Forestry Department
Food and Agriculture Organization of the United Nations

GLOBAL FOREST RESOURCES ASSESSMENT 2010

COUNTRY REPORT

NEW ZEALAND

FRA2010/148
Rome, 2010

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 2010 (FRA 2010).

The reporting framework for FRA 2010 is based on the thematic elements of sustainable forest management acknowledged in intergovernmental forest-related fora and includes variables related to the extent, condition, uses and values of forest resources, as well as the policy, legal and institutional framework related to forests. More information on the FRA 2010 process and the results - including all the country reports - is available on the FRA Web site (www.fao.org/forestry/fra).

The Global Forest Resources Assessment process is coordinated by the Forestry Department at FAO headquarters in Rome. The contact person for matters related to FRA 2010 is:

Mette Løyche Wilkie
Senior Forestry Officer
FAO Forestry Department
Viale delle Terme di Caracalla
Rome 00153, Italy

E-mail: Mette.LoycheWilkie@fao.org

Readers can also use the following e-mail address: fra@fao.org

Contents

Report preparation and contact persons

The present report was prepared by the following person(s):

Name (FAMILY NAME, First name)	Institution / address	E-mail	Fax	Tables
RIVAS PALMA, Rosa	Ministry of Agriculture and Forestry (MAF) PO Box 2526, Wellington New Zealand	Rosa.Rivas@maf.govt.nz	64-4-8940741	1-17
LANE, Paul	Ministry of Agriculture and Forestry (MAF) PO Box 2526, Wellington New Zealand	Paul.Lane@maf.govt.nz	64-4-8940741	1-17
BULMAN, Lindsay	Scion Research Private Bag 3020 49 Sala Street Rotorua New Zealand	Lindsay.Bulman@scionresearch.com	64-7-3435679	10

Comments and/or peer reviews were provided by the following persons:

Name (FAMILY NAME, First name)	Institution / address	E-mail	Fax	Tables
BRANDON, Andrea	Ministry for the Environment (MfE) PO Box 10362, Wellington New Zealand.	Andrea.Brandon@mfe.govt.nz	64-4-4397706	6-8
WAKELIN, Steve	Scion Research Private Bag 3020 49 Sala Street Rotorua New Zealand	Steve.Wakelin@scionresearch.com	64-7-3435679	9
STANLEY, Julia	Ministry of Agriculture and Forestry (MAF) PO Box 2526, Wellington New Zealand	julia.stanley@maf.govt.nz	64-4-8940741	11,13
CAMERON, Geoff	Ministry of Agriculture and Forestry (MAF) PO Box 2526, Wellington New Zealand	geoff.cameron@maf.govt.nz	64-4-8940741	12
NOVIS, John	Ministry of Agriculture and Forestry (MAF) PO Box 20 280, Christchurch New Zealand	john.novis@maf.govt.nz	64-3-9431757	14-17
WRIGHT, Elaine	Department of Conservation PO Box 13049 3/137 Kilmore St. Christchurch New Zealand	ewright@doc.govt.nz	64-3-3537418	3,4,10, 17

1 Table T1 – Extent of Forest and Other wooded land

1.1 FRA 2010 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
Ministry of Forestry (1992). A National Exotic Forest Description as at 1 April 1991.	H	Planted forest area estimates	1990	The 1991 figures were used to report year 1990
Ministry of Agriculture and Forestry (2000). New Zealand Land Cover Database Version 1.	H	Indigenous forest area estimates	1990	
Ministry of Agriculture and Forestry (2001). A National Exotic Forest Description as at 1 April 2000.	H	Planted forest area estimates	2000	Collected by postal survey
Ministry for the Environment (2004). New Zealand Land Cover Database Version 2.	H	Indigenous forest and shrub land area estimates	2000 2005	
Ministry of Agriculture and Forestry (2006). A National Exotic Forest Description as at 1 April 2005.	H	Planted forest area estimates	2005	Collected by postal survey
Statistics New Zealand (2006). New Zealand Official Yearbook 2006.	H	Country land area estimate	1990 2000 2005	Official area of New Zealand
Ministry of Agriculture and Forestry (2008). A National Exotic Forest Description as at 1 April 2007.	H	Planted forest area estimates	2010	Collected by postal survey
Trotter, C. et al. (2005). Afforestation/reforestation	M	Shrub land expansion	2005	

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
of New Zealand marginal pasture lands by indigenous shrub lands: the potential for Kyoto forest sinks. Ann.For.Sci.62:865-871.		trend		
Newsome, P.F.J. (1987). The vegetation cover if New Zealand. Water and Soil Miscellaneous Publication No. 112. Ministry of Works and Development. 153 p.	M	Shrub land expansion trend	2005	

1.2.2 Classification and definitions

The following definitions are based on the Land Cover Database (LCDB version 2) description of the national vegetation,

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 than 1 ha in size. All forests mapped into this class exceed 30% canopy cover and 5 metres in height.
Shrub land	Areas of shrub land greater than 1 ha in extent. This area includes the LCDB classes of: Fern land; Gorse and Broom; Manuka & Kanuka; Matagouri; Broadleaved Indigenous Hardwoods; Sub Alpine Shrub land; Mixed Exotic Shrub land; Grey Scrub and Mangrove. The area in this class will generally exceed 30% canopy cover and 1 metre in height.

1.2.3 Original data

a. Planted forest

According to the FRA 2010 definition, the estimates include areas with the presence of trees, and areas temporarily unstocked due to clear cutting. The estimates for these years were based on the National Exotic Forest Description (NEFD) figures. The 2000 and 2005 areas have been updated in comparison with those reported previously in the FRA 2005 with revised statistics that include 40 000 ha of harvested area awaiting restocking for year 2000 and actual figures for 2005.

National Class	Forest area (1000 ha)			
	1990	2000	2005	2007
Net Stocked plantation forest area	1 261	1 769	1 811	1 790
Harvested areas awaiting restocking	n.a.	40	43	36
Total area	1 261	1 809	1 854	1 826

b. Indigenous forest and shrub land

The estimates for these years were based on the LCDB version 1 and 2, using,

- 1996/97 (LCDB v1) to estimate for indigenous forest area (1990)
- 2001/02 (LCDB v2) to estimate for indigenous forest area (2000, 2005)
- 2001/02 (LCDB v2) to estimate for shrub land area (1990, 2000, 2005)

These figures were reported in the FRA 2005. It was assumed that indigenous forest and shrub land areas remained static between 2000 and 2005. There is no measurable change in the indigenous forest area. This is a conservative estimate for shrub land area, as it has been suggested that shrub land area could be increasing with the abandonment of economically marginal agricultural and pastoral land which allows the regrowth of shrub species on the land (Newsome, 1987). The shrub land area could presumably increase in the future if the reversion of pastoral-hill country is considered to help offset greenhouse gas emissions (Trotter et al., 2005). Trotter et al. (2005) estimated 1.45 million hectares of marginal pasture lands that could potentially be available for reversion to native vegetation. Currently, there are no updated estimates of shrub land area expansion.

National Class	Forest area (1000 ha)	
	LCDB v1 data 1996/1997	LCDB v2 data 2001/2002
Indigenous forest	6 459	6 457
Shrub land	2 577	2 557

1.3 Analysis and processing of national data

1.3.1 Calibration

No calibration was needed for these data. The current data in FAOSTAT on total land area (26 771 "000" ha) coincide with the official land area for New Zealand, as reported by Land Information New Zealand (LINZ) in the New Zealand Official Yearbook 2006 (Statistics New Zealand, 2006). LINZ is the governmental agency responsible for measuring and providing official land area information in New Zealand.

1.3.2 Estimation and forecasting

a. Planted forest

Planted forest area is expected to decrease by 42 200 ha over the 2005 area, based on the following information,

a. Net stocked area 2007: as reported in NEFD as at April 2007: 1 790 000 ha of net stocked area, and 36 000 ha of harvested area awaiting restocking.
b. New planting: 2 000 ha from April 2007 to April 2008 (provisional Ministry of Agriculture and Forestry (MAF) estimate).
c. Anticipated new planting: The planting rate was considered to be constant for years 2009 to 2010, making a total of 10 000 ha (5 000 ha/yr) (MAF estimate).
d. Deforestation intention: The deforestation rate was of 19 000 ha in year 2007. In a recent survey, forest owners revealed a deforestation intention of 2 400 ha for 2008. This estimate would be considered constant for years 2009 and 2010 (MAF estimate).

b. Indigenous forest and shrub land

It was assumed that indigenous forest and shrub land areas will remain static between 2005 and 2010, therefore using the estimates from the LCDB v2. There is no measurable change in the indigenous forest or shrub land area.

c. Other land area

Other land area was calculated as difference between Total Land Area and Total Wooded Land. Since the Total Land Area has been updated, the resulting Other land areas for years 1990, 2000 and 2005 are different from those reported in the FRA 2005. Other land area also includes 350 000 ha of inland water in this report.

The estimates for the categories explained in the items above are presented in the following table.

National Class	Area (1000 hectares)			
	1990	2000	2005	2010
Planted forest	1 261	1 809	1 854	1 812
Indigenous forest	6 459	6 457	6 457	6 457
Total Forest	**7 720**	**8 266**	**8 311**	**8 269**
Shrub land	2 557	2 557	2 557	2 557
Total Wooded Land	**10 277**	**10 823**	**10 868**	**10 826**
Other Land	16 494	15 948	15 903	15 945
Inland water	0	0	0	0
Total Land Area	**26 771**	**26 771**	**26 771**	**26 771**

1.3.3 Reclassification into FRA 2010 categories

The forest areas were reclassified (percentage allocation) according to FRA 2010 categories as follows,

National Class	FRA 2010 Categories				
	Forest	Other wooded land	Other land with tree cover	Other land	Inland water
Planted forest	100 %				
Indigenous forest	100 %				
Scrub/Shrub/ Grassland & Pasture		100 %			
Other land				100 %	
Water spreads					100 %
Others				100 %	

1.4 Data for Table T1

FRA 2010 categories	Area (1000 hectares)			
	1990	2000	2005	2010
Forest	7 720	8 266	8 311	8 269
Other wooded land	2 557	2 557	2 557	2 557
Other land	16 494	15 948	15 903	15 945
..of which with tree cover	n.a.	n.a.	n.a.	n.a.
Inland water bodies	0	0	0	0
TOTAL	**26 771**	**26 771**	**26 771**	**26 771**

1.5 Comments to Table T1

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Forest	The 1990 forest and other wooded land areas are **provisional estimates** only, based on satellite mapped areas dated 2001/02 and a postal survey of planted forest owners in 1991. MAF and the Ministry for the Environment (MfE) have undertaken an extensive study to establish a 1990 baseline for New Zealand's Carbon Accounting System for reporting to the UNFCCC and Kyoto Protocol. The analysis of these data will be completed within the next 2 years. These estimates will provide a more robust estimate of 1990 forest and other wooded land areas.	The average new planting rate over the last 30 years has been 40 000 hectares per year. In the period 1992 to 1998 new planting rates were high (average 69 000 hectares per year). Since 1998 the rates of new planting have declined. At 2 000 hectares in 2007, new planting is at its lowest level since 1945 (MAF, 2008). A new trend of not re-establishing all planted forest after harvesting, and in a number of cases converting immature planted forest to pasture, started on a larger scale in 2004. This is due to changes in the relative profitability of forests versus pastoral agriculture, particularly dairy farming. Historically very little conversion of planted forests has occurred.
Other wooded land		
Other land		
Other land with tree cover		
Inland water bodies	The total area of New Zealand includes approximately 350 000 hectares of inland water bodies.	

Other general comments to the table
The Land Cover Database (LCDB) is a digital thematic map of land cover designed for use in a GIS or printed map. LCDB v1 was completed in June 2000 and used Spot IV satellite imagery from 1996/1997. It used 16 land cover classes covering artificial, cultural and natural classes in most regions with a seventeenth class (riparian willows) added in some regions. There are 4 relevant forest classes. Overall classification accuracy is 93.9% although this varied between cover classes. LCDB v2 used Landsat 7 satellite imagery from 2001/2002. The land cover classification was expanded in a way that allowed backward comparability of land cover information. There are 16 relevant forest classes. LCDB v2 represents a hierarchical development of the target classes used in the LCDB v1.

Expected year for completion of ongoing/planned <u>national</u> forest inventory and/or RS survey / mapping	
Field inventory	Post 1989 planted forest (2009) Pre 1990 planted forest (2010)
Remote sensing survey / mapping	1990 indigenous forest baseline (2008) 2008 Land Cover Map (2009) 2012 Land Cover Map (2013)

2 Table T2 – Forest ownership and management rights

2.1 FRA 2010 Categories and definitions

Category	Definition
Public ownership	Forest owned by the State; or administrative units of the public administration; or by institutions or corporations owned by the public administration.
Private ownership	Forest owned by individuals, families, communities, private co-operatives, corporations and other business entities, private religious and educational institutions, pension or investment funds, NGOs, nature conservation associations and other private institutions.
Individuals *(sub-category of Private ownership)*	Forest owned by individuals and families.
Private business entities and institutions *(sub-category of Private ownership)*	Forest owned by private corporations, co-operatives, companies and other business entities, as well as private non-profit organizations such as NGOs, nature conservation associations, and private religious and educational institutions, etc.
Local communities *(sub-category of Private ownership)*	Forest owned by a group of individuals belonging to the same community residing within or in the vicinity of a forest area. The community members are co-owners that share exclusive rights and duties, and benefits contribute to the community development.
Indigenous / tribal communities *(sub-category of Private ownership)*	Forest owned by communities of indigenous or tribal people.
Other types of ownership	Other kind of ownership arrangements not covered by the categories above. Also includes areas where ownership is unclear or disputed.
Categories related to the holder of management rights of public forest resources	
Public Administration	The Public Administration (or institutions or corporations owned by the Public Administration) retains management rights and responsibilities within the limits specified by the legislation.
Individuals/households	Forest management rights and responsibilities are transferred from the Public Administration to individuals or households through long-term leases or management agreements.
Private institutions	Forest management rights and responsibilities are transferred from the Public Administration to corporations, other business entities, private co-operatives, private non-profit institutions and associations, etc., through long-term leases or management agreements.
Communities	Forest management rights and responsibilities are transferred from the Public Administration to local communities (including indigenous and tribal communities) through long-term leases or management agreements.
Other form of management rights	Forests for which the transfer of management rights does not belong to any of the categories mentioned above.

2.2 National data

2.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Ministry of Forestry (1991). New Zealand Forestry Statistics 1991.	M	Indigenous forest area by ownership category	1990	Data from 1974 revision of National Forest Survey. The 1991 figures were used to report year 1990.
Ministry of Forestry (1992). A National Exotic Forest Description as at 1 April 1991.	H	Planted forest area by ownership category	1990	The 1991 figures were used to report year 1990
Ministry of Agriculture and Forestry (2001a). A National Exotic Forest Description as at 1 April 2000.	H	Planted forest area by ownership category	2000	Collected by postal survey
Ministry of Agriculture and Forestry (2001b). New Zealand Forestry Statistics 2000.	M	Indigenous forest area by ownership category	2000	Data from LCDB v1. (1996/97 satellite imagery).
Smartwood Program (2004). Forest Management Public Summary for Lindsay&Dixon Ltd.	H	Forest rights of indigenous forest area	2005	Forest rights of State owned indigenous forest (Southland) were given in perpetuity to Waitutu Inc. in 2000
Ministry of Agriculture and Forestry (2006a). A National Exotic Forest Description as at 1 April 2005.	H	Planted forest area by ownership category	2005	Collected by postal survey
Ministry of Agriculture and Forestry (2006b). Māori Land Analysis version 1.1. GIS Analysis.	M	Planted and indigenous forest area within Māori ownership	2000	Data from LCDB v2 (2001/02 satellite imagery) and Maori Land Information Database (2000)
Ministry of Agriculture and Forestry (2008a). Indigenous forest area in conservation state. GIS Analysis.	M	Indigenous forest area in conservation estate	2000 2005	Data from LCDB v2 (2001/02 satellite imagery) and Department of Conservation digital database (2001 and 2006)
Ministry of Agriculture and Forestry (2008b). EcoSat forest in private ownership. GIS Analysis for the Indigenous Forest Unit.	M	Indigenous forest area in private ownership	2005	Data from EcoSat (Landcare Research, 2005), and Department of Conservation digital database (2006), and Queen Elizabeth II (QEII) trust covenants digital database (2006)
Griffiths, Alan (2008). Pers. comm. Ministry of Agriculture and Forestry. Indigenous Forest Unit.	M	Indigenous forest area estimates	2005	State owned indigenous forest area for timber production

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	Include all privately owned forests. The legal entities included in this category are private companies, partnerships, individuals and trusts, which includes Māori trusts and incorporations (National Exotic Forest Description, 2000 and 2005)
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. Planted forest

Planted forests ownership figures were based on the NEFD reports for the corresponding years (Ministry of Forestry (MoF), 1992; MAF, 2001a and 2006a). The 1991 report was used to report forest ownership in 1990, as there was no ownership information available in the 1990 report. The ownership information was only available on the net stocked plantation forest area and excludes harvested areas awaiting restocking (both these areas were considered within the forest definition in Table 1).

Planted forest area owned by indigenous/tribal communities (Māori) was based on the Māori Land Analysis that was only available for year 2000 (MAF, 2006b).

b. Indigenous forest

Indigenous forests ownership area for year 1990 was based on the New Zealand Forestry Statistics 1991 (MoF, 1991).

The 1990 and 2000 New Zealand Forest Statistics presented indigenous forest area estimates based on the 1974 revision of the national forest inventory and the LCDB v1 respectively (MAF, 2001b). These sources of information have a level of accuracy that has been improved with enhanced satellite imagery used in the LCDB v2. The 1990 statistics currently represent the only available estimates for indigenous forest areas and were used to report year 1990.

The 2000 indigenous forest area for conservation was estimated through GIS analysis using LCDB v2 and the Department of Conservation (DoC) digital database (MAF, 2008a). Privately owned indigenous forest area owned by indigenous/tribal communities (Māori) was based on the Māori Land Analysis (MAF, 2006b) that was only available for year 2000.

The 2000 New Zealand Forest Statistics were used to improve the detail in the ownership information. While the State owned forests for timber production in the Southland region (12 000 ha) are reported as owned by the Crown in the statistics, these forests were included as privately owned in 2000 in this report. In 1989, these forests were managed by a State owned enterprise (Timberlands Southland). From 1991 to 1996 a private company (Pine Plan NZ) managed these forests for the Crown. Since 1996, a private company (Waitutu Incorporation)

has the forest rights in perpetuity though a contractual agreement with the New Zealand government (Smartwood Program, 2004).

The year 2000 total privately owned indigenous forest area was estimated by difference, subtracting the forest areas described in the previous paragraphs (conservation land, Māori owned) from the total indigenous forest area as estimated in the LCDB2.

For year 2005, the indigenous forest area for conservation was also estimated through GIS analysis (MAF, 2008a). The total privately owned indigenous forest area was based on GIS analysis results based on the EcoSat Forest Classification by Landcare Research (2005) (MAF, 2008b). This analysis was also the source for the privately owned indigenous forest area under conservation covenants under the Queen Elizabeth II trust. Indigenous forest area privately owned for timber production (Southland area) was also assumed to be the same as 2000, as this area remained the same in that time period (Alan Griffiths, pers. comm., 2008).

Category of Forest/Ownership	**Forest area (1000 hectares)**		
	1990	**2000**	**2005**
Planted forest			
State owned enterprise	311	45	31
Local government	58	55	58
Central government	49	48	46
Registered public company	500	790	437
Privately owned	371	831	1239
...of which owned by individuals	n.a.	n.a.	n.a.
...of which owned by private business entities and institutions	n.a.	n.a.	n.a.
...of which owned by local communities	n.a.	n.a.	n.a.
...of which owned by indigenous / tribal communities	n.a.	122	n.a.
…of which owned by other type of ownership	n.a.	n.a.	n.a.
SUB TOTAL	**1 289**	**1 769**	**1 811**
Indigenous forest			
State owned	4 905	4 881	4 995
Privately owned	1 323	1 277	1 201
...of which owned by indigenous / tribal communities	n.a.	293	n.a.
SUB TOTAL	**6 228**	**6 158**	**6 196**
TOTAL FORESTS	**7 517**	**7 927**	**8 007**

The following classification was used to categorise planted forest data in Table 2.2.3:

For the 1991 ownership classes

NEFD 1991 Owner Definition	Ownership classification	Management Rights
Registered public companies	Private ownership	Private institutions
Individual	Private ownership	Individual
Registered private companies	Private ownership	Private institutions
Partnership/consortium	Private ownership	Private institutions
Trusts, including Māori trusts	Private ownership	Private institutions
Other (e.g. cooperatives)	Private ownership	Private institutions
State owned enterprise	Public ownership	Public administration
Local government body	Public ownership	Public administration
Central government department	Public ownership	Public administration

For the 2000 and 2005 ownership classes

NEFD 2000/2005 Owner Definition	Ownership classification	Management Rights
Registered public companies	Private ownership	Private institutions
Privately owned	Private ownership	Private institutions
State owned enterprise	Public ownership	Public administration
Local government	Public ownership	Public administration
Central government	Public ownership	Public administration

2.3 Analysis and processing of national data

2.3.1 Calibration

Forest area estimates in Table 2.2.3 were adjusted on a pro-rata basis to fit the total forest area in Table 1.

Category of Forest/Ownership	Forest area (1000 hectares)		
	1990	2000	2005
Planted forest			
State owned enterprise	304	46	32
Local government	57	56	60
Central government	48	50	47
Registered public company	489	808	447
Privately owned	363	849	1 268
...of which owned by individuals	n.a.	n.a.	n.a.
...of which owned by private business entities and institutions	n.a.	n.a.	n.a.
...of which owned by local communities	n.a.	n.a.	n.a.
...of which owned by indigenous / tribal communities	n.a.	124	n.a.
…of which owned by other type of ownership	n.a.	n.a.	n.a.
SUB TOTAL	**1 261**	**1 809**	**1 854**
Indigenous forest			
State owned	5 087	5 118	5 205
Privately owned	1 372	1 339	1 252
...of which owned by indigenous / tribal communities	n.a	308	n.a.
SUB TOTAL	**6 459**	**6 457**	**6 457**
TOTAL FORESTS	**7 720**	**8 266**	**8 311**

2.3.2 Estimation and forecasting

No estimation or forecasting was needed for these data.

2.3.3 Reclassification into FRA 2010 categories

Based on the categorisation presented in section 2.2.3, the ownership of forests can be summarised as follows,

Forest ownership	Forest area (1000 ha)		
	1990	2000	2005
Public ownership	5 496	5 270	5 344
Private ownership	2 224	2 996	2 967
TOTAL	**7 720**	**8 266**	**8 311**

2.4 Data for Table T2

Table 2a - Forest ownership

FRA 2010 Categories	Forest area (1000 hectares)		
	1990	2000	2005
Public ownership	5 496	5 270	5 344
Private ownership	2 224	2 996	2 967
...of which owned by individuals	n.a.	n.a.	n.a.
...of which owned by private business entities and institutions	489	821	460
...of which owned by local communities	n.a.	n.a.	n.a.
...of which owned by indigenous / tribal communities	n.a.	432	n.a.
Other types of ownership	0	0	0
TOTAL	**7 720**	**8 266**	**8 311**

Does ownership of trees coincide with ownership of the land on which they are situated?	Yes ☐ No ☒
If **No** above, please describe below how the two differ:	
In the original data, state owned planted forests within the "Central Government" category are predominantly Crown owned forests on Māori leasehold land (MAF, 2006a). Planted forests within the private ownership category are on private land, Crown land or Māori leasehold land. The forest areas reported as owned by indigenous / tribal communities in year 2000 were based on Māori Land Analysis. This GIS analysis used the Māori Land Information Database, which is currently the best geospatial representation of Māori owned lands in New Zealand (MAF, 2006b). It was not possible to establish the ownership of forests within Māori land.	

Table 2b - Holder of management rights of public forests

FRA 2010 Categories	Forest area (1000 hectares)		
	1990	2000	2005
Public Administration	5 326	5 270	5 344
Individuals	0	0	0
Private corporations and institutions	170	0	0
Communities	0	0	0
Other	0	0	0
TOTAL	**5 496**	**5 270**	**5 344**

2.5 Comments to Table T2

Variable / category	Comments related to data definitions etc.	Comments on the reported trend
Public ownership	Table 2b reports 164 000 ha (170 000 ha when calibrated) of State Owned indigenous forest managed by a stated owned enterprise for timber production.	
Private ownership	Treaty of Waitangi settlements are agreements between the Crown and Māori claimant groups to settle historical grievances against the Crown. Claimants can negotiate a settlement in cash or assets. Crown Forest land has been set aside to settle historical Treaty of Waitangi claims. This will increase indigenous/tribal forest land ownership in the future years. In 2001, it was estimated that when all Treaty claims were resolved, Māori could own up to 41% of the land under planted forests (if not subsequently sold) (MAF estimate).	
Other types of ownership		
Management rights		

Other general comments to the table

3 Table T3 – Forest designation and management

3.1 FRA 2010 Categories and definitions

Term	Definition
Primary designated function	The primary function or management objective assigned to a management unit either by legal prescription, documented decision of the landowner/manager, or evidence provided by documented studies of forest management practices and customary use.
Protected areas	Areas especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means.
Categories of primary designated functions	
Production	Forest area designated primarily for production of wood, fibre, bio-energy and/or non-wood forest products.
Protection of soil and water	Forest area designated primarily for protection of soil and water.
Conservation of biodiversity	Forest area designated primarily for conservation of biological diversity. Includes but is not limited to areas designated for biodiversity conservation within the protected areas.
Social services	Forest area designated primarily for social services.
Multiple use	Forest area designated primarily for more than one purpose and where none of these alone is considered as the predominant designated function.
Other	Forest areas designated primarily for a function other than production, protection, conservation, social services or multiple use.
No / unknown	No or unknown designation.
Special designation and management categories	
Area of permanent forest estate (PFE)	Forest area that is designated to be retained as forest and may not be converted to other land use.
Forest area within protected areas	Forest area within formally established protected areas independently of the purpose for which the protected areas were established.
Forest area under sustainable forest management	To be defined and documented by the country.
Forest area with management plan	Forest area that has a long-term (ten years or more) documented management plan, aiming at defined management goals, which is periodically revised.

3.2 National data

3.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Ministry of Forestry (1991). New Zealand Forestry Statistics 1991.	M	Indigenous forest area estimates	1991	Data from 1974 revision of National Forest Survey. The 1991 figures were used to report year 1990.
Ministry of Agriculture and Forestry (2001). New Zealand Forestry Statistics 2000.	M	Indigenous forest area estimates	2000	Data from LCDB v1. (1996/97 satellite imagery).

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Griffiths, A.D. (2002). Indigenous Forestry on Private Land: Present Trends and Future Potential. MAF Technical Paper No 01/6. Prepared for the Indigenous Forestry Unit. Ministry of Agriculture and Forestry.	H	Indigenous forest area under sustainable forest management	2010	Forecast for 2010
Bayfield, B.A. and Meister, A.D. (2005). East Coast Forestry Project Review. Report prepared for Ministry of Agriculture and Forestry.	H	East Coast Forestry Project area	2000 2005 2010	
Department of Conservation (2005). The Application in New Zealand of the IUCN System of Management Categories for Protected Natural Areas	H	Forest area within protected areas by IUCN categories	2005 2010	
New Zealand Forest Owners Association (NZFOA) (2006). New Zealand Forestry Industry Facts and Figures.	H	FSC certified planted forest area	2006	Included in comments
Department of Conservation (2007). Conservation General Policy. In: www.doc.govt.nz/ templates/page.aspx?id=421	H	Forest area under management plan		Conservation Management Strategies and Plans information
Ministry of Agriculture and Forestry (2008a). Sustainable Forest Management Plan and Permit Statistics. Indigenous Forestry Unit.	H	Indigenous forest area under sustainable forest management	2000 2005	Source: Indigenous Forestry Database
Ministry of Agriculture and Forestry (2008b). Indigenous forest area in conservation state. GIS Analysis.	M	Indigenous forest area in conservation estate	2000 2005 2010	Data from LCDB v2 (2001/02 satellite imagery) and Department of Conservation database (2001,2006, and 2008)
Queen Elizabeth II trust (2008). About QEII covenants. In: www.openspace.org.nz/ Site/Covenants/default.aspx	H	Forest area under management plan		Covenant plans information

3.2.2 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.

3.2.3 Original data

a. Planted forest

The primary function of planted forests is Timber production. Planted forest areas reported in Table 1.3.2c were used for this table.

National Class	Forest area (1000 hectares)			
	1990	2000	2005	2010
Planted forest	1 261	1 809	1 854	1 812

Planted forest areas reported in NEFD include the East Coast Forestry Project areas. The primary objective of this project is to establish forests for soil conservation. These areas were included in the Protection of soil and water category. Forest area estimates reported in this category in the FRA 2005 were updated with estimates published in a review of the project (Bayfield and Meister, 2005) presented in the following table,

Years	Established area (1000 ha)	Cumulative established area (1000 ha)
1993	3	3
1994	4	7
1995	2	9
1996	5	14
1997	5	19
1998	4	23
1999	4	27
2000	2	29
2001	1	30
2002	2	32
2003	1	33
2004	2	35
Total	35	

b. Indigenous forest

National forest statistics indicate that the primary forests functions for indigenous forests are Conservation of biodiversity, and a relatively small area has a Timber production function (MoF, 1991; MAF, 2001). The total forest area estimates reported in Table 2 (2.2.3.b) were used in this table, adding forest areas under sustainable forest management (SFM) (timber production). Indigenous forests for timber production are managed under the Forest Act 1949 (Part 3A) (amended in 1993) which outlines provisions and procedures for the sustainable management of indigenous forests under approved sustainable forest management plans and permits (Griffiths, 2002). The Indigenous Forestry Unit (IFU) administers the Indigenous Forestry provisions of the Forest Act within privately owned forests, approving plans and permits, and monitoring and enforcing compliance with the Act since 1993. The forest areas under SFM plans and permits approved in 2000 and 2005 were based on figures provided by the IFU (MAF, 2008a).

There is a proportion of the privately owned forest area reported in year 2000 and 2005 which function was not possible to identify (unknown function). These areas could potentially be used for either SFM or conservation.

National class	Forest area (1000 ha)		
	1990	2000	2005
State owned indigenous forest	**4 905**	**4 881**	**4 995**
…for conservation of biodiversity	4 741	4 881	4 995
…for timber production	164	0	0
Privately owned indigenous forest	**1 323**	**1 277**	**1 201**
…for conservation of biodiversity/covenants	n.a.	n.a.	123
...for timber production	124	12	12
…for timber production under SFM	0	46	110
…unknown function	1 199	1 219	956
Total	**6 228**	**6 158**	**6 196**

c. Area of permanent forest estate

All state owned indigenous forests are legally protected. The main aim of these areas is to protect and preserve indigenous flora and fauna in their natural estate in perpetuity. These forest areas were considered as permanent forest estate. The same areas reported in Table 2 (2.2.3 b) and 3.2.3c were used for this table. Indigenous forest area for conservation for year 2008 was also estimated through GIS analysis (MAF, 2008b), and was used to report year 2010.

National class	Forest area (1000 ha)			
	1990	2000	2005	2010
Indigenous forest legally protected	4 741	4 881	4 995	5 003

d. Forest area within protected areas (IUCN Categories I-IV)

New Zealand protected areas categories include areas set apart and designed according to the national legislation (National Parks Act 1980, Reserves Act 1977, Conservation Act 1987, Marine Mammals Protection Act 1978, Marine Reserves Act 1971, Queen Elizabeth the Second National Trust Act 1977, Wildlife Act 1953, Crown Forest Assets Act 1989, and Fisheries Act 1983 (Freshwater Fisheries Regulations)).

Indigenous forest area within protected areas by IUCN categories were estimated through GIS analysis for years 2006 and 2008 (MAF, 2008b). This analysis was based on the DoC review of the application of the IUCN system for New Zealand protected areas categories, and alignment of each national category with the nearest IUCN category (Department of Conservation, 2005).

The 2006 and 2008 results will be used to report years 2005 and 2010. It was not possible to estimate these areas for years 1990 and 2000. The DoC did not have available a 1990 GIS database for the conservation estate. The GIS database for 2001 (used previously to calculate 2000 estimates) did not have the features that allowed the analysis by IUCN category, as latest databases did.

IUCN category	Forest area (1000 ha)	
	2005	2010
Category Ia	160	160
Category Ib	37	37
Category II	1 947	1 947
Category III	1 424	1 444
Category IV	19	19
Subtotal	**3 587**	**3 607**
Category V	4	4
Unclassified	1 404	1 392
Total	4 995	5 003

e. Forest area under sustainable management plan/management plan

Forest areas with management plans include: Indigenous forest legally protected, conservation covenants, and all planted forest.

The DoC has Conservation Management Strategies and Plans for all the areas under their authority, as required by the Conservation Act 1987. The purpose of these plans is to implement general policies and establish objectives for the integrated management of resources of each particular area (Department of Conservation 2007). State owned indigenous forest for conservation for year 2008 was used to report 2010. Conservation covenants under the QEII trust are designed with landowners when the covenants are established. The trust provides support and monitors covenants every second year (QEII trust, 2008). The same area under conservation covenants for year 2005 was used to report 2010.

Most planted forest areas are managed under the NZ Forest Accord (1991) and the Principles for Commercial Plantation Forest Management (1995) that ensure good management practices that meet all statutory requirements, including management plans. Indigenous forest areas capable of wood production are managed in accordance with the Forest Act and since 1993 have sustainable forest management plans and permits (MAF, 2008a). The estimate of indigenous forest areas in SFM plans and permits for 2010 was taken from a report prepared for the Ministry of Agriculture and Forestry-Indigenous Forest Unit (178 000 ha) (Griffiths, 2002). For the year 1990, indigenous forests areas for timber production were considered have a management plan.

National class	Forest area with sustainable management/ management plan (1000 ha)			
	1990	2000	2005	2010
Indigenous forest legally protected	4 741	4 881	4 995	5 003
Private indigenous forest in protection covenants	n.a.	n.a.	123	123
Indigenous forest for timber production	164	0	0	0
Planted forest	1 261	1 809	1 854	1 812
Total with management plan	**6 166**	**6 690**	**6 972**	**6 938**
Privately owned indigenous forest: SFM plans and permits	n.a.	46	110	178
Total with sustainable management plan	**n.a**	**46**	**110**	**178**

3.3 Analysis and processing of national data

a. Indigenous forest

Indigenous forest area estimates in Table 3.2.3b were adjusted on a pro-rata basis to fit the total forest area in Table (1.3.2c).

National class	Forest area (1000 ha)		
	1990	2000	2005
State owned indigenous forest	**5 087**	**5 118**	**5 205**
…for conservation of biodiversity	4 917	5 118	5 205
… for timber production	170	0	0
Privately owned indigenous forest	**1 372**	**1 339**	**1 252**
…for conservation of biodiversity	n.a.	n.a.	128
… for timber production	129	13	13
… for timber production under SFM	n.a.	48	114
…unknown function	1 243	1 278	997
Total	**6 459**	**6 457**	**6 457**

b. Planted forest

No calibration was needed as estimates from Table 1.3.2c were used.

3.3.2 Estimation and forecasting

a. Planted forests

The Production primary designated function was calculated as the difference between planted forest figures reported in Table in 1.3.2c and the East Coast Forestry project figures. The areas for the East Coast Forestry project for 2005 and 2010 were forecasted based on an average of planting per year of 2 600 ha between 1993-2004 (Table 3.2.3a). These figures represent the primary designated function of Protection of soil and water.

Years	Cumulative established area (1000 ha)
2000	29
2005	38
2010	51

The estimates for planted forests functions are presented in the following table,

National class	Forest area (1000 ha)			
	1990	2000	2005	2010
Planted forest areas	**1 261**	**1 809**	**1 854**	**1 812**
…for timber production	1 261	1 780	1 816	1 761
…for protection of soil and water	n.a.	29	38	51

b. Indigenous forest

A proportion of the privately owned indigenous forest areas don't have a specific function (unknown function) for years 2000 and 2005. Conservation of biodiversity was considered as the main function of indigenous forests. Therefore, these forest areas were considered to have Conservation of biodiversity as primary function.

State owned indigenous forest for conservation for year 2008 was used to report 2010. The estimate of indigenous forest areas in SFM plans and permits for 2010 was taken from a report prepared for the Ministry of Agriculture and Forestry-Indigenous Forest Unit (178 000 ha) (Griffiths, 2002). The 2010 estimates were also adjusted on a pro-rata basis to fit the total forest area listed in Table 1.3.2c. Since there haven't been any significant changes in the ownership and land use of indigenous forest areas between 2005 and 2008, and there are not expected to be any significant changes, all other areas and primary functions reported for year 2005 were used in 2010.

The estimates for indigenous forests functions are presented in the following table,

National class	Forest area (1000 ha)			
	1990	2000	2005	2010
State owned indigenous forest	**5 087**	**5 118**	**5 205**	**5 207**
…for conservation of biodiversity	4 917	5 118	5 205	5 207
…for timber production	170	0	0	0
Privately owned indigenous forest	**1 372**	**1 339**	**1 252**	**1 250**
…for conservation of biodiversity	1 243	1 278	1 125	1 052
…for timber production	129	61	127	198
Total	**6 459**	**6 457**	**6 457**	**6 457**

3.3.3 Reclassification into FRA 2010 categories

Reporting year: 1990

National category	FRA 2010 categories (1000 ha)					
	Production	Protection	Conservation	Social	Multiple	Total
Planted forests	1 261					1 261
Indigenous forests	299		6 160			6 459
Total	1 560		6 160			7 720

Reporting year: 2000

National category	FRA 2010 categories (1000 ha)					
	Production	Protection	Conservation	Social	Multiple	Total
Planted forests	1 780	29				1 809
Indigenous forests	61		6 396			6 457
Total	1 841	29	6 396	0	0	8 266

Reporting year: 2005

National category	FRA 2010 categories (1000 ha)					
	Production	Protection	Conservation	Social	Multiple	Total
Planted forests	1 816	38				1 854
Indigenous forests	127		6 330			6 457
Total	1 943	38	6 330	0	0	8 311

Reporting year: 2010

National category	FRA 2010 categories (1000 ha)					
	Production	Protection	Conservation	Social	Multiple	Total
Planted forests	1 761	51				1 812
Indigenous forests	198		6 259			6 457
Total	1 959	51	6 259	0	0	8 269

3.4 Data for Table T3

Table 3a – Primary designated function

FRA 2010 Categories	Forest area (1000 hectares)			
	1990	2000	2005	2010
Production	1 560	1 841	1 943	1 959
Protection of soil and water	0	29	38	51
Conservation of biodiversity	6 160	6 396	6 330	6 259
Social services	0	0	0	0
Multiple use	0	0	0	0
Other (please specify in comments below the table)	0	0	0	0
No / unknown	0	0	0	0
TOTAL	**7 720**	**8 266**	**8 311**	**8 269**

Table 3b – Special designation and management categories

FRA 2010 Categories	Forest area (1000 hectares)			
	1990	2000	2005	2010
Area of permanent forest estate	4 741	4 881	4 995	5 003
Forest area within protected areas	n.a.	n.a.	3 587	3 607
Forest area under sustainable forest management	n.a.	46	110	178
Forest area with management plan	6 166	6 690	6 971	6 938

3.5 Comments to Table T3

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Production	The figures for this function are made up from: (a) Net stocked planted forest area (as reported in Table 1), and (b) State and Privately owned indigenous forest areas allocated to wood production (as reported in Table 2).	There have been updates in total planted production forest area for the 2000 and 2005 years from those reported in the FRA 2005 (Table 1) which have also changed the production area for those years. New information in the indigenous forest areas capable of wood production have updated those areas reported in the FRA 2005.

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Protection of soil and water	The East Coast Forestry project was established in 1992 to deal with severe erosion in the East Coast (Gisborne District). The multiple objectives set for the project when it started, where changed to a primary goal of sustainable land management, targeting severely eroding land (60 000 ha) (Bayfield and Meister, 2005). Besides the East Coast Forestry project, there are other forest areas that have been established or set aside for the purpose of soil and water conservation. However, it was not possible to identify and quantify the extent of these areas for this report.	The information from the East Coast Forestry review (Bayfield and Meister, 2005) updated estimates reported in the FRA 2005. This category only reports forests and does not include other wooded land as reported in the FRA 2005.
Conservation of biodiversity	Most of the indigenous forest land in New Zealand managed by the DoC 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 3a are the total areas of forest land under management of the DoC plus Private Protection.	Indigenous forests for Conservation of biodiversity is estimated by the difference between the total area and Production forest area. Since the Production areas have been updated in this report, the Conservation areas also differ from those reported in the FRA 2005.
Social services		
Multiple use		
Other		
No / unknown designation		
Area of permanent forest estate	Includes all legally protected indigenous forest area (original data in Table3.2.3c).	
Forest area within protected areas	Includes indigenous forest area within protected areas (IUCN categories I-IV) (original data in Table 3.2.3d).	
Forest area under sustainable forest management	Includes all privately owned indigenous forest under sustainable forest management (SFM) plans (original data in Table 3.2.3e). SFM plans provide for long-term management of indigenous forests (minimum of 50 years). SFM permits are limited to a 10 year term, providing the harvest does not exceed 10 percent of the timber standing (Griffiths, 2002).	
Forest area with management plan	Includes all legally protected indigenous forest area, private indigenous forest in protection covenants (2005 and 2010 considered equal), indigenous forest for timber production and all planted forest area (original data in Table 3.2.3e).	At June 2006, 42% of the New Zealand's planted forests had been certified under the FSC scheme, ensuring sustainable forest management (NZFOA, 2006).

Other general comments to the table

4 Table T4 – Forest characteristics

4.1 FRA 2010 Categories and definitions

Term / category	Definition
Naturally regenerated forest	Forest predominantly composed of trees established through natural regeneration.
Introduced species	A species, subspecies or lower taxon, occurring outside its natural range (past or present) and dispersal potential (i.e. outside the range it occupies naturally or could occupy without direct or indirect introduction or care by humans).
Characteristics categories	
Primary forest	Naturally regenerated forest of native species, where there are no clearly visible indications of human activities and the ecological processes are not significantly disturbed.
Other naturally regenerated forest	Naturally regenerated forest where there are clearly visible indications of human activities.
Other naturally regenerated forest of introduced species *(sub-category)*	Other naturally regenerated forest where the trees are predominantly of introduced species.
Planted forest	Forest predominantly composed of trees established through planting and/or deliberate seeding.
Planted forest of introduced species *(sub-category)*	Planted forest, where the planted/seeded trees are predominantly of introduced species.
Special categories	
Rubber plantations	Forest area with rubber tree plantations.
Mangroves	Area of forest and other wooded land with mangrove vegetation.
Bamboo	Area of forest and other wooded land with predominant bamboo vegetation.

4.2 National data

4.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Ministry of Forestry (1991). New Zealand Forestry Statistics 1991.	M	Indigenous forest area estimates	1990	Data from 1974 revision of National Forest Survey. The 1991 figures were used to report year 1990.
Ministry of Agriculture and Forestry (2001). New Zealand Forestry Statistics 2000.	H	Indigenous forest area estimates	2000	Data from LCDBv1.1 (1996/97 satellite imagery).
FAO (2007). The world's mangroves. 1980-2005. FAO Forestry Paper 153.	H	Mangroves areas estimates	1990 2000 2005 2010	
Lovelock, C.E. et al. (2007). Mangrove growth in New Zealand estuaries:the role of nutrient enrichment at sites with contrasting rates of sedimentation. Oecologia 153:633-641	H	Mangroves expansion		In comments
NIWA (2008). What ails our estuaries. Mangrove spread. In: www.niwa.cri.nz/rc/ freshwater/nzestuaries/ails	H	Mangroves expansion		In comments

4.2.2 Classification and definitions

National class	Definition
Primary forest	Indigenous forest within protected areas that have as a main management objective to protect and preserve representative indigenous forest ecosystems (National Parks, Nature Reserves, and Scientific Reserves/IUCN categories Ia, Ib, II)
Other naturally regenerated forest	Other indigenous forest excluding National Parks, Nature Reserves, and Scientific Reserves/IUCN categories Ia, Ib, II
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.

4.2.3 Original data

a. Primary forest

In the FRA 2005, indigenous forest areas within National Parks and reserves for years 1990, 2000 and 2005 were based on the New Zealand Forest Statistics, assuming 2005 area to be the same as 2000 (MoF, 1991; MAF, 2001).

National Class	Forest area (1 000 ha)	
	1990	2000
Nature Reserves	186	n.a.
Scientific Reserves	9	615
National Parks	2 362	2 891
Total	**2 557**	**3 506**

In this report, indigenous forest areas within IUCN categories Ia, Ib, and II reported in Table 3 (3.2.3d) were used in this table (GIS analysis) for years 2005 and 2010, updating the previously reported area for year 2005. Statistics based estimates for 1990 and 2000, and are not directly comparable with spatial analysis estimates (2005 and 2010). GIS analysis estimates are considered more accurate and reliable, only these were used for further analysis, not reporting primary forest areas for years 1990 and 2000 in this submission.

National Class	Forest area (1 000 ha)	
	2005	2010
IUCN Category Ia	160	160
IUCN Category Ib	37	37
IUCN Category II	1 947	1 947
Total	**2 144**	**2 144**

b. Other naturally regenerated forests

Total indigenous forest areas reported in Table 1 (1.3.2c) were used in this table. The difference between these total areas and Primary forest areas (reported in the previous table) were considered as other naturally regenerated forests.

National Class	Forest area (1 000 ha)			
	1990	2000	2005	2010
Total indigenous forest	6 459	6 457	6 457	6 457
Other Naturally regenerated forests	n.a.	n.a.	4 313	4 313

c. Planted forests

Planted forest areas reported in Table 1 (1.3.2c) were used in this table.

d. Special categories

New Zealand has mangrove forest areas in the North Island. Mangrove areas were based on a FAO thematic study (FAO, 2007). Mangroves areas considered the same for years 1990, 2005, 2010 (26 000 ha).

4.3 Analysis and processing of national data

4.3.1 Calibration

a. Primary forests and Other naturally regenerated forests

No calibration was needed as estimates from Table 1.3.2c were used.

b. Planted forests

No calibration was needed as estimates from Table 1.3.2c were used.

4.3.2 Estimation and forecasting

a. Primary forests and Other naturally regenerated forests

The estimation of these forest areas was described in the previous section. No additional forecasting was needed as estimates from Table 1.3.2c were used.

b. Planted forests

No estimation or forecasting was needed as estimates from Table 1.3.2c were used. All the reported planted forest figures are from exotic species**.**

4.3.3 Reclassification into FRA 2010 categories

No further reclassification was needed for this table.

4.4 Data for Table T4

Table 4a – Characteristics

FRA 2010 Categories	Forest area (1000 hectares)			
	1990	2000	2005	2010
Primary forest	n.a.	n.a.	2 144	2 144
Other naturally regenerated forest	n.a.	n.a.	4 313	4 313
...of which of introduced species	n.a.	n.a.	n.a	n.a
Planted forest	1 261	1 809	1 854	1 812
...of which of introduced species	1 261	1 809	1 854	1 812
TOTAL	**7 720**	**8 266**	**8 311**	**8 269**

Table 4b – Special categories

FRA 2010 Categories	Area (1000 hectares)			
	1990	2000	2005	2010
Rubber plantations (Forest)	0	0	0	0
Mangroves (Forest and OWL)	26	26	26	26
Bamboo (Forest and OWL)	0	0	0	0

4.5 Comments to Table T4

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Primary forest		
Other naturally regenerating forest		
Planted forest		Since 1998 the rates of new planting have declined. At 2 000 hectares in 2007, new planting is at its lowest level since 1945 (MAF, 2008). A new trend of not re-establishing all planted forest after harvesting, and in a number of cases converting immature planted forest to pasture, started on a larger scale in 2004. This is due to changes in the relative profitability of forests versus pastoral agriculture, particularly dairy farming. Historically very little conversion of planted forests has occurred.
Rubber plantations		
Mangroves		Although it has been reported that coverage is increasing, there is currently no information about the rate of expansion. Mangrove spread has been attributed to increased sedimentation and nutrient of coastal and estuarine areas (Lovelock et al., 2007; NIWA, 2008).
Bamboo		

Other general comments to the table

5 Table T5 – Forest establishment and reforestation

5.1 FRA 2010 Categories and definitions

Term	Definition
Afforestation	Establishment of forest through planting and/or deliberate seeding on land that, until then, was not classified as forest.
Reforestation	Re-establishment of forest through planting and/or deliberate seeding on land classified as forest.
Natural expansion of forest	Expansion of forests through natural succession on land that, until then, was under another land use (e.g. forest succession on land previously used for agriculture).

5.2 National data

5.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Ministry of Forestry (1990). A National Exotic Forest Description as at 1 April 1989.	M	New planting and restocking estimates	1990	
Ministry of Forestry (1992). A National Exotic Forest Description as at 1 April 1991.	H	New planting and restocking estimates	1990	
Ministry of Forestry (1994). A National Exotic Forest Description as at 1 April 1993.	H	New planting and restocking estimates	1990	
Ministry of Agriculture and Forestry (2001). A National Exotic Forest Description as at 1 April 2000.	H	New planting and restocking estimates	2000	
Ministry of Agriculture and Forestry (2003). A National Exotic Forest Description as at 1 April 2002.	H	New planting and restocking estimates	2000	
Ministry of Agriculture and Forestry (2005). A National Exotic Forest Description as at 1 April 2004.	H	New planting and restocking estimates	2000 2005	
Ministry of Agriculture and Forestry (2006). A National Exotic Forest Description as at 1 April 2005.	H	New planting and restocking estimates	2005	
Ministry of Agriculture and Forestry (2008). A National Exotic Forest Description as at 1 April 2007.	H	New planting and restocking estimates	2005	

5.2.2 Classification and definitions

National class	Definition
New planting	Planting of trees for the primary purpose of producing wood or wood fibre, on land that has not previously been used for growing planted production forests.
Restocking	Replanting of a planted production forest area that has been clear felled. Based on data collected from forest owners.

5.2.3 Original data

a. New planting and restocking

The figures for planted forests were based on the NEFD reports (MoF, 1990, 1992, and 1994; MAF, 2001, 2003, 2005, 2006, and 2008). Estimates for year 2007 are provisional. A large area of forest was planted between years 1993 and 1997. These estimates are reported for reference. There is no measurable forest establishment area in indigenous forest.

Reporting year: 1990

National class	Years					Average (5-years)
	1988	1989	1990	1991	1992	
New planting (000 ha)	20	21	16	15	50	25
Restocking (000 ha)	22	23	22	22	21	22

New planting and restocking between 1993 and 1997

National class	Years					Average (5-years)
	1993	1994	1995	1996	1997	
New planting (000 ha)	62	98	74	84	64	76
Restocking (000 ha)	25	25	25	28	30	27

Reporting year: 2000

National class	Years					Average (5-years)
	1998	1999	2000	2001	2002	
New planting (000 ha)	51	40	34	30	22	35
Restocking (000 ha)	30	30	36	36	40	34

Reporting year: 2005

National class	Years					Average (5-years)
	2003	2004	2005	2006	2007	
New planting (000 ha)	20	11	6	3	2	8
Restocking (000 ha)	38	40	32	34	36	36

5.3 Analysis and processing of national data

5.3.1 Calibration

No calibration was needed for these data.

5.3.2 Estimation and forecasting

The values reported are five year average estimates based on NEFD reports (exotic species).

5.3.3 Reclassification into FRA 2010 categories

New planting estimates are reported as Afforestation and Restocking estimates are reported as Reforestation.

5.4 Data for Table T5

FRA 2010 Categories	Annual forest establishment (hectares/year)			...of which of introduced species [1)] (hectares/year)		
	1990	2000	2005	1990	2000	2005
Afforestation	25 000	35 000	8 000	25 000	35 000	8 000
Reforestation	22 000	34 000	36 000	22 000	34 000	36 000
...of which on areas previously planted	22 000	34 000	36 000	22 000	34 000	36 000
Natural expansion of forest	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Note: The figures for the reporting years refer to the averages for the 5-year periods 1988-1992, 1998-2002 and 2003-2007 respectively.

5.5 Comments to Table T5

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Afforestation	New Zealand had high rates of afforestation during the period 1992 and 1998 which aren't captured in this table. The 5-year average afforestation rate for the period 1993 to 1997 was 76,000 hectares/year.	Since 1998 the rates of new planting have declined. At 2 000 hectares in 2007, new planting is at its lowest level since 1945 (MAF, 2008).
Reforestation		A new trend of not re-establishing all planted forest after harvesting, and in a number of cases converting immature planted forest to pasture, started on a larger scale in 2004. This is due to changes in the relative profitability of forests versus pastoral agriculture, particularly dairy farming. Historically very little conversion of planted forests has occurred.
Natural expansion of forest		

Other general comments to the table

6 Table T6 – Growing stock

6.1 FRA 2010 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.
Growing stock of commercial species	Growing stock (see def. above) of commercial species.

6.2 National data

6.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
National Exotic Forest Description database	H	Planted forest growing stock	1990 2000 2005 2008	National Exotic Forest Description database
National Exotic Forest Description database	H	Planted forest growing stock annual increment	2010	National Exotic Forest Description database
Beets, P.N., Kimberley, M.O., Goulding, C.J., Garrett, L.G., Oliver, G.R., Paul, T.S.H. (2009). Natural forest plot data analysis: Carbon stock analyses and re-measurement strategy. Scion Research contract for the Ministry for the Environment	H	Indigenous forest volume	2005	Beets, P.N., Kimberley, M.O., Goulding, C.J., Garrett, L.G., Oliver, G.R., Paul, T.S.H. (2009). Natural forest plot data analysis: Carbon stock analyses and re-measurement strategy. Scion Research contract for the Ministry for the Environment

6.2.2 Classification and definitions

National class	Definition
Standing Volume	The total volume of wood contained in stems of all age classes (in cubic metres). For planted forests, the standing volume includes some non-recoverable volume, but excludes bark.
Total Recoverable Volume Inside Bark	Volume of wood recovered during harvesting in planted forests, excluding bark (in cubic metres)

6.2.3 Original data

a. Planted forest

Standing volume figures (inside bark) for years 1990, 2000, 2005 and 2008 were based on NEFD database (MAF).

National Class	Volume (million cubic meters)			
	1990	2000	2005	2008
Planted forest (inside bark)	201	367	405	446

b. Indigenous forest and shrub land

Indigenous forest and shrub land volume estimates were based on data collected from 2002 to 2007 through the New Zealand's Carbon Accounting System inventory and analysed by Beets et al. (2009). The results of this analysis were used to for the 2005 reporting year. There are currently no time series estimates available for years 1990 and 2000.

National Class	Volume (million cubic meters)		
	1990	2000	2005
Indigenous forest (over bark)	n.a.	n.a.	2 976
Shrub land	n.a.	n.a.	258

6.3 Analysis and processing of national data

6.3.1 Calibration

No calibration was needed for these data.

6.3.2 Estimation and forecasting

a. Planted forest

New Zealand's planted forests standing volume is reported as "inside bark". A multiplying factor of 1.17 was used to produce the "over bark" figure. All the planted forest species are commercial. Figures for years 1990 and 2000 are the same as those reported in the FRA 2005. For year 2005, the growing stock figure was updated with the actual statistics reported for this year. Approximately 85% of the total growing stock is commercial ie recovered merchantable volume.

National Class	Volume (million cubic meters)		
	1990	2000	2005
Planted forest (over bark)	235	429	473
…of which coniferous	235	423	466
…of which broadleaved	0	6	7
Commercial growing stock	200	365	402

To estimate the 2010 standing volume in planted forests, the average annual volume increment for the last 5 years was extracted from the NEFD database (2003-2007). This estimate was 38 million m^3 per year.

National Class	Annual increment (million cubic meters)					Average (5-years)
	2003	2004	2005	2006	2007	
Planted forest	37	37	38	39	39	38

This annual increment figure was considered as yearly average for 2009 and 2010, and added to the 2008 growing stock figure. This gives a standing volume estimate of 522 million m^3 for 2010. This figure was multiplied by the bark correction factor resulting in the 2010 growing

stock estimate of 610 million m^3 (601 m^3 coniferous and 9 m^3 broadleaved) and a commercial growing stock of 518 million m^3.

b. Indigenous forest and shrub land

It was assumed that the growing stock in indigenous forest and shrub land between 2005 and 2010 remains unchanged. This assumption was based on preliminary results presented by Beets et al. (2009) which shows there is no significant change in above ground biomass between 1990 and 2004.

6.3.3 Reclassification into FRA 2010 categories

No reclassification was needed for this table.

6.4 Data for Table T6

Table 6a – Growing stock

FRA 2010 category	Volume (million cubic meters over bark)							
	Forest				Other wooded land			
	1990	2000	2005	2010	1990	2000	2005	2010
Total growing stock	n.a.	n.a.	3 449	3 586	n.a.	n.a.	258	258
... of which coniferous	n.a.	n.a.	833	968	n.a.	n.a.	32	32
... of which broadleaved	n.a.	n.a.	2 616	2 618	n.a.	n.a.	226	226
Growing stock of commercial species	n.a.	n.a.	402	518	n.a.	n.a.	n.a.	n.a.

Table 6b – Growing stock of the 10 most common species

FRA 2010 category / Species name			Growing stock in forest (million cubic meters)		
Rank	Scientific name	Common name	1990	2000	2005
1st	*Nothofagus menziesii*	Silver beech	n.a.	n.a.	458
2nd	*Pinus radiata*	Radiata pine	235	393	433
3rd	*Nothofagus fusca*	Red beech	n.a.	n.a.	371
4th	*Weinmannia racemosa*	Kamahi	n.a.	n.a.	264
5th	*Nothofagus solandri var.cliffortioides*	Mountain beech	n.a.	n.a.	180
6th	*Dacrydium cupressinum*	Rimu	n.a.	n.a.	126
7th	*Beilschmiedia tawa*	Tawa	n.a.	n.a.	113
8th	*Metrosideros umbellata*	Southern rata	n.a.	n.a.	78
9th	*Nothofagus truncata*	Hard beech	n.a.	n.a.	75
10th	*Nothofagus solandri*	Black beech	n.a.	n.a.	55
Remaining			0	36	1296
TOTAL			**n.a.**	**n.a.**	**3 449**

Note: Rank refers to the order of importance in terms of growing stock, i.e. 1st is the species with the highest growing stock. Year 2000 is the reference year for defining the species list and the order of the species.

Table 6c – Specification of threshold values

Item	Value	Complementary information
Minimum diameter (cm) at breast height[1] of trees included in growing stock (X)	>0 2.5	Planted forest: all crop trees included in estimate Indigenous forest
Minimum diameter (cm) at the top end of stem for calculation of growing stock (Y)	0 0	Planted forest Indigenous forest
Minimum diameter (cm) of branches included in growing stock (W)	-1 10	Planted forest: no branches included Indigenous forest
Volume refers to "above ground" (AG) or "above stump" (AS)	AG AG	Planted forest Indigenous forest

6.5 Comments to Table T6

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Total growing stock	Total growing stock estimates for all forests are only available for years 2005 and 2010. Therefore, only these years are reported in Table 6a. Planted forest growing stock estimates for years 1990 and 2000 are presented in the original data and estimation and forecasting sections.	
Growing stock of broadleaved / coniferous	The growing stock of broadleaved and coniferous species in indigenous forests was based on an assumed proportion (88% broadleaved and 12% coniferous). This percentage was based on the results of tree species measurements in indigenous forest and shrub land (OWL) plots (Beets et al,, 2009).	
Growing stock of commercial species	There are no national estimates 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 and permits, 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.	
Growing stock composition	The growing stock by most common species (Table 6b) for indigenous species (all in table except *Pinus radiata*) is based on results from tree species measurements in indigenous forests and shrub land (OWL) plots (Beets et al., 2009). The resulting mean volume per hectare of each indigenous	

[1] Diameter at breast height (DBH) refers to diameter over bark measured at a height of 1.30 m above ground level or 30 cm above buttresses if these are higher than 1 m.

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
	species was multiplied by the indigenous forest area used in the analysis.	

Other general comments to the table

a. Standing volumes in planted forests are calculated on the basis of regional yield tables for particular silvicultural regimes.

b. Minimum small end diameters (MIN. SED) for the main log types from planted forests species are:

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

7 Table T7 – Biomass stock

7.1 FRA 2010 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 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	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.

7.2 National data

7.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Wakelin, S.J. (2008). Carbon inventory of New Zealand's 2007 Greenhouse Gas Inventory.	H	Planted forest above ground carbon, below ground carbon, coarse woody debris carbon	1990 2000 2005 2010	Carbon was multiplied by 2 to give total biomass.
Beets, P.N., Kimberley, M.O., Goulding, C.J., Garrett, L.G., Oliver, G.R., Paul, T.S.H. (2009). Natural forest plot data analysis: Carbon stock analyses and re-measurement strategy. Scion Research contract for the Ministry for the Environment	H	Indigenous forest above ground biomass, below ground biomass, coarse woody debris biomass	2005	

7.2.2 Classification and definitions

National class	Definition
N/A	Carbon stocks in forests and shrub land in New Zealand are estimated based on the definitions of the four IPCC Good Practice Guidance biomass pools: Above ground biomass (AGB), Below ground biomass (BGB), Coarse woody debris (CWD) and Fine woody debris and litter (FWD). CWD is equivalent to the Dead wood FRA category definition.

7.2.3 Original data

a. Planted forest

Planted forests carbon stocks for the AGB, BGB, CWD and FWD pools are quantified every year for reporting in the national greenhouse gas inventory (Wakelin, 2008). These are

currently based on NEFD data. As the methodology involves updating and time-shifting data to calculate estimates for the current inventory year, the estimates reported for 1990, 2000 and 2005 in the FRA 2005 have changed and been updated in this report. Carbon stocks are multiplied by a factor of 2 to calculate the biomass estimates.

Planted forests data for all the pools are currently being collected through the New Zealand Land Use and Carbon Analysis System (LUCAS) and will begin to replace NEFD based estimates in the future.

National Class	Carbon (million tonnes)			
	1990	2000	2005	2010
Above ground	67	101	121	145
Below ground	15	22	26	31
Coarse woody debris	12	19	24	28

b. Indigenous forest and shrub land

Indigenous forest and shrub land biomass estimates were based on data collected from 2002 to 2007 through the New Zealand's Carbon Accounting System inventory and analysed by Beets et al. (2009). The results of this analysis were used to for the 2005 reporting year. There are currently no time series consistent estimates available for years 1990 and 2000. Official biomass estimates for 1990 will be available within the next two years.

National Class	Carbon (million tonnes)	
	2005	
	Indigenous forest	Shrub land
Above ground	893	89
Below ground	223	22
Coarse woody debris	119	11

Note: Estimates for indigenous forests and shrub land are preliminary

7.3 Analysis and processing of national data

7.3.1 Calibration

No calibration was needed for these data.

7.3.2 Estimation and forecasting

a. Planted forest

The biomass for each pool was estimated multiplying carbon stocks by 2.

National Class	Biomass (million tonnes)			
	1990	2000	2005	2010
Above ground	135	203	242	289
Below ground	29	44	52	62
Coarse woody debris	23	37	48	56

b. Indigenous forest and shrub land

The biomass for each pool was estimated multiplying carbon stocks by 2. It was assumed that the biomass in indigenous forest and shrub land between 2005 and 2010 have remained unchanged. This assumption was based on preliminary results presented by Beets et al. (2009)

which show no significant change in above ground biomass estimated between 1990 and 2004. Although there might be changes in carbon stocks in the other pools through the years, this will only be established by a re-measurement of the plots network (Beets et al, 2009). 2010 estimates will be updated when this information is available.

National Class	Biomass (million tonnes)	
	2005	
	Indigenous forest	Shrub land
Above ground	1 786	178
Below ground	446	45
Coarse woody debris	238	21

Note: Estimates for indigenous forests and shrub land are preliminary

7.3.3 Reclassification into FRA 2010 categories

No reclassification was needed for this table.

7.4 Data for Table T7

FRA 2010 category	Biomass (million metric tonnes oven-dry weight)							
	Forest				Other wooded land			
	1990	2000	2005	2010	1990	2000	2005	2010
Above-ground biomass	n.a.	n.a.	2 028	2 075	n.a.	n.a.	178	178
Below-ground biomass	n.a.	n.a.	498	508	n.a.	n.a.	45	45
Dead wood	n.a.	n.a.	286	294	n.a.	n.a.	21	21
TOTAL	**n.a.**	**n.a.**	**2 812**	**2 877**	**n.a.**	**n.a.**	**244**	**244**

7.5 Comments to Table T7

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Above-ground biomass	Biomass data for all forests are only available for years 2005 and 2010. Therefore, only these years are reported in Table 7. Planted forest biomass estimates for years 1990 and 2000 are presented in the original data and estimation and forecasting sections.	Reported estimates of biomass in indigenous forests and shrub land are preliminary.
Below-ground biomass	Biomass data for all forests are only available for years 2005 and 2010. Therefore, only these years are reported in Table 7. Planted forest biomass estimates for years 1990 and 2000 are presented in the original data and estimation and forecasting sections.	Reported estimates of biomass in indigenous forests and shrub land are preliminary.
Dead wood	Biomass data for all forests are only available for years 2005 and 2010. Therefore, only these years are reported in Table 7. Planted forest biomass estimates for years 1990 and 2000 are presented in the original data and estimation and forecasting sections.	Reported estimates of biomass in indigenous forests and shrub land are preliminary.

Other general comments to the table
The data which will underpin the UNFCCC LULUCF sector and Kyoto Protocol is: forest related, soil related and land-use mapping. Data collection methodologies have been designed to provide unbiased carbon estimates at the national scale, with methods supported by relevant scientific research. Analysis of the data will provide nationally applicable values for carbon stock and stock change for the five IPCC carbon pools. The forest carbon inventory involves the use of plots located on a systematic grid across New Zealand (8km grid for indigenous forest and 4km grid for post-1989 planted forest). Historic plots for soil carbon measurement have been established in different land uses.

8 Table T8 – Carbon stock

8.1 FRA 2010 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 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	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 the minimum diameter for dead wood (e.g. 10 cm), lying dead in various states of decomposition above the mineral or organic soil.
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.

8.2 National data

8.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Wakelin, S.J. (2008). Carbon inventory of New Zealand's 2007 Greenhouse Gas Inventory.	H	Planted forest above ground carbon, below ground carbon, coarse woody debris carbon	1990 2000 2005 2010	
Beets, P.N., Kimberley, M.O., Goulding, C.J., Garrett, L.G., Oliver, G.R., Paul, T.S.H. (2009). Natural forest plot data analysis: Carbon stock analyses and re-measurement strategy. Scion Research contract for the Ministry for the Environment	H	Indigenous forest above ground carbon, below ground carbon, coarse woody debris carbon	2005	

8.2.2 Classification and definitions

National class	Definition
N/A	Carbon stocks in forests and shrub land in New Zealand are estimated based on the definitions of the four IPCC Good Practice Guidance biomass pools: Above ground biomass (AGB), Below ground biomass (BGB), Coarse woody debris (CWD) and Fine woody debris and litter (FWD). CWD is equivalent to the Dead wood FRA category definition. FWD is equivalent to the Litter FRA category definition.

8.2.3 Original data

a. Planted forest

Planted forests carbon stocks for the AGB, BGB, CWD and FWD pools are quantified every year for reporting in the national greenhouse gas inventory (Wakelin, 2008). These are currently based on NEFD data. As the methodology involves updating and time-shifting data to calculate estimates for the current inventory year, the estimates reported for 1990, 2000 and 2005 in the FRA 2005 have changed and been updated in this report.

Planted forests data for all the pools have been collected through the New Zealand's Carbon Accounting System inventory and will replace NEFD based estimates in the future.

National Class	Carbon (million tonnes)			
	1990	2000	2005	2010
Above ground	67	101	121	145
Below ground	15	22	26	31
Coarse woody debris	12	19	24	28
Fine woody debris	10	15	18	21

b. Indigenous forest and shrub land

Indigenous forest and shrub land biomass estimates were based on data collected from 2002 to 2007 through the New Zealand Land Use and Carbon Analysis System and analysed by Beets et al. (2009). The results of this analysis were used to for the 2005 reporting year. There are currently no time series consistent estimates available for years 1990 and 2000. Official biomass estimates for 1990 will be available within the next two years.

National Class	Carbon (million tonnes)	
	2005	
	Indigenous forest	Shrub land
Above ground	893	89
Below ground	223	22
Coarse woody debris	119	11
Fine woody debris	36	9

Note: Estimates for indigenous forests and shrub land are preliminary

8.3 Analysis and processing of national data

8.3.1 Calibration

No calibration was needed for these data.

8.3.2 Estimation and forecasting

a. Indigenous forest and shrub land

It was assumed that carbon stocks in indigenous forest and shrub land between 2005 and 2010 have remained unchanged. This assumption was based on preliminary results presented by Beets et al. (2009) which show no significant change in above ground biomass estimates between 1990 and 2004. Although there might be changes in carbon stocks in the other pools through the years, this will only be established by a re-measurement of the plots network (Beets et al, 2009). 2010 estimates will be updated when this information is available.

8.4 Data for Table T8

FRA 2010 Category	Carbon (Million metric tonnes)							
	Forest				Other wooded land			
	1990	2000	2005	2010	1990	2000	2005	2010
Carbon in above-ground biomass	n.a.	n.a.	1014	1038	n.a.	n.a.	89	89
Carbon in below-ground biomass	n.a.	n.a.	249	254	n.a.	n.a.	22	22
Sub-total: Living biomass	n.a.	n.a.	***1263***	***1292***	***n.a.***	***n.a.***	***111***	***111***
Carbon in dead wood	n.a.	n.a.	143	147	n.a.	n.a.	11	11
Carbon in litter	n.a.	n.a.	55	57	n.a.	n.a.	9	9
Sub-total: Dead wood and litter	n.a.	n.a.	***198***	***204***	***n.a.***	***n.a.***	***20***	***20***
Soil carbon	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
TOTAL	**n.a.**	**n.a.**	**n.a.**	**n.a.**	***n.a.***	***n.a.***	**n.a.**	**n.a.**

Soil depth (cm) used for soil carbon estimates	n.a.

8.5 Comments to Table T8

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Carbon in above-ground biomass	Data for all forests are only available for years 2005 and 2010. Therefore, only these years are reported in Table 8. Planted forest carbon estimates for years 1990 and 2000 are presented in the original data and estimation and forecasting sections.	Reported estimates of carbon in indigenous forests and shrub land are preliminary.
Carbon in below-ground biomass	Data for all forests are only available for years 2005 and 2010. Therefore, only these years are reported in Table 8. Planted forest carbon estimates for years 1990 and 2000 are presented in the original data and estimation and forecasting sections.	Reported estimates of carbon in indigenous forests and shrub land are preliminary.
Carbon in dead wood	Data for all forests are only available for years 2005 and 2010. Therefore, only these years are reported in Table 8. Planted forest carbon estimates for years 1990 and 2000 are presented in the original data and estimation and forecasting sections.	Reported estimates of carbon in indigenous forests and shrub land are preliminary.
Carbon in litter	Data for all forests are only available for years 2005 and 2010. Therefore, only these years are reported in Table 8. Planted forest carbon estimates for years 1990 and 2000 are presented in the original data and estimation and forecasting sections.	Reported estimates of carbon in indigenous forests and shrub land are preliminary.
Soil carbon		

Other general comments to the table

9 Table T9 – Forest fires

9.1 FRA 2010 Categories and definitions

Category	Definition
Number of fires	Number of vegetation fires per year.
Area affected by fire	Area affected by vegetation fires per year.
Vegetation fire *(supplementary term)*	Any vegetation fire regardless of ignition source, damage or benefit.
Wildfire	Any unplanned and/or uncontrolled vegetation fire.
Planned fire	A vegetation fire regardless of ignition source that burns according to management objectives and requires limited or no suppression action.

9.2 National data

9.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
New Zealand Fire Service and Rural Fire Authority annual returns (2008).	M/L	Area affected by fires by vegetation type	1988-1992/ 1998	
New Zealand Fire Service database (2008).	M	Area affected by fires by vegetation type	1999-2007	
New Zealand Fire Service database (2008).	M	Total number of wildfires	1988-2007	
Wakelin, S.J. (2007) Carbon Inventory of New Zealand's Planted Forests-Calculations revised in October 2007 for New Zealand's 2006 Greenhouse Gas Inventory. ENSIS. Internal report.	M			Used approach to estimate figures from 1988 to 2000 (calibration). Based on information provided by Neil Challands, New Zealand Fire Service.

9.2.2 Classification and definitions

National class	Definition
Forest fires area	Forest area over which wildfires have burned vegetation
Scrub fires area	Shrub land and wetlands area over which wildfires have burned vegetation
Grass fires area	Grassland area over which wildfires have burned vegetation

9.2.3 Original data

The New Zealand Fire Service publishes data on area lost to wildfires by vegetation type (forest, scrub, and grass) and number of vegetation fires based on incident statistics provided by rural fire authorities. The available data published in Annual reports and Emergency Statistic Incidents was used for years 1988 to 1992 and 1998. The New Zealand Fire Service's current electronic database has no data prior to July 1998. The data for years 1999 to 2007 was obtained from this source.

Reporting year: 1990

National class	Area affected by fires (1000 ha)					Average (5-years)
	1988	1989	1990	1991	1992	
Forest fires	0.615	0.462	0.240	0.152	0.151	0.324
Scrub fires	9.504	1.313	3.361	0.857	2.193	3.446
Grass fires	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Total area	**10.119**	**1.775**	**3.601**	**1.009**	**2.344**	**3.770**
Total number of wildfires	**729**	**1 205**	**928**	**1 234**	**1 116**	**1 042**

Reporting year: 2000

National class	Area affected by fires (1000 ha)					Average (5-years)
	1998	1999	2000	2001	2002	
Forest fires	1.296	0.023	0.002	0.585	0.180	0.417
Scrub fires	2.019	0.175	0.065	0.931	1.307	0.899
Grass fires	2.938	0.323	0.010	1.542	0.804	1.123
Total area	**6.253**	**0.521**	**0.077**	**3.058**	**2.291**	**2.440**
Total number of wildfires	**3 610**	**3 169**	**2 944**	**3 318**	**3 709**	**3 350**

Reporting year: 2005

National class	Area affected by fires (1000 ha)					Average (5-years)
	2003	2004	2005	2006	2007	
Forest fires	0.432	0.155	0.354	0.604	0.460	0.401
Scrub fires	1.619	2.217	1.466	2.061	1.450	1.763
Grass fires	0.620	3.060	1.497	0.422	3.043	1.728
Total area	**2.671**	**5.432**	**3.317**	**3.087**	**4.953**	**3.892**
Total number of wildfires	**4 657**	**4 336**	**4 710**	**4 271**	**3 983**	**4 391**

9.3 Analysis and processing of national data

9.3.1 Calibration

These figures are based on statistics provided by Rural Fire Authorities (New Zealand Defence Force, Local Authorities, Department of Conservation, or a forestry company), and coordinated by the National Rural Fire Authority. However, as Rural Fire Authorities are mainly operational, incident reporting has not been a priority through the years. Additionally, the Fire Service has gone through changes in personnel and database systems, with an official database system starting to operate in July 1998. All these factors, made the data from years 1988 to 2000 of poor quality. As a result, a similar approach as for the Carbon Inventory of New Zealand's Planted forest report (Wakelin, 2007) was taken, using the average from years 2001 to 2007 as the estimate for years 1988 to 1992 (1990 reporting year), and years 1998 to

2000 (2000 reporting year , with actual values for 2001 and 2002). The following table presents the average for the 2001 to 2007 period,

National class	Area affected by fires (1000 ha)							Average
	2001	2002	2003	2004	2005	2006	2007	
Forest fires	0.585	0.180	0.432	0.155	0.354	0.604	0.460	0.396
Scrub fires	0.931	1.307	1.619	2.217	1.466	2.061	1.450	1.579
Grass fires	1.542	0.804	0.620	3.060	1.497	0.422	3.043	1.570
Total area	**3.058**	**2.291**	**2.671**	**5.432**	**3.317**	**3.087**	**4.953**	**3.545**
Total number of wildfires	**3 318**	**3 709**	**4 657**	**4 336**	**4 710**	**4 271**	**3 983**	**4 141**

9.3.2 Estimation and forecasting

The average for the 2000 reporting year was estimated using the 2001-2007 period average as the estimate for years 1998 to 2000, and actual values for 2001 and 2002.

Reporting year: 2000

National class	Area affected by fires (1000 ha)					Average (5-years)
	1998	1999	2000	2001	2002	
Forest fires	0.396	0.396	0.396	0.585	0.180	0.391
Scrub fires	1.579	1.579	1.579	0.931	1.307	1.395
Grass fires	1.570	1.570	1.570	1.542	0.804	1.411
Total area	**3.545**	**3.545**	**3.545**	**3.058**	**2.291**	**3.197**
Total number of wildfires	**4 141**	**4 141**	**4 141**	**3 318**	**3 709**	**3 890**

9.3.3 Reclassification into FRA 2010 categories

The area affected by fire were reclassified (percentage allocation) according to FRA 2010 categories as follows,

National Class	FRA 2010 Categories			
	Total land area affected by fire	Forest	Other land wooded land	Other land
Forest fires		100 %		
Scrub fires			100 %	
Grass fires				100 %
Total area	100 %			

9.4 Data for Table T9

Table 9a

FRA 2010 category	Annual average for 5-year period					
	1990		2000		2005	
	1000 hectares	number of fires	1000 hectares	number of fires	1000 hectares	number of fires
Total land area affected by fire	3.545	4 141	3.197	3 890	3.892	4 391
... of which on forest	0.396	n.a.	0.391	n.a.	0.401	n.a.
... of which on other wooded land	1.579	n.a.	1.395	n.a.	1.763	n.a.
... of which on other land	1.570	n.a.	1.411	n.a.	1.728	n.a.

Table 9b

FRA 2010 category	Proportion of forest area affected by fire (%)		
	1990	2000	2005
Wildfire	100	100	100
Planned fire	0	0	0

Note: The figures for the reporting years refer to the averages of annually affected areas for the 5-year periods 1988-1992, 1998-2002 and 2003-2007 respectively

9.5 Comments to Table T9

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Area affected by fire	Reporting areas of scrub land burnt or areas of plantation lost to the National Rural Fire Authority has been not very accurate in the past. Increasing professionalism in the rest of the rural fire management sector and the better use of technology (e.g. GPS) has led to better quality and more reliable data in the last 3 to 5 years. In order to overcome poor quality data for 1988 to 2000, previously reported estimates for 1990 has been updated with the average from years 2001 to 2007. This average was also used for years 1998 to 2000 to estimate the average for 2000 (with actual values for 2001 and 2002).	
Number of fires	Based on Fire Authority returns.	
Wildfire / planned fire	Fire is no longer widely used as a site preparation tool in forest management.	

Other general comments to the table

10 Table T10 – Other disturbances affecting forest health and vitality

10.1 FRA 2010 Categories and definitions

Term	Definition
Disturbance	Damage caused by any factor (biotic or abiotic) that adversely affects the vigour and productivity of the forest and which is not a direct result of human activities.
Invasive species	Species that are non-native to a particular ecosystem and whose introduction and spread cause, or are likely to cause, socio-cultural, economic or environmental harm or harm to human health.
Category	**Definition**
Disturbance by insects	Disturbance caused by insect pests.
Disturbance by diseases	Disturbance caused by diseases attributable to pathogens, such as bacteria, fungi, phytoplasma or virus.
Disturbance by other biotic agents	Disturbance caused by biotic agents other than insects or diseases, such as wildlife browsing, grazing, physical damage by animals, etc.
Disturbance caused by abiotic factors	Disturbances caused by abiotic factors, such as air pollution, snow, storm, drought, etc.

10.2 National data

10.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Somerville, A. (1995) Wind damage to New Zealand State plantation forests. p. 460-467. In: Coutts, M.P. and J. Grace (Eds.). Wind and Trees.	M/L	Weighted percentage of planted forest area loss by wind damage	1900-1990	
Bulman, Lindsay. (2008). Scion. Expert estimates.	M	Estimates of affected planted forest area by disturbances	1990 2000 2005	Expert estimates based on: Forest Health database (Scion), Records from Dothistroma Control Committee, and Internal Scion reports.
Ridley, G.S., Bain, J., Bulman, L.S., Dick, M.A. and M.K. Kay. (2000). Threats to New Zealand's indigenous forests from exotic pathogens and pests. Science for conservation 142. 67 p.	H	Pathogens and pests affecting indigenous forests		In disturbance by insects and diseases
Barlow, N.D, Beggs, J.R. and M.C. Barron. (2002). Dynamics of common wasps in New Zealand beech forests. Journal of Animal Ecology 71: 663-671.	H	Effect of wasps in indigenous forest		In disturbance by insects and diseases

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Johnston, P.R., Horner, I.J. and R. Beever. (2003). *Phytophthora cinnamomi* in New Zealand's indigenous forests. New Zealand Journal of Botany 42:1-20.	H	Effect of *Phytophthora cinnamomi* in indigenous forests		In disturbance by insects and diseases
Payton, I. (2000). Damage to Native Forests. p.111-125. In: Montague, T.L. (Ed.) The brushtail possum:biology, impact and management of an introduced marsupial.	H	Effect of brush tail possums in indigenous forests		In disturbance by other biotic agents
Cowan, P.E. (2005). Brushtail possums. p.56-80. In: King, C.M. The Handbook of New Zealand Mammals.	H	Effect of brush tail possums in indigenous forests		In disturbance by other biotic agents
Bellingham, P.J. and W.G. Lee (2006). Distinguishing Natural Processes from Impacts of Invasive Mammalian Herbivores. p.323-336. In: Allen, R.B. and W.G., Lee (Eds.) Biological Invasions in New Zealand. Ecological Studies, Vol. 186.	H	Effect of brush tail possums in indigenous forests		In disturbance by other biotic agents
Landcare Research Information Sheet. Possums…Their Effects on Native Vegetation.	H	Effect of brush tail possums in indigenous forests		In disturbance by other biotic agents
Timmins, S.M and P.A. Williams (1991). Weed numbers in New Zealand's Forest and Scrub Reserves. New Zealand Journal of Ecology 152 (2): 153-162.	H	Weed species within conservation land		In area of forests affected by woody species
Howell, C. (2008). Consolidated list of environmental weeds in New Zealand. DOC research and development series 292. 42p.	H	Weed species within conservation land		In area of forests affected by woody species
Bulman, L S; Gadgil, P D 2001: Cyclaneusma needle-cast in New Zealand. Forest Research Bulletin No. 222, 76p, September 2001.	H	Cyclauneusma Needle Cast description		In comments
Ridley, G.S. and M.A. Dick. (2001). Forest Research Bulletin 220. An Introduction to The Diseases of Forest and Amenity Trees in New Zealand.	H	Armillaria root rot description		In comments
Bulman, L.S., Gadgil, P.D., Kershaw, D.J. and J.W. Ray. (2004). Assessment and Control of Dothistroma Needle Blight. Forest Research Bulletin 229.	H	Dothistroma Needle Blight description		In comments
Forest Biosecurity Research Council. (2006). A Summary of Research Findings 2005/2006.	H	Nectria flute canker and Physiological needle blight description		In comments
Department of Conservation. (2008). Pest Control and Sustained Management. Financial year ending 1991-2007. Internal report.	M	Areas treated for possum control within conservation land	1990 2000 2005	

10.2.2 Classification and definitions

National class	Definition
Disturbance by insects	Area of planted forests affected by bark beetle (*Hylastes ater*)
Disturbance by diseases	Area of planted forests affected by Cyclaneusma needle cast, Dothistroma needle blight, Armillaria root rot, and Nectria flute canker
Disturbance by possums	Area of planted forests affected by possums
Disturbance by wind	Area of planted forest affected by catastrophic wind damage
Disturbance by Physiological needle blight	Area of planted forest affected by Physiological needle blight

10.2.3 Original data

a. Disturbance by insects and diseases

Figures for planted forest area affected by insects and diseases were based on expert estimate (Lindsay Bulman, Scion, 2008). Disturbance by insects figures include planted forest areas affected by bark beetle (*Hylaster ater*). Disturbance by fungal diseases figures include planted forest areas affected by Cyclaneusma needle cast (*Cyclaneusma minus*), Dothistroma needle blight (*Dothistroma pini)*, Armillaria root rot (*Armillaria* spp.), and Nectria flute canker (*Nectria fuckeliana*).

National category	Planted forest area (1000 hectares)		
	1990	2000	2005
Disturbance by insects	60	50	40
Disturbance by diseases	265	240	320

There are no reported figures of indigenous forests area affected by insects or diseases. Scientific literature reports the existence and effect of certain pathogens and pests in indigenous forests. For instance, *Phytophthora cinnamomi* is present in soils in indigenous forests, although major disease episodes have been rare. These fungi can affect the seedlings of some major forest trees species, such as kauri (*Agathis australis*) and beech (*Nothofagus* spp.), and could have longer term effects on the vegetation (Johnston, et al., 2003). High density populations of the common wasp (*Vespula vulgaris*) in beech forests, associated with an abundant supply of honey dew on trunks and branches, may be impacting beech forest ecology through predation by wasps on native insects (Barlow, et al., 2002). A study by Ridley, et al. (2000) assessed the threats to New Zealand indigenous forest by exotic pathogens and pests. The study presents an extensive literature review showing there hasn't been any extensive effect of exotic pathogens and pests in the major indigenous forests species. Nevertheless, risks to indigenous forests were considered real but unquantifiable at this stage.

b. Disturbance by other biotic agents

The introduced Australian brush tail possum (*Trichosurus vulpecula)* is a major forest problem in New Zealand. Their impact affects the overall structure and composition of indigenous forests and also affects planted forests. Possums are also important predators of forest birds and native invertebrates.

Figures for planted forest area affected by possums were based on forest health inspection records held in the forest health database and provided by Lindsay Bulman, Scion, 2008. They are presented in the following table. All major exotic plantation forests are inspected at least once a year for signs of newly established pests or diseases. At that time forest health assessments are undertaken, where damage by biotic and abiotic agents is estimated and recorded. Reports of possum damage were significantly more common in the late 1990s and early 2000s. It is difficult to determine the reason for that, but one possible reason is that forest companies reduced efforts to control possums prior to that period and populations increased to the level where significant damage was being caused. Over the period 1998 to 2005 the number of reports of possum damage in exotic forest plantations declined consistently from year to year.

National class	Planted forest area (1000 hectares)		
	1990	2000	2005
Disturbance by possums	15	310	140

Possums are a pest in New Zealand because of their high density. The exact consequences of possum browsing in indigenous forest dynamics and soil erosion have been debated for decades. The impact of possums can vary within plant populations, communities and ecosystems, and is influenced by a range of biotic and abiotic factors which may predispose plant communities to possum damage. Selective browsing on some species may have a gradual effect in forest composition, with some species disappearing from certain areas and being replaced by others. Within forest stands possum browsing could be concentrated on a few trees, which could be heavily defoliated or killed. Possum browsing may have some secondary effects such as weakening canopies and making them susceptible to wind throw, salt damage, pathogens, insects or climatic extremes. Also, possum browsing of leaves may reduce the production of flowers and fruit (Payton, 2000; Cowan, 2005; Bellingham and Lee, 2006; Landcare Research).

Because the effect of possums is widespread in indigenous forests in New Zealand, it could be assumed that most of the forest has been affected by possums to some degree. Since they impact forest composition, and this effect is not monitored in a national scale, it is difficult to provide an exact estimate of indigenous forest area affected by possums.

c. Disturbance by abiotic factors

Wind is the main abiotic factor affecting planted forests in New Zealand. Planted forest area affected by wind damage was calculated using the same approach used in the FRA 2005 report. This approach used a weighted average of percentage of net stocked area loss per year due to catastrophic wind damage risk (0.38% loss per year) estimated by Somerville (1995) (based on figures from 1900 to 1990). This approach does not account for any genetic quality improvements made in the planting stock since 1990 that could have reduce wind damage risk. Planted forest areas presented in Table 1.3.2c were used to estimate forest areas loss due to wind damage as presented in the following table,

National class	Planted forest area (1000 hectares)		
	1990	2000	2005
Total planted forest area	1 261	1 809	1 854
Disturbance by wind damage	5	7	7

Physiological needle blight (PNB) was also considered as a disturbance caused by abiotic factors. PNB outbreaks have often been associated with high mid-winter rainfall and non-porous soils (Forest Biosecurity Research Council, 2006). Figures for planted forest area affected by PNB were based on expert estimate (Lindsay Bulman, Scion, 2008).

National class	Planted forest area (1000 hectares)		
	1990	2000	2005
Disturbance by Physiological needle blight	0	95	20

d. Major outbreaks of insects and diseases affecting forest health and vitality

Figures for major outbreaks of diseases affecting planted forests health and vitality were based on expert estimate and are reported in Table 10b. No insect outbreaks of note were recorded (Lindsay Bulman, Scion, 2008).

e. Area of forest affected by woody invasive species

Indigenous forests in protected areas could be increasingly threatened by weeds, as surrounding land uses intensify and natural landscape fragmentation (Timmins and Williams (1991). Howell (2008) reported a consolidated list of 328 vascular plant species present in the Department of Conservation's land, and considered as having a detrimental effect on the conservation values of the sites. Over 40% of these species are trees and shrubs. Wilding pine spread due to wind-blown pine seeds, can affect indigenous forest areas, competing for space with native trees and plants. Similarly to the case of possums, there is no monitoring of the impact of weeds in forests at a national scale, and therefore an estimate of the exact forest area affected is difficult to estimate.

10.3 Analysis and processing of national data

10.3.1 Calibration

No calibration was needed for these data.

10.3.2 Estimation and forecasting

a. Disturbance by insects and diseases

No estimation or forecasting was needed for these data.

b. Disturbance by other biotic agents

No estimation or forecasting was needed for these data.

c. Disturbance by abiotic factors

The total area affected by abiotic factors (wind and Physiological needle blight) was estimated by adding the corresponding estimates.

National class	Planted forest area (1000 hectares)		
	1990	2000	2005
Disturbance by wind damage	5	7	7
Disturbance by Physiological needle blight	0	95	20
Total disturbance by abiotic factors	5	102	27

d. Major outbreaks of insects and diseases affecting forest health and vitality

No estimation or forecasting was needed for these data.

10.4 Data for Table T10

Table 10a – Disturbances

FRA 2010 category	Affected forest area (1000 hectares)		
	1990	2000	2005
Disturbance by insects	60	50	40
Disturbance by diseases	265	240	320
Disturbance by other biotic agents	15	310	140
Disturbance caused by abiotic factors	5	102	27
Total area affected by disturbances	**n.a.**	**n.a.**	**n.a.**

Notes: The figures for the reporting years refer to the averages of annually affected areas for the 5-year periods 1988-1992, 1998-2002 and 2003-2007 respectively.

The total area affected by disturbances is not necessarily the sum of the individual disturbances as these may be overlapping.

Table 10b – Major outbreaks of insects and diseases affecting forest health and vitality

Description / name	Tree species or genera affected (scientific name)	Year(s) of latest outbreak	Area affected (1000 hectares)	If cyclic, approx. cycle (years)
Dothistroma needle blight/*Dothistroma pini*	*Pinus radiata*	2006	130	5
Dothistroma needle blight/*Dothistroma pini*	*Pinus radiata*	2002	183	5
Dothistroma needle blight/*Dothistroma pini*	*Pinus radiata*	1995	115	5
Dothistroma needle blight/*Dothistroma pini*	*Pinus radiata*	1989	119	5
Cyclaneusma needle cast/*Cyclaneusma minus*	*Pinus radiata*	2000	150	
Cyclaneusma needle cast/*Cyclaneusma minus*	*Pinus radiata*	1999	200	

Note: Area affected refers to the total area affected during the outbreak.

Table 10c – Area of forest affected by woody invasive species

Scientific name of woody invasive species	Forest area affected 2005 (1000 hectares)
n.a	
Total forest area affected by woody invasive species	

Note: The total forest area affected by woody invasive species is not necessary the sum of the values above, as these may be overlapping.

10.5 Comments to Table T10

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Disturbance by insects	Historically very few insect problems have been noted in planted forests, apart from one species of bark beetle (*Hylastes ater*) that can be associated with seedling death (Bulman, 2008). Bark beetles are considered a major threat to pine forests internationally (Forest Biosecurity Research Council, 2006).	
Disturbance by diseases	*Dothistroma pini* is a fungus that causes a needle cast of conifers (Dothistroma needle blight). In New Zealand, the tree species most significantly affected are *Pinus radiata, P. nigra* and *P. ponderosa* (Bulman, et al,. 2004). There are two peak periods of Cyclaneusma needle cast: spring and autumn. *Cyclaneusma minus* fungus spores occur most frequently in autumn-winter and spore release is dependent on rainfall. Infection to radiata pine first occurs around the same time of the year when needles are about 8-9 months old (Bulman & Gadgil, 2001). Nectria flute canker is initiated by the entrance of *Nectria fuckeliana* fungus spores into the tree stems through pruning wounds and spreads from entry point killing cambium cells and resulting in the characteristic flute canker symptom (Forest Biosecurity Research Council, 2006). Pines trees are more susceptible Armillaria root rot (*Armillaria spp*.) *Armillaria* fungus species occur naturally in native beech and broadleaf/podocarp forests. The clear felling and burning of native sites fails to remove *Armillaria* spp. from the soil. When the site is planted for plantation forestry, infection occurs by rhizomorphs and root contacts (Ridley and Dick, 2001).	
Disturbance by other biotic agents	The Department of Conservation has established possum control measures at priority sites within conservation land under their authority. Possum control work undertaken by the Department of Conservation is mostly within indigenous forest (Elaine Wright, DoC. Pers. comm., 2008). The average indigenous forest area treated was 748 832 hectares in 2000 and 1 305 075 hectares in 2005 (five year averages).	
Disturbance caused by abiotic factors	Reported wind damage figure refers to planted forests only. Wind damage in indigenous forests and other wooded land is regarded by DoC as a natural occurrence and so the area affected is not recorded. Physiological Needle Blight occurs in radiata pine plantations in late winter or early spring. This disorder affects trees from 15 years and older. It causes foliage to turn red brown and die, while still attached to the tree (Forest Biosecurity Research Council, 2006).	
Major outbreaks		

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Invasive species	Indigenous forests could be increasingly threatened by weeds. There is no monitoring of the impact of weeds in forests at a national scale.	

Other general comments to the table
The information provided in the FRA table refers only to disturbances in planted forests. Currently, there is no quantitative data available to report disturbances on indigenous forests. For the FRA 2005, information on disturbance by insects and diseases was not provided.

11 Table T11 – Wood removals and value of removals

11.1 FRA 2010 Categories and definitions

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

11.2 National data

11.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Ministry of Agriculture and Forestry (2006). Estimate of Roundwood Removals from New Zealand Forests for the year ended March 2005. SR 03/2006.	H	Roundwood removals	1988-2000	Actual values
PF Olsen and Company (2006). Forestry Cost Monitoring.	H	Harvesting and transport costs	1990	Used to estimate "delivered at mill" prices" from stumpage averages
Ministry of Agriculture and Forestry (2007). Forestry Production and Trade for the December 2006 Quarter. SR 04/2007.	H	Roundwood removals	2001-2007	Actual values
Horgan, Gerard. 2008. Ministry of Agriculture and Forestry. Stumpage averages. Unpublished data.	M	Planted forests log prices	1988-1991	Weighted averages (NZD/m^3)
Ministry of Agriculture and Forestry log prices. http://www.maf.govt.nz/forestry/statistics/logprices/logprices.xls. Last accessed: April 10th, 2008.	H	Planted forests log prices	1992-2007	Price delivered at mill (NZD/m^3)
Griffiths, Alan. (2008). Indigenous Forest Unit. Ministry of Agriculture and Forestry. Expert estimates.	M	Indigenous Log prices	1990 2000 2005	Price delivered at mill (NZD/ m^3)

11.2.2 Classification and definitions

National class	Definition
Roundwood removals	Wood removed for production purposes from planted and indigenous forests. The volume of roundwood is calculated **under bark**.
Price delivered at mill	Domestic pricing point at mill which includes harvesting and transport costs (NZD/tonne)

11.2.3 Original data

a. Roundwood removals

Industrial roundwood removal figures (under bark) from planted and indigenous forests are periodically collected and reported in MAF Statistical Releases. These publications were the source for the data reported and averages estimated for 1990, 2000, and 2005 (year ended March) (MAF 2006, 2007). The value reported in the FRA 2005 (one year value forecast) was updated with the current roundwood removal average value (5 year average).

Reporting year: 1990

National class	Years					Average (5-years)
	1988	1989	1990	1991	1992	
Removal from planted forests (000m^3)	9 118	10 242	11 129	13 093	13 698	**11 456**
Removal from indigenous forests (000m^3)	570	377	357	361	205	**374**
Total	**9 688**	**10 619**	**11 486**	**13 454**	**13 903**	**11 830**

Reporting year: 2000

National class	Years					Average (5-years)
	1998	1999	2000	2001	2002	
Removal from planted forests (000m^3)	16 630	15 689	18 120	19 232	20 883	**18 111**
Removal from indigenous forests (000m^3)	75	125	76	55	57	**78**
Total	**16 705**	**15 814**	**18 196**	**19 285**	**20 940**	**18 188**

Reporting year: 2005

National class	Years					Average (5-years)
	2003	2004	2005	2006	2007	
Removal from planted forests (000m^3)	22 413	20 855	19 234	18 767	20 020	**20 258**
Removal from indigenous forests (000m^3)	38	31	26	24	18	**27**
Total	**22 451**	**20 886**	**19 260**	**18 792**	**20 038**	**20 285**

b. Value of industrial roundwood

MAF periodically collects log prices from producers (planted forests) in order to analyse trends, usually on a monthly or quarterly basis. These statistics have been collected since 1992 and are published in the MAF website. Domestic log price averages for all log prices and grades (delivered at mill) were used to calculate average values for 2000 and 2005 (1998-2007).

Stumpage information for previous years (before 1992) was gathered by a senior analyst at MAF (Gerard Horgan, unpublished data). Weighted average stumpages for all log types and grades were used to estimate an average value for the 1990 reporting year (1988-1992).

Reporting year: 1990

National class	Years					Average (5-years)
	1988	1989	1990	1991	1992	
Planted forests weighted average stumpage (NZD/m^3)	21.7	26.7	39.0	40.1	48.1	**35.1**

Reporting year: 2000

National class	Years					Average (5-years)
	1998	1999	2000	2001	2002	
Planted forests log prices delivered at mill (NZD/tonnes)	93.3	88.6	94.6	95.4	93.6	**93.1**

Reporting year: 2005

National class	Years					Average (5-years)
	2003	2004	2005	2006	2007	
Planted forests log prices delivered at mill (NZD/tonnes)	98.6	82.9	82.9	81.0	85.9	**86.3**

Indigenous log prices estimates were provided by Alan Griffiths from the Indigenous Forest Unit (MAF, unpublished data[2]),

National class	Years		
	1990	2000	2005
Indigenous log prices delivered at mill (NZD/m^3) (rounded weighted average)	62	210	350

11.3 Analysis and processing of national data

11.3.1 Calibration

a. Roundwood removals

A conversion figure of 1.17 was used to change the 5-year average roundwood removal figures to "over bark".

National class	Volume over bark (000m^3)		
	1990	2000	2005
Removal from planted forests	13 404	21 190	23 702
Removal from indigenous forests	438	91	32
Total	**13 842**	**21 280**	**23 734**

[2] Based on: (1) Indigenous forests roundwood removals statistics as reported in: Ministry of Agriculture and Forestry statistics, and Indigenous Forestry Unit statistics, and (2) Indigenous forest log prices estimates from: Ministry of Forestry. Indigenous Forestry Unit. Review of Indigenous Timber Royalties Timberlands West Coast Limited (1994); Ministry of Agriculture and Forestry. Indigenous Forestry on Private Land. MAF Technical Paper No 01/6 (2002); Documented sale prices (softwoods); Anecdotal sale prices (hardwoods).

b. Value of industrial roundwood

For 1990, the five year weighted average planted forests stumpage was 35.1 NZD/m^3. An average logging cost of 25.9 NZD/m^3 and average transport cost 15.3 NZD/m^3 (Olsen, 2006) were assumed in order to estimate "at mill" values, giving a total of NZD 76.3/m^3. The value reported in the FRA 2005 (one year value forecast) was updated with this value (5 year average).

Domestic log price statistics are published in New Zealand dollars per tonne. Tonnes and cubic meters were considered equivalent. The average value results for planted forests log prices are presented in the following table,

National class	Price delivered at mill NZD/m^3		
	1990	2000	2005
Planted forests log prices	76.3	93.1	86.3

11.3.2 Estimation and forecasting

In order to estimate a total value of roundwood removals including planted and indigenous forests data, a unit value weighted average was estimated.

FRA 2010 Category	Industrial roundwood removals		
	1990	2000	2005
Volume (1000 m^3 o.b.)			
... of which from planted forest	13 404	21 190	23 702
... of which from indigenous forest	438	91	32
Total volume (1000 m^3 o.b.)	**13 842**	**21 280**	**23 734**
Unit value (NZD/m^3 o.b.)			
... from planted forest	76.3	93.1	86.3
... from indigenous forest	62.0	210.0	350.0
Unit value weighted average (NZD/m^3 o.b.)	**75.8**	**93.6**	**86.6**
Total value (1000 local currency)	**1 049 819**	**1 992 124**	**2 055 711**

11.3.3 Reclassification into FRA 2010 categories

No reclassification was needed for this table.

11.4 Data for Table T11

FRA 2010 Category	Industrial roundwood removals			Woodfuel removals		
	1990	2000	2005	1990	2000	2005
Total volume (1000 m^3 o.b.)	13 842	21 280	23 734	n.a.	n.a.	n.a.
... of which from forest	13 842	21 280	23 734	n.a.	n.a.	n.a.
Unit value (local currency / m^3 o.b.)	75.8	93.6	86.6	n.a.	n.a.	n.a.
Total value (1000 local currency)	1 049 819	1 992 124	2 055 711	n.a.	n.a.	n.a.

Note: The figures for the reporting years refer to the averages of annually affected areas for the 5-year periods 1988-1992, 1998-2002 and 2003-2007 respectively.

	1990	2000	2005
Name of local currency	New Zealand dollar	New Zealand dollar	New Zealand dollar

11.5 Comments to Table T11

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Total volume of industrial roundwood removals		
Total volume of woodfuel removals	Woodfuel removals are not reported in official statistics.	
Unit value	The indigenous forests log prices estimates include volumes for softwoods (mostly rimu, kauri, miro, matai, totara, and kahikatea), and hardwoods (mostly silver beech, tawa, rewarewa, and small volumes of a mix of minor hardwoods).	
Total value		

Other general comments to the table

12 Table T12 – Non-wood forest products removals and value of removals

12.1 FRA 2010 Categories and definitions

Term	Definition
Non-wood forest product (NWFP)	Goods derived from forests that are tangible and physical objects of biological origin other than wood.
Value of NWFP removals	For the purpose of this table, value is defined as the market value at the site of collection or forest border.

NWFP categories

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. Wild meat
13. Raw material for medicine
14. Raw material for colorants
15. Other edible animal products
16. Other non-edible animal products

12.2 National data

12.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Ministry of Agriculture and Forestry (2003). Deer Monitoring Report. July 2003.	H	Feral deer meat production	2005	Forecast for 2004, assumed to be equal for 2005. No feral statistics published after 2003.
Ministry of Agriculture and Forestry (2005). Horticulture Monitoring Report	H	Honey production and bulk prices	2005	33% of the honey production was assumed to come from forests and other wooded land (MAF estimate)
MAF estimate	H	Sphagnum moss production and value	2005	Reported in FRA 2005.

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Wilkes & Prior (possum traders) (pers.comm.)	H	Possum skims production and value	2005	Reported in FRA 2005.
MAF estimate	H	Christmas trees production and value	2005	Reported in FRA 2005.
Meat and Wool New Zealand (2007). Goat Review 2006-2007. Paper No. P07021. September 2007.	H	Goat meat farm gate sale prices	2005	
Ministry of Agriculture and Forestry (2007). Situation and Outlook for New Zealand Agriculture and Forestry 2007.	H	Deer meat value	2005	
Ministry of Agriculture and Forestry (2008). Slaughter statistics.	H	Goat meat production	2005	All inspected goats were considered to be feral.

12.2.2 Classification and definitions

National class	Definition
N/A	

12.2.3 Original data

The estimates for the national production and local price of honey, feral goats, and feral deer were sourced from periodical statistics published by MAF and the industry. FRA 2005 estimates for the production and local price of sphagnum moss, Christmas trees, and possum skins were used in this report.

NWFP Product	Quantity	Unit	Local price (NZD/unit)	Total value (000 NZD)
Honey	9 689	tonnes	4 625	44 812
Sphagnum moss	900	tonnes	11 600	10 440
Christmas trees	500 000	numbers	15	7 500
Feral goats	1 458	tonnes	2 679	3 905
Feral deer	700	tonnes	4 110	2 877
Possum skins	24 000	numbers	5	120

12.3 Analysis and processing of national data

12.3.1 Calibration

No calibration was needed for these data.

12.3.2 Estimation and forecasting

Honey production from forests and other wooded land was estimated to be 33% of the national production (MAF estimate). No estimation or forecasting was needed for any of the other NWFP as original data were used.

NWFP Product	Quantity	Unit	Local price (NZD/unit)	Total value (000 NZD)
Honey from forests	3 197	tonnes	4 625	14 788

12.3.3 Reclassification into FRA 2010 categories

No reclassification was needed for this table.

12.4 Data for Table T12

Rank	Name of product	Key species	Unit	NWFP removals 2005		NWFP category
				Quantity	Value (1000 local currency)	
1st	Honey		tonnes	3 197	14 788	11
2nd	Sphagnum moss	*Sphagnum cristatum*	tonnes	900	10 440	8
3rd	Christmas trees	*Pinus radiata*	numbers	500 000	7 500	8
4th	Feral goats	*Capra hircus*	tonnes	1 458	3 905	12
5th	Feral deer	*Cervus elaphus*	tonnes	700	2 877	12
6th	Possum skins	*Trichosurus vulpecula*	numbers	24 000	120	10
7th						
8th						
9th						
10th						
All other plant products						
All other animal products						
TOTAL					**39 630**	

	2005
Name of local currency	New Zealand Dollar

12.5 Comments to Table T12

Variable / category	Comments related to data, definitions, etc.
10 most important products	Honey estimates includes production from forests and other wooded land (estimated to be 33% of the national production)
Other plant products	
Other animal products	
Value by product	
Total value	

Other general comments to the table

13 Table T13 – Employment

13.1 FRA 2010 Categories and definitions

Category	Definition
Full-time equivalents (FTE)	A measurement equal to one person working full-time during a specified reference period.
Employment	Includes all persons in paid employment or self-employment.
Paid employment	Persons who during a specified reference period performed some work for wage or salary in cash or in kind.
Self-employment	Persons who during a specified reference period performed some work for profit or family gain in cash or in kind (e.g. employers, own-account workers, members of producers' cooperatives, contributing family workers).

13.2 National data

13.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Ministry of Forestry (1993). New Zealand Forestry Statistics 1993.	H	Persons engaged	1990	Based on: New Zealand Standard Industrial Classification (NZSIC) 1987 codes.
Ministry of Agriculture and Forestry (2004). Employment in Forestry and Wood Processing Activities as at February 2003. (SR 15/2004)	H	Persons engaged	2000	Based on: Australian and New Zealand Standard Industrial Classification (ANZSIC) 1993 codes.
Ministry of Agriculture and Forestry (2005). Employment in Forestry and Wood Processing Activities as at February 2004. (SR 22/2005)	H	Employee counts	2000	Based on: ANZSIC 1993 codes.
Ministry of Agriculture and Forestry (2008). Employment in Forestry and Wood Processing Activities as at February 2007. (SR 02/2008)	H	Employee counts	2005	Based on: ANZSIC 1993 codes.
Wright, Elaine. (2008). Department of Conservation. Pers.comm	H	Full-time employees	1990 2000 2005	Total of full-time employees at the Department of Conservation (management of Protected Areas)

13.2.2 Classification and definitions

National class	Definition
Persons engaged/Full-time equivalent	Total number of full-time employees (number of persons working 30 hours or more per week plus half the number of persons working part-time). It includes working proprietors who did not pay themselves a salary or wage.
Employee count	Head-count of all salary and wage earners without differentiation of employees and working proprietors.
NZSIC 1987 (for 1990)	
1210	Forestry and services to forestry
1220	Logging & other timber felling
1230	Forestry & logging management & consulting
ANZSIC 1993 (for 2000 and 2005)	
A030100	Forestry: Growing standing timber both in native forests, plantations or timber tracts.
A030200	Logging: Felling trees for logs, cutting and shaping trees, or gathering other forest products.
A030300	Services to forestry: Providing services such as reforestation, afforestation, conservation or plantation maintenance on a fee or contract basis, operating nurseries, or providing fire fighting services.

13.2.3 Original data

The following tables present the estimates for forestry employment. These estimates are collected by Statistics New Zealand and reported periodically by MAF.

The 1990 data are based on the number of persons engaged in the forestry industry as a full-time equivalent (FTE) measure of employees and working proprietors. In 2003, FTE was discontinued and replaced by an employee count (EC) measure in 2004. The EC measure was estimated from year 2000 to allow comparisons with previous years. The FTE figures for 1990 and 2000 remained the same as reported in the FRA 2005. Statistics for 2000 in EC were also included in the table for comparison purposes. Figures for 2005 are based on EC statistics.

NZSIC	Definition	Persons engaged
		1990
1210	Forestry & services to forestry	3 342
1220	Logging & other timber felling	2 280
1230	Forestry & logging management & consulting	259
Total		5 881

ANZSIC	Definition	Persons engaged	Employee count	
		2000	2000	2005
A030100	Forestry	1 780	1 010	800
A030200	Logging	3 990	3 130	3 760
A030300	Services to forestry	3 325	2 840	3 100
Total		9 095	6 980	7 660

13.3 Analysis and processing of national data

13.3.1 Estimation and forecasting

No estimation or forecasting was needed for these data. However, because of the differences in national data collection from 2003, EC measures are reported in years 2000 and 2005 (as FTE) in order to allow comparison with future reports. Therefore, employment figures for 1990 (persons engaged) are not strictly comparable with 2000 and 2005 (employee count).

13.3.2 Reclassification into FRA 2010 classes

Employment in primary production of goods category includes all the activities reported in national statistics (original data) (Forestry, Logging, and Services to Forestry).

13.4 Data for National reporting table T13

FRA 2010 Category	Employment (1000 years FTE)		
	1990	2000	2005
Employment in primary production of goods	5.881	6.980	7.660
...of which paid employment	5.881	6.980	7.660
...of which self-employment	n.a.	n.a.	n.a.
Employment in management of protected areas	1.438	1.373	1.629

13.5 Comments to Table T13

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Employment in primary production of goods	This is defined as people employed in forestry and logging, and related support services. Although there are differences in the categories definitions between data collected in the reporting years (NZSIC and ANZSIC codes), it was considered that the FRA 2010 category was inclusive of all of them, and the added total was reported.	However, because of the differences in national data collection from 2003, EC measures are reported in years 2000 and 2005 (as FTE) in order to allow comparison with future reports. Therefore, employment figures for 1990 (persons engaged) are not strictly comparable with 2000 and 2005 (employee count).
Paid employment / self-employment	The EC measure includes data of all salary earners sourced by the employers monthly tax reports (IRD forms, Inland Revenue), which could include business owners who pay themselves a salary. It is not possible to identify any working proprietors (self-employment) from these data. It was assumed that all employees were in paid employment.	
Employment in management of protected areas		

Other general comments to the table
Persons engaged in forestry and first stage processing is regarded as the most appropriate indicator of employment generated by forests and woodlands in New Zealand. This includes Forestry and Logging, Log Sawmilling, Wood Chipping, Timber Resawing and Dressing, Plywood and Veneer Manufacturing, Fabricated Wood Manufacturing, and Pulp, Paper and Paperboard Manufacturing. The 1990 figure was 18 239, being 1.15% of the total national labour force as at March quarter (MOF, 1993). The

corresponding 2000 and 2005 figures were 18 700 and 23 179 respectively, which represented 0.99% and 1.08% of the total national labour force as at March quarter for the corresponding years (MAF, 2005, 2008).

14 Table T14 – Policy and legal framework

14.1 FRA 2010 Categories and definitions

Term	Definition
Forest policy	A set of orientations and principles of actions adopted by public authorities in harmony with national socio-economic and environmental policies in a given country to guide future decisions in relation to the management, use and conservation of forest and tree resources for the benefit of society.
Forest policy statement	A document that describes the objectives, priorities and means for implementation of the forest policy.
National forest programme (nfp)	A generic expression that refers to a wide range of approaches towards forest policy formulation, planning and implementation at national and sub-national levels. The national forest programme provides a framework and guidance for country-driven forest sector development with participation of all stakeholders and in consistence with policies of other sectors and international policies.
Law (Act or Code) on forest	A set of rules enacted by the legislative authority of a country regulating the access, management, conservation and use of forest resources.

14.2 Data for Table T14

Indicate the existence of the following (2008)		
Forest policy statement with national scope		☒ Yes ☐ No
If Yes above, provide:	Year of endorsement [1)]	1990
	Reference to document	Indigenous forest policy statement
National forest programme (nfp)		☐ Yes ☒ No
If Yes above, provide:	Name of nfp in country	
	Starting year	
	Current status	☐ In formulation ☐ In implementation ☐ Under revision ☐ Process temporarily suspended
	Reference to document or web site	
Law (Act or Code) on forest with national scope		☒ Yes, specific forest law exists ☐ Yes, but rules on forests are incorporated in other (broader) legislation ☐ No, forest issues are not regulated by national legislation
If Yes above, provide:	Year of enactment [2)]	1993
	Year of latest amendment	2005
	Reference to document	Forests Act 1949 (Part 3A)

If the responsibility for forest policy- and/or forest law-making is decentralized, please indicate the existence of the following and explain in the comments below the table how the responsibility for forest policy- and law-making is organized in your country.	
Sub-national forest policy statements	☐ Yes ☒ No
If Yes above, indicate the number of regions/states/provinces with forest policy statements	
Sub-national Laws (Acts or Codes) on forest	☐ Yes ☒ No
If Yes above, indicate the number of regions/states/provinces with Laws on forests	

Notes:

1. The forest policy statement is endorsed when it is officially recognised as a government policy or instruction. The endorsement is formalised by a dated and signed document.
2. The Law is enacted when the legislative authority adopted its text.

14.3 Comments to Table T14

Variable / category	Comments related to data, definitions, etc.
Forest policy statement with national scope	An indigenous forest policy exists with national scope. The base policy was announced by government in a Press Statement under the heading "Indigenous Forest Policy" by the Minister of Forestry, Minister for the Environment, and Minister for Conservation in December 1990. Some modifications have been made over the years, but the base policy remains largely intact. One key amendment was to halt all harvesting on Crown owned indigenous forest by 31 March 2002.
National forest programme (nfp)	New Zealand does not have a national forest programme. Historically, Forestry (Development) Conferences, held in 1969, 1974, 1975 and 1981, delivered outcomes very similar in nature to national forestry programmes by involving stakeholders in the development of policies and programmes, setting the future direction of forestry in New Zealand.

Variable / category	Comments related to data, definitions, etc.
Law (Act or Code) on forest with national scope	Several Acts are relevant. The Forests Act 1949 includes Part 3A (provisions relating to indigenous forests) with the purpose of promoting sustainable forest management of (private) indigenous forest land. It also includes a new Part 3B (mechanism allowing landowners to access value created by Kyoto Protocol of carbon sequestration on land through establishment of forest sink covenants) with the purpose of providing a mechanism to allow landowners to access the value of carbon sequestration on land through the establishment of forest sink covenants. The latest amendment was the Forests Amendment Act 2005. The Conservation Act 1987 and National Parks Act 1980 govern the management of forested and other land on the Crown conservation estate. The latest amendments were the Conservation Amendment Act 2005 and the National Parks Amendment Act 2005. The Resource Management Act 1991 applies to the management of all natural and physical resources (except minerals), centred on the idea of sustainable management and integrated management of land resources. The Act is of direct relevance to forestry as a land use. The latest amendment was the Resource Management Amendment Act 2007. Other Acts include the Crown Forest Assets Act 1989, Forest and Rural Fires Act 1977, and Forestry Rights Registration Act 1983. There are many other non-forestry specific Acts that may have implications for forest management, such as: Biosecurity Act 1993, Local Government Act 2002, Fencing Act 1978, Hazardous Substances and New Organisms Act 1996, Historic Places Act 1993, Land Act 1948, Maori Reserved Land Act 1955, Te Ture Whenua Maori Act (Maori Land Act) 1993, Trespass Act 1980, Wildlife Animal Control Act 1977, Wildlife Act 1953.
Sub-national forest policy statements	
Sub-national Laws (Acts or Codes) on forest	

Other general comments to the table

15 Table T15 – Institutional framework

15.1 FRA 2010 Categories and definitions

Term	Definition
Minister responsible for forest policy-making	Minister holding the main responsibility for forest issues and the formulation of the forest policy.
Head of Forestry	The Head of Forestry is the Government Officer responsible for implementing the mandate of the public administration related to forests.
Level of subordination	Number of administrative levels between the Head of Forestry and the Minister.
University degree	Qualification provided by University after a minimum of 3 years of post secondary education.

15.2 Data for Table T15

Table 15a – Institutions

FRA 2010 Category	2008
Minister responsible for forest policy formulation : please provide full title	Hon. David Carter, Minister of Forestry Hon. Tim Groser, Minister of Conservation
Level of subordination of Head of Forestry within the Ministry	☒ 1st level subordination to Minister ☐ 2nd level subordination to Minister ☐ 3rd level subordination to Minister ☐ 4th or lower level subordination to Minister
Other public forest agencies at national level	Scion (New Zealand Forest Research Institute)
Institution(s) responsible for forest law enforcement	Ministry of Agriculture and Forestry (with respect to the Forests Act 1949, Forestry Rights Registration Act 1983 and Biosecurity Act 1993). Department of Conservation (with respect to the Conservation Act 1987) Land Information New Zealand (with respect to Crown forest land under the Crown Forests Assets Act 1989) National Rural Fire Authority (with respect to the Forest and Rural Fires Act 1977)

Notes:

1. If more than one Minister is responsible for forest issues and formulation of forest policy, please indicate in comments and describe how the responsibilities are shared.
2. If more than one institution is responsible for forest law enforcement, please provide explanation in the comments below the table on how the responsibilities are shared.

Table 15b – Human resources

FRA 2010 Category	Human resources within public forest institutions					
	2000		2005		2008	
	Number	%Female	Number	%Female	Number	%Female
Total staff	1 490	n.a.	1 746	n.a.	1 875	n.a.
...of which with university degree or equivalent	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Notes:
1. Includes human resources within public forest institutions at sub-national level
2. Excludes people employed in State-owned enterprises, education and research, as well as temporary / seasonal workers.

15.3 Comments to Table T15

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Minister responsible for forest policy formulation		
Level of subordination of Head of Forestry within the Ministry	The Director General of Agriculture and Forestry is a 1st level subordinate to the Minister of Agriculture and the Minister of Forestry. The Director General of Conservation is a 1st level subordinate to the Minister of Conservation.	
Other public forest agencies at national level	Scion, formerly known as the New Zealand Forest Research Institute, is a Crown Research Institute dedicated entirely to forest related research. Scion has extended its research programmes to include the development of new bio-based materials, energy systems, high value products and environmentally friendly processes using renewable resources based on plants, particularly trees.	
Institution(s) responsible for forest law enforcement		
Human resources within public forest institutions	The Ministry of Agriculture and Forestry Human Resources statistics does not report on the educational background from staff, and gender estimates were only reported in 2005 (year ending December). The figure in the table is an estimate of the proportion of employees that work only in forestry related activities, including the Crown forestry group, Indigenous Forestry Unit, East Coast Forestry Project, and approximately 15% of the Policy and Biosecurity divisions. The figures also include the Department of Conservation staff. It was assumed that all staff, except those working in Marine and Freshwater areas, work in protected areas including forest ecosystems.	

Other general comments to the table

16 Table T16 – Education and research

16.1 FRA 2010 Categories and definitions

Term	Definition
Forest-related education	Post-secondary education programme with focus on forests and related subjects.
Doctor's degree (PhD)	University (or equivalent) education with a total duration of about 8 years.
Master's degree (MSc) or equivalent	University (or equivalent) education with a total duration of about five years.
Bachelor's degree (BSc) or equivalent	University (or equivalent) education with duration of about three years.
Technician certificate or diploma	Qualification issued from a technical education institution consisting of 1 to 3 years post secondary education.
Publicly funded forest research centers	Research centers primarily implementing research programmes on forest matters. Funding is mainly public or channelled through public institutions.

16.2 National data

16.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Ministry of Education statistics (2008).	H	Graduates from Forest and Related Studies Qualifications	2000 2005 2008	Includes domestic and international students completing a formal qualification at a tertiary education provider, except private training provider (Levels 1-10)
Forest Industries Training and Education Council (FITEC) statistics (2008)	H	Graduates from Forestry related training programmes	2000 2005 2008	Includes all graduates completing forestry qualifications (Levels 2-4)
Scion. Human Resources department statistics (2008)	H	Professionals working in publicly funded forest research centres	2000 2005 2008	

16.2.2 Classification and definitions

The New Zealand Qualifications framework involves ten qualification levels that depend on the complexity of learning. The levels and definitions are explained in the following table,

National class	Definition
Level 1-4: Certificate	Certificates are often used to prepare candidates for both employment and further education and training.
Level 5-6: Diploma	Diplomas often prepare learners for self-directed application of skills and knowledge, and often build on prior qualifications or experience.
Level 7: Bachelors degree, Graduate diploma, and Graduate certificate	Bachelors Degrees are a systematic and coherent introduction to the knowledge, ideas, principles, concepts, chief research methods and problem-solving techniques of a recognised major subject. Graduate Diplomas are designed as a vehicle for degree graduates to pursue further study at an undergraduate level. Graduate Certificates are designed primarily as a vehicle for degree graduates to pursue further study at an undergraduate level.
Level 8: Postgraduate diploma, Postgraduate certificate, and Bachelors with Honours	Postgraduate Diploma is designed to extend and deepen a candidate's knowledge and skills by building on attainment in the principal subject(s) of the qualifying degree. Postgraduate Certificate involves credits from a specified subject and, it serves as a qualification recognising continuing professional development. Bachelors Degree may be awarded with honours to recognise advanced or distinguished study in advance of a level 7 Bachelors Degree.
Level 9: Masters	Master degrees are constituted in one discipline or coherent programme of study. They may be undertaken by taught courses or research or by a combination of both.
Level 10: Doctorates	A Doctorate is a research degree that is awarded on the basis of an original and substantial contribution to knowledge as judged by independent experts applying contemporary international standards.

16.2.3 Original data

a. Graduation of students in forest related education

The following figures were provided by the Ministry of Education. They include all graduates (domestic and international students) from programmes related with forest management and conservation.

Reporting year: 2000

Qualification level	Degree	Number of graduates	
		Female	Total
Level 1-3: Certificate	Certificate in Forest Establishment and Silviculture	0	7
Level 1-3: Certificate	Certificate in Forest Harvesting	0	11
Level 1-3: Certificate	Certificate in Forest Silviculture	0	24
Level 1-3: Certificate	Certificate in Forestry	1	29
Level 1-3: Certificate	Certificate in Forestry Skills	2	15
Level 1-3: Certificate	Certificate in Practical Logging	0	36
Level 1-3: Certificate	Certificate in Wood Mouldings & Remanufacturing	1	3
Level 1-3: Certificate	Certificate in Farm Forestry	0	7
Level 1-3: Certificate	Certificate in Possum and Related Pest Control	2	25
Level 1-3: Certificate	Certificate in Professional Hunting and Pest Control	1	12
Level 1-3: Certificate	Certificate in Technical Forestry	0	4
Level 1-3: Certificate	Trainee Ranger Certificate	4	15
Level 4: Certificate	Certificate in Arboriculture	0	8
Level 4: Certificate	Certificate in Cable Logging	2	30
Level 6: Diploma	Diploma in Forest and Natural Resource Management	4	5
Level 6: Diploma	Diploma in Forest Management	2	34
Level 1-6: Certificate/Diploma	FITEC forestry programmes graduates	1	8
Level 7: Bachelors	Bachelor of Forestry Science	4	30
Level 7: Bachelors	Bachelor of Parks; Recreation and Tourism Management	22	45
Level 8: Honours	Bachelor of Parks; Recreation and Tourism Management (Hons)	2	2
Level 8: Postgraduate diploma	Postgraduate Diploma in Forestry	0	1
Level 8: Postgraduate diploma	Postgraduate Diploma in Parks, Recreation and Management	5	8
Level 8: Postgraduate diploma	Postgraduate Diploma in Wildlife Management	9	12
Level 9: Masters	Master of Conservation Science	3	3
Level 9: Masters	Master of Forestry Science	1	3
Level 9: Masters	Master of Parks, Recreation and Tourism Management	0	2
Level 10: Doctorate	Doctor of Philosophy: Forestry Science	1	3
Total		67	382

Reporting year: 2005

Qualification level	Degree	Number of graduates	
		Female	Total
Level 1-3: Certificate	Certificate in Forestry	0	32
Level 1-3: Certificate	Certificate in Forestry Skills	1	17
Level 1-3: Certificate	Certificate in Pest Management: Vector Control	0	5
Level 1-3: Certificate	Certificate in Practical Conservation	2	4
Level 1-3: Certificate	Certificate in Practical Logging	11	148
Level 1-3: Certificate	Certificate in Saw Doctoring	0	3
Level 1-3: Certificate	Introduction to General Requirements for Forestry	0	2
Level 1-3: Certificate	Introduction to Forestry Certificate	0	6
Level 1-3: Certificate	Introduction to Using Chainsaws	11	94
Level 1-3: Certificate	Rural Risk Management: Chainsaw Skills	63	453
Level 1-3: Certificate	Solid Wood Processing	2	5
Level 1-3: Certificate	Certificate in Technical Forestry	1	1
Level 1-3: Certificate	Trainee Ranger Certificate	6	24
Level 4: Certificate	Certificate in Arboriculture	0	12
Level 4: Certificate	Certificate in Cable Logging	12	109
Level 6: Diploma	Diploma in Forest Management	0	12
Level 1-6: Certificate/Diploma	FITEC forestry programmes graduates	34	1 223
Level 7: Bachelors	Bachelor of Forestry Science	4	20
Level 7: Bachelors	Bachelor of Parks, Recreation and Tourism Management	4	6
Level 8: Postgraduate diploma	Postgraduate Diploma in Forestry	1	3
Level 8: Postgraduate diploma	Postgraduate Diploma in Parks, Recreation and Tourism Manag.	2	4
Level 8: Postgraduate diploma	Postgraduate Diploma in Wildlife Management	4	9
Level 9: Masters	Master of Forestry Science	0	6
Level 9: Masters	Master of Parks, Recreation and Tourism Management	1	3
Level 10: Doctorate	Doctor of Philosophy: Forestry Science	0	2
Total		159	2 203

b. Professionals working in publicly funded forest research centres

The following figures were provided Scion (formerly known as Forest Research), which is the only research institute in New Zealand solely advocated to forest related research.

Degree	Professionals working in Scion					
	2000		2005		2008	
	Number	%Female	Number	%Female	Number	%Female
Doctor's degree (PhD)	66	13	66	21	54	24
Master's degree (MSc) or equivalent	79	22	78	30	58	29
Bachelor's degree (BSc) or equivalent	172	29	147	35	110	35

16.3 Analysis and processing of national data

16.3.1 Estimation and forecasting

No estimation or forecasting was needed for these data.

16.3.2 Reclassification into FRA 2010 categories

The qualification levels were considered equivalent to the FRA categories as indicated in the following table,

Qualification level	FRA Category
Level 1-6: Certificate and Diploma	Forest technician certificate / diploma
Level 7-8: Bachelors and Postgraduate diploma	Bachelor's degree (BSc) or equivalent
Level 9: Masters	Master's degree (MSc) or equivalent

16.4 Data for Table T16

FRA 2010 Category	Graduation [1] of students in forest-related education					
	2000		2005		2008	
	Number	%Female	Number	%Female	Number	%Female
Master's degree (MSc) or equivalent	8	50	9	11		
Bachelor's degree (BSc) or equivalent	98	43	42	36		
Forest technician certificate / diploma	273	7	2 150	7		
FRA 2010 Category	**Professionals working in publicly funded forest research centres [2]**					
	2000		2005		2008	
	Number	%Female	Number	%Female	Number	%Female
Doctor's degree (PhD)	66	13	66	21	54	24
Master's degree (MSc) or equivalent	79	22	78	30	58	29
Bachelor's degree (BSc) or equivalent	172	29	147	35	110	35

Notes:

1. Graduation refers to the number of students that have successfully completed a Bachelor's or higher degree or achieved a certificate or diploma as forest technician.
2. Covers degrees in all sciences, not only forestry.

16.5 Comments to Table T16

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Graduation of students in forest-related education	FITEC is an industry-owned training organisation (ITO) for the New Zealand forest industry that provides education and training aligned to business needs. It has council membership. It was established under the Industry Training Act 1992, the Tertiary Education Reform Bill 2002 and the Industry Training Amendment Act 2002. FITEC provides training in: Forestry establishment, silviculture and harvesting; Solid wood processing; Pulp & paper converting; Wood panel manufacturing; Forest health & biosecurity; Credit & finance. FITEC also receives government subsidies available to employees working towards national qualifications.	There was a considerable increase in the number of graduates between years 2000 and 2005, mainly because of forestry industry needs for qualified employees (John Eyre, MAF 2008. Pers.comm.). The forestry industry enrols employees in modern apprenticeships, that allow employees to gain national qualifications as they work, and may encourage workers to develop a career in forestry reducing the turnover (from: www.careers.govt.nz)
Professionals working in public forest research centres	Other Crown Research Institutes that do research in forestry related topics are Landcare Research, AgResearch, and NIWA (National Institute of Water and Atmospheric Research). However, as these organisations do not have a forest research only focus, they were not included in Table 16b.	

Other general comments to the table

17 Table T17 – Public revenue collection and expenditure

17.1 FRA 2010 Categories and definitions

Category	Definition
Forest revenue	All government revenue collected from the domestic production and trade of forest products and services. For this purpose, forest products include: roundwood; sawnwood; wood-based panels; pulp and paper; and non-wood forest products. As far as possible, this should include revenue collected by all levels of government (i.e. central, regional/provincial and municipal level), but it should exclude the income of publicly owned business entities.
Public expenditure	All government expenditure on forest related activities (further defined below).
Operational expenditure *(sub-category to Public expenditure)*	All government expenditure on public institutions solely engaged in the forest sector. Where the forest administration is part of a larger public agency (e.g. department or ministry), this should only include the forest sector component of the agency's total expenditure. As far as possible, this should also include other institutions (e.g. in research, training and marketing) solely engaged in the forest sector, but it should exclude the expenditure of publicly owned business entities.
Transfer payments *(sub-category to Public expenditure)*	All government expenditure on direct financial incentives paid to non-government and private-sector institutions, enterprises communities or individuals operating in the forest sector to implement forest related activities.
Domestic funding	Public expenditure funded from domestic public financial resources, including: retained forest revenue; forest-related funds; and allocations from the national budget (i.e. from non-forest sector public revenue sources).
External funding	Public expenditure funded from grants and loans from donors, non-governmental organisations, international lending agencies and international organisations, where such funds are channelled through national public institutions.

17.2 National data

17.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Department of Conservation (2000). Annual Report 2000. For the year ended June 2000.	H	Operational expenditure	2000	
Ministry of Agriculture and Forestry (2000). Annual report. For the year ended June 2000.	H	Revenue/ Operational expenditure/ Transfer payments	2000	
Forest Research (2000). Annual report 2000.	H	Revenue/ Operational expenditure	2000	
Queen Elizabeth the Second National Trust (2000). Annual report. For the year ended 30 June 2000.	H	Operational expenditure/ Transfer payments	2000	For the proportion of covenants that have forest ecosystems (85% of total covenants area is forest)
Department of Conservation (2005). Annual Report 2005. For the year ended June 2005.	H	Revenue/ Operational expenditure	2005	

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Ministry of Agriculture and Forestry (2005). Annual report. For the year ended June 2005.	H	Revenue/ Operational expenditure/ Transfer payments	2005	
Scion (2005). Annual report 2005.	H	Revenue/ Operational expenditure	2005	Formerly known as Forest Research
Queen Elizabeth the Second National Trust (2005). Annual report. For the year ended 30 June 2005.	H	Operational expenditure/ Transfer payments	2005	For the proportion of covenants that have forest ecosystems (79% of total covenants area is forest)
School of Forestry. University of Canterbury (2008). School of Engineering accountant estimates.	H	Revenue/ Operational expenditure	2000 2005	
Department of Conservation (2008). Manager estimates.	H	Revenue	2000 2005	
Land Information New Zealand (2008). Crown Property Management estimates	H	Operational expenditure	2000 2005	From the management of Crown Forests Licences portfolio Revenues are collected through the Crown Forest Rental Trust.
New Zealand Trade and Enterprise (2008). Sector manager estimates.	H	Transfer payments	2005	New Zealand Trade and Enterprise (NZTE) started in 2003
Wood Processing Strategy Budget (2008). MAF estimate (John Eyre)	M	Expenditure	2000	The Wood Processing Strategy (WPS) ran between 2000 and 2003.
Forest Industries Development Agenda (2008). MAF estimate (John Eyre).	M	Expenditure	2005	Forest Industries Development Agenda (FIDA) started in 2005.
Forest Industries Development Agenda (2008). http://www.fida.org.nz/	M	Information		In comments
New Zealand Trade and Enterprise (2008). http://www.nzte.govt.nz/	M	Information		In comments
Nga Whenua Rahui Fund (2008). http://www.doc.govt.nz /templates/page.aspx? id=43144	M	Information		In comments
Crown Forestry Rental Trust (2008). http://www.cfrt.org.nz/ about/	M	Information		In comments

17.2.2 Classification and definitions

National class	Definition
N/A	

17.2.3 Original data

The following tables present data from national organisations identified as working in forest related matters. These figures include only the areas of revenue and expenditure that relate to forests. In some cases, it was difficult to identify the exact figure, and a percentage of the total was assumed to be forest related.

a. Forest revenue

National organisation	Revenues (1000 local currency)		% from total assumed as forest related
	2000	2005	
Department of Conservation			
Tourism and Non-tourism concessions	6 561	9 860	100
Hut and Camp fees	4 370	6 295	100
Total	**10 931**	**16 155**	
Ministry of Agriculture and Forestry			
Crown Forests on Leased Maori Land	61 305	81594	100
Sale of Forestry Assets	16	7 444	100
Sawmill registration	35	28	100
Biosecurity fees	1 958	3 409	15
Total	**63 313**	**92 475**	
School of Forestry			
Income from students fees	634	714	100
Research income	394	168	100
Other income	109	108	100
Total	**1 137**	**990**	
Forest Research/Scion			
Revenue	42 878	35 199	100
Total	**42 878**	**35 199**	
Total revenue	**118 259**	**144 819**	

b. Operational expenditure

National organisation	Operational expenditure (1000 local currency)		% from total assumed as forest related
	2000	2005	
Department of Conservation			
Operational expenditure	75 879	120 692	50
Total	**75 879**	**120 692**	
Ministry of Agriculture and Forestry			
Management of Crown Forestry Assets	42 766	65 879	100
Loss on transfer/disposal of Crown Lease forests	37 513	0	100
Indigenous Forestry Unit	1 378	1 556	100
East Coast Forestry Project	432	585	100
Crown forestry	1 238	1 287	100
Biosecurity	9 193	17 117	15
SILNA goodwill payments	313	310	100
SILNA settlement	1 871	0	100
Subscription to ITTO	39	42	100
Subscription to FAO	201	205	14
Total	**94 943**	**86 980**	
School of Forestry			
Operational expenditure	2 100	1 831	100
Total	**2 100**	**1 831**	
Forest Research/Scion			
Operational expenditure	41 744	34 114	100
Total	**41 744**	**34 114**	
Land Information New Zealand			
Operational expenditure	675	798	100
Total	**675**	**798**	
Queen Elizabeth the Second National Trust			
Operational expenditure	374	618	85% (2000)
Total	**374**	**618**	79% (2005)
Total expenditure	**215 715**	**245 033**	

c. Transfer payments

National organisation	Transfer payments (1000 local currency)		% from total assumed as forest related
	2000	2005	
Ministry of Agriculture and Forestry			
East Coast Afforestation Grants	3 257	3 372	100
Sustainable Farming Fund (only forestry grants)	190	1 005	100
Total	**3 447**	**4 377**	
Queen Elizabeth the Second National Trust			
Operational expenditure	1 210	2 494	85% (2000)
Total	**1 210**	**2 494**	79% (2005)
New Zealand Trade and Enterprise			
Grants to forest industry	0	472	100
Total	**0**	**472**	
Nga Whenua Rahui			
Grants	n.a.	1 970	100
Total	**n.a**.	**1 970**	
Wood Processing Strategy			
Budget	8 600	0	100
Total	**8 600**	**0**	
Forest Industry Development Agenda			
Budget	0	4 600	100
Total	**0**	**4 600**	
Total transfer payments	**13 076**	**13 381**	

17.3 Analysis and processing of national data

17.3.1 Calibration

No calibration was needed for these data.

17.3.2 Estimation and forecasting

No estimation or forecasting was needed for these data.

17.3.3 Reclassification into FRA 2010 categories

No reclassification was needed for this table.

17.4 Data for Table T17

Table 17a - Forest revenues

FRA 2010 Categories	Revenues (1000 local currency)	
	2000	2005
Forest revenue	118 259	144 819

Table 17b - Public expenditure in forest sector by funding source

FRA 2010 Categories	Domestic funding (1000 local currency)		External funding (1000 local currency)		Total (1000 local currency)	
	2000	2005	2000	2005	2000	2005
Operational expenditure	215 715	245 033	0	0	215 715	245 033
Transfer payments	13 076	13 381	0	0	13 076	13 381
Total public expenditure	**228 791**	**258 415**	**0**	**0**	**228 791**	**258 415**
If transfer payments are made for forest management and conservation, indicate for what specific objective(s) - Please tick all that apply.	☐ Reforestation ☒ Afforestation ☐ Forest inventory and/or planning ☒ Conservation of forest biodiversity ☒ Protection of soil and water ☐ Forest stand improvement ☒ Establishment or maintenance of protected areas ☒ Other, specify below					
	• Forest Industries Development Agenda (FIDA), previously known as the Wood Processing Strategy (WPS). http://www.fida.org.nz/ • New Zealand Trade and Enterprise (NZTE). http://www.nzte.govt.nz/					

17.5 Comments to Table T17

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Forest revenue		
Operational expenditure		

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Transfer payments	The Forest Industries Development Agenda (FIDA) has been running since 2005 and is an extension of the Wood Processing Strategy (WPS) that ran from 2000 to 2003. The WPS aimed to develop and implement integrated response strategies to improve the business case for investment in value added wood processing in New Zealand. The WPS addressed many roadblocks to investment that the industry had identified, but not all. Discussions indicated more work was needed in some areas and, based on these, programmes and budgets were developed. Cabinet allocated $18.2 million (GST excl) to the FIDA process through to July 2009 (FIDA, 2008). New Zealand Trade and Enterprise (NZTE) works with forest industries to develop capabilities to enable better response to market opportunities. Nga Whenua Rahui is a contestable Ministerial fund established in 1991 to provide funding for the protection of indigenous ecosystems on Māori land. Its scope covers the full range of natural diversity originally present in the landscape.	

Other general comments to the table
The Crown Forestry Rental Trust was set up under the Crown Forest Assets Act 1989, after the New Zealand Māori Council and Federation of Māori Authorities took court action to protect Māori interests in the Crown's commercial forests. The aims of the trust are to: receive rental proceeds from the Crown forest land upon which Crown Forest Assets are located, and to assist Māori in the preparation, presentation and negotiation of claims before the Waitangi Tribunal which involve, or could involve, certain Crown forest land (with the rentals) (Crown Forestry Rental Trust, 2008). Treaty claims have been lodged over all Crown forest lands, and it is expected that most will be resolved in the future. Revenue from the rentals was approximately 52 million dollars in 2000 and 50 million dollars in 2005. Since revenue collected is administered through a trust, it was not considered as public.