,588	4,727	5,146
Other	167	184	192	191	252	201
Broad leaved native total	10,314	10,090	9,866	8,575	8,551	8,940
Broadleaved plantations	975	975	975	975	975	975
Coniferous						
Saw and veneer logs	8,557	9,143	9,121	9,384	9,477	9,502
Pulpwood for						
Wood-based panels	1,584	1,418	1,318	1,418	1,154	1,222
Woodchips for domestic paper	2,259	2,166	2,112	1,941	2,191	2,334
Woodchips for export	1,133	1,517	1,298	1,221	1,281	1,524
Other	377	343	347	415	486	428
Coniferous total	13,911	14,589	14,196	14,379	14,590	15,010

[1] Australian Bureau of Agricultural and Resource Economics, Table 6 Australian Forest and Wood Product Statistics – September and December Quarters 2009.

5.C.1.3 Projected supply of harvested wood products from Article 3.4 forests under Forest Management

Projected supply of harvested wood products from Article 3.4 forests under Forest Management for the period 2013-2020 are derived from an extrapolation of the most recent historical data in ABARE 2010.

5.C.2 Use and disposal of harvested wood products

5.C.2.1 Data

Wood products harvested from Australian forests are used both domestically and are exported. Data for the quantities of wood products sourced from Australian forests and used domestically and for the quantities of wood products exported are required because of the differing modelling assumptions used in relation to the life times of products (and as required by Draft decision -/CMP.6 (*Land use, land use change and forestry*), adopted by the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol at its sixth session).

Historical data on the quantities of wood products exported are published each year by the Australian Bureau of Agricultural and Resource Economics (ABARE 2010). These data are available for Australia as a whole for exports by product type.

A number of additional assumptions were necessary to allocate these data on wood product exports between Article 3.3 and Article 3.4 forests. These assumptions include the proportion of roundwood exports which are converted to different products. To ensure consistency, the methods used to classify wood products into decay class pools in the impact model were used. The decay rates are those set out in the draft decision.

5.C.2.2 Recent trends in exports

5.C.2.2.1 Level of exports

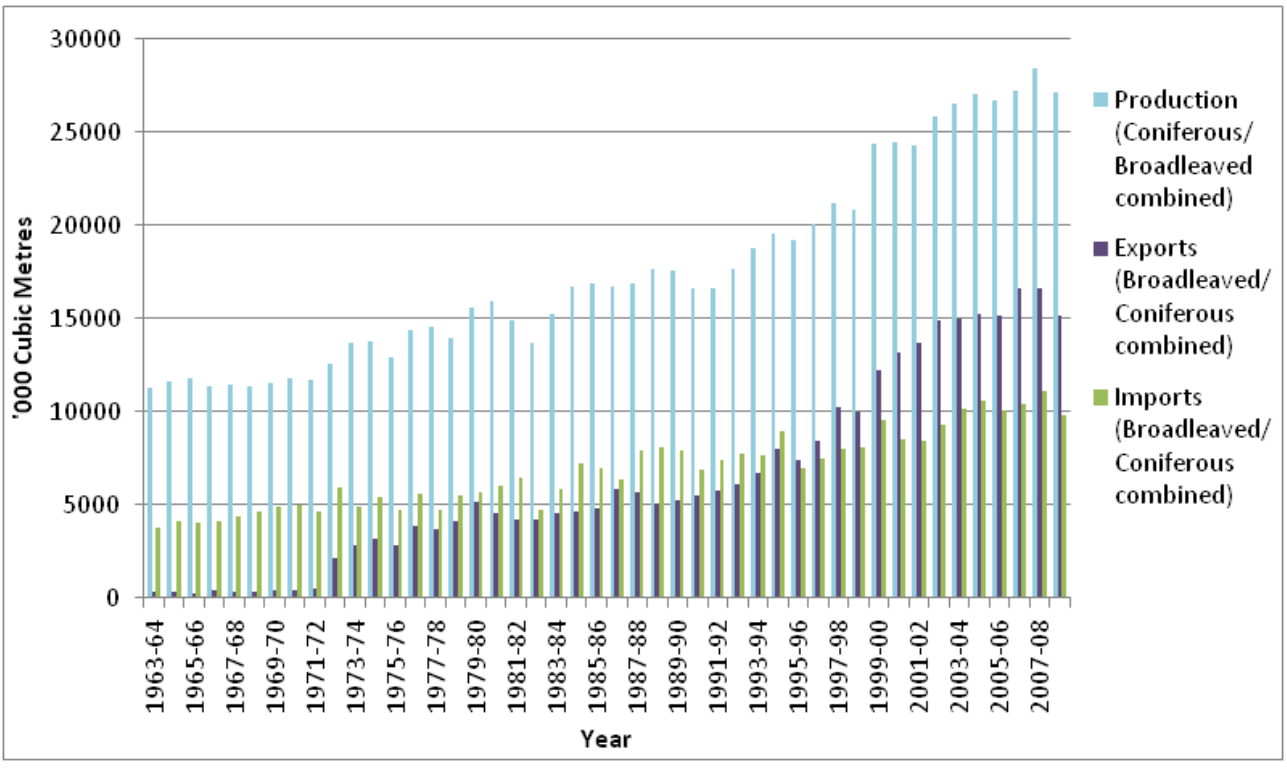
Exports of wood products from Australia grew relatively strongly over the period 1970 to 2000 in line with increases in production. Since 2000, however, the growth in the quantities of exported product has slowed, with minor fluctuations around the trend (Figure 3).

There has also been growth evident in imports of wood products, but this growth has been smaller than the growth in wood exports from Australia.

The downturn in production in 2008-09 was as a result of the global financial crisis and a reduction for global demand for timber.

Given the assumptions made regarding production, all exports in 2002 can be attributed to Article 3.4 forests. While there is limited information available in relation to the quantities of wood exports sourced from Article 3.4 forests since 2002, a reasonable assumption is to allocate exports in proportion to production from Article 3.4 and Article 3.3 forests.

Figure 3 Australian Roundwood removals and exports



Source: Australian Bureau of Agricultural and Resource Economics, Australian Forest and Wood Product Statistics – September and December Quarters 2009.

5.C.2.2.1 Composition of exports

The composition of exports is heavily weighted towards woodchips used for paper production. Data are available from ABARE 2010.

5.C.2.3 Projected levels of exports

The key assumptions made in relation to projected quantities of exported harvested wood products are:

1. the proportion of total wood product sold on export markets is assumed constant at 2008 levels;
2. the proportion of exports derived from Article 3.4 forests under Forest Management is assumed constant at 2008 levels; and
3. the composition of exports allocated to paper, particle and sawnwood classifications is assumed constant at 2008 levels;

which are assumptions that ensure projected quantities reflect recent trade history and are also consistent with the framework of a constant policy stance since 2009.

5.D DISTURBANCES IN THE CONTEXT OF FORCE MAJEURE

Fire in Australia

The average annual area burned by wildfire in Australia between 1990 and 2009 was 831,000 ha, this totals over 16.6 M ha burned with the minimum annual area burned being 132,000 ha and the maximum over 4.6 M ha. The fires occur across a range of tenures and forest types, many of which are not captured by Australia's Forest Management definition.

Wildfire occurs in Australian forests over a range of frequencies, intensities and seasons. While forest fires occur every year in Australia, there are extreme fire seasons that are the culmination of a number of factors, particularly climate. Fires that burn under these conditions are beyond the influence of human intervention. Under these conditions conventional fire fighting methods are inadequate and fire fighting resources are also stretched beyond their capacity.

Fire data available for Australia's National Inventory Submission does not allow for the reporting of area burned by forest type or forest tenure.

To estimate the impact of fire on Australia's reference level, the history of wildfires between 1990 and 2009, that have impacted multiple use forests in south-eastern Australia has been compiled from state agency information (Raison and Squire 2008) and state agency annual reports. This was used to provide an estimate of the possible area and emissions that could be expected to occur on Forest Management lands.

The treatment of fire in the context of force majeure has two components, emissions from the fire event, and the excision of the area of land burnt until the carbon lost in the fire is recovered. In setting a reference level, the emissions and subsequent removals from fire must be estimated to allow for the symmetrical exclusion of emissions and removals. Australia has estimated the expected loss of removals that may occur because of the excision of emissions and removals on land that has been impacted by fire under force majeure provisions. That is, where a unit of land has been impacted by a force majeure fire, the removals that would have occurred on that unit of land in the absence of fire have been excluded from the reference level.

6. DESCRIPTION OF CONSTRUCTION OF REFERENCE LEVELS

The reference level was constructed based upon the estimate of emissions and removals in the three Forest Management sub-categories (Multiple use forests, Private harvest native forests, and Pre 1990 plantations) as well as emissions and removals from harvested wood products. Assuming the complete absence of fire during the commitment period, Australia estimates that Forest Management land will contribute a removal of -4.0 Mt CO_2-e yr^{-1} (Table 8). In reality, fires of varying extent occur on an annual basis on Forest Management lands. Therefore, Australia has calculated a number of reference levels incorporating the treatment of fire under a range of potential force majeure provisions (Table 9). In the absence of a force majeure provision, Australia's reference level is 8.5 Mt CO_2-e yr^{-1}, and ranges between -0.2 and 4.1 Mt CO_2-e yr^{-1} for the force majeure provisions estimated in Table 9.

Table 8 Estimated emissions for Forest Management sub-categories in the absence of fire

Forest Management sub-category	Emissions (Mt CO_2-e yr^{-1})
Multiple Use Forests	-9.1
Private native harvesting	9.6
Pre 1990 Plantations	0.3
Harvested Wood Products[a]	-4.7
Forest Management total assuming no wildfire[b]	-4.0

a) Harvested wood products was estimated using both a 1990 and a 1900 base for wood products. The estimate provided in the table is from a 1990 base, if a 1900 base was used this would decrease the removals slightly by 0.13 Mt CO_2 –e. b) There has not been a year since 1990 where there has not been any fire in forests that are defined by Australia as Forest Management, This estimate is therefore not a business as usual estimate.

Table 9 Australia's Reference level under potential Force Majeure provisions

Forest Management with treatment of Force majeure	Threshold (% of National Emissions)	Reference level (Mt CO_2-e yr^{-1})
FM total with Force majeure		
Emissions under threshold not accountable	0%	-0.2
	1%	1.0
Emissions under threshold accountable	0%	-0.2
	1%	4.1
FM total without Force majeure provision	NA	8.5

6.A SUMMARY OF THE COMPONENTS OF THE REFERENCE LEVEL

Australia's reference level has been estimated from a combination of models and data as outlined in sections 4 and 5. In addition the estimation of an adjustment under a range of force majeure provisions has also been estimated (Table 9).

6.A.1 Multiple use forests

The estimation of emissions and removals from Multiple use forests used the model developed for *harvested native forests* under the UNFCCC inventory (Section 4.A). The area under Multiple use forests of 9.41 M ha was used as the basis for the land area contributing to emissions and removals. Harvesting activity between 1990 and 2009 is the public native forest harvest areas in the *harvested native forest* model of Australia's *National Inventory (2008 and 2009* (*in*

preparation)). The projected harvest area from 2010 to 2020 was based on an average of the harvest area between 2002 and 2009 (Section 5.B).

6.A.2 Private harvest native forests

The estimation of emissions and removals from Private harvest native forest was done using a combination of two methods (section 4.A). The estimate of emissions for the states where the area of private harvest of native forest is known, the model developed for *harvested native forests* for the 2008 inventory submission. The harvest area data between 1990 and 2009 is the private native forest harvest area included in the *harvested native forest* model of Australia's *National Inventory Report 2008 and 2009* (*in preparation)*.

To estimate emissions for the states where the area of private native forest harvesting is not known, estimated sawlog harvest volumes for the period 1996-1997 to 2006-2007 (RIRDC 2009) were used to estimate the level of harvesting in states where the area harvested is not known. The emissions associated with the sawlog harvest volumes were estimated using the Tier 2 model used to verify the *harvested native forests* model for Australia's national inventory submission 2009.

6.A.3 Pre 1990 Plantations

The emissions and removals from Pre 1990 plantations were estimated using the Pre 1990 plantations model from Australia's national inventory submission (2008 and 2009 (in prep.)) (Section 4.A). The area under pre-1990 plantations was assumed to remain at 817,000 ha with no changes in management.

6.A.4 Force Majeure

The force majeure provisions for which reference levels were estimated and reported in Table 9 include the following:

- the party is accountable for fire emissions underneath the threshold percentage of national emissions in a year when the threshold has been exceeded;
- the party is not accountable for fire emissions underneath the threshold percentage of national emissions in a year when the threshold has been exceeded;
- threshold percentages of national emissions of 0 and 1%; and,
- no provision for force majeure, in which a country must account for all wildfire emissions.

To calculate the reference levels, Australia has used estimates of the emissions from wildfires on Multiple use forests between 1990 and 2009.It is estimated that, since 1990, an average annual area of 189,000 ha has been burnt by wildfire in Multiple use forests. This includes the effect of three large fires that occurred in 2003, 2007 and 2009.

These data were used to estimate the emissions that could be expected to be accountable under Forest Management contingent on the final form of the force majeure provision.

In addition, the effect of wildfire and the treatment of fire under force majeure will lead to the loss of removals due to forest growth that would otherwise have occurred on forest lands if they were not burnt by fire as these lands will be excluded from the account for a significant period. Therefore, potential loss of foregone removals has also been estimated based on the history of fire in Multiple use forests.

7. ADDITIONAL INFORMATION

7.A FOREST MANAGEMENT ACTIVITIES ALREADY UNDERTAKEN

Australia did not elect Forest Management as an activity in the first commitment period. However, sustainable Forest Management activities already take place in Australia under a range of national and state and territory policies, which are outlined in section 8 of this submission.

7.B PROJECTED FOREST MANAGEMENT ACTIVITIES UNDER A BUSINESS AS USUAL SCENARIO; (WHERE RELEVANT)

*S*ustainable Forest Management activities already take place in Australia under a range of national and state and territory policies, which are outlined in section 8 of this submission.

7.C CONTINUITY WITH THE TREATMENT OF FOREST MANAGEMENT IN THE FIRST COMMITMENT PERIOD; (WHERE RELEVANT)

Australia did not elect to account for Forest Management under Article 3.4 for the first commitment period.

8. OTHER INFORMATION

8.A FOREST MANAGEMENT AND ITS RELATIONSHIP TO THE UNFCCC FOREST LAND CATEGORY

It is noted in IPCC 2003 that it is *good practice* to explain differences between the area of managed forest (as reported under the UNFCCC) and the area of forest subject to Forest Management.

The area of 'multiple use forests' is a subset of the *harvested native forest* category in the UNFCCC inventory. There is a difference of 5.4 M Ha between the area of *harvested native forest* applied in the UNFCCC inventory and the area of the 'multiple use forests' applied in the calculation of the Forest Reference Level. The difference in the net sink estimates of these two classifications is 35 Mt CO_2-e (see Table 11). Additional forests in the UNFCCC inventory include forests lands where the predominant activity is no longer wood or wood fibre production and, in particular, forest lands that have been transferred to formal conservation reserves as at December 2009. In addition the definition of the *harvested native forest* area in 1990 included an estimated area of private native forests that may be subject to harvesting. These areas are no longer included under the definition of Multiple use forests. The Forest Management activities on private native forests have been estimated separately for this submission.

The next most important reason for differences between the two sets of estimates relates to the treatment of forest fires. Only non-CO_2 emissions from forest fires are reported under the classification *harvested native forests* in the UNFCCC inventory (CO_2 emissions are included under *other native forests*) while estimates of both non-CO_2 and CO_2 emissions are included in the Forest reference level.

Table 10: Reconciliation of UNFCCC forest estimates (2009) and Forest Reference Level estimates

Variable	UNFCCC submission (2009)	Forest reference level submission (2013-2020)	Difference	Comment
Harvested native forests (sink)	-32	0.5	+32.5	Subset of harvested native forests included in FM (multiple use forests only). FM activity areas are 5.4 Mha lower (ie because of the exclusion of conservation areas) and as identified in MIG 2008.
Plantations	3	-0.5	-3.5	Small changes over time due to tree growth and harvest dynamics (ie comparison between 2009 and 2020)
Fire (CO_2)	(-42) [a]	9	+9	Differences in accounting rules (force majeure). Subset of forest fires allocated to multiple use forests based on State agency reports.
Fire (non-CO_2)	2	0.5	-1.5	Subset of forest fire emissions allocated to multiple use forests based on State agency reports.
Firewood	9	1.5	-7.5	Subset of firewood emissions allocated to multiple use forests.
HWP [b]	-4	-5	-1	Differences in accounting rules

a Not included in harvested native forests in the UNFCCC national inventory (ie included in 'other native forests'). b Not included in harvested native forests but under 5G Other.

The relative importance of the Forest Management activity compared with Article 3.3 activities for the projection period is given in Table 12.

Table 11 Projected emissions levels for article 3.3 and 3.4 Forest Management activities

Activity	Kyoto Period 2008-2012	2020
FM[a]	NA	-0.2 to 8.5
AR [b c d]	-21	-7
D [e]	49	49
Total	28	41.8 to 50.5

a) The 2020 estimate for FM is based upon Australia's preferred treatment of Force Majeure – refer to section 6 b) 2008-2012 estimate calculated with Kyoto protocol sub-rule c) 2020 estimate calculated without Kyoto protocol sub-rule d) source: Department of Climate Change and Energy Efficiency, *Australia's emissions projections 2010*

8.B REVISIONS FOR CHANGES IN TECHNICAL ASSUMPTIONS

Estimates for the forest reference level have been calculated largely using the methods documented in the *National Inventory Report (2008 and 2009 (in prep.))*. The *National Inventory Report* also records Australia's intention to continue to develop the methods for forest lands to progress towards a full Tier 3 Approach 3 modelling capability for forest lands. Provision should be

made for the option to recalculate the forest reference level for technical reasons, should the estimation methods evolve over the course of the reporting period. This will ensure time-series consistency and ensure that any net benefit obtained from Forest Management is due to changed activities rather than methodological changes.

8.C REVISIONS TO ESTIMATES IN PREVIOUS SUBMISSION DUE TO CHANGES IN TECHNICAL ASSUMPTIONS

Australia's estimate for the forest reference level has been revised from the estimate presented in the previous submission. For this submission a more recent mapping classification of Multiple use forests has been able to be utilised (MIG, 2008) which has identified a transfer of forest out of Multiple use forests and into conservation protection over the last decade (by 1.7million hectares). As the forest areas that have been transferred out of the Multiple use forest estate will be growing during the second commitment period, this change has significantly reduced the removals estimate for Multiple use forests under Forest Management compared with the previous submission (leading to an increase in the reference level of 7.8Mt). This revision does not lead to unbalanced accounting, however, as the sink capacity of these areas will be excluded from both the Reference Level estimate and from the net emissions to be estimated in a future reporting period. Both the Reference Level and the reporting period have been treated equivalently.

Table 12: Explanations for update to Forest management reference level submitted in 2009

Recalculation	2009 submission	2011 submission	Difference (Mt CO_2)	Description
Total Reference level	-9.2	-0.2 a	9.0	
Emissions from forests (excluding wildfire)	-14.2	-4.2	10.0	
Comprising:				
Change in area of multiple use forests			7.8	Since the previous submission the area under multiple use forest has been adjusted to match that reported in the State of the Forests Report (2008). This resulted in a reduction from 11.1 M ha to 9.4 M ha
Updated models and data			2.2	Since the previous submission Australia has updated its model for harvested native forests and pre-1990 plantations as used in the *National Inventory Report (2008 and 2009 (in prep.))*. Harvested wood products were not required for the previous submission but were modelled as required for this submission.
Force majeure construct: treatment of excluded removals from force majeure lands	5.0	4.0	-1.0	Updated data on the area of native forest burnt by wildfire

a Contingent on a force majeure provision under which there is no accounting for wildfire emissions (only sinks).

In addition Australia has updated models used to estimate removals and emissions from forests for use in the *National Inventory Report (2008,* as reviewed in 2010, and *2009 (in prep.)*). Activity data has also been updated. This submission also includes estimates of emissions from harvested

wood products using the methods outlined in Draft decision -/CMP.6 (*Land use, land use change and forestry*). The net effect of these updates is to increase the forest reference level by 2.2Mt.

Under the force majeure construct whereby emissions from fire are not accounted for, there has been a change in the area of land projected to be affected by fire based on consideration of an extended fire history, leading to a reduction in foregone removals for these lands. The net effect is to reduce the reference level by 1 Mt.

8.D FACTORING OUT IN ACCORDANCE WITH PARAGRAPH 1 OF DECISION 16/CMP.1

The models used to construct the Forest Management reference level assume there is no effect from elevated CO_2. In addition the use of a Forest Management reference means that removals resulting from elevated CO_2 concentrations above the pre-industrial level and indirect nitrogen deposition will be factored out when subtracting the reference level from net emissions/removals that occur during the commitment period. The use of a projected reference level implicitly excludes these factors.

Similarly, the dynamic effects of differing age structures across the forests resulting from past activities and practices and natural disturbances are built in to both the construction of the reference level and in the estimation of net emissions during the reporting period.

8.E COMPLETENESS

The potential for unbalanced accounting due to leakage of Forest Management activities from the areas included under the system of practices (Multiple use forests) to areas outside of the Multiple use forests is eliminated through the use of specific activity tracking for all forests. Australia's ongoing program of annual wall to wall mapping of forest extent and its ability to track units of land through time will ensure such leakage will not occur and also ensures that Forest Management lands which are subsequently converted to another land use are correctly allocated (i.e. to Article 3.3 deforestation) and that no double counting will occur.

Estimates are provided for all carbon pools: above ground biomass; litter and debris; soil carbon; harvested wood products. For the soil carbon of native forests, the pool is estimated to be in equilibrium at zero.

8.F TIME SERIES CONSISTENCY

Consistent with *good practice*, all calculations have been made on the basis of the area at the end of the period, and this approach has been applied consistently through time.

8.G POLICIES INCLUDED

This section describes policies in place at December 2009 in accordance with paragraph 11 of the draft decision on Land use, land use change and forestry. Australia seeks to manage its forests in line with sustainable Forest Management principles. Sustainable Forest Management entails the management of forests to maintain their full range of environmental, social and economic values. The concept of sustainable forestry has a long and evolving history in Australia. As the level of 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 now has a comprehensive domestic framework designed to achieve the conservation and sustainable management of all 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) – RFAs have legal status via the national *Regional Forests Agreement Act 2002*. RFAs are 20 year plans underpinning regional approaches to balance conservation and production from native forests and cover the majority of production forest regions in Australia. In addition to forest conservation provisions, RFAs also provide certainty for sustainable timber supply.
- 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 applies to most of Australia's production forests.

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

At the national level, Australia uses the international Montreal Process Criteria and Indicators as the basis framework for monitoring and measuring the management of forests.

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 forests sustainability which could be applied across all Australian forests. This was achieved through the national-level Montreal Process Implementation Group for Australia (MIG), comprising 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 sustainable forestry as measured by the Montreal C&I,

through the five-yearly release of its State of the Forests Report. The most recent report was produced in 2008.

National Forest Policy Statement

The management of Australia's forests is guided by the 1992 National Forest Policy Statement (NFPS). Through the NFPS and other mechanisms, the Australia, State and Territory Governments are committed to the sustainable management of all Australian forests, whether the forest is on public or private land, or reserved or available for production.

In developing the NFPS, governments were mindful of the important conservation values of Australia's forests, and of the contribution that forest-based activities make to the national economy and rural and regional communities.

Regional Forest Agreements

A key outcome of the NFPS was the Regional Forest Agreements (RFAs). The protection provided by Australia's RFAs is given legal status through the national *Regional Forest Agreements Act 2002*.

Regional Forest Agreements are 20 year plans for the conservation and sustainable management of Australia's native forests. There are ten RFAs in four states: Western Australia, Victoria, Tasmania and New South Wales. The Agreements provide certainty for forest-based industries, forest-dependent communities and conservation. The aim of the RFA system was to reserve at least 15% of the pre-1750 distribution of each forest type, 60% of the existing distribution of each forest type if vulnerable, 60% of existing old-growth forest, 90% or more of high quality wilderness forests, and all remaining rare and endangered forest ecosystems.

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. All jurisdictions have committed to the national goal of increasing the extent and condition of native forests and have enacted legislation to curtail and/or strengthen controls on the broadscale clearing of native vegetation.

Plantations

Australia also has in place the *Plantations for Australia: The 2020 Vision* which is a strategic partnership between the Australian and State and Territory Governments and the plantation timber growing and processing industries. The Vision seeks to enhance regional wealth creation and international competitiveness through a sustainable increase in Australia's plantations, based on a notional target of trebling the area of commercial tree crops to around 3 million hectares by 2020. The Vision was launched in 1997 and revised in 2002 to take account of a number of developments.

9. REFERENCES

Australian Bureau of Agricultural and Resource Economics (ABARE) 2010, *Australian Forest and Wood Product Statistics – September and December Quarters 2009*

Department of Climate Change and Energy Efficiency 2010, *National Inventory Report 2008,* Canberra

Department of Climate Change and Energy Efficiency (*in prep*), *National Inventory Report 2009,* Canberra

Lucas, R.M., King, S., et al., 1997, 'The role of Australia's native forests in carbon sequestration: Tasmania as a case study'. Report to the Department of Environment, Sports and Territories, Canberra, Australia.

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

Rural Industries Research and Development Corporation, 2009, *The Role, Values and Potential of Australia's Private Native Forests.*

Richards, G, and Evans, D.W. 2000, CAMFor *User Manual v 3.35*. National Carbon Accounting System Technical Report No. 26 (47pp), Australian Greenhouse Office, Canberra.

Snowden, P. and James, R, 2008 *'Historical development of silvicultural practices in plantations'.* In: Raison, R.J. and Squire, R. (Eds.), 'Forest Management in Australia: Implications for carbon budgets'. National Carbon Accounting System Technical Report No. 32, Australian Greenhouse Office

Turner, B, and James, R. 2002. *Derivation of indicative yields for major plantation species.* In: Richards, G. (Ed) Biomass Estimation: Approaches for Assessment of Stocks and Change. National Carbon Accounting System Technical Report no. 27, Australian Greenhouse Office, Canberra, pp 71-77.