Forestry Department
Food and Agriculture Organization of the United Nations

GLOBAL FOREST RESOURCES ASSESSMENT

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The Forest Resources Assessment Programme

Sustainably managed forests have multiple environmental and socio-economic functions important at the global, national and local scales, and play a vital part in sustainable development. Reliable and up-to-date information on the state of forest resources - not only on area and area change, but also on such variables as growing stock, wood and non-wood products, carbon, protected areas, use of forests for recreation and other services, biological diversity and forests' contribution to national economies - is crucial to support decision-making for policies and programmes in forestry and sustainable development at all levels.

FAO, at the request of its member countries, regularly monitors the world's forests and their management and uses through the Forest Resources Assessment Programme. This country report forms part of the Global Forest Resources Assessment 2005 (FRA 2005), which is the most comprehensive assessment to date. More than 800 people have been involved, including 172 national correspondents and their colleagues, an Advisory Group, international experts, FAO staff, consultants and volunteers. Information has been collated from 229 countries and territories for three points in time: 1990, 2000 and 2005.

The reporting framework for FRA 2005 is based on the thematic elements of sustainable forest management acknowledged in intergovernmental forest-related fora and includes more than 40 variables related to the extent, condition, uses and values of forest resources. More information on the FRA 2005 process and the results - including all the country reports - is available on the FRA 2005 Web site (www.fao.org/forestry/fra2005).

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1 Table T1 – Extent of Forest and Other wooded land

1.1 FRA 2005 Categories and definitions

Category	Definition
Forest	Land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds *in situ*. It does not include land that is predominantly under agricultural or urban land use.
Other wooded land	Land not classified as "Forest", spanning more than 0.5 hectares; with trees higher than 5 meters and a canopy cover of 5-10 percent, or trees able to reach these thresholds *in situ*; or with a combined cover of shrubs, bushes and trees above 10 percent. It does not include land that is predominantly under agricultural or urban land use.
Other land	All land that is not classified as "Forest" or "Other wooded land".
Other land with tree cover (Subordinated to "Other land")	Land classified as "Other land", spanning more than 0.5 hectares with a canopy cover of more than 10 percent of trees able to reach a height of 5 meters at maturity.
Inland water bodies	Inland water bodies generally include major rivers, lakes and water reservoirs.

1.2 National data

1.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
New Zealand Land Cover Database Version 1. Ministry of Agriculture and Forestry (2000)	H	Land Cover Class (4 relevant forestry classes)	1996/1997	Derived from Spot 4 satellite imagery
New Zealand Land Cover Database Version 2. Ministry for the Environment (2004)	H	Land Cover Class (16 relevant forestry classes)	2001/2002	Derived from Landsat 7 satellite imagery
A National Exotic Forest Description as at 1 April 1990. Ministry of Forestry (1991)	M	Estimates total area of exotic plantation species.	1990	Collected by postal survey
A National Exotic Forest Description as at 1 April 2000 and 2003. Ministry of Agriculture & Forestry (2001 & 2004)	H	Estimates total area of exotic plantation species.	2000, 2003	Collected by postal survey
Land Information New Zealand 260 series topographic maps	H	Land Areas	2004	Official area of New Zealand

1.2.2 Classification and definitions

National class	Definition
Planted forest	Forests planted in exotic tree species predominately grown for wood or wood fibre and greater than 1 ha in extent. In New Zealand 90 percent of the area is planted in *Pinus radiata*. The area reported is the net stocked forest area which generally excludes mappable gaps such as roads, landings, and areas with in forest boundaries that are not planted in exotic forest. Harvested areas awaiting replanting are included in the area. Areas harvested and not intended to be replanted are excluded. All forests in this class will exceed 30% canopy cover and 5 metres in height before 10 years of age.
Indigenous Forest	Indigenous forest is defined as forest dominated by tall indigenous forest canopy species greater then 1 ha in size. All forests mapped into this class exceed 30% canopy cover and 5 metres in height.
Shrub land	Areas of shrubland greater than 1 ha in extent. This area includes the : LCDB v2 classes of Fernland; Gorse and Broom; Manuka & Kanuka; Matagouri; Broadleaved Indigenous Hardwoods; Sub Alpine Shrubland; Mixed Exotic Shrubland; Grey Scrub and Mangrove. The area in this class will generally exceed 30% canopy cover and 1 metre in height.

1.2.2 Original data

National Class	1990 (000 ha)	LCDBv1 data 1996/1997 (000 ha)	LCDBv2 data 2001/2002 (000 ha)
Planted Forest	1 261	1 822	1 962
Indigenous Forest (From LCDB2)	ID	6 459	6 457
Total Forest	**ID**	**8 281**	**8 419**
Shrubland (Other Wooded Land)	ID	2 577	2 557
Total Wooded Land	**ID**	**10 858**	**10976**
All Other Land	ID	15 499	15 381
Total Land Area	**26 357**	**26 357**	**26 357**

The Total Land Area listed is the official land area for New Zealand from Land Information New Zealand (LINZ).
The figures for "planted forests" in this report use the following National Exotic Forest Description (NEFD) figures and not the above LCDB data.

National Class	1990	2000	2003
Net Stocked plantation forest area (000 ha)	1,261	1,769	1,827

1.3 Analysis and processing of national data

1.3.1 Calibration

The data in FAOSTAT on country area (27053 "000"ha), total land area (26799 "000"ha) and area of inland water bodies land (254 "000"ha) is different than the official land area currently in use in New Zealand. Land Information New Zealand (LINZ) is the governmental agency responsible for measuring and providing official land area information in New Zealand. The LINZ land area figure is from the most recent satellite imagery available and is the official New Zealand Government figure for land area. The discrepancy between the LINZ land area and the FAOSTAT New Zealand land area is currently being investigated.

Therefore, following calibration has been done for the sole purpose of reporting to FRA 2005 with all adjustments being made against the area of "Other land" while keeping the figures of "forests" and "Other Wooded Land" intact.

National Class	1990 (000 ha)	LCDBv1 data 1996/1997 (000 ha)	LCDBv2 data 2001/2002 (000 ha)
Planted Forest	1 261	1822	1962
Indigenous Forest	ID	6459	6457
Total Forest	**ID**	**8281**	**8419**
Shrubland (Other Wooded Land)	ID	2577	2557
Total Wooded Land	**ID**	**10 858**	**10976**
Other Land	ID	15941	15823
In Land Water bodies	254	254	254
Total Land Area	**27053**	**27053**	**27053**

The figures for Inland Water Bodies and Total Land Area are from FAOSTAT and are not official figures.

1.3.2 Estimating and forecasting

A. Estimating **1990**

- Using the revised 1990 NEFD figure for the Planted Forest area;
- Using the 1996/97 (LCDBv1) estimate for indigenous forest;
- Using the 2001/02 (LCDBv2) estimate for Shrub land;
- Calibrating All Other Land by subtraction from the LINZ Total Land Area.

The LCDBv1 figures for Indigenous Forest captured in 1996/97 were used for 1990 on the basis that there had been little change to indigenous forests in that time, and the satellite mapping was more accurate in 1996/97 than had been possible previously. Although there had been some clearfelling of indigenous forest for conversion to pasture during the period 1990 - 1996, this was not of a scale to impact on these figures. Since the signing of the NZ Forest Accord in 1991 there has not been any clearfelling of indigenous forest for conversion to plantation.

B. Estimating 2000

- Using the 2000 NEFD figures for planted forest;
- Using the 2001/02 (LCDBv2) estimate for indigenous forest;
- Using the 2001/02 (LCDBv2) estimate for Shrub land

The LCDB v2 imagery was subsequently used to estimate both the 1990 and the 2000 Shrubland figures as the data were found to be more accurate then the LCDB v1 data.

C, Forecasting 2005

The 2001/02 areas for "Indigenous Forest" and "Shrub land" as measured by LCDB v2 have been assumed for 2005 assuming that these areas will remain static between 2001/02 and 2005. This is a slightly conservative forecast as some evidence suggests that the net area of shrub land is increasing slightly due to the natural regeneration on economically marginal hill country farmland. There is no measurable change in tall Indigenous Forest.

As regards plantation forest, it is expected that its area will increase by 24,900 ha over the 2003 (April 2003) area reported (1,827,000 ha) in NEFD because of the following.

a. New planting: April 03 to December 03 of 14,900 ha (derived from MAF nursery surveys).
b. Anticipated new planting: December 03 to December 05 of 20 000 ha (10,000 ha/yr) (MAF estimate).
c. Expected 10 000 ha of deforestation. Over the last year several forest companies have announced that they plan to sell forest land following harvesting and that this land will be used for other purposes such as farming.

National Class	**1990 (1000 ha)**	**2000 (1000 ha)**	**2005 (1000 ha)**
Planted Forest	1261	1769	1852
Indigenous Forest	6459	6457	6457
Total Forest	**7720**	**8226**	**8309**
Shrub land	2557	2557	2557
Total Wooded Land	**10277**	**10783**	**10866**
Other Land	16522	16016	15933
Inland water	254	254	254
Total Land Area	**27053**	**27053**	**27053**

1.4 Reclassification into FRA 2005 classes

Reclassification (percentage allocation) according to FRA 2005 classes

Reclassification	**Forest**	**Other wooded land**	**Other land with tree cover**	**Other land**	**Inland water**
Planted Forests	100 %				
Indigenous Forests	100%				
Scrub/Shrub/ Grassland & Pasture		100 %			
Other land				100 %	
Water spreads					100 %
Others				100 %	

1.5 Data for National reporting table T1

FRA 2005 Categories	**Area (1000 hectares)**		
	1990	**2000**	**2005**
Forest	7720	8226	8309
Other wooded land	2557	2557	2557
Other land	16522	16016	15933
...of which with tree cover [1)]			
Inland water bodies	254	254	254
TOTAL	**27053**	**27053**	**27053**

1.6 Comments to National reporting table T1

The 1990 forest and other wooded land areas are **provisional estimates** only. These are based on satellite mapped areas dated 1996/97 and a postal survey of planted forest owners in 1991. It is important to note that the Ministry of Agriculture and Forestry (MAF) and the Ministry for the Environment (MfE) are presently undertaking an extensive study to establish a 1990 baseline for the country's Carbon Accounting System for reporting to the UNFCCC under the Kyoto Protocol. When complete and verified in 2 to 3 years time a more robust estimate of 1990 forest and other wooded land areas will be available.
The average new planting rate over the last 30 years has been 44,900 hectares per year. In the period 1992 to 1998 new planting rates were high; during this period new planting averaged 69,000 hectares per year. Since 1998 the rates of new planting have declined. At 14,900 hectares in 2003, new planting is now well below the afforestation rate of the last 30 years (NEFD Report, 2004).

2 Table T2 – Ownership of Forest and Other wooded land

2.1 FRA 2005 Categories and definitions

Category	Definition
Private ownership	Land owned by individuals, families, private co-operatives, corporations, industries, religious and educational institutions, pension or investment funds, and other private institutions.
Public ownership	Land owned by the State (national, state and regional governments) or government-owned institutions or corporations or other public bodies including cities, municipalities, villages and communes.
Other ownership	Land that is not classified either as "Public ownership" or as "Private ownership".

2.2 National data

2.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year	Additional comments
A National Exotic Forest Description as at 1 April 1991. Ministry of Forestry (1992)	H	Area by ownership category	1991	Forest ownership data are collected from 1991.
A National Exotic Forest Description as at 1 April 2000. Ministry of Agriculture and Forestry (2001)	H	Area by ownership category	2000	
New Zealand Forestry Statistics 1991. Ministry of Forestry (1991)	H	Natural forest area estimates	1991	Data from 1974 revision of National Forest Survey
New Zealand Forestry Statistics 2000. Ministry of Agriculture and Forestry (2001)	H	Natural forest area estimates		Data from LCDBv1.1 (1996/97 satellite imagery).
A National Policy for Indigenous Forests. NZ Institute of Forestry (1989)	H		1989	

2.2.2 Classification and definitions

National class	Definition
Registered public company	A company in which members of the public can invest, and which is registered on the NZ Stock Exchange.
Privately owned	Includes Maori owned land. Some of this land may be owned by registered public companies.
State-owned enterprise	State owned companies or trusts
Local government	Government at the city or district level.
Central Government	Government at the country level.

2.2.3 Original data

A. Forests

Category of Forest	Area (1000 hectares)	
	1991	2000
Planted Forest		
Registered public company	499	790
Privately owned	372	831
Sub Total Private	**871**	**1621**
State-owned enterprise	311	45
Local government	58	55
Central Government	49	48
Sub Total Public	**418**	**148**
Indigenous Forest		
Private ownership	1323	1069
Public ownership	4905	5187
Total		
Private ownership	2194	2690
Public ownership	5323	5335
TOTAL	**7 517**	**8 025**

The above ownership category information for plantation forests is from the 1991 NEFD Report with the area difference applied to the "Privately owned" sector.

The 1991 indigenous forest data came from "NZ Forestry Statistics, 1991", published by the Ministry of Forestry, July 1991. These figures were derived from a 1974 revision of the National Forest Survey. They do not match the 1996/97 LCDB1 figures which have been used elsewhere in this Report

The 2000 indigenous forest data came from "NZ Forestry Statistics, 2000", published by the Ministry of Agriculture and Forestry, June 2001. They also do not match the 1996/97 LCDB1 figures which have been used elsewhere in this Report.

Following classification has been used to tabulate the above data.

(a). For the 1991 ownership classes

NEFD 1991 Owner Definition	Classification
Individual	Private ownership
Partnership/consortium	Private ownership
Central government department	Public ownership
State owned enterprise	Public ownership
Local government body	Public ownership
Trusts, including Maori trusts	Private ownership
Registered private companies	Private ownership
Registered public companies	Private ownership
Other	Other ownership
Unknown	Other ownership

(b). For the 2000 ownership classes

NEFD 2000 Owner Definition	Classification
Registered public companies	Private ownership
Private owned	Private ownership
State owned enterprise	Public ownership
Local government	Public ownership
Central Government	Public ownership

B. Shrub Land

Insufficient data is available at the level of detail required for this Report.

2.3 Analysis and processing of national data

2.3.1 Calibration

The areas in Table 2.2.3 were adjusted as under on a pro rata basis to fit the total forest areas listed in Table 1.

Ownership of Forests	1991	2000
Private ownership	2252	3013
Public ownership	5468	5213
TOTAL	**7720**	**8226**

2.3.2 Estimation and forecasting

No ownership category data was available for 1990, so ownership at 1991 was used. The area difference was applied to privately owned forest.

2.4 Reclassification into FRA 2005 classes

2.5 Data for National reporting table T2

FRA 2005 Categories	Area (1000 hectares)			
	Forest		Other wooded land	
	1990	2000	1990	2000
Private ownership	2252	3013	ID	ID
Public ownership	5468	5213	ID	ID
Other ownership			ID	ID
TOTAL	**7 720**	**8 226**	**2 557**	**2557**

2.6 Comments to National reporting table T2

3 Table T3 – Designated function of Forest and Other wooded land

3.1 FRA 2005 Categories and definitions

Types of designation

Category	Definition
Primary function	A designated function is considered to be primary when it is significantly more important than other functions. This includes areas that are legally or voluntarily set aside for specific purposes.
Total area with function	Total area where a specific function has been designated, regardless whether it is primary or not.

Designation categories

Category / Designated function	Definition
Production	Forest / Other wooded land designated for production and extraction of forest goods, including both wood and non-wood forest products.
Protection of soil and water	Forest / Other wooded land designated for protection of soil and water.
Conservation of biodiversity	Forest / Other wooded land designated for conservation of biological diversity.
Social services	Forest / Other wooded land designated for the provision of social services.
Multiple purpose	Forest / Other wooded land designated to any combination of: production of goods, protection of soil and water, conservation of biodiversity and provision of social services and where none of these alone can be considered as being significantly more important than the others.
No or unknown function	Forest / Other wooded land for which a specific function has not been designated or where designated function is unknown.

3.2 National data

3.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variables	Year	Additional comments
Newsome, P.J. (1987) The Vegetative Cover of New Zealand. Water & Soil Miscellaneous Publication No. 112.	M	47 vegetation cover classes	1980's	Mapping data was derived from a range of sources through the 1980s and so is only an approximation of the cover at 1990.
New Zealand Land Cover Database Version 1. Ministry of Agriculture and Forestry (2000)	M	17 Cover and land-use classes	Based on 1996/7 imagery	Mapping of mixture of land-cover and land-use classes
New Zealand Land Cover Database Version 2. Ministry for the Environment (2004)	M	43 Cover and land-use classes	Based on 2001/2 imagery	Mapping of mixture of land-cover and land-use classes.
New Zealand Forestry Statistics 1991. Ministry of Forestry (1991)	H	Natural forest area estimates	1991	The areas were derived from the 1974 revision of the National Forest Survey
New Zealand Forestry Statistics 2000. Ministry of Agriculture and Forestry (2001)	H	Natural forest area estimates		The areas were derived from LCDBv1.1 (1996/97 satellite imagery).
MAF website	H	East Coast Forestry Project area information	2004	

3.2.2 Classification and definitions

National class	Definition
Indigenous Forest	Indigenous forest is defined as forest dominated by tall indigenous forest canopy species greater then 1 ha in size. All forests mapped into this class exceed 30% canopy cover and 5 metres in height.
Shrub land (Other Wooded Land) as defined in LCDB v2	Areas of shrubland greater than 1 ha in extent. This includes: Fernland; Gorse and Broom; Manuka & Kanuka; Matagouri; Broadleaved Indigenous Hardwoods; Sub Alpine Shrubland; Mixed Exotic Shrubland; Grey Scrub and Mangrove. The area in this class will generally exceed 30% canopy cover and 1 metre in height.

3.2.2 Original data

A. Indigenous Forests

The original data for Indigenous forest are from the NZ Forestry Statistics handbooks:

National Class	1991	2000
State owned natural forest	**4 905**	**5 187**
– protected	4 741	5 175
- capable of wood production	164	12
Privately owned natural forest	**1 323**	**1 069**
- capable of wood production	124	ID
- protected	1199	ID
Total	**6 228**	**6 256**

B. Plantation Forest

The plantation forest figures from the Table in 1.3.2 (C) for 1990, 2000 and 2005 have been used .

C. Shrub lands

The Shrub land (OWL) figures from the Table in 1.3.2 (C) for 1990, 2000 and 2005 have been used.

3.3 Analysis and processing of national data

3.3.1 Calibration

Not needed as figures from Table 1 are being used.

3.3.2 Estimation and forecasting

A. Indigenous Forest

Conservation of Biodiversity is the predominant use function for indigenous forests. See Section 3.6.

B. Plantation Forest

Small areas of plantation forest have been designated as “protection of soil and water” to recognise the East Coast project. Also see 3.6.

C. Shrub lands

Landcare Research estimates that about 411,000 hectares of shrubland were used for biodiversity conservation purposes in 1990 and 2000. This had increased to 420,000 hectares by 2005.

3.4 Reclassification into FRA 2005 classes

A. For 1990

National Category	Production	Protection	Conservation	Social	Multiple	Total
Planted Forests	1261					1261
Indigenous Forests	288		6171			6459
Total	1549	0	6171	0	0	7720
Shrub land		2146	411			2557

B. For 2000

National Category	Production	Protection	Conservation	Social	Multiple	Total
Planted Forests	1767	2				1769
Indigenous Forests	12		6445			6457
Total	1779	2	6445	0	0	8226
Shrub land		2146	411			2557

C. For 2005

National Category	Production	Protection	Conservation	Social	Multiple	Total
Planted Forests	1832	20				1852
Indigenous Forests			6457			6457
Total	1832	20	6457	0	0	8309
Shrub land		2137	420			2557

3.5 Data for National reporting table T3

FRA 2005 Categories / Designated function	Area (1000 hectares)					
	Primary function			Total area with function		
	1990	2000	2005	1990	2000	2005
Forest						
Production	1549	1779	1832	1549	1781	1852
Protection of soil and water		2	20	7720	8226	8309
Conservation of biodiversity	6171	6445	6457	7720	8226	8309
Social services				7720	8226	8309
Multiple purpose				not appl.	not appl.	not appl.
No or unknown function				not appl.	not appl.	not appl.
Total - Forest	**7720**	**8226**	**8309**	**not appl.**	**not appl.**	**not appl.**
Other wooded land						
Production						
Protection of soil and water	2146	2146	2137	2557	2557	2557
Conservation of biodiversity	411	411	420			
Social services						
Multiple purpose				not appl.	not appl.	not appl.
No or unknown function				not appl.	not appl.	not appl.
Total – Other wooded land	**2557**	**2,557**	**2,557**	**not appl.**	**not appl.**	**not appl.**

3.6 Comments to National reporting table T3

Most of the indigenous forest land in New Zealand managed by the Department of Conservation and fulfils both Classes '*conservation of biodiversity'* and '*protection of soil and water'* although only entered into one class for the national reporting table. Areas listed in Table 3.5 are the total areas of forest land under management of Department of Conservation plus Private Protection.

In Table 3.5 the Primary Function Production Forest figures are made up from Net Stocked plantation area plus the State owned areas allocated to wood production, plus privately owned natural forest identified for wood production in the indigenous forest Table in Section 3.2.3. For 2000 and 2005, the area has been reduced by 2000 and 20 000 hectares respectively, and these areas moved to Protection of Soil and Water, to recognise the East Coast Project. The 2005 area estimate for production forest does not include any State owned indigenous forest.

In Table 3.5, the total functional area designated as Conservation of Biodiversity is the total forest area on the basis that the NZ plantation sector regards the plantation forests as assisting in biodiversity conservation. The use of plantation grown timber has caused a dramatic drop in the use of indigenous timber, and rare, threatened and endangered species can find suitable ecosystems for survival in plantation areas.

Similarly, almost all forests are used for a variety of recreational purposes.

4 Table T4 – Characteristics of Forest and Other wooded land

4.1 FRA 2005 Categories and definitions

Category	Definition
Primary	Forest / Other wooded land of native species, where there are no clearly visible indications of human activities and the ecological processes are not significantly disturbed.
Modified natural	Forest / Other wooded land of naturally regenerated native species where there are clearly visible indications of human activities.
Semi-natural	Forest / Other wooded land of native species, established through planting, seeding or assisted natural regeneration.
Productive plantation	Forest / Other wooded land of introduced species, and in some cases native species, established through planting or seeding mainly for production of wood or non wood goods.
Protective plantation	Forest / Other wooded land of native or introduced species, established through planting or seeding mainly for provision of services.

4.2 National data

4.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Newsome, P.J. (1987) The Vegetative Cover of New Zealand. Water & Soil Misc Publication No. 112.	M	47 vegetation cover classes	1980's	Mapping data was derived from a range of sources through the 1980s and so is only an approximation of the cover at 1990.
LCDB1	M	17 Cover and land-use classes	Based on 1996/7 imagery	Mapping of mixture of land-cover and land-use classes
LCDB2	M	43 Cover and land-use classes	Based on 2001/2 imagery	Mapping of mixture of land-cover and land-use classes
National Exotic Forest Estate Database (NEFD). Ministry of Agriculture and Forestry.	H	National summaries of exotic plantation statistics	Annual summaries	Derived from the major forestry companies and postal surveys of small forest owners.
New Zealand Forestry Statistics 1991. Ministry of Forestry (1991)	H	Natural forest area estimates	1991	The areas were derived from the 1974 revision of the National Forest Survey
New Zealand Forestry Statistics 2000. Ministry of Agriculture and Forestry (2001)	H	Natural forest area estimates		The areas were derived from LCDBv1.1 (1996/97 satellite imagery).
MAF web site	M	East Coast Forestry Project area information	2004	

4.2.2 Classification and definitions

All national data sources utilised fit the required classes and definitions in the broadest possible way. Main differences from FRA requirements are date of national summary data, lack of harmonisation between forest description categories, and the basic definition of forest by FRA as 'Land spanning more than 0.5 hectares with trees higher than 5 metres and a canopy cover of more than 10 percent'. Available sources of New Zealand data use a minimum 1 ha and a 30% predominant cover threshold.

a. Productive plantation area for 1990 has been derived from the NEFD for 1990 (1,261,000 ha).

b. Semi-natural forest established through planting, seeding or assisted natural regeneration includes 'Restoration sites' in New Zealand and the only database of them can be found at the New Zealand Ecological Restoration Network (NZERN) website (http://www.bush.org.nz/nzern). NZERN believes the total area of land involved may be several thousand hectares in 2004. Most of that area has been developed in recent years and is still in an early stage of succession. The area of *'semi-natural'* OWL will mostly already be included as pasture, grassland, or *other wooded land* classes in broad classifications such as those by LCDB. No areas are included in this Report as there are no published data, and no other reliable estimates.

National class	Definition
LCDB1 – all classes	1 ha and a 50% predominant cover
LCDB2 – all classes	1 ha and a 50% predominant cover
National Park, Nature reserve, Scientific reserve, Scenic reserve	From 1991 NZ Forestry Statistics, defined as "Primary"
National Park	From 2000 NZ Forestry Statistics, defined as "Primary"

4.2.3 Original data

National Class	1991	2000
National Park	2 362	2 891
Nature reserve	186	
Scientific reserve	9	615
Scenic reserve	357	
Sub total – National Park and Reserves	**2 914**	**3 506**
Forest Park	1 990	ID
Total State-owned Natural Forest	**4 905**	5 187
Private Natural Forest	**1 323**	1 069
This total – Natural forest	**6 228**	**6 256**
Table 1.3.2 (C) Total	6 459	6 457

The area for Protective plantation has been taken from the MAF web site information on the East Coast Forestry project.

4.3 Analysis and processing of national data

4.3.1 Calibration

Not needed as data is mainly from Table 1.

4.3.2 Estimation and forecasting

Figures for 1991 have been assumed for 1990.

A. Primary Forests
Total area of National Parks and Reserves in state owned natural forests have been assumed to be "primary forest". Further that the area of "primary" forest will remain constant between 2000 and 2005

B. Modified Forests
All areas (public and private) of natural forests excluding area of National Parks and Reserves have been assumed to be "modified natural". Further that the area of "modified forests" will remain constant between 2000 and 2005.

C. Productive plantations
Information from Table 3 have been used.

D. Protective plantations
Information from Table 3 have been used which has been taken from the MAF web site information on the East Coast Forestry project.

4.4 Reclassification into FRA 2005 classes

National Category	Primary	Modified	Semi-Natural	Production Plantation	Protective Plantation
National Parks and Reserves	100%				
Natural forest Excluding National Parks and Reserves		100%			
Plantation for Production Plantation for protection				100%	100%

4.5 Data for National reporting table T4

FRA 2005 Categories	Area (1000 hectares)					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Primary	3506	3506	3506	411	411	411
Modified natural	2951	2951	2951	2146	2146	2146
Semi-natural						
Productive plantation	1261	1767	1832			
Protective plantation		2	20			
TOTAL	**7720**	**8226**	**8309**	**2557**	**2557**	**2557**

4.6 Comments to National reporting table T4

Data have seldom been collected in the years required for the FRA, and as yet only predictions can be made for the 2005 figure.

The latest available data have been used and matched as closely as possible to the required years. Vegetation cover as summarised by Newsome (1987) was derived from a range of existing maps, reports, and surveys at a coarse scale (~800 ha), and the greater number of descriptive vegetation classes are reasonably easily assigned to the FRA categories.

LCDB1 and LCDB2 are based on satellite imagery from 1996/7 and 2001/2 respectively and have vegetation cover classes that are difficult to realign with the FRA classes. The issue

raised in the accompanying documentation (FAO Forest Resources Assessment Programme Working Paper 81. Rome 2004) of 'loose definitions for Forests and Other Wooded Land' occurs within the New Zealand sources of data, and there is a need for harmonising definitions both within and between countries.

The data from the NZ Forestry Statistics series (1991 and 2000) come from a variety of sources, but these represent published data and so have been used where appropriate.

5 Table T5 – Growing stock

5.1 FRA 2005 Categories and definitions

Category	Definition
Growing stock	Volume over bark of all living trees more than X cm in diameter at breast height (or above buttress if these are higher). Includes the stem from ground level or stump height up to a top diameter of Y cm, and may also include branches to a minimum diameter of W cm.
Commercial growing stock	The part of the growing stock of species that are considered as commercial or potentially commercial under current market conditions, and with a diameter at breast height of Z cm or more.

5.2 National data

5.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)
A National Exotic Forest Description (NEFD) as at 1 April 2000. Ministry of Agriculture & Forestry (2001)	H	Standing volume of exotic plantation species.	2000
A National Exotic Forest Description (NEFD) as at 1 April 2003. Ministry of Agriculture & Forestry (2004)	H	As above	2003
A National Exotic Forest Description as at 1 April 1990, Ministry of Forestry (1991)	M	Commercial Growing Stock estimate	1990

5.2.2 Classification and definitions

National class	Definition
Standing Volume	The total volume (in cubic metres) of wood contained in stems of all age classes. The standing volume includes some non-recoverable volume, but excludes bark.
TRV IB	An abbreviation for Total Recoverable Volume Inside Bark. This is the volume of wood recovered during harvesting, excluding bark, expressed in cubic metres.

5.2.3 Original data

The data on commercial growing stock (under bark) is calculated and reported by the Ministry of Agriculture and Forestry as part of the annual National Exotic Forest Description (NEFD) report.

National Class	1990	2000	2003
Planted Forest Standing Volume (million m3 ib)	201	367	398

Growing stock estimates are not currently available for New Zealand's indigenous forests. However, work is in progress to develop such an estimate and it is hoped to have a figure by the end of 2005.

5.3 Analysis and processing of national data

5.3.1 Calibration

Not needed.

5.3.2 Estimation and forecasting

General: The New Zealand commercial growing stock in planted forests is reported as "under bark", therefore a multiplying factor of 1.17 was used to produce the "over bark" figure.

A. 1990 Estimates

In the 1990 NEFD Report, there was no published estimate for growing stock for plantation forests, hence the NEFD database was directly accessed to produce the figure.

B. 2000 Estimates

The "standing volume" or total stem volume inside bark for 2000 was multiplied by the bark correction factor, and then 85% of this figure was taken to estimate the merchantable volume.

C. 2005 Forecast

To estimate the 2005 standing volume in planted forests, the average annual volume increment for the last 5 years was extracted from the NEFD database. This figure was calculated to be 34.783 million m3 per year. This average annual increment figure was then used to extrapolate the 2003 standing volume figure (the latest published NEFD estimate) for remaining two 2 years (2004 and 2005) from 2003. This gives (398 + 69.566 = 467.566) to give the 2005 Standing Volume estimate of 468 million m3. This figure was multiplied by the bark correction factor, and then by 85% to generate the CGS estimate for 2005 of 465 million m3, having the following results:

FRA 2005 Categories	Volume (million cubic meters over bark)		
	Forest		
	1990	2000	2005
Growing stock	235	429	547
Commercial growing stock	200	365	465

Since the above growing stock and commercial growing stock are only referred to planted forests it could not be used to complete table 5.5.

5.4 Reclassification into FRA 2005 classes

Not needed.

5.5 Data for National reporting table T5

FRA 2005 Categories	Volume (million cubic meters over bark)					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Growing stock	ID	ID	ID	ID	ID	ID
Commercial growing stock	ID	ID	ID	ID	ID	ID

Specification of country threshold values	Unit	Value	Complementary information
1. Minimum diameter at breast height of trees included in Growing stock (X)	cm	NA	No information on Growing Stock for indigenous forest (see comment (3) in Section 5.6
2. Minimum diameter at the top end of stem (Y) for calculation of Growing stock	cm	NA	As above

Specification of country threshold values	Unit	Value	Complementary information
3. Minimum diameter of branches included in Growing stock (W)	cm	NA	As above
4. Minimum diameter at breast height of trees in Commercial growing stock (Z)	cm	10	
5. Volume refers to "Above ground" (AG) or "Above stump" (AS)	AG / AS	AS	
6. Have any of the above thresholds (points 1 to 4) changed since 1990	Yes/No	No	
7. If yes, then attach a separate note giving details of the change	Attachment	-	

5.6 Comments to National reporting table T5

(1) Commercial Growing Stock standing volumes are calculated on the basis of regional yield tables for particular silvicultural regimes.

(2) Minimum small end diameters (MIN. SED) for the main log types are:

LOG TYPE	MIN. SED
Pruned	30 cm
Unpruned	20 cm
Pulp	10 cm

(3) The Department of Conservation (DoC) does not record the growing stock of the indigenous forest estate as it is not available for wood supply. DoC do not regard Standing Volume as an appropriate measure for the assets it manages. The forests are managed only to ensure the continuation of natural processes, and so there is no need for data on growing stock for forest management purposes.

(4) There are no national estimates currently available for the growing stock for merchantable and non-merchantable tree species in indigenous forests growing on private land. However, growing stock information on indigenous merchantable species is available for those indigenous forest areas covered by approved sustainable management plans (45) and permits (500), but, it is only recorded on the individual application documents and is not aggregated to cover the total forest area managed under these plans and permits.

(5) No estimates are available for growing stock on Other Wooded Lands at present.

6 Table T6 – Biomass stock

6.1 FRA 2005 Categories and definitions

Category	Definition
Above-ground biomass	All living biomass above the soil including stem, stump, branches, bark, seeds, and foliage.
Below-ground biomass	All living biomass of live roots. Fine roots of less than 2mm diameter are excluded because these often cannot be distinguished empirically from soil organic matter or litter.
Dead wood biomass	All non-living woody biomass not contained in the litter, either standing, lying on the ground, or in the soil. Dead wood includes wood lying on the surface, dead roots, and stumps larger than or equal to 10 cm in diameter or any other diameter used by the country.

6.2 National data

6.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Stephen J Wakelin, (2004). Carbon Inventory of NZ's Planted Forests (as at April 2004). NZ Forest Research Institute Report.	M	Total carbon (not soil)	1990 - 2000	This is for planted production forests only. The Carbon figure was multiplied by 2 to give total biomass.
Hall et al (2001). Strategies to estimate forest carbon stocks from inventory data: the 1990 baseline. Global Change Biology (2001) 7, 389-403	M	Total live tree carbon (does not include litter or soil)	1990	This is a preliminary estimate for indigenous forests only. This estimate does not include litter or CWD as this data was not recorded on the inventory plots
Tate et al, (2002). Land-use change alters NZ's terrestrial carbon budget: uncertainties associated with estimates of soil carbon changes between 1990 – 2000. Tellus (2002).	M	Soil carbon up to 30 cm depth, by major land use	1990	Provides the preliminary base data for soil carbon beneath forests and OWL.

6.2.2 Classification and definitions

There are no national definitions.

6.2.3 Original data

The original data is for carbon stocks in plantation forests using -Low new planting – Model CO4_B. The carbon stocks figures are multiplied by a factor of 2 to produce the biomass estimates.

	Carbon stock in million tonnes						
Year	**Total Crown C**	**Total Stem C**	**Total Above Grnd C**	**Current Rotn Root C**	**Previous Rotn Root C**	**Total Below Grnd C**	**Under-story + Floor C**
1990	16.932	53.827	70.759	22.996	3.184	26.18	18.229
2000	24.317	81.079	105.396	33.167	6.499	39.666	28.616
2005	28.931	96.305	125.236	40.162	8.427	48.589	35.986

The preliminary live tree carbon stock estimate for indigenous forests in 1990 is 919.1 Mt (from: Hall et al, 2001) (See Reference 2 in Table 6.2.1)

6.3 Analysis and processing of national data

6.3.1 Calibration

No calibration required

6.3.2 Estimation and forecasting

The biomass estimate was derived by multiplying the following carbon estimate by a factor of 2.

FRA 2005 Categories	Carbon (Million metric tonnes)					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Carbon in above-ground biomass						
(a) Plantation forests	70.759	105.396	125.236			
(b) Indigenous forests	735.3	NA	NA			
				ID	ID	ID
Carbon in below-ground biomass						
(a) Plantation forests	26.18	39.666	48.589			
(b) Indigenous forests	183.8	NA	NA	ID	ID	ID
Sub-total: Carbon in living biomass:						
(a) Plantation forests (Reference 1)	**96.939**	**145.062**	**173.825**			
(b) Indigenous forests (Reference 4)	**919.1**	**ID**	**ID**			
Sub Total	**1016.039**	**NA**	**NA**	**527**	ID	ID
Carbon in litter:						
(a) Plantation forests (Reference 1)	18.229	28.616	35.986			
(b) Indigenous forests (References 4 & 6)	570.0	ID	ID	ID	ID	ID
Total: Carbon in dead wood and litter	**588.229**	**NA**	**NA**	ID	ID	ID

6.4 Reclassification into FRA 2005 classes

Not required.

6.5 Data for National reporting table T6

FRA 2005 Categories	Biomass (million metric tonnes oven-dry weight)					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Above-ground biomass						
(a) Plantation -Ref 1	141.52	210.8	250.5			
(b) Indigenous -Ref 2	1470.6	ID	ID	ID	ID	ID
Below-ground biomass						
(a) Plantation	52.36	79.4	97.2			
(b) Indigenous	367.6	ID	ID	ID	ID	ID
Dead wood biomass						
(a) Plantation	36.458	57.2	72.0			
(b) Indigenous -Ref 3	1140	ID	ID	ID	ID	ID
TOTAL	**3208.54**			**1054**	ID	ID

6.6 Comments to National reporting table T6

Data sources are same as used for Table 7 carbon stock.

7 Table T7 – Carbon stock

7.1 FRA 2005 Categories and definitions

Category	Definition
Carbon in above-ground biomass	Carbon in all living biomass above the soil, including stem, stump, branches, bark, seeds, and foliage.
Carbon in below-ground biomass	Carbon in all living biomass of live roots. Fine roots of less than 2 mm diameter are excluded, because these often cannot be distinguished empirically from soil organic matter or litter.
Carbon in dead wood biomass	Carbon in all non-living woody biomass not contained in the litter, either standing, lying on the ground, or in the soil. Dead wood includes wood lying on the surface, dead roots, and stumps larger than or equal to 10 cm in diameter or any other diameter used by the country.
Carbon in litter	Carbon in all non-living biomass with a diameter less than a minimum diameter chose by the country for lying dead (for example 10 cm), in various states of decomposition above the mineral or organic soil. This includes the litter, fumic, and humic layers.
Soil carbon	Organic carbon in mineral and organic soils (including peat) to a specified depth chosen by the country and applied consistently through the time series.

7.2 National data

7.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable	Year	Additional comments
Wakelin, S. J, 2004. Carbon Inventory of NZ's Planted Forests (as at April 2004; NZ Forest Research Institute Report.	M	Total carbon (not soil)	1990, 2000	This is for planted production forests only, and is based on the NZ National Exotic Forest Description database.
Hall et al, 2001. Strategies to estimate forest carbon stocks from inventory data: the 1990 baseline. Global Change Biology (2001) 7, 389-403.	M	Total live tree carbon (does not include litter or soil)	1990	This is for indigenous forests only. This estimate does not include litter or CWD as this data was not recorded on the inventory plots
Scott et al, 2001. Monitoring Land -use change effects on soil carbon in New Zealand: quantifying baseline soil carbon stocks. Environmental Pollution 116 (2002) S167-S186.	M	Soil carbon to 1 metre depth	1990	Applies to the whole country, not just forests and other wooded land.
Hall et al, 1998. Estimate of the Carbon stored in NZ's indigenous forest and scrub vegetation for 1990. (LCR & FR Report JNT:9798/147).	L	Total carbon (not soil)	1990	Indigenous forests only. Includes an estimate of litter carbon. Includes an estimate of OWL; Does not include soil carbon
Tate et al, 2002. Land-use change alters NZ's terrestrial carbon budget: uncertainties associated with estimates of soil carbon changes between 1990 – 2000. Tellus (2002)	M	Soil carbon up to 30 cm depth, by major land use	1990	Provides the preliminary base data for soil carbon beneath forests and OWL.
Tate et al, 1997. Organic carbon stocks in New Zealand's terrestrial ecosystems. Jnl of the Royal Society of NZ, Vol 27 No 3, September 1997, pp315-335.	M	Organic carbon in vegetation & soils.	1992	Provides the source document for the provisional estimate of indigenous forest litter.

7.2.2 Classification and definitions

No national classification and definitions are available.

7.2.3 Original data

A. Plantation Forests

(i) NEFD areas as at 1 April 2003

(ii) April 2004 estimates of new planting, re-stocking and harvesting. (See Reference 1 in Table 7.2.1).

(iii) Estimate of carbon in all planted forests using low new planting – Model CO4_B

Year	Total Crown C	Total Stem C	Total Above Grnd C	Current Rotn Root C	Previous Rotn Root C	Total Below Grnd C	Under-story + Floor C
1990	16.932	53.827	70.759	22.996	3.184	26.18	18.229
2000	24.317	81.079	105.396	33.167	6.499	39.666	28.616
2005	28.931	96.305	125.236	40.162	8.427	48.589	35.986

B. Indigenous forests

(i) National Vegetation Survey (NVS) plot database; Vegetation Cover Map (VCM) of NZ, 1987, from Newsome (1987).

(ii) The live tree carbon stock estimate used for indigenous forests in 1990 is 919.1 Mt (from: Hall et al, 2001) (See Reference 2 in Table 7.2.1). From this figure, an estimate of 20% (183.8 Mt) is used for below ground Carbon with 735.3 Mt allocated to Carbon in above-ground biomass.

(iii) The estimate for Carbon in indigenous forest litter is taken from Tate et al, 1997. To reach this estimate, the paper describes the relationship between total above ground biomass, total litter and root biomass for beech-podocarp forest as a basis for estimating total litter mass and root C for all indigenous forests. The authors acknowledge that the lack of data on litter mass, its spatial distribution and temporal variability prevents a more reliable estimate being made.

(iv) Soil carbon at 1990: Figures in Mt from Scott et al, 2002 and Tate et al, 2002;

NZ Total Soil C 0 – 0.3m Scott et al, 2002 (ref 3)	Less: **Urban C** Scott et al	Less: **Grazing C** Tate et al, 2002 (ref 6)	Less: **Crop C** Tate et al	Less: **Scrubland C** Tate et al	**Total forest Soil C**
2 591	**60**	**1480**	**26**	**244**	**781**

7.3 Analysis and processing of national data

7.3.1 Calibration

No calibration was necessary

7.3.2 Estimation and forecasting

The forecasting for Planted forest was by the Forest Research C-Change model, version CO4_B was used for this report. However, no forecasting was possible for Indigenous forest or OWL.

7.4 Reclassification into FRA 2005 classes

Not required.

7.5 Data for National reporting table T7

FRA 2005 Categories	Carbon (Million metric tonnes)					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Carbon in above-ground biomass						
(a) Plantation forests	70.759	105.396	125.236			
(b) Indigneous forests	735.3	NA	NA			
				ID	ID	ID
Carbon in below-ground biomass						
(a) Plantation forests	26.18	39.666	48.589			
(b) Indigenous forests	183.8	NA	NA	ID	ID	ID
Sub-total: Carbon in living biomass:						
(a) Plantation forests (Reference 1)	**96.939**	**145.062**	**173.825**			
(b) Indigenous forests (Reference 4)	**919.1**	**ID**	**ID**			
Sub Total	**1016.039**	**NA**	**NA**	**527**	ID	ID
Carbon in dead wood*	ID	ID	ID	ID	ID	ID
Carbon in litter:						
(a) Plantation forests (Reference 1)	18.229	28.616	35.986			
(b) Indigenous forests (References 4 & 6)	570.0**	ID	ID	ID	ID	ID
Sub-total: Carbon in dead wood and litter	**588.229**	**NA**	**NA**	ID	ID	ID
Soil carbon to a depth of 30 cm (Reference 5)	781	ID	ID	244	ID	ID
TOTAL CARBON	**2385.27**	**ID**	**ID**	**771*****	**ID**	**ID**

*Note: Carbon in deadwood is included in the litter values. See comments below.
**This estimate is based on limited data and is thought to over-estimate the amount of deadwood. See 7.2.3 (iv) above.
***This figure is incomplete because of insufficient data in key components.

7.6 Comments to National reporting table T7

A Kyoto Protocol carbon accounting system is currently being developed for New Zealand's forests. It is being developed to satisfy that IPCC Good Practice Guidance for Land-use, Land-use Change and Forestry and once complete, this system will account for human-induced carbon sources and sinks from New Zealand's land use change and forestry activities.

For this Report, however, the carbon estimate for indigenous forests used in the above Table 7 has been derived from existing forest inventory plots (Hall et al, 1998 & 2001). These plots have not been systematically located across all indigenous forests in NZ and therefore the current estimates may not be truly representative. The estimates of carbon in living biomass for indigenous forests varied between the publications noted. These estimates should not be regarded as definitive estimates at this stage.

Above and below ground carbon sources were combined, and the 1998 report indicated that root carbon was considered to be about 20% of the total live carbon. The estimate of dead wood or litter (coarse woody debris or CWD) carbon referred to in the first report was derived from another source, (Tate et al 1997), and this represents the first published estimate for indigenous forests (Tate pers comm.).

The data available for scrublands (OWL) was preliminary and weighted according to vegetation type. Areas of OWL vegetation type have only been crudely estimated, and so the carbon estimates will vary as the mapping of New Zealand's shrub lands improves.

The national carbon accounting system module for indigenous forests and scrublands being implemented now is based on the measurement and analysis of about 1400 systematically

located permanent sample plots, established on an 8km by 8km grid across New Zealand. This will provide unbiased estimates for all carbon pools at given times. About one-third of the plots already exist, enabling the system to incorporate some existing forest data. These data are still to be analysed and so no estimates for 2000 are currently available from this data source.

The carbon estimates for plantation forests include stem, crown and root carbon and also values for the forest floor and understorey. A specific model, which simulates the carbon content of managed radiata pine stands, is used to convert stem volume at each age to total carbon. Carbon in dead wood and carbon in forest litter have been combined in the report used (Wakelin, 2004). They are likely to be unbundled for future Carbon monitoring, but this has not been done in time for this report.

The 2004 estimate for plantation forest carbon in future years takes into account a revised estimate of new planting and a lower level of harvesting than previously modelled.

The estimates for soil carbon to a depth of 30 cm have been derived from 2 separate sources.

8 Table T8 – Disturbances affecting health and vitality

8.1 FRA 2005 Categories and definitions

Category	Definition
Disturbance by fire	Disturbance caused by wildfire, independently whether it broke out inside or outside the forest/OWL.
Disturbance by insects	Disturbance caused by insect pests that are detrimental to tree health.
Disturbance by diseases	Disturbance caused by diseases attributable to pathogens, such as a bacteria, fungi, phytoplasma or virus.
Other disturbance	Disturbance caused by other factors than fire, insects or diseases.

8.2 National data

8.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Rural Fire Authority annual returns, as reported annually by the National Rural Fire Authority	M/L	Area of fires	1986/87 to 2003/04	
John Moore pers.com. FR database on wind damage to plantations. Forest Research (unpublished)	M/L	Area of plantation lost to wind	1960's to 2004	Records from NZ Forest Service have been kept, and supplemented by personal records from other forestry companies.
A Somerville, 1995. Wind damage to New Zealand State plantation forests. .In: "Wind and Trees" MP Coutts & J Grace Eds, 1995	M/L	Area of plantation lost to wind	1900 - 1990	Wind damage varies considerably between forests. A weighted average of 0.38% per annum of State Forests was lost catastrophically. Attritional losses were 0.25% pa.
Lindsay Bulman pers.com in "Montreal Process Country Report (MAF, 2003): Criterion 3(a)"	M/L	Economic losses in plantation forests from exotic pathogens.	1970's to present	To date, exotic pathogens have had little effect on an area basis.

8.2.2 Classification and definitions

National class	Definition
Disturbance by fire	Area over which fire has burned the vegetation
Disturbance by wind	Area in which wind damage has been caused, such that up to 85% of the pre-event stocking has been lost.

8.2.1 Original data

Data on fire loss is mostly provided by crews managing the fire suppression operation. For larger fires, area data is now likely to be captured by GPS.

Fire Losses for 1990 Reporting Year

Year	1988	1989	1990	1991	1992	Average
Area Forest Fires (ha)	615	462	240	152	151	**324**
Area Scrub Fires (OWL)	9,504	1,313	3,361	857	2,193	**3,446**

Fire Losses for 2000 Reporting Year

Year	1998	1999	2000	2001	2002	Average
Area Forest Fires (ha)	1,296	209	141	437	119	**440**
Area Scrub Fires (OWL)	2,019	5,759	1,349	1,879	2,187	**2,639**

Data on wind loss in planted forests was gathered by NZ Forest Service staff and provided to wind researchers on an informal basis.

The following data is taken from the paper by Somerville, 1995:

	NSA 1990	Area Damaged	Catastrophic risk % loss/year	Attritional risk % loss /year
Overall Forests	259,950	30,860	0.42	0.19
Weighted Average			**0.38**	**0.25**

8.3 Analysis and processing of national data

8.3.1 Estimation and forecasting

The area of planted forest affected by wind was estimated by applying the Somerville percentage losses in the following way:

Year	1990	2000
Planted Forest area (000 ha)	1,261	1,769
% Loss per Year	0.38	0.38
Area Affected (000 ha)	**4.79**	**6.72**

8.4 Reclassification into FRA 2005 classes

N/A

8.5 Data for National reporting table T8

FRA-2005 Categories	Average annual area affected (1000 hectares)			
	Forests		Other wooded land	
	1990	2000	1990	2000
Disturbance by fire	0.324	0.44	3.446	2.639
Disturbance by insects	ID	ID	ID	ID
Disturbance by diseases	ID	ID	ID	ID
Other disturbance (wind in plantation forests)	4.79	6.72	ID	ID

8.6 Comments to National reporting table T8

Other disturbance is wind damage in plantation forests

Fire Data

Rural Fire Authorities in New Zealand are a mix of Department of Conservation, forestry companies, Ministry of Defence and Local Government in which the culture is essentially operational. Reporting areas of scrub land burnt or areas of plantation lost to the National Rural Fire Authority has been by "guestimates" in the past. DoC record fire losses in forest and OWL accurately. Increasing professionalism in the rest of the rural fire management sector and the better use of technology (eg GPS) has led to better quality and more reliable data in the last 3 – 5 years.

Insects and Diseases
No figures are kept for disturbance by insect or disease in plantations, mainly because the research and biosecurity efforts have kept NZ plantations essentially pest free.
Work by Bulman (reported in 2003) describes productivity loss through various diseases affecting plantations, and relates that to an effect on forest value. It is difficult to place an area figure on such a loss as to date the trees have not been killed by these pathogens.
The Department of Conservation (DoC) regard indigenous pest and disease disturbance of indigenous Forest and Other Wooded Land as a natural phenomenon and do not record it.

Wind
Wind damage in indigenous forests and OWL is regarded by DoC as a natural occurrence and so the area affected is not recorded.

9 Table T9 – Diversity of tree species

9.1 FRA 2005 Categories and definitions

Category	Definition
Number of native tree species	The total number of native tree species that have been identified within the country.
Number of critically endangered tree species	The number of native tree species that are classified as "Critically endangered" in the IUCN red list.
Number of endangered tree species	The number of native tree species that are classified as "Endangered" in the IUCN red list.
Number of vulnerable tree species	The number of native tree species that are classified as "Vulnerable" in the IUCN red list.

9.2 National data

9.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Landcare New Zealand, 2000. Species 2000 – a species list.. (a Millenium document)	H	Tree species	Valid as at 2000	The list included species that are naturalised. Not all will yet be common elements in forests, but are probably all present in some forested areas.
Rod Hitchmough (compiler), NZ threat classification system lists. Department of Conservation (2002).	H	Species under threat.	2002	NZ does not use the IUCN system, and has cross-referenced the results of using the NZ system

9.2.2 Classification and definitions

National class	Definition
Number of critically endangered tree species	Number of species classified as "nationally critical" in the NZ system. Similar to the IUCN definition.
Number of endangered tree species	Number of species classified as "nationally endangered" in the NZ system. Similar to the IUCN definition.
Number of vulnerable tree species	Number of species classified as nationally vulnerable, serious decline, gradual decline, sparse or range restricted in the NZ system. This may be a slightly wider definition than the IUCN vulnerable.

9.2.3 Original data

Data was collected as part of a Millennium project to list all the known plant species in NZ.

9.3 Data for National reporting table T9

FRA 2005 Categories	Number of species (year 2000)
Native tree species	121
Critically endangered tree species	1
Endangered tree species	2
Vulnerable tree species	4

9.4 Comments to National reporting table T9

The corresponding figures under the Department of Conservation system are 3, 2, and 24. The Department of Conservation does not use the IUCN system, and does not distinguish between trees and shrubs as it makes no difference from a management perspective.

10 Table T10 – Growing stock composition

10.1 FRA 2005 Categories and definitions

List of species names (scientific and common names) of the ten most common species.
Planted Forests:
Pinus radiata – Radiata or Monterey pine
Pseudotsuga menzesii – Douglas fir
Cupressus macrocarpa – Macrocarpa
Cupressus lusitanica – Lusitanica
Pinus nigra – Corsican pine
Larix spp – larch
Eucalyptus spp – Eucalypts

10.2 National data

10.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
A National Exotic Forest Description as at 1 April 1990. Ministry of Forestry (1991)	M	Estimates total growing stock of exotic plantation species.	1990	
A National Exotic Forest Description as at 1 April 2000. Ministry of Agriculture and Forestry (2001)	H	Estimates total growing stock of exotic plantation species.	2000	

10.2.2 Original data

The data on commercial growing stock is calculated and reported by the Ministry of Agriculture and Forestry as part of the annual National Exotic Forest Description (NEFD) report.

National Class	1990	2000
Planted Forest Standing Volume (million m3 ib)	201	367

Commercial growing stock by main species (in million m3):

Species	Growing Stock IB, 1990	Growing Stock OB 1990	Growing Stock IB, 2000	Growing Stock OB, 2000
Radiata pine	178	208.3	336	393.1
Douglas fir	13	15.2	18.6	21.8
Other softwoods	6	7.0	6.7	7.8
All hardwoods	4	4.7	5.6	6.6

10.3 Analysis and processing of national data

10.3.1 Calibration

The New Zealand commercial growing stock figure is measured as “inside bark”. To produce the “over bark” figure a factor of 1.17 was used.

10.3.2 Estimation and forecasting

10.4 Data for National reporting table T10

FRA 2005 Categories / Species name (Scientific name and common name)	**Growing Stock in Forests (million cubic meters)**	
	1990	**2000**
Name of 1st most common species: Pinus radiata (Radiata pine)	208	393
Name of 2nd most common species : Pseudotsuga menzesii (Douglas fir)	15	22
Name of next most common species : "Other softwoods" is a group of a number of different species including pines, cypresses, larch, spruce	7	8
The most common hardwood: Eucalyptus spp (eucalypts) "All hardwoods" is all the hardwood spp grown in NZ plantations	5	7
TOTAL	**235**	**429**

10.5 Comments to National reporting table T10

As reported in other tables, currently no growing stock estimates are available for NZ's indigenous forests. See notes in Table 5.

No commercial growing stock estimates for the other species are collected for use in any of the NEFD reports.

11 Table T11 – Wood removal

11.1 FRA 2005 Categories and definitions

Category	Definition
Industrial wood removal	The wood removed (volume of roundwood over bark) for production of goods and services other than energy production (woodfuel).
Woodfuel removal	The wood removed for energy production purposes, regardless whether for industrial, commercial or domestic use.

11.2 National data

11.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
MAF Statistics Release: SR 12/2004: Estimated Roundwood Removals from NZ Forests, March 2004	H	Roundwood removals	1990 & 2000	
Situation & Outlook for NZ Agriculture & Forestry (SONZAF) May 2004 Update; Table 21. Ministry of Agriculture and Forestry. (2004)	H	Forecast Roundwood removals	2005	

11.2.2 Classification and definitions

National class	Definition
Industrial roundwood	The wood removed for production purposes. The volume of roundwood is calculated **inside bark**.

11.2.3 Original data

Roundwood removal figures as collected and reported annually by MAF:

For the 1990 reporting year

Year	1988	1989	1990	1991	1992	Average (5-years)
Roundwood Removal (000m3)	9,688	10,619	11,486	13,454	13,903	**11,830**

For the 2000 reporting year

Year	1998	1999	2000	2001	2002	Average (5-years)
Roundwood Removal (000m3)	16,705	15,814	18,196	19,287	20,940	**18,188**

11.3 Analysis and processing of national data

11.3.1 Estimation and forecasting

A figure of 1.17 has been used to convert the base data figures to "over bark".

The forecast figure for 2005 has been taken from the Situation and Outlook for NZ Agriculture and Forestry, 2004 publication (21,100,000 m3). This is a one year figure compared to the 5 year averages for the 1990 and 2000 reporting years.

11.4 Reclassification into FRA 2005 classes

No reclassification was necessary

11.5 Data for National reporting table T11

FRA 2005 Categories	Volume in 1000 cubic meters of roundwood over bark					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Industrial roundwood	13841	21280	24687	ID	ID	ID
Woodfuel	ID	ID	ID	ID	ID	ID
TOTAL for Country	**13,841**	**21,280**	**24,687**	**ID**	**ID**	**ID**

11.6 Comments to National reporting table T11

Wood fuel removal is not recorded in official statistics. There is some removal for domestic fuel, but generally as off-cuts from the main industrial roundwood use. Many plantation forestry companies allow occasional access for people to collect firewood, but do not collect statistics on it as the amounts involved are so small, and the activity is seasonal.
The commercial firewood business is characterised by a large number of small, transient operators. It is under threat as a number of Regional Councils throughout the country are seeking to place bans or controls on wood burning fires.
Some wood processing plants are investigating co-generation of energy in the form of electricity from waste materials, particularly wood waste. As this is still largely experimental, no figures are available.

12 Table T12 – Value of wood removal

12.1 FRA 2005 Categories and definitions

Category	Definition
Value of industrial wood removal	Value of the wood removed for production of goods and services other than energy production (woodfuel).
Value of woodfuel removal	Value of the wood removed for energy production purposes, regardless whether for industrial, commercial or domestic use.

12.2 National data

12.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
MAF –stumpage averages. Unpublished tables.	M	Log prices	1990	
MAF – log prices, as published on the MAF web site	H	Log prices	2000	
Situation & Outlook for NZ Agriculture & Forestry (SONZAF) May 2004 Update; Table 21. Ministry of Agriculture and Forestry (2004)	H	Log prices	2005	
Reserve Bank of NZ (Source)	H	US/NZD exchange rate	1990 - 2000	Supplied by Treasury

12.2.2 Classification and definitions

National class	Definition
N/A	

12.2.3 Original data

1988 – 1992 weighted average stumpage was New Zealand Dollars $34.14 per cubic metre.

1998 – 2002 weighted average stumpage derived from 5-year average of all-grade log prices was NZD 61.31/m3. This was calculated from mill gate price of $94.11, less the average logging cost of $25, less the average cartage cost of 60km at 13 cents/km ($7.8), all in NZD per cubic metre.

USD/NZD Exchange rate average – March Year – 1990 Reporting Year

Year	1988	1989	1990	1991	1992	Average (5-years)
Exchange Rate	.621	.646	.592	.598	.566	**0.605**

USD/NZD Exchange rate average – March Year – 2000 Reporting Year

Year	1998	1999	2000	2001	2002	Average (5-years)
Exchange Rate	.633	.527	.52	.441	.419	**0.508**

12.3 Analysis and processing of national data

12.3.1 Estimation and forecasting

2005 weighted average stumpage was forecast to be $80.80, with average logging and transport costs the same as the previous period.

The exchange rate is forecast to be 0.639.

12.4 Reclassification into FRA 2005 classes

12.5 Data for National reporting table T12

FRA 2005 Categories	Value of roundwood removal (1000 USD)					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Industrial roundwood	244345	566474	647179	ID	ID	ID
Woodfuel	ID	ID	ID	ID	ID	ID
TOTAL for Country	244,345	566,474	647,179	ID	ID	ID

12.6 Comments to National reporting table T12

In New Zealand, the values of logs are calculated and sold on an “Under Bark” basis so the figures from Table 11.2.3 were used to calculate the values in Table T12.

13 Table T13 – Non-wood forest product removal

13.1 FRA 2005 Categories and definitions

The following categories of non-wood forest products have been defined:

Category
Plant products / raw material
1. Food
2. Fodder
3. Raw material for medicine and aromatic products
4. Raw material for colorants and dyes
5. Raw material for utensils, handicrafts & construction
6. Ornamental plants
7. Exudates
8. Other plant products
Animal products / raw material
9. Living animals
10. Hides, skins and trophies
11. Wild honey and bee-wax
12. Bush meat
13. Raw material for medicine
14. Raw material for colorants
15. Other edible animal products
16. Other non-edible animal products

13.2 National data

13.2.1 Data sources

References to sources of information	**Quality (H/M/L)**	**Variable(s)**	**Year(s)**	**Additional comments**
NZ Horticulture Facts & figures 2003	H	Honey	2003	Provides total honey production for the country as a whole. Production from Forest & OWL estimated by MAF staff.
MAF Horticulture Monitoring Report July 2003	H	Gross Margin per hive	2000 - 2003	Honey production is only part of the value from bees. This report provides the number of hives & the Gross Margin per hive.
NZ Horticulture Facts & figures 2003	H	Sphagnum Moss	1990 - 2003	Additional comments were obtained from industry sources. The 2005 figure is an estimate based on declining production.
TBFRA 2000	L	Christmas Trees	1990 – 2005	Based on population estimates.
Wilkes & Prior –Possum traders (pers com)	L	Possum skins, possum fur	1990 - 2005	Regarded as 1 of the major players in the industry.
New Zealand Country Report to Montreal Process, 2003. MAF Technical Paper 2002/21, December 2002.	H	Variety of NWFP	2000	Provides a source of data for most of NWFP.
NZ Department of	H	Honey	1995	MAF staff have estimated the honey

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Statistics Yearbook, 1995		production		produced from forest sources compared to pasture & non-forest sources.
NZ Food Safety Authority (pers.com.)	H	Honey production	2002	As above
MAF Deer Monitoring Report, July 2003.	H	Feral deer killed. Velvet produced.	2000 - 2004	The 2005 figure is a projected estimate. Does not include animals killed for private purposes or personal consumption.
MAF slaughter statistics database	H	Feral goats killed	1997 – 2003	All goats registered as slaughtered are assumed to be feral animals. Does not include goats killed for private purposes or in goat control operations.

13.2.2 Classification and definitions

National class	Definition
N/A	

13.2.3 Original data

See 13.3.1

13.3 Analysis and processing of national data

13.3.1 Estimation and forecasting

Accurate original data for NWFP are difficult to obtain. Production estimates for the following NWFP are:

Product	1990	2000	2005
Sphagnum moss (tonnes)	950	1320	900
Xmas trees (tonnes)	4000	4500	5000
Possum skins (000)	500	21	24
Honey (tonnes)	2566	3203	2900
Feral goats (numbers)	1500	1400	1200
Feral deer (numbers)	800	797	700
Feral velvet (tonnes)	16	15.5	10.6

The estimate of the honey production coming from Forest and OWL (33%) was applied to the number of hives

An average Christmas tree weighs about 10 kg, so there will be 100 Christmas trees per tonne.

An average of 3 possum skins are required to produce 1 kg of possum fur.

Average live weights: feral goat 35-40 kg, feral deer 95-100 kg. These values were used to convert the number of feral deer and goats obtaining the following results:

Product	1990	2000	2005
Feral goats (tonnes)	52.5	49.0	42.0
Feral deer (tonnes)	76.0	75.72	47.5
Total	**128.5**	**124.72**	**89.5**

13.4 Reclassification into FRA 2005 classes

Not required.

13.5 Data for National reporting table T13

FRA 2005 Categories	Scale factor	Unit	NWFP removal		
			1990	2000	2005
Plant products / raw material					
1. Food			ID	ID	ID
2. Fodder			0	0	0
3. Raw material for medicine and aromatic products			ID	ID	ID
4. Raw material for colorants and dyes			ID	ID	ID
5. Raw material for utensils, handicrafts & construction			ID	ID	ID
6. Ornamental plants			0	0	0
7. Exudates			0	0	0
8. Other plant products – Sphagnum Moss & Christmas trees		tonnes	4950	5820	5900
Animal products / raw material					
9. Living animals			ID	ID	ID
10. Hides, skins and trophies: Possum skins exported & skins purchased domestically		1000	500	21	24
11. Wild honey and bee-wax		tonnes	2566	3203	2900
12. Bush meat: Feral Goats & Feral deer		tonnes	128.5	124.72	89.5
13. Raw material for medicine			0	0	0
14. Raw material for colorants			0	0	0
15. Other edible animal products – velvet		tonnes	16.0	15.5	10.6
16. Other non-edible animal products			ID	ID	ID

13.6 Comments to National reporting table T13

Plant products/raw material

1. **Food** products for personal uses include water cress from forest streams.
   Young fern fronds are now being used in specialised restaurants that feature Maori dishes. Small, trial shipments have been exported in previous years, but no data are kept on either domestic use or export volumes.
   Nuts, olives and truffles have been excluded as they are harvested from agricultural lands specifically planted for the purpose.

2. **Fodder** has been given a nil score as forests are not normally used for grazing purposes. Some casual grazing is permitted in both plantation and natural forests at certain times, but this is not recorded.

3. **Raw material for medicine and aromatic products.** The indigenous Mâori population has traditionally utilised a number of forest plant species for medicinal purposes. These include Karamu, Koromiko, Makomako, and manuka. Flax also has antiseptic properties. No figures exist for such usage. There has been increased scientific research on these species to determine whether they have commercial applications. Research is also continuing to determine whether seeds and berries of up to 46 indigenous forest plants have benefits as supplements for human food and nutrition.

4. **Raw material for colorants and dyes.** There has been occasional Maori and artist use of forest berries, lichens etc for dyes. Such use is not recorded.

5. **Raw material for utensils, handicrafts & construction.** No known Non Wood Forest Products have been used by the indigenous Maori population or European settlers for utensils.

There is increasing use of flax, a traditional material, for handicrafts by Maori. Flax is a swamp plant and not all comes from Forest or OWL. The volumes or amounts of flax used are not recorded. Wood, particularly totara, is the traditional material for Maori carving, both as a handicraft and for traditional construction components (eg carved central poles, lintels and fascia boards) of houses and community buildings. There is little traditional carving for domestic use; the main market is for the tourist trade. The volumes used are not recorded.
The trunks of tree ferns are popular for landscape construction purposes. No records of this trade are kept.

6. **Ornamental plants.** There is very little collection of ornamental plants from New Zealand's forests. The indigenous flora is not well known for vibrant colours or special flowers. However, plant breeders have produced a number of different varieties of various species with different colours and variegated leaves etc, but this work has been done in commercial glass houses.

7. **Exudates.** There is no collection of exudates from New Zealand forests. The only exudate that was collected in the past was kauri gum, a subterranean solid resin product from kauri forests.

8. **Other Plant Products.** Sphagnum moss is produced from a range of areas including some forest boundaries, but mostly from swamps within the forest lands of the South Island's West Coast. It is collected under licence from State land as well as from some private land. When dry, it is highly absorbent. The majority of the production, about 80%, is exported, mainly to Japan, where it is used in horticulture in general and orchid production in particular. The industry is increasing its focus on domestic use to make use of its naturally sterile properties, especially in sanitary products. Production has fluctuated with international demand, and the industry has been affected in the last decade by swamp drainage for conversion to dairy farming, the shortage of rural labour, and increased competition from a lower grade moss from Chile.
Christmas trees (usually 3 – 4 year old radiata pine thinnings or branches from older trees) are popular in New Zealand homes and businesses during the Christmas season. The demand appears to be increasing with an increasing population, despite the increasing sales of artificial trees. No records are kept as much of the pre-Christmas trade in such trees is off the back of trucks or large trailers, or organised for various charities.

Animal Products/raw material

9. **Living Animals.** Because New Zealand's natural forests were not originally home to any large animals or mammals, living animals are not a recognised forest product. The introduced red deer is sometimes caught by farmers in specific traps and the deer either killed for home consumption or added to the domesticated herd, but this is now a relatively infrequent occurrence as feral deer can be disruptive to a domesticated herd.

10. **Hides, Skins and Trophies.** There is an occasional market for hides of the various introduced animals that frequent forests and OWL.
The market for possum skins was the original reason for the introduction of the Australian possum in the 1830's. The export market thrived until fashions changed and the possum fur was regarded as the same as other furs. Possum skin use is now limited domestically and declining rapidly in the export markets.
Possum fur, plucked from dead carcasses, is now highly sought after domestically as it is blended with merino fibre to produce a light warm yarn that is gaining wide market acceptance. This market is confined to the winter months when the possum fur is at its longest. The number of possum skins sold domestically was estimated from an average of 3 possums required to produce 1 kilogram of possum fur.
The possum is regarded as one of the most serious threats to NZ's indigenous flora and fauna, and the numbers quoted above do not relate in any way to the numbers of possums killed in possum control operations in any one year. Those numbers are not established in any way.
New Zealand has a developing game estate and trophy industry, but specific data is not available. The photographic evidence from the hunting lodge web sites, combined with the known habits of Thar and Chamois indicates that many of the trophy animals are shot or photographed in the hill or high country outside forest or OWL areas.

11. **Wild Honey and Bee Wax.** Forests play an important role in the domestic honey and bee keeping industry. NZ's beekeepers utilise a range of flowering forest tree species as a source of pollen and

nectar. Three monofloral honeys (manuka, southern rata and tawari) are important to the industry. Manuka honey in particular is sought after for its range of anti-bacterial properties. Beekeepers also extract honeydew nectar from 2 species of scale insects that inhabit the bark of beech (Nothofagus) trees. Honeydew is a significant health food product, and is viewed as a premium honey product in Europe. However, production is subject to fluctuations in wasp populations in forest areas. The data collected by the industry do not distinguish between honey collected from forests or other areas. Hives are moved on a regular basis, and there are seasonal fluctuations and annual differences in production from different areas and sources. However, for the purpose of this report, the percentage of honey production estimated as coming from forest and OWL sources was put at 33% by MAF staff.

12. **Bush Meat.** There are no accurate records for the number of feral animals processed for commercial sale. The Ministry of Agriculture and Forestry records the number of Deer killed, but these are primarily farmed stock and there is an estimate of the numbers of feral animals killed. This number is declining rapidly. The figures exclude feral meat taken for private consumption. All goats processed may be regarded as feral as they are not specifically farmed; however, not all come from forest and OWL. Possum meat has previously been regarded as a potential source of low-cholesterol meat and as pet food, but because of its close association with bovine Tuberculosis, this market has not developed and no data on its production is available.

13. **Raw material for medicine.** No animal products are used.

14. **Raw material for colorants.** No animal products are used.

15. **Other edible animal products.** A small market for "medicinal" remedies such as velvet exists. The main market is in Asia and has been volatile. Data on velvet production were estimated from the MAF Deer monitoring report, on the basis that velvet production from feral deer was in the same proportion as meat production.

16. Other non-edible animal products. A small export market for such products as deer tails and sinews exists, but it also is volatile and apparently easily over-supplied.

14 Table T14 – Value of non-wood forest product removal

14.1 FRA 2005 Categories and definitions

The following categories of non-wood forest products have been defined:

Category
Plant products / raw material
1. Food
2. Fodder
3. Raw material for medicine and aromatic products
4. Raw material for colorants and dyes
5. Raw material for utensils, handicrafts & construction
6. Ornamental plants
7. Exudates
8. Other plant products
Animal products / raw material
9. Living animals
10. Hides, skins and trophies
11. Wild honey and bee-wax
12. Bush meat
13. Raw material for medicine
14. Raw material for colorants
15. Other edible animal products
16. Other non-edible animal products

14.2 National data

14.2.1 Data sources

References to sources of information	**Quality (H/M/L)**	**Variable(s)**	**Year(s)**	**Additional comments**
MAF Policy exchange rate historical data and projections for 2005	H	NZD/US exchange rate conversion	1990 – 2005	
MAF Horticulture Monitoring Report 2003	H	Gross margin per hive	2003	The value of bees is more than honey production. The industry data identifies the gross margin per hive.
NZ Horticulture Facts & figures 2003	M	Sphagnum Moss	1990 - 2003	Additional comments were obtained from industry sources. Value per tonne was calculated from the table.

14.2.2 Classification and definitions

National class	**Definition**
N/A	

14.2.3 Original data

USD/NZD Exchange rate average – March Year – 1990 Reporting Year:

Year	**1988**	**1989**	**1990**	**1991**	**1992**	**Average**
Exchange Rate	.621	.646	.592	.598	.566	**0.605**

USD/NZD Exchange rate average – March Year – 2000 Reporting Year:

Year	**1998**	**1999**	**2000**	**2001**	**2002**	**Average**
Exchange Rate	.633	.527	.52	.441	.419	**0.508**

14.3 Analysis and processing of national data

14.3.1 Estimation and forecasting

- The USD/NZD exchange rate is forecast to be 0.639.

Product	Basis for Value	1990	2000	2005
Sphagnum moss	NZ$11,600/tonne	$11.0 million	$15.3 million	$10.4 million
Xmas trees (000)	NZ$15 each	$6 million	$6.75 million	$7.5 million
Possum skins (000)	NZ$15 each ($5 for '05)	$7.5 million	$365,000	$365,000
Honey	NZ$1695/tonne ($3185 for '05)	$4.35 million	$5.43 million	$9.24 million
Feral goats	NZ$2.50/carcass	$3,750	$3,500	$3,000
Feral deer	NZ$400/carcass	$320,000	$318,800	$280,000
Feral velvet (kg)	NZ$114/kg ($68/kg for '05)	$1.824 million	$1.767 million	$721,000

14.4 Reclassification into FRA 2005 classes

N/A

14.5 Data for National reporting table T14

FRA 2005 Categories	Value of the of NWFP removed (1000 USD)		
	1990	2000	2005
Plant products / raw material			
1. Food	ID	ID	ID
2. Fodder	0	0	0
3. Raw material for medicine and aromatic products	ID	ID	ID
4. Raw material for colorants and dyes	ID	ID	ID
5. Raw material for utensils, handicrafts & construction	ID	ID	ID
6. Ornamental plants	0	0	0
7. Exudates	0	0	0
8. Other plant products: Sphagnum moss & Christmas trees	10297	11207	11463
Animal products / raw material			
9. Living animals	ID	ID	ID
10. Hides, skins and trophies: Possum skins	4537	199	233
11. Wild honey and bee-wax	2631	2758	5902
12. Bush meat: Feral goats & Feral deer	196.27	163.78	180.92
13. Raw material for medicine	0	0	0
14. Raw material for colorants	0	0	0
15. Other edible animal products (Velvet)	1103	897	461
16. Other non-edible animal products	ID	ID	ID
TOTAL			

14.6 Comments to National reporting table T14

The possum fur industry did not exist in 1990.

15 Table T15 – Employment in forestry

15.1 FRA 2005 Categories and definitions

Category	Definition
Primary production of goods	Employment in activities related to primary production of goods, like industrial roundwood, woodfuel and non-wood forest products.
Provision of services	Employment in activities directly related to services from forests and woodlands.
Unspecified forestry activities	Employment in unspecified forestry activities.

15.2 National data

15.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
MAF Statistical Release SR15/2004 –Employment.	H	Persons engaged	2000	Data obtained from Statistics NZ Business Directory.
MOF Statistical Release SR24/1990 – Employment	H	Persons engaged	1990	Data obtained from Statistics NZ Business Directory. NB different Industry Code from that used for 2000 numbers.
MOF Statistical Release SR29/1996 – Employment	H	Persons engaged	1992 - 1996	
NZ Forestry Statistics, 2000. Ministry of Agriculture and Forestry (2001).	H	Employment in Forestry Activities	1995 - 2000	The ANZIC codes changed in 1994, and this is the first year to enable a direct comparison with the year 2000.
MAF Statistical Release SR42/2001 –Employment.	H	Persons engaged	1997 - 2001	Data obtained from Statistics NZ Business Directory.

15.2.2 Classification and definitions

National class	Definition
ANZIC Codes	Australia & New Zealand Standard Industry Classification
A030100	Forestry
A030200	Logging
A030300	Services to forestry
NZSIC (for 1990)	
1210	Forestry and services to forestry
1220	Logging & other timber felling
1230	Forestry & logging management & consulting
Persons Engaged	Total number of full time employees and working proprietors (persons working 30 hours or more per week) plus half the number of part time employees and working proprietors.

15.2.3 Original data

The forestry statistics are from the Business Directory Update surveys conducted annually by Statistics NZ. MAF does not collect employment statistics for the "forestry sector" as a whole because of boundary definition problems.
Changes from year to year may be related to changes to the ANZIC code allocated to the activity, or they may be due to improvements in the coverage of the Business Directory. An example of the changes that can occur can be seen in the 1995 – 2000 table below.

Employment at Mid February 1990 - 1996:
(Sources: SR24/1990 and SR29/1996)

NZSIC	Definition	1990	1995	1996
1210	Forestry & services to forestry	3 342	5 702	5 656
1220	Logging & other timber felling	2 280	3 661	3 724
1230	Forestry & logging management & consulting	259	549	573

Employment at mid February 1995 – 2000:

ANZIC	Definition	1995	1996	2000	2000
Source		NZ Forestry Statistics	NZ Forestry Statistics	NZ Forestry Statistics	SR15/2004
A030100	Forestry	2326	2470	1860	1780
A030200	Logging	3890	3920	4050	3990
A030300	Services to Forestry	3148	3010	3380	3325

The 1990 data has a different basis for collection than the 2000 data and the two years cannot strictly be compared from a common point.

The Business Directory data is updated and revised annually, and the SR15/2004 figure, as the most recent, will be presented in Table T15.

15.3 Analysis and processing of national data

15.3.1 Estimation and forecasting

N/A

15.4 Reclassification into FRA 2005 classes

No reclassification was carried out. The way New Zealand national employment data is collected does not permit such a breakdown.

15.5 Data for National reporting table T15

FRA 2005 Categories	Employment (1000 person-years)	
	1990	2000
Primary production of goods (1)	5.622	5.77
Provision of services	ID	ID
Unspecified forestry activities (2)	0.259	3.325
TOTAL	**5.881**	**9.095**

15.6 Comments to National reporting table T15

(1)This is defined as people employed in forestry and logging, as at mid February 1990 and 2000. The 1990 figures are not comparable as the definitions against which employment data were collected changed in the mid 1990's.

(2) This is defined as services to forestry, or forestry and logging management and consulting, in the relevant years.

"*Persons engaged in forestry and first stage processing*" is regarded as the most appropriate indicator of employment generated by forests and woodlands in NZ.
The 1995 figure was 23,967, being 1.36% of the total national labour force as at the March quarter.
The corresponding 2000 figure was 23,570, or 1.24% of the total national labour force as at the March quarter (MAF 2000).

16 Thematic reporting tables

New Zealand has submitted its 2003 Montreal Process Country report ("New Zealand Country Report Montreal Process Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests 2003") as its supporting thematic report.

New Zealand's Montreal Process Country report is available on: http://www.maf.govt.nz/mafnet/publications/montreal-process-country-report-2003/montreal-process-technical-paper-2002-21.pdf.