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Food and Agriculture Organization of the United Nations

GLOBAL FOREST RESOURCES ASSESSMENT 2010

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The Forest Resources Assessment Programme

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

FAO, at the request of its member countries, regularly monitors the world's forests and their management and uses through the Forest Resources Assessment Programme. This country report forms part of the Global Forest Resources Assessment 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:

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Introduction

Most historic data in this report for FRA 2010 show little or no change from the data reported for FRA 2005. Woodland areas are still extrapolated forward from the National Inventory of Woodland & Trees (NIWT) 1995-99, while growing stock figures (and hence carbon) are still produced from the same NIWT-based estimates.

All area and growing stock data (including historic data) will be subject to revision when results from the next NIWT become available. The first output in 2010 will be a new woodland map down to 0.5 ha, which will give new estimates of total forest area. This will be followed by other results, including new growing stock estimates in 2011, new estimates of the area of other wooded land and sparse woodland, and a full range of sample-based results by 2015. All these will be too late for inclusion in FRA 2010.

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
Forestry Statistics 2008 and related databases	H	Forest	1990 to 2008	Uses GB inventory 1995-99 and other sources to extrapolate forward
TBFRA 2000	L	Other wooded land	2000	Estimate of wood pastures, unchanged from TBFRA 2000
Agricultural census	H	Other land with tree cover	various 1990 to 2007	http://statistics.defra.gov.uk/esg/ Source used for orchards

1.2.2 Classification and definitions

National class	Definition
Woodland	In NIWT, same as forest in FRA, except canopy cover threshold 20% rather than 10%, and minimum area 0.1 ha rather than 0.5 ha.
Wood pasture	A priority habitat under Biodiversity Action Plan, which has trees but usually insufficient canopy cover to be classified as woodland.
Orchard	In agricultural census, area of fruit trees; mostly apples, also pears, plums and other fruit.

1.2.3 Original data

The National Inventory of Woodland & Trees (NIWT) 1995-99 gave total GB woodland area of 2,665,000 hectares. This is not used directly.

Annual estimates for GB (and latterly for UK) are published in Forestry Statistics and Forestry Facts & Figures (FFF). Woodland area for Northern Ireland (83,000 ha for 2000), including estimates of private woodland, are published annually in the Forest Service Annual Report, and incorporated into Forestry Statistics. This gives:

- UK woodland area (2000) = 2,793,000 ha (Forestry Statistics 2004)
- UK woodland area (2005) = 2,825,000 ha (Forestry Statistics 2008)
- UK woodland area (2008) = 2,841,000 ha (Forestry Statistics 2008)

Other data used for Table T1:

- Area of orchards in UK (000 ha, from June agricultural censuses, statistical notices, on Defra website): 1990 34.5, 2000 28.0, 2005 23.3, 2007 23.0
- Area of wood pastures, 20,000 ha, used as estimate of other wooded land for TBFRA 2000; in the absence of any new information, assume that this figure can be used for all years: 1990, 2000, 2005 and 2010. No information exists for other types of other wooded land, but the areas are expected to be small.

In 2005 the Office for National Statistics (ONS) compiled a new set of standard area measurements for total land and inland water, based on Ordnance Survey mapping, intended for use in all UK statistics. These new statistics had not been communicated to FAOSTAT, but are used for this report in the expectation that FAOSTAT will be updated in 2009.

1.3 Analysis and processing of national data

1.3.1 Calibration

No calibration required. Other land calculated as the difference between total land area from ONS standard area measurements and the sum of forest plus other wooded land.

1.3.2 Estimation and forecasting

Published annual estimates of woodland area are compiled by rolling forward from the inventory base, using administrative data for state woodland, sales of state woodland and new planting. At present no adjustment is made for woodland converted to another land use, because the areas are believed to be small and there is no reliable source of data. This gave the published figure for 2000.

A similar process was used to extrapolate back to 1990, as shown below. In this calculation, it is assumed that areas of broadleaved restocking were conifers before harvesting, because harvested broadleaved volumes are relatively small, and would normally be from thinning or selective felling, rather than clear-fell followed by restocking.

Broadleaved totals for 1990 were derived by starting from the broadleaved totals for 2000, then subtracting broadleaved new planting and broadleaved restocking in the years 1990 to 2000. Conifer totals for 1990 were derived by starting from the conifer totals for 2000, then subtracting conifer new planting and adding broadleaved restocking in the years 1990-2000. Below the new estimates are shown, for comparison, the original published statistics for 1990, which had been derived by extrapolating forward from the 1980 Census. The new estimates for 1990 are much higher, particularly for broadleaves, because of the 1995-99 National Inventory's better coverage and better recognition of woodland areas.

000 hectares

	UK		England		Scotland		Wales		N Ireland	
	C	**B**	**C**	**B**	**C**	**B**	**C**	**B**	**C**	**B**
Area 2000	**1662**	**1132**	**377**	**726**	**1050**	**269**	**168**	**121**	**67**	**16**
NP 1990-2000	87	96	7	44	73	45	1	4	6	3
B RS 1990-2000		41		22		15		3		1
Area 1990 (calc)	**1616**	**995**	**392**	**660**	**992**	**209**	**170**	**114**	**62**	**12**
Area 1990 (old)	1576	823	386	572	956	164	173	75	61	13

C = conifers, B = broadleaves
NP = new planting (all new woodland creation), RS = restocking

The published figures for March 2005 and March 2008 were extrapolated forward in a similar way to the extrapolation for 2000. They were affected by a reclassification of Forestry Commission open land within the forest in moving to a new Geographical Information System (GIS) in 2001, when around 20,000 hectares previously included in woodland area was mapped out as open space (not counted in woodland area in the GIS). The forecast for 2010 was projected forward by two years from the area at March 2008, assuming a similar annual level of new woodland creation to 2000-2005 (around 10,000 hectares a year, representing a slight recovery from 2005-08, when the grant schemes were being changed).

1.3.3 Reclassification into FRA 2010 categories

The classification of Forestry Commission integral open space as woodland before 2001 seems to be closer to the FRA definition, so to adjust for the reclassification in 2001, 20,000 hectares have been added to the published woodland area in deriving the estimate for 2005 and forecast for 2010.

1.4 Data for Table T1

FRA 2010 categories	Area (1000 hectares)			
	1990	2000	2005	2010
Forest	2611	2793	2845	2881
Other wooded land	20	20	20	20
Other land	21619	21437	21385	21349
...of which with tree cover	35	28	23	22
Inland water bodies	167	167	167	167
Total for country	**24417**	**24417**	**24417**	**24417**

1.5 Comments to Table T1

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Forest	Two differences were noted between UK definition of "woodland" and FRA definition of "forest" (canopy cover threshold 20% rather than 10%, and minimum area 0.1 ha rather than 0.5 ha.) The area of woodland of 0.1-0.5 ha is about 37,000 hectares, from the survey of small woods & trees in the National Inventory of Woodland & Trees 1995-99 (NIWT). The area of woodland with 10-20% canopy cover is unknown because it is outside the scope of NIWT, but is also estimated to be less than 50,000 hectares. This means that the two differences are expected to balance out approximately, so figures for 1990 and 2000 were not adjusted.	As in FRA 2005, these forest areas for 1990 and 2000 are close to those reported in Global FRA 2000, but markedly higher than the TBFRA 2000 total of 2,469,000 hectares for 1995. This is because TBFRA used data from 1980 projected forward, but much better data subsequently became available from the 1995-99 National Inventory of Woodland and Trees, used for GB statistics published since 2000.
Other wooded land	The area of wood pastures, 20,000 ha, was used as estimate of other wooded land for TBFRA 2000. No information exists for other types of other wooded land, but the areas are expected to be small.	In the absence of any new information, assume that this figure can be used for all years: 1990, 2000, 2005 and 2010.
Other land		
Other land with tree cover	The area of (fruit) orchards in the Agricultural Census is used as an estimate of other land with tree cover. The branch responsible for these statistics was unable to confirm whether most orchards would be likely to meet the criteria for other land with tree cover, and this source does not give any breakdown by size. Any over-counting from using this source could be roughly balanced by other categories not recorded (e.g.) areas of urban trees of over 0.5 ha.	The figure for 2010 was extrapolated forward from 2007 assuming a similar small decline to 2004-2007.
Inland water bodies		

Other general comments to the table
All area data (including historic data) will be subject to revision when results from the next NIWT become available. The first output, in 2010 will be a new woodland map down to 0.5 ha, which will give new estimates of total forest area. This will be followed by other results, including new estimates of the area of other wooded land and sparse woodland, and a full range of sample-based results by 2015. All these will be too late for inclusion in FRA 2010.

Expected year for completion of ongoing/planned national forest inventory and/or RS survey / mapping	
Field inventory	2015
Remote sensing survey / mapping	2010

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
Forestry Statistics 2008 and related databases	H	Public	1990 to 2008	Used for state forests (FC/FS)
National Inventory	M	All	1995-99	Used for other public bodies, local authorities and breakdown of private

2.2.2 Classification and definitions

National class	Definition
Forestry Commission / Forest Service	State owned woodland, from administrative data sources
Other public body	Woodland owned by other public bodies, not FC, e.g. for defence, highways, crown estate. GB estimate for 1995-99 from NIWT.
Local authority	Woodland owned by counties, districts and other local authorities. GB estimate for 1995-99 from NIWT.

2.2.3 Original data

State forests 000 hectares

	UK	England	Scotland	Wales	N Ireland
1990	956	235	533	130	58
2000	886	216	493	116	61
2005	838	205	463	109	61

NIWT 1995-99 000 hectares

	GB	England	Scotland	Wales
Other public	45	27	13	5
Local authorities	80	61	11	8
Personal	1110	481	533	96
Private forestry businesses	41	7	28	6
Other private businesses	273	147	101	26
Charities	90	68	14	8
Communities / common	5	4	0	1
Unclassified	18	4	13	1

2.3 Analysis and processing of national data

2.3.1 Estimation and forecasting

Forestry Commission / Forest Service statistics are published annually. Published figures are used here for 1990 and 2000, while 20,000 hectares are added for 2005, as described for Table 1. Figures for other public bodies (GB) and local authorities (GB) are assumed to be constant at levels recorded by 1995-99 NIWT. FRA Private is estimated as (Total – Public) for all years; in the absence of any time series, the proportions for each sub-category of the private total are assumed to be the same in each year.

2.3.2 Reclassification into FRA 2010 categories

FRA Public = Forestry Commission / Forest Service plus other public bodies plus local authorities.
FRA business entities and institutions (2000) = private forestry businesses, other private businesses, charities, unclassified
FRA communities (2000) = communities or common land
FRA Individuals (2000) = Total private minus two categories above

Note that, as the NIWT 1995-99 data exclude Northern Ireland, this reclassification allocates all Northern Ireland non-state forests (around 15,000 hectares) to individuals.

2.4 Data for Table T2

Table 2a - Forest ownership

FRA 2010 Categories	Forest area (1000 hectares)		
	1990	2000	2005
Public ownership	1081	1011	983
Private ownership	1530	1782	1862
...of which owned by individuals	1163	1355	1416
...of which owned by private business entities and institutions	362	422	441
...of which owned by local communities	5	5	5
...of which owned by indigenous / tribal communities	0	0	0
Other types of ownership	0	0	0
TOTAL	**2611**	**2793**	**2845**

Note: If other types of ownership is reported, please specify details in comment to the table.

Does ownership of trees coincide with ownership of the land on which they are situated?	x	Yes
		No
If **No** above, please describe below how the two differ:		

Table 2b - Holder of management rights of public forests

FRA 2010 Categories	Forest area (1000 hectares)		
	1990	2000	2005
Public Administration	1081	1011	983
Individuals	0	0	0
Private corporations and institutions	0	0	0
Communities	0	0	0
Other	0	0	0
TOTAL	**1081**	**1011**	**983**

2.5 Comments to Table T2

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Public ownership		
Private ownership		
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
UK Indicators of Sustainable Forestry A7, based on National Inventory	M	No/unknown function	1995-1999	% of clusters with no management practice
Forests' Role in Tourism (report, 2003) on FC website.	M	Primary, social services	2002	Includes estimate of number of woodland sites used for recreation
State of Europe's Forests (Ministerial Conference on the protection of Forests in Europe (MCPFE)) 2003	M	Primary biodiversity	2000	MCPFE Protected Class 1
Forestry Commission Facts &	M	Primary	1990,	GB conifer area

Figures		production	2000	
Forestry statistics databases	H	Primary production, certified areas	1990-2008	Planting statistics, containing more detail than published in Forestry Statistics 2008.
Personal communications from state forest agencies and from Grants & Licences	M	Management plans	2005	

3.2.2 Classification and definitions

National class	Definition
Management practices - timber production - conservation - unmanaged	In NIWT 1995-99, each cluster contained between 1 and 5 sample squares, each of 1 hectare, spread over an area of 40 hectares. The surveyor recorded the management practices present in the cluster. Up to 8 management practices could be recorded from a list of 10, including: • Timber production is recorded where there is deliberate management within the cluster for timber products, including coppice. • Conservation is recorded where there is active management for wildlife, which may include permitting regeneration and scrub. The opening up of streamsides and the general encouragement of diversity in storeys and species as well as obvious signs, such as bird boxes and ride management for butterflies. The encouragement of deer into a woodland will also be included. • Unmanaged is recorded where there is no obvious management practice in all or part of a cluster. Recording this management practice does not preclude the use of other practices noted in the cluster.
Management plans and equivalents	Types of documents included in category: • Management plans: Forest design plans (state forests); management plans in grant schemes • Equivalents: Other FC/FS state forests; other grant-aided woodland.

3.2.3 Original data

UK Protected forest areas (as published in State of Europe's Forests – MCPFE 2003)

Class	Description	UK area	UK interpretation
1.1	no active intervention	7,000 ha	Sites of Special Scientific Interest (SSSIs) that either have • a management agreement to manage as a National Nature Reserve (NNR) with non-intervention and scientific monitoring as the main objective, or • a designation as a Special Area of Conservation and agreed management objectives for non-intervention
1.2	minimum intervention	3,000 ha	NNRs and SSSIs that are subject to management agreements to manage to retain and restore natural characteristics
1.3	conservation through active management	135,000 ha	• Near natural woodlands in National Parks (20,000 ha): estimated as half the area of semi-natural woodland in National Parks • Habitat/Species Management areas (115,000 ha): estimated as OSNW not on SSSIs, plus PAWS where the intention is to restore them towards a more semi-natural condition, plus some planted woodlands where the conservation of native species is the main objective
2 (not included)	protection of landscapes and specific natural elements	646,000 ha	• Near-natural semi-natural woodland which are in SSSIs or protective ownership (400,000 ha): estimated from Ancient Woodland Inventories, National Inventory, grant scheme statistics and monitoring of management plans for state forests, other public bodies and voluntary organisations. • ASNW in protected landscapes (54,000 ha): includes PAWS and OSNW in National Parks, Royal Forests and Common Grazings. • Multi-purpose semi-natural woodland (192,000 ha): OSNW outside SSSIs and protected landscapes or protective ownerships.

Management practices
(in UK Indicators of Sustainable Forestry A7, based on NIWT 1995-99)

- Timber production: 83%
- Wildlife/conservation: 18.3%
- Public recreation: 23.3%
- Unmanaged: 10.7%
- Unmanaged (and no other management practice in cluster): 3.8%

(this final figure is unpublished and comes from analysis of the database)

Conifer areas (from Forestry Facts & Figures for that year)
GB 1990 = 1,515,000 ha - of which 814,000 ha FC
GB 2000 = 1,584,000 ha - of which 727,000 ha FC

Conifer new planting (from Forestry Statistics database)
1990-2000 = 87,200 ha
2000-2005 = 17,600 ha
2005-2008 = 4,100 ha

Broadleaved restocking (from Forestry Statistics database)
1990-2000 = 41,000 ha
2000-2005 = 13,700 ha
2005-2008 = 11,100 ha

Permanent Forest Estate
All forest areas have a considerable degree of protection under the law, and in general the granting of a felling licence is conditional on restocking. Any forest area can be converted to another land use, if this change is approved under appropriate procedures (planning, restoration of other habitats, etc). Such procedures are considered to be equivalent to “special permission” mentioned in the FRA 2010 guidelines, so the permanent forest estate is reported as equal to total forest area.

Management Plans
For FC/FS state forest (area in 2005, on FRA definition, 858,000 ha), formal Forest Design Plans now exist for most areas: the only areas reported in 2005 as not covered are 4% in Scotland and 9% in England, total about 38,000 ha. For MCPFE 2007 the area with Forest Design Plans (820,000 ha) was included in the area reported as having a management plan and the 38,000 ha was reported as "equivalent" only.

For other woodland, 634,000 ha in GB was reported as having management plans in grant system; including N Ireland takes the total to about 640,000 ha. Total woodland area that has received grant aid is about 1 million hectares (this is an old figure, but we have no reliable basis to improve this estimate), and the remaining 360,000 ha should be considered to have an "equivalent". Areas covered by a felling licence could also be considered as "equivalent", but not included for MCPFE report.

Based on the above, MCPFE reported the following percentages for 2005:
Total area with management plan = 820,000 + 640,000 = 1,460,000 ha = 51%
Total area with equivalent = 38,000 + 360,000 = 398,000 ha = 14%

Forest area under sustainable forest management
No estimate is available for the UK area under sustainable forest management. It must include all the areas certified as sustainably managed, shown in the table below, but will also include other areas.

UK certified area at end-March

Year	Certified area 000 hectares
2001 (Dec)	1037
2002 (Sept)	1047
2003	na
2004	1120
2005	1217
2006	1227
2007	1276
2008	1266
2009	1283

Most grant aided woodland should also be sustainably managed, in order to meet the conditions for grant (for afforestation, management, etc). Some grant-aided woodland is included in the areas certified above, but grant-aided areas not certified could add around 600,000 hectares to the above totals. Precise figures are not available, because a geographic (GIS) comparison is not yet possible for grant scheme areas and certified areas.

Areas outside grant schemes may also be sustainably managed, but we have no estimates of such areas. The National Forest Inventory (NIWT) did not assess whether sample areas were sustainably managed. It is not possible to claim all forest as being sustainably managed, because it is known that some areas have been neglected and are in poor condition; current policies aim to bring some of these areas back into management.

3.3 Analysis and processing of national data

3.3.1 Estimation and forecasting

Production
As an estimate of area with primary function production, take a proportion of large conifer plantations. Based on an expert view add the following categories for 2000:

- FC: just under half of forests over 100 hectares in Scotland (516,000 ha) and Northumberland (46,000), giving a total of 270,000 ha (out of total FC conifers 727,000 ha and total FC forest 825,000 ha).
- Non-FC: 80% of non-FC conifers (858,000), giving about 684,000 ha [A suggested refinement for this category would be to exclude conifers in woods smaller than 10 ha, and to take 90% Scotland and 80% England/Wales, but this has not been possible to calculate from data tables currently available].
- Northern Ireland: 80% of conifers (67,000 ha), giving about 54,000 ha.

Adding these three categories gives a total for the UK of 1,008,000 ha for 2000.

Estimation of the area in 1990 needs to combine two changes over the decade 1990-2000:

- The net increase in total conifer area from 1990 to 2000 was 46,000 ha (see estimation for Table T1). Of this, about 16,000 ha was extension to Caledonian pinewood, leaving 30,000 net change in productive conifer plantations. Using similar assumption to above, take 80% to be primary function production, giving 24,000 ha net increase.
- Over the same period, some forests with primary function production will have changed to become multiple purpose, because of increased importance given to management for recreation and for conservation. There are no statistics on this, but estimate that it applies to 10% of FC conifers in 1990 (814,000 ha), 5% of non-FC and NI conifers in 1990 (803,000 ha), a total of 122,000 ha for the UK.

Combining these two changes gives a net decrease of 98,000 ha over the decade, implying a total of 1,106,000 ha for 1990.

Conifer new planting 2000-2005 is around 18,000 ha, of which about 8,000 ha is Scots pine in Caledonian pinewood, giving 10,000 ha new conifer plantations. Over the same period, broadleaved restocking (assumed to be mostly former conifer plantations) will be around 14,000 ha, giving a small net decrease in total conifer plantation area. As in the previous decade some forests with primary function production are changing to become multiple purpose. Combining these changes gives a decrease, of perhaps around 50,000 ha in the UK, to 958,000 ha for 2005.

Conifer new planting 2005-2008 is around 4,000 ha, which may be extrapolated to a total of about 8,000 ha for the 5 years to 2010. Of this, about 5,000 ha may be Scots pine in Caledonian pinewood, giving 3,000 ha new conifer plantations. Over the same 3-year period, broadleaved restocking (assumed to be mostly former conifer plantations) was around 11,000 ha, which can be extrapolated to about 18,000 ha for the 5 years to 2010. Taking the two changes together, this gives a net decrease of about 15,000 ha in total conifer plantation area. As in the previous decade some forests with primary function production are changing to become multiple purpose. Combining these changes gives a decrease, of perhaps around 50,000 ha in the UK, to 908,000 ha for 2010.

To summarise, the estimates derived above are:

thousand hectares

	1990	**2000**	**2005**	**2010**
Primary function production	1106	1008	958	908

Protection of soil and water

No statistics are available for areas with primary function protection of soil or water. This may be the primary function of some plantations on sandy soils, particularly in coastal areas. It may also be a function in some areas next to important public water supplies. Estimate that this could total around 5,000 hectares in all years.

Conservation of biodiversity

Forest within protected areas (class 1) = 3,000 + 7,000 + 135,000 = 145,000 ha, using MCPFE classification. Assume applies to all years (no estimates of change). Use this directly in Table 3b, and (as in FRA 2005) use the same estimate for forest with primary function conservation of biodiversity in Table 3a.

Social services
There is no good source for area with primary function social services (recreation etc). The NIWT figure for the area with management practice of public recreation (23.3% = 651,000) is not used, because it is much greater than the area with primary function recreation, as it just requires signs of some management for recreation in the 40 hectare cluster.

In many forests, visitors may not go beyond the car parks, picnic areas, waymarked walks etc, so the area with function recreation could be limited to the immediate surroundings of these facilities, unlikely to average more than 10 ha per site. Assuming 40 hectares per site on average for each of around 500 FC sites and 20 hectares per site on average for around 2500 others identified in "Forests' Role in Tourism" (2003), this adds up to around 70,000 ha for 2000. The number of recreation sites is increasing, but there are no statistics for this, so estimate 60,000 ha for 1990, 75,000 ha for 2005 and 80,000 ha for 2010.

To this can be added new planting in community forests and similar initiatives – around 20,000 ha in the 1990s, perhaps a further 10,000 ha to 2005 and perhaps another 10,000 ha to 2010, to give the totals shown below. Other possible areas (e.g. all Local Authority-owned woods) have not been included.

thousand hectares

	1990	2000	2005	2010
Estimate based on number of recreation sites	60	70	75	80
Community forests etc	0	20	30	40
Total - primary function social services	60	90	105	120

No or unknown function
An estimate of the area with "no or unknown function" can be based on the area recorded with management practice "unmanaged". Because management practices are recorded at the level of cluster (up to 40 ha), the relevant area will consist of all clusters where this was the only practice recorded (3.8%) and an unknown proportion of the area of clusters where other practices were recorded as well (6.9%). Estimate that this adds to around 5%, or around 137,000 ha in 1995-99. This area is likely to be decreasing over time, because no new woodland created with grant aid is unmanaged, and there are incentives to bring existing woodland into management. In the absence of any statistics on trends over time, estimate the following areas with "no or unknown function".

thousand hectares

	1990	2000	2005	2010
No or unknown primary function	150	130	120	110

Multiple purpose
Multiple purpose management is now the most widespread practice in UK forestry. Estimate the area with multiple purpose by subtracting all the above estimates from the total area.

Management plan
As indicated above, all FC/FS state forest is regarded as having a management plan or equivalent. As shown in the workings for Table 2, this was 956,000 ha in 1990 and 886,000 ha in 2000, with 858,000 ha in 2005 as reported above. Based on trends 2005-2008, the area could be around 830,000 ha in 2010.

We have no reliable basis to derive trends for other woodland, based on the area that has received grant-aid. The best that we can do is to assume that the total changes in line with the area of new planting grant-aided. On this basis, it would have increased by 165,000 ha from

1990 to 2000, 66,000 ha from 2000 to 2005 and around 40,000 ha from 2005 to 2010. In addition, there will have been some increases from previously unaided areas receiving grants for restocking or management grant, and some decreases from grant-aided areas converted to other habitats or lost to development, but the areas are likely to have been relatively small and may balance out, so such changes have not been taken into account.

3.3.2 Reclassification into FRA 2010 categories

For forest area with management plan in 2005, use area reported to MCPFE as with forest management plans and equivalents.

3.4 Data for Table T3

Table 3a – Primary designated function

FRA 2010 Categories	Forest area (1000 hectares)			
	1990	2000	2005	2010
Production	1106	1008	958	908
Protection of soil and water	5	5	5	5
Conservation of biodiversity	145	145	145	145
Social services	60	90	105	120
Multiple use	1145	1415	1512	1593
Other (please specify in comments below the table)	0	0	0	0
No / unknown	150	130	120	110
TOTAL	**2611**	**2793**	**2845**	**2881**

Table 3b – Special designation and management categories

FRA 2010 Categories	Forest area (1000 hectares)			
	1990	2000	2005	2010
Area of permanent forest estate	2611	2793	2845	2881
Forest area within protected areas	145	145	145	145
Forest area under sustainable forest management	n.a.	n.a.	n.a.	n.a.
Forest area with management plan	1725	1820	1858	1870

3.5 Comments to Table T3

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Production		
Protection of soil and water		
Conservation of biodiversity		
Social services	Within the function "social services", forests also have a role in sustaining health and wellbeing. This function is not yet fully understood, but is not limited to recreation usage identified in this table. This is a new area for which research is under way in UK.	
Multiple use		
Other		
No / unknown designation		
Area of permanent forest estate		
Forest area within protected areas	These estimates of protected forest area are unchanged from FRA 2005. It is believed that these figures may be too high on strict MCPFE definitions, but a study will be required to derive new estimates of UK areas under MCPFE definitions.	The creation of new National Parks since 2000 mostly moved woodland within sub-categories of class 2, so no changes are shown in the reported figures in FRA, which are limited to class 1.
Forest area under sustainable forest management	Similarly to Table T1, 20,000 hectares should be added to the national statistics for certified area in 3.2.3 to move to the FRA definition of woodland. The area under sustainable forest management at least covers the certified area, but also other areas to an unknown extent (see 3.2.3 above).	There was no certification in 1990. The certified area was around 1.0 million hectares in 2000 and around 1.2 million hectares in 2005. This does not give a good indication of the trend in area sustainably managed.
Forest area with management plan		

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
Protected Forest Areas in the UK, Pryor & Peterken 2001	M	Semi-natural	1990	As used for TBFRA 2000.
Pryor and Smith, 2002	M	Semi-natural	1990	not used (see text)
Forestry Statistics, Forestry Facts & Figures and related databases	H	Semi-natural	1990-2008	Broadleaved new planting and restocking, used for calculating and updating.
National Inventory 1995-99, Table 10 (MWS + SW) (unpublished)	M	Native species	1995-99	NIWT did not distinguish planted from naturally regenerated

4.2.2 Classification and definitions

National class	Definition
Semi-natural	As classified in the report Protected Forest Areas in the UK, Pryor & Peterken 2001. About half the area is Ancient Semi-Natural Woodland, continually wooded since the earliest reliable records. The rest is native woodland that is not obviously planted; i.e. appears to have arisen mainly through natural regeneration.
Scots pine	*Pinus sylvestris*, native conifer. Makes up a large proportion of the native Caledonian pinewood in Scotland (classified as UK semi-natural), but also in extensive plantations.

4.2.3 Original data

All figures in thousand hectares.

Semi-natural woodland and Ancient Semi-natural woodland (ASNW)

	UK	England	Scotland	Wales	N Ireland
Pryor & Peterken 2001 semi-natural	646	416	133	82	15
Pryor & Peterken 2001 ASNW	326	206	89	31	0
Pryor & Smith 2002 ASNW	285	193	65	27	N/a

UK Broadleaved New Planting and Restocking,

	NP	RS	Total
1990-2000	96	41	137
2000-2005	55	13	68
2005-2008	23	11	34

Source: databases for Forestry Statistics

4.3 Analysis and processing of national data

4.3.1 Estimation and forecasting

Naturally regenerated

The FRA 2010 category “naturally regenerated” largely corresponds to what was reported in FRA 2005 as “modified natural”, based on the UK category semi-natural in Pryor & Peterken 2001, for which estimates can be taken as relating approximately to 1990 (the Ancient Woodland Inventory (AWI) part was late 1980s). This gives a figure of 646,000 ha for 1990.

The later publication Pryor & Smith 2002 reported the overlap from overlaying digital maps for the Ancient Woodland Inventory and National Inventory of Woodland, reducing the total Ancient Semi-Natural Woodland (ASNW) area by 41,000 ha. However, further investigation of the discrepancies between NIWT and the ancient woodland inventories suggests that some discrepancies are due to differences in spatial registration of woods, and that some areas of ancient woodland are incorrectly omitted from the totals in Pryor & Smith (2002). In consequence, the estimates from Pryor & Peterken (2001) are now recommended for use, until better information becomes available.

The annual loss of ASNW and other semi-natural woodland has not been monitored, but relatively small areas are now thought to be lost for roads and other developments. In recent

years, this is likely to have been balanced by restoration of plantations on ancient woodland sites to ASNW. So estimate no net change since 1990.

Most of the FRA 2005 category "semi-natural" (see below) was planted. The percentage with (assisted) natural regeneration was estimated for the Planted Forests study in FRA 2005, giving the following areas (thousand hectares): 1990: 0, 2000: 2, 2005: 10. This can be extrapolated to estimate 16 (th ha) for 2010.

The criteria for classification as UK semi-natural prevent the inclusion of any areas of introduced species. The new areas (in the preceding paragraph) will also be native species, so estimate zero area for introduced species.

Planted

The planted area is estimated by subtraction from the total area.

In NIWT 1995-99, native species (most broadleaves and Scots pine) made up about 48% of the forest area. The % native would have been lower in N Ireland (not covered by NIWT), but would have increased slightly from the variable NIWT date to 2000, so 48% (1,340,000 hectares) is a reasonable estimate for native species in 2000, implying 1,453,000 hectares introduced. As no introduced species were in naturally regenerated forest, allocate all to planted forest.

For 2000-2005, increase in area of native species will have consisted of most broadleaved new planting and restocking (say 62,000 out of 67,000 hectares) plus 8,000 hectares of Scots pine in Caledonian pinewood, and negligible losses, so estimate 70,000 hectare increase to 1,410,000 hectares. By subtraction from total woodland, this leaves 1,435,000 hectares introduced.

For 2005-2010, increase in area of native species will have consisted of most broadleaved new planting and restocking (say 55,000 out of 60,000 hectares) plus 5,000 hectares of Scots pine in Caledonian pinewood, and negligible losses, so estimate 60,000 hectare increase to 1,470,000 hectares. By subtraction from total woodland, this leaves 1,411,000 hectares introduced.

For 1990-2000, increase in area of native species will have consisted of most broadleaved new planting and restocking (say 125,000 out of 135,000 hectares) plus 16,000 hectares of Scots pine in Caledonian pinewood, and perhaps a few thousand hectares of losses, so estimate 135,000 hectare increase over the decade. Subtracting this from the 2000 estimate of 1,340,000 hectares gives 1,205,000 hectares native, and by subtraction from total woodland gives 1,406,000 hectares introduced.

4.3.2 Reclassification into FRA 2010 categories

Covered in section above.

4.4 Data for Table T4

Table 4a

FRA 2010 Categories	Forest area (1000 hectares)			
	1990	2000	2005	2010
Primary forest	0	0	0	0
Other naturally regenerated forest	646	648	656	662
...of which of introduced species	0	0	0	0
Planted forest	1965	2145	2189	2219
...of which of introduced species	1406	1453	1435	1411
TOTAL	**2611**	**2793**	**2845**	**2881**

Table 4b

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

Other general comments to the table
In the UK, native species include most broadleaves and Scots pine. Apart from yew and juniper (neither of which cover significant areas), all other conifers have been introduced.

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
Forestry statistics databases for new planting and restocking	H	All	1990 to 2008	Includes figures on natural colonisation and regeneration.

5.2.2 Classification and definitions

National class	Definition
New planting	Includes natural colonisation. Data for years ending 31 March
Restocking	Includes natural regeneration. Data for years ending 31 March

5.2.3 Original data

Thousand hectares

UK 5 year totals	New planting		Restocking	
	Broadleaves	Conifers	Broadleaves	Conifers
1988/89 to 1992/93	31.7	77.4	23.0	54.6
1993/94 to 1997/98	51.2	39.0	18.5	56.2
1998/99 to 2002/03	55.8	25.7	14.0	59.0
2003/04 to 2007/08	42.0	9.2	17.0	67.8

Thousand hectares

GB 5 year totals	Natural colonisation		Natural regeneration	
	Non-FC	FC	Non-FC	FC
1988/89 to 1992/93	0.0	0.0	0.0	Total to 2001
1993/94 to 1997/98	0.8	0.0	0.5	= 1.5
1998/99 to 2002/03	5.1	0.0	2.8	
2003/04 to 2007/08	4.0	0.0	2.5	1.8

5.3 Analysis and processing of national data

5.3.1 Estimation and forecasting

For FC natural regeneration before 2003, estimate breakdown into 5-year periods, of 0.0 to 1993, 0.7 to 1998 and 1.3 to 2003 (including 0.5 for two missing years in original data).

Areas of natural regeneration/colonisation for Northern Ireland are small, so use GB figures as estimates for UK.

In general, all reforestation (restocking by planting) since 1990 will have been on areas previously planted. In the past, many plantations were created by reforesting ancient woodland sites. The area of such PAWS was estimated to be 224,000 ha in 1990, but the practice was ended when the environmental value of ancient woodland sites was recognised.

Data have not been compiled for the area of native and introduced species in new planting and restocking. Since 1990, most broadleaved planting will have been native species, and most conifers introduced species; planting of introduced broadleaves may roughly balance native conifers (Scots pine). So use the conifer totals above as estimates of the areas of introduced species.

5.3.2 Reclassification into FRA 2010 categories

Afforestation = new planting – natural colonisation
Reforestation = restocking – natural regeneration
Natural expansion of forest = natural colonisation
(Natural regeneration is not reported in Table T5)

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	21,800	15,300	9,400	15,500	5,100	1,800
Reforestation	15,400	13,900	16,100	10,900	11,800	13,600
...of which on areas previously planted	15,400	13,900	16,100	10,900	11,800	13,600
Natural expansion of forest	0	1000	800	0	0	0

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		
Reforestation		
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
Private sector growing stock model for GB (Forest Research, unpublished, 2004, 2005)	M	GS	2000, 2005	
EFISCEN data submitted for EFSOS (Forest Research, international return, 2001)	M	GS	1995-99	Used for Northern Ireland and for comparison
GB softwood availability forecasts, and actual harvesting, published in Forestry Statistics & Forestry Facts & Figures	M	GS	1992 to 2006	Used to estimate increase in over-mature volume.
Census of Woodlands & Trees 1979-82 (FC Bulletin 63 by GML Locke, 1987)	M	GS	1980	Data for 1980, to estimate 1990 by interpolation.

6.2.2 Classification and definitions

National class	Definition
Growing stock	Stem volume to 7 cm minimum diameter, including stump.
Commercial species	Almost all forest tree species have some commercial use in UK, so growing stock of commercial species is taken to be the same as total growing stock.

6.2.3 Original data

In this report, forecasts by Forest Research and Forest Enterprise are considered to be original data, because they are separate from the processes of estimation and forecasting carried out

for this report. However, they in turn are based on original data from NIWT and sub-compartment databases, which are then modelled to produce estimates and forecasts.

GB: Growing stock in forests (million cubic metres)

Common name	2000 Private comml FR fcast	2000 Private Non-comml FR fcast	1995-99 Private other over-mature comml	1995-99 Private other over-mature non-comml	2005 State comml FE fcast	2005/ 2000 State comml FR fcast	2000 State non-comm FR fcast	1980 Total comml
Sitka spruce	42.7	0.2	1.7	0.0	48.1	1.132	0.5	28.2
Scots pine	22.4	0.9	4.3	0.4	8.5	1.077	0.4	27.7
Larch	11.9	0.5	1.4	0.1	5.6	0.974	0.3	17.5
Lodgepole pine	7.4	0.0	0.1	0.0	7.0	1.189	0.1	2.6
Norway spruce	7.8	0.2	0.5	0.0	6.0	0.953	0.2	12.9
Douglas fir	6.0	0.1	0.8	0.1	2.8	1.058	0.0	6.1
Corsican pine	3.2	0.0	0.3	0.1	4.1	1.129	0.1	6.0
Other conifers	5.3	1.1	2.6	1.7	2.6	1.094	0.3	5.3
Total conifers	**106.6**	**3.0**	**11.9**	**2.2**	**84.6**		**2.1**	**106.3**
Oak	16.9	8.3	3.4	0.6	1.0	1.040	0.4	32.9
Beech	6.4	1.6	4.5	0.8	1.5	1.097	0.1	15.2
Birch	3.1	6.0	0.5	0.2	0.0	1.050	0.6	6.1
Ash	4.6	1.6	4.2	1.4	0.1	0.714	0.1	10.2
Sycamore	3.3	1.1	1.6	0.6	0.1	1.077	0.3	8.0
Other broadleaves	8.8	8.2	1.7	0.5	0.2	1.111	0.5	18.8
Total broadleaves	**43.1**	**26.8**	**15.8**	**4.2**	**2.9**		**2.0**	**91.2**
TOTAL	**149.6**	**29.8**	**27.7**	**6.4**	**87.5**		**4.0**	**197.4**

The 1980 total commercial, from Census of Woodland 1979-82, is assumed to exclude over-mature. It includes for state forests 60.0 conifer and 4.3 broadleaved, species split not available.

From data for European Forest Information Scenario Model (EFISCEN) (2001) for Northern Ireland state forest, total of 6.0 breaks down:
5.0 spruces, 0.5 pines, 0.4 other conifers, 0.1 broadleaves. As in FRA 2005, other NI estimated as 0.3 state non-commercial, 1,5 private commercial and 0.3 private non-commercial, roughly based on areas.

To estimate GB private sector increase in over-mature softwood

Average for 5-year period	FR forecast availability	Actual harvest	Difference = increased over-mature
2002-2006	5750	4360	1390
1997-2001	4280	3270	1010
1992-1996	2500	2860	-360

The FR model starts from data recorded in the 1995-99 National Inventory of Woodland & Trees for areas by species by planting year. It then applies model estimates of yield class and agreed assumptions about management practices, based on advice from regional groups, to define expected cutting regimes (rotations, thinning etc), to estimate the standing volume at the survey date and to roll it forward to 2000 and 2005.

The initial model runs in 2004 assumed that all timber to be harvested is harvested at the time predicted by the model – it does not take account of any actual variation in harvesting rates

caused by market conditions. It also excludes a proportion of over-mature standing volume. A subsequent run of the model in 2005 estimated the total private sector over-mature standing volume for a base date in 1996-2000, immediately after the National Inventory of Woodland & Trees, giving an additional 34 million m^3.

For much of the period since the National Inventory actual softwood harvesting has been below availability predicted by the model, because of low timber prices, while hardwood harvesting has been depressed for many years because of the lack of suitable markets. These market trends cause over-mature volume to increase over time. Based on the comparisons of FR forecast softwood availability and actual harvesting shown above, the over-mature softwood volume seems to increase by about 1 million m^3 a year after the NIWT base date, but with no clear trend before the NIWT base date. There are no equivalent forecasts for hardwood, but a conservative estimate is that around 1.4 million m^3 reaches maturity each year, compared with annual harvesting of around 0.7 million m^3, so over-mature hardwood is probably increasing at about 0.7 million m^3 a year.

The FE model is based on operational management data for each sub-compartment of state forest in GB. It only gives commercial volume, identified by a 'forecastable' flag in the data. This excludes sub-compartments that might otherwise be productive, but have been excluded because of economic considerations, management decisions and low-quality material. This incorporates the best management assessment of each woodland, and also incorporates data about actual harvesting and restocking, so should be better than statistical models for short-term forecasts of growing stock in state woodlands in GB. For this report, we prefer to use FE model results where available, but still have to use FR model for state sector rate of change and non-commercial volumes.

6.3 Analysis and processing of national data

6.3.1 Estimation and forecasting

	2000	**2005**
GB private commercial	Original data	Original data
GB private non-commercial	Original data	Original data
GB private over-mature commercial	Extrapolated from 1995-99 (1998) by annual changes derived in original data	Extrapolated from 1995-99 (1998) by annual changes derived in original data
GB private over-mature non-commercial	Extrapolated from 1995-99 (1998) by annual changes derived in original data	Extrapolated from 1995-99 (1998) by annual changes derived in original data
GB state commercial	Extrapolated back from 2005 by dividing by 2005/2000 from FR forecast in original data	Original data
GB state non-commercial	Original data	Original data
Northern Ireland	State commercial from original data. Other NI split by species pro rata to GB private	Extrapolated forward from 2000 using same rate of increase as GB

For 2010, over-mature extrapolated forward using the same annual change (hectares) as in 2000-2005. All others extrapolated forward from 2005 using the same % change as 2000-2005.

The FR model is unable to project back to dates before the NIWT base date. For 1990 estimates:

- Total commercial (excluding over-mature) interpolated between 2000 and 1980.
- Over-mature extrapolated back by assuming no change in conifer and 0.7 million m^3 a year, as above.
- Non-commercial extrapolated back by using the same % change as 2000-2005.
- Northern Ireland extrapolated back assuming same rate of change as GB state commercial.

1990: Growing stock in forests (million cubic metres)

Common name	GB Private comml forecast	GB Private non-comm	GB Private over-mature comm	GB Private over-mature non-comm	GB State comml	GB State non-comm	GB Total	NI	UK Total
Sitka spruce	22.4	0.1	1.7	0.0	25.4	0.5	**51.7**	3.0	**54.7**
Scots pine	16.8	1.0	4.3	0.4	11.3	0.5	**35.5**	0.9	**36.4**
Larch	9.4	0.5	1.4	0.1	7.4	0.3	**19.9**	0.4	**20.3**
Lodgepole pine	2.8	0.0	0.1	0.0	2.8	0.1	**6.1**	0.1	**6.2**
Norway spruce	6.4	0.2	0.5	0.0	6.5	0.2	**14.3**	0.6	**14.9**
Douglas fir	4.0	0.1	0.9	0.0	3.1	0.0	**8.3**	0.2	**8.5**
Corsican pine	2.9	0.0	0.4	0.1	3.4	0.1	**6.9**	0.0	**7.0**
Other conifers	4.0	1.2	2.6	1.7	3.1	0.3	**12.4**	0.2	**12.6**
Total conifers	68.6	3.2	11.9	2.2	67.9	1.8	**155.1**	5.5	**160.5**
Oak	23.2	11.3	2.5	0.4	1.2	0.7	**40.0**	0.4	**40.4**
Beech	10.3	2.4	3.2	0.6	1.0	0.2	**18.4**	0.1	**18.6**
Birch	4.2	9.3	0.3	0.2	0.1	0.9	**15.3**	0.2	**15.5**
Ash	7.4	1.8	3.0	1.1	0.2	0.1	**14.0**	0.1	**14.1**
Sycamore	5.2	1.4	1.1	0.4	0.1	0.2	**8.9**	0.1	**9.0**
Other broadleaves	12.6	8.1	1.2	0.4	0.4	0.4	**23.6**	0.3	**23.8**
Total broadleaves	62.9	34.5	11.4	3.0	3.4	2.6	**120.2**	1.2	**121.4**
TOTAL	131.5	37.6	23.3	5.2	71.3	4.4	**275.2**	6.7	**281.9**

2000: Growing stock in forests (million cubic metres)

Common name	GB Private comml forecast	GB Private non-comm	GB Private over-mature comm	GB Private over-mature non-comm	GB State comml	GB State non-comm	GB Total	NI	UK Total
Sitka spruce	42.7	0.2	2.0	0.0	42.5	0.5	**87.9**	5.0	**92.8**
Scots pine	22.4	0.9	4.9	0.5	7.9	0.4	**37.0**	0.6	**37.6**
Larch	11.9	0.5	1.6	0.1	5.7	0.3	**20.1**	0.3	**20.3**
Lodgepole pine	7.4	0.1	0.1	0.0	5.9	0.1	**13.5**	0.2	**13.7**
Norway spruce	7.8	0.2	0.6	0.0	6.2	0.2	**15.0**	0.6	**15.6**
Douglas fir	6.0	0.1	1.0	0.0	2.7	0.0	**9.7**	0.1	**10.0**
Corsican pine	3.3	0.0	0.4	0.1	3.6	0.1	**7.4**	0.0	**7.5**
Other conifers	5.3	1.1	3.0	1.9	2.4	0.3	**13.9**	0.2	**14.2**
Total conifers	106.6	3.0	13.6	2.5	76.9	2.0	**204.6**	7.2	**211.7**
Oak	16.9	8.3	3.6	0.6	1.0	0.4	**30.8**	0.3	**31.2**
Beech	6.4	1.6	4.8	0.9	1.3	0.1	**15.2**	0.1	**15.3**
Birch	3.1	6.0	0.5	0.3	0.0	0.6	**10.5**	0.1	**10.5**
Ash	4.6	1.6	4.5	1.6	0.1	0.1	**12.4**	0.1	**12.4**

Sycamore	3.4	1.1	1.7	0.7	0.1	0.3	**7.1**	0.1	**7.1**
Other broadleaves	8.8	8.2	1.8	0.5	0.2	0.5	**20.1**	0.2	**20.5**
Total broadleaves	43.1	26.8	16.9	4.5	2.7	2.1	**96.0**	1.0	**97.0**
TOTAL	149.7	29.8	30.5	7.0	79.6	4.1	**300.6**	8.1	**308.7**

2005: Growing stock in forests (million cubic metres)

Common name	**GB Private comml forecast**	**GB Private non-comm**	**GB Private over-mature comm**	**GB Private over-mature non-comm**	**GB State comml**	**GB State non-comm**	**GB Total**	**NI**	**UK Total**
Sitka spruce	55.8	0.2	2.6	0.0	48.1	0.5	**107.2**	5.7	**112.9**
Scots pine	24.0	0.9	6.5	0.6	8.5	0.4	**40.9**	0.7	**41.5**
Larch	10.9	0.4	2.1	0.1	5.6	0.3	**19.4**	0.3	**19.7**
Lodgepole pine	9.8	0.1	0.1	0.0	7.0	0.2	**17.2**	0.3	**17.4**
Norway spruce	8.9	0.2	0.7	0.0	6.0	0.3	**16.1**	0.6	**16.6**
Douglas fir	6.1	0.1	1.3	0.0	2.8	0.0	**10.3**	0.1	**10.5**
Corsican pine	3.5	0.0	0.5	0.1	4.1	0.1	**8.3**	0.0	**8.3**
Other conifers	5.5	1.0	4.0	2.5	2.6	0.2	**15.9**	0.2	**16.1**
Total conifers	124.5	3.0	17.8	3.3	84.6	2.1	**235.3**	7.9	**243.1**
Oak	16.1	7.1	4.2	0.7	1.0	0.4	**29.4**	0.3	**29.8**
Beech	6.6	1.3	5.6	1.0	1.5	0.1	**16.1**	0.1	**16.2**
Birch	2.5	4.8	0.6	0.3	0.0	0.4	**8.7**	0.2	**8.9**
Ash	4.8	1.5	5.2	1.8	0.1	0.1	**13.4**	0.1	**13.5**
Sycamore	2.8	1.0	1.9	0.8	0.1	0.4	**6.9**	0.1	**6.9**
Other broadleaves	9.6	8.3	2.1	0.6	0.2	0.6	**21.4**	0.2	**21.6**
Total broadleaves	42.3	23.9	19.7	5.2	2.9	2.0	**96.0**	1.0	**97.0**
TOTAL	166.8	26.9	37.5	8.6	87.5	4.0	**331.2**	8.9	**340.1**

2010: Growing stock in forests (million cubic metres)

Common name	**GB Private comml forecast**	**GB Private non-comm**	**GB Private over-mature comm**	**GB Private over-mature non-comm**	**GB State comml**	**GB State non-comm**	**GB Total**	**NI**	**UK Total**
Sitka spruce	72.9	0.3	3.2	0.0	54.4	0.6	**131.4**	6.5	**137.8**
Scots pine	25.8	0.8	8.0	0.7	9.2	0.4	**44.9**	0.7	**45.6**
Larch	9.9	0.4	2.6	0.1	5.4	0.3	**18.9**	0.3	**19.2**
Lodgepole pine	13.1	0.1	0.1	0.0	8.3	0.2	**21.8**	0.3	**22.1**
Norway spruce	10.3	0.2	0.9	0.0	5.7	0.3	**17.4**	0.5	**17.9**
Douglas fir	6.2	0.1	1.6	0.0	3.0	0.0	**10.9**	0.2	**11.0**
Corsican pine	3.8	0.0	0.6	0.1	4.6	0.1	**9.2**	0.0	**9.3**
Other conifers	5.7	1.0	4.9	3.1	2.8	0.2	**17.8**	0.2	**18.0**
Total conifers	147.6	2.9	22.0	4.1	93.5	2.2	**272.3**	8.7	**281.0**
Oak	15.3	6.0	4.8	0.8	1.1	0.3	**28.3**	0.4	**28.7**
Beech	6.8	1.1	6.4	1.1	1.6	0.1	**17.2**	0.1	**17.3**
Birch	2.1	3.9	0.7	0.4	0.0	0.3	**7.3**	0.2	**7.5**
Ash	4.9	1.4	5.9	2.1	0.0	0.1	**14.4**	0.1	**14.5**
Sycamore	2.3	0.9	2.2	0.9	0.1	0.5	**6.7**	0.1	**6.8**
Other broadleaves	10.5	8.3	2.4	0.7	0.2	0.6	**22.8**	0.2	**23.1**
Total broadleaves	41.9	21.5	22.5	5.9	3.0	1.9	**96.7**	1.1	**97.8**
TOTAL	189.5	24.5	44.4	10.1	96.5	4.1	**369.0**	9.8	**378.8**

6.3.2 Reclassification into FRA 2010 categories

No reclassification undertaken

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	282	309	340	379	1	1	1	1
... of which coniferous	161	212	243	281	0	0	0	0
... of which broadleaved	121	97	97	98	1	1	1	1
Growing stock of commercial species	282	309	340	379	1	1	1	1

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	Picea sitchensis	Sitka spruce	55	93	113
2nd	Pinus sylvestris	Scots pine	36	38	42
3rd	Quercus robur / Q petraea	Oak	40	31	30
4th	Larix spp	Larch	20	20	20
5th	Picea abies	Norway spruce	15	16	17
6th	Fagus sylvatica	Beech	19	15	16
7th	Pinus contorta	Lodgepole pine	6	14	17
8th	Fraxinus excelsior	Ash	14	12	14
9th	Betula pubescens / B pendula	Birch	15	11	9
10th	Pseudotsuga menziesii	Douglas fir	8	10	10
Remaining			54	49	52
TOTAL			**282**	**309**	**340**

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)	7	
Minimum diameter (cm) at the top end of stem for calculation of growing stock (Y)	7	
Minimum diameter (cm) of branches included in growing stock (W)	7	
Volume refers to "above ground" (AG) or "above stump" (AS)	AG	

[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.

6.5 Comments to Table T6

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Total growing stock		
Growing stock of broadleaved / coniferous		
Growing stock of commercial species		
Growing stock composition		If the top 10 were based on area rather than estimated growing stock, the top 10 would include Sycamore (*Acer pseudoplatanus*) instead of Douglas fir (*Pseudotsuga menziesii*). Corsican pine (*Pinus nigra var maritima)* is outside the top 10 on both bases.

Other general comments to the table
Estimates of UK growing stock were compiled in 2001 for the European Forest Information Scenario Model (EFISCEN) as part of the European Forest Sector Outlook Studies (EFSOS), and reported in 2002 in the UK Indicators of Sustainable Forestry. These EFISCEN estimates were based on area statistics from NIWT 1995-99, but did not have the modelling capability that is now available in Forest Research. The EFISCEN estimates totalled 353 million m^3 standing, of which 236 million m^3 conifer and 117 million m^3 broadleaved. There was an error in calculation of the conifer figure for EFISCEN, which should have been 184 million m^3 to give a total of 301 million m^3. The new estimates for total conifers are 212 million m^3 for 2000 and 243 million m^3 for 2005, of which about 7-8 million m^3 are non-commercial. Given the steady increase in commercial conifer growing stock, these are reasonably consistent with the amended EFISCEN figure of 184 million m^3 for 1995-99 commercial conifers, and with the estimate of 190 million m^3 (of which 188 million m^3 available for wood supply) reported in TBFRA 2000 for conifers in 1995, projected forward from 1980. The estimates for broadleaves reported in FRA 2005 and here, including the adjustment for over-mature, are lower than previous estimates. These estimates are 96 million m^3 for 2000 and 97 million m^3 for 2005, compared with the EFISCEN estimate of 117 million m^3 for 1995-99, and the TBFRA 2000 estimate of 127 million m^3 for 1995. The new estimates are thought to be more accurate, because the new model can handle a greater level of detail, but the modelling of broadleaved volume for UK is still less developed than the modelling of conifer volume, because it is less important commercially.

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
Growing stock	M	All	All	From table T6
Temperate and Boreal Forest Resources Assessment (TBFRA) 2000	M	All	All	Conversion factors for stem volume to above-ground and below-ground biomass.
National Inventory of Woodland and Trees : Analysis of Management and Biodiversity Data" - Gilbert (2007)	M	Deadwood	1995-99	

7.2.2 Classification and definitions

National class	Definition
Standing deadwood	>15 cm diameter – dead tree or branch/limb
Lying deadwood	>15 cm diameter and >2m long
Fallen trees	> 7cm dbh

7.2.3 Original data

From Table T6: Forest growing stock (million cubic metres over bark)

	1990	2000	2005	2010
Total growing stock	282	309	340	379
... of which coniferous	161	212	243	281
... of which broadleaved	121	97	97	98

Conversion factors from growing stock volume to biomass were taken from a Forestry Commission guidance note (1998).

- For Sitka spruce (accounting for about half of all conifers), total to merchantable ratio of 1.2, and 0.33 tonnes biomass per m^3, giving a factor of 0.40. Other conifers give factors up to 0.56, giving an average around 0.45.
- For broadleaves, total to merchantable ratio of 2.0-2.5 and around 0.45-0.55 tonnes biomass per m^3, giving a factor of around 1.1.

Total above ground biomass also includes shrubs and bushes in forest and OWL, explicitly identified in TBFRA 2000, and reported as 5 million oven dried tonnes (ODT) for UK. The same estimate of 5 million ODT is included here for each year, added to the estimates for tree biomass to give total above ground biomass.

Biomass of below-ground stump and roots per m^3 growing stock = 0.10
(0.13 for stump + roots as in TBFRA 2000, less 0.03 for above-ground stump).

For deadwood, classification of volume per hectare is given in Gilbert (2007) for each country. This was derived from survey counts of number of pieces (by type, and fallen trees by size category), multiplied by an estimate of average size per piece for each type/category. It is summarised to show the following averages: GB 2.0, England 2.7, Scotland 1.8, Wales 0.7.

7.3 Analysis and processing of national data

7.3.1 Estimation and forecasting

Above ground:

For each year total =conifer biomass + broadleaf biomass + shrubs and bushes biomass (ODT)

1990: (161 x 0.45) + (121 x 1.1) + 5 = 211
2000: (212 x 0.45) + (97 x 1.1) + 5 = 207
2005: (243 x 0.45) + (97 x 1.1) + 5 = 221
2010: (281 x 0.45) + (98 x 1.1) + 5 = 234

Below ground i.e. biomass of stumps and roots (ODT)

All years: 0.1 x total volume
1990: 0.1 x 282 = 28
2000: 0.1 x 309 = 31
2005: 0.1 x 340 = 34
2010: 0.1 x 379 = 38

For deadwood, for each country multiply volume per hectare by woodland area, and add estimate for Northern Ireland, to get a total of 5.6 million m^3 (3 million ODT) for UK.

All estimation copied from a spreadsheet using unrounded values.

7.3.2 Reclassification into FRA 2010 categories

No reclassification undertaken.

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	211	207	221	234	1	1	1	1
Below-ground biomass	28	31	34	38	0	0	0	0
Dead wood	3	3	3	3	0	0	0	0
TOTAL	**242**	**241**	**258**	**275**	**1**	**1**	**1**	**1**

7.5 Comments to Table T7

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Above-ground biomass	The source for conversion factors is the same as used for TBFRA 2000, but further adjustments were applied in TBFRA 2000 to take account of the different (standardised) definition of growing stock, giving factors of 0.43 and 0.83 respectively. These factors from TBFRA 2000 were mistakenly applied to growing stock on UK definitions in FRA 2005, so biomass and carbon were underestimated in FRA 2005. Better factors should be available from the models being developed for the 2011 Production Forecast, but are not available in time for this report.	
Below-ground biomass		
Dead wood		Deadwood in UK forests is much lower than the default figures in FRA guidelines (which were based on semi-natural and near-natural forests), because most UK forest are plantations, and past silvicultural practices in UK tended not to leave much deadwood in plantations.

Other general comments to the table

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
R. Milne, I, Bradley, C. Jordan and T. A.W. Brown (2004) Development of an improved version of the soil carbon inventory for the UK LULUCF GHG Inventory. & D. Mobbs).	M	Soil Carbon	1990	In: *UK Emissions by Sources and Removals by Sinks due to Land Use, Land Use Change and Forestry Activities.* Annual report (2004) for DEFRA Contract CEPG1/GA01054 (Ed. By R. Milne & D. Mobbs).
I. Bradley (2003) UK soil database for modelling soil carbon fluxes and land use for the national carbon dioxide inventory. Final project report to Defra for Project SP0511	M	Soil Carbon	1990	
R. Milne, R. W. Tomlinson, D. Mobbs and T.D. Murray (2004) Land Use Change and Forestry: The 2002 UK Greenhouse Gas Inventory and projections to 2020.	M	Soil Carbon	Projecting from 1990 to 2000 and 2005	In: UK Emissions by Sources and Removals by Sinks due to Land Use, Land Use Change and Forestry Activities. Annual report (2004) for DEFRA Contract CEPG1/GA01054 (Ed. By R. Milne & D. Mobbs).
R. Milne (2004), Centre for Ecology & Hydrology, Pers. Comm.	M	Soil Carbon	All	
Forestry Statistics 2004	H	Woodland area, for soil carbon	2000	

Forestry statistics databases	H	Area afforested, for soil carbon	All	Used to estimate 1990 area, as in Table T1 and for changes 1990-2000-2005.
R Milne, personal communications, 2004-05	M	Carbon in litter, soil carbon	All	

8.2.2 Classification and definitions

National class	Definition
Soil carbon	Soil carbon to a depth of 100 cm, as modelled by the Centre for Ecology & Hydrology (CEH).

8.2.3 Original data

Carbon in litter

From model output from Centre for Ecology & Hydrology, for carbon in UK forests – covers around 1.5 million hectares, afforested since 1920 (Northern Ireland since 1900): 13 million tonnes carbon in litter (R Milne, CEH, personal communication, 2005).

Soil carbon

- Average soil carbon by country from Milne, Jordan, Bradley & Brown (2004) and Bradley (2003).
- Woodland areas by country for 1990 projected back using new planting, as done for UK totals in Table 1.
- Soil carbon change from Milne, Tomlinson, Mobbs & Murray (2004)

	SOIL CARBON	UK	England	Scotland	Wales	N Ireland
A	Average soil carbon tC/ha for woodland land cover		175.4	333.3	207.9	161.6
B	Area 1990 woodland (000 ha)	2611	1052	1201	284	74
C	Area afforested 1990-2000 (000 ha)	182	51	117	5	9
D	Area afforested 2000-2005 (000 ha)	72	26	40	2	4
E	Forest soil carbon change 1990-2000 (million tonnes) (from CEH model)	5.8	2.1	2.6	0.7	0.3
F	Forest soil carbon change 2000-2005 (million tonnes) (from CEH model)	2.8	1.0	1.4	0.3	0.2

8.3 Analysis and processing of national data

8.3.1 Estimation and forecasting

All estimations copied from a spreadsheet using unrounded data.

Forest:

Carbon in living biomass
For carbon in living biomass, take 50% of biomass figures from Table T7, and round to nearest million tonnes.
Above ground:
1990: 0.5 x 211 = 106
2000: 0.5 x 207 = 104
2005: 0.5 x 221 = 111
2010: 0.5 x 234 = 117

Below ground:
1990: 0.5 x 28 = 14
2000: 0.5 x 31 = 15
2005: 0.5 x 34 = 17
2005: 0.5 x 38 = 19

Carbon in deadwood
For deadwood biomass, take 50% of biomass figures from Table T7, and round to nearest million tonnes.
All years: 0.5 x 2.8 = 1.4 (round up to 2, as source thought to under-estimate total)

Carbon in litter
The area not covered by the CEH model is likely to have more carbon in litter per hectare, because it is mostly older forest. Including these other areas could increase the total from 13 Million tonnes Carbon (MtC) for the modelled area to 25-30 MtC in total (R Milne, personal communication). Use the lower end of this range (25 MtC) for all years.

Soil carbon
Forecasts for 2005-2010

	SOIL CARBON	**UK**	**England**	**Scotland**	**Wales**	**N Ireland**
G	Area afforested 2005-2010 (000 ha) – projected as for Table T1	47	15	27	2	3
H	Forest soil carbon change 2005-2010 (million tonnes) – assume same as 2000-2005 = D	2.8	1.0	1.4	0.3	0.2

million tonnes

SOIL CARBON	**UK**	**England**	**Scotland**	**Wales**	**N Ireland**
Soil carbon 1990 = (A x B)	**655.8**	**184.5**	**400.3**	**59.0**	**12.0**
Existing soil carbon in area afforested 1990-2000 = (C x average for previous use)	40.6	7.9	30.1	0.9	1.6
Forest soil carbon change 1990-2000 = E	5.8	2.1	2.6	0.7	0.3
Soil carbon 2000 (million tonnes) = (sum of above)	**702.2**	**194.6**	**433.0**	**60.6**	**13.9**
Existing soil carbon in area afforested 2000-2005 = (D x average for previous use)	13.5	4.0	8.4	0.3	0.8
Forest soil carbon change 2000-2005 = F	2.8	1.0	1.4	0.3	0.2

Soil carbon 2005 (million tonnes) = (sum of above)	**718.4**	**199.5**	**442.8**	**61.3**	**14.9**
Existing soil carbon in area afforested 2005-2010 = (G x average for previous use)	8.8	2.3	5.7	0.3	0.6
Forest soil carbon change 2005-2010 = H	2.8	1.0	1.4	0.3	0.2
Soil carbon 2010 (million tonnes) = (sum of above)	**730.0**	**202.8**	**449.8**	**61.9**	**15.7**

8.3.2 Reclassification into FRA 2010 categories

No reclassification undertaken.

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	106	104	111	117	0	0	0	0
Carbon in below-ground biomass	14	15	17	19	0	0	0	0
Sub-total: Living biomass	***120***	***119***	***128***	***136***	***0***	***0***	***0***	***0***
Carbon in dead wood	2	2	2	2	0	0	0	0
Carbon in litter	25	25	25	25	0	0	0	0
Sub-total: Dead wood and litter	***27***	***27***	***27***	***27***	***0***	***0***	***0***	***0***
Soil carbon	656	702	718	730	3	3	3	3
TOTAL	**803**	**848**	**873**	**893**	**3**	**3**	**3**	**3**

Soil depth (cm) used for soil carbon estimates	100

8.5 Comments to Table T8

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Carbon in above-ground biomass	Revised from FRA 2005 – see comments on biomass.	
Carbon in below-ground biomass		
Carbon in dead wood		
Carbon in litter		
Soil carbon	The soil carbon content is relatively high, because much of the new woodland creation in the 20th century area consisted of conifer plantations on upland peaty soils. Also note that the carbon estimates are to a depth of 1m.	

Other general comments to the table

9 Table T9 – Forest fires

9.1 FRA 2010 Categories and definitions

Category	Definition
Number of fires	Average number of vegetation fires per year in the country.
Area affected by fire	Average area affected by vegetation fires per year in the country.
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
Forest fire statistics	H	Fire	1988 to 2002	As reported to EU/UNECE and in Forestry Statistics 2004 Table 4.6 and UK Indicators C10.

9.2.2 Classification and definitions

National class	Definition

9.2.3 Original data

Fires on state forest, years starting April: number of fires and area burned (hectares)

Year	1988	1989	1990	1991	1992	Average 88-92
Number	299	98	412	475	328	322
Area	106	312	464	114	194	238
Year	1998	1999	2000	2001	2002	Average 98-02
Number	158	81	47	363	260	182
Area	54	171	266	226	148	173

The only later data are for 2003-04, showing 77 fires and 237 ha burnt. This compilation has been discontinued, so there are no data for subsequent years.

9.3 Analysis and processing of national data

9.3.1 Estimation and forecasting

For fires, data are only available for state forests. Assuming a similar number of fires and % of area affected in other forests, the total could be around 500 hectares for all forests – this has been rounded up to 1 thousand hectares. Similarly the number of fires in state forest areas has been doubled to estimate totals that include private land.

9.3.2 Reclassification into FRA 2010 categories

No reclassification undertaken

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	na	na	na	na	na	na
... of which on forest	1	660	1	360	1	400
... of which on other wooded land	0	0	0	0	0	0
... of which on other land	na	na	na	na	na	na

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	For fires, data are only available for state forests. Assuming a similar number of fires and % of area affected in other forests, the total could be around 500 hectares for all forests – this has been rounded up to 1 thousand hectares.	
Number of fires		
Wildfire / planned fire		

Other general comments to the table
At present there is no comprehensive collection of data for other vegetation fires. A new vegetation fire monitoring system, including forest fires, is planned to be introduced in 2009.

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
Forest Condition Survey	H	Insects, diseases	1989 to 2003	As reported in UK Indicators C9.
National Inventory of Woodland 1995-99	H	Other (windblow)	1995-99	As reported in UK Indicators C10.
FR monitoring (catastrophic storms)	M	Other (windblow)	1950 to 2000	As reported in UK Indicators C10.
Forestry Commission website and Information Notes	H	Diseases		Source for information about *Phytophthora* diseases

10.2.2 Classification and definitions

National class	Definition
Damage by insects, fungi	Common or abundant damage (categories 3+4) by insects, and by fungi, as measured by Forest Condition Survey and reported in UK Indicators C9. Gives area with damage present, not area suffering disturbance in year.
Windblow	Two measures available form National Inventory of Woodland 1995-99: • Blown woodland that remains uncleared and not regenerated • Woodland with signs of windblow

10.2.3 Original data

Forest condition survey: insect damage

% of trees surveyed showing common or abundant insect damage (cats 3 + 4)

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Beech		19.4	23.7	27.4	31.5	29.1	26.3	20.7	19.5	10.9	22.0	23.9	20.6	23.6	12.4
Norway spruce	10.3	13.7	7.7	6.4	4.9	3.7	3.3	0.6	2.6	2.7	1.6	1.7	4.7	5.2	2.9
Oak		17.9	21.3	44.2	49.9	31.1	35.6	26.4	19.4	13.1	14.5	11.7	12.0	15.4	23.1
Scots pine	2.6	3.2	2.7	0.6	2.3	2.3	2.4	2.6	0.7	1.1	1.0	0.9	0.5	0.9	1.0
Sitka spruce	15.5	16.4	12.1	7.5	8.0	6.0	5.5	2.9	5.3	8.5	2.9	4.5	4.0	7.5	4.2

Data for 1989-2000 used for chart in UK Indicators of Sustainable Forestry C9.
Data for 2001-2003 from same source, used for indicator update.

Forest condition survey: damage by fungi

% of trees surveyed showing common or abundant damage by fungi (cats 3 + 4)

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Beech		0.0	0.5	0.1	0.1	0.1	1.3	2.4	2.8	2.8	1.4	0.0	0.1	0.8	0.1
Norway spruce	0.0	1.4	0.0	0.2	0.4	1.4	1.8	3.0	2.2	2.7	2.6	2.7	2.5	2.5	5.0
Oak		0.8	0.4	0.2	2.4	0.7	0.0	0.1	0.4	0.3	0.3	0.3	0.0	0.1	0.3
Scots pine	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.2	0.5	0.7	1.0	2.7	0.6
Sitka spruce	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.1	0.6	0.1	0.1	0.1	0.2	0.0	0.0

Data for 1989-2000 used for chart in UK Indicators of Sustainable Forestry C9.
Data for 2001-2003 from same source, used for indicator update.

Mammal[1] damage (bark stripping and browsing) in GB (from National Inventory of Woodland 1995-99), reported in UK Indicators of Sustainable Forestry C10)

% of high forest area[2]

	England	**Scotland**	**Wales**	**GB**
Mammal Bark Stripping – Total	**5.2**	**7.2**	**0.9**	**5.7**
< 20 % of trees with bark stripping	2.5	5.6	0.2	3.8
20-50 % of trees with bark stripping	2.1	1.1	0.5	1.4
> 50 % of trees with bark stripping	0.6	0.5	0.2	0.5
Mammal Browsing – Total	**0.9**	**11.0**	**0.1**	**5.7**
< 20 % of trees browsed	0.5	6.6	0.0	3.4
20-50 % of trees browsed	0.3	2.3	0.1	1.3
> 50 % of trees browsed	0.1	2.1	0.0	1.1

Source: NIWT 1995-1999

[1] Mammal damage includes damage from livestock, squirrels, deer, rodents and humans.

[2] High forest is woodland excluding open land and coppice.

Forest windblow in GB (from National Inventory of Woodland 1995-99), reported in UK Indicators of Sustainable Forestry C10

- Blown woodland that remains uncleared and not regenerated = 5507 ha
- Woodland with signs of windblow = 133,704 ha

Invasive species

Up to 5 species present in each of up to 5 layers could be recorded in the structure assessments in NIWT 1995-99. A special analysis of the NIWT dataset in January 2009 showed that 3.7% of sample squares contained rhododendron (*Rhododendron ponticum),* and that this was the only woody invasive species recorded in substantial quantities. Take the presence of rhododendron in any layer of the structure assessment as evidence that the square is affected, so this implies that around 3.7 % of woodland was affected.

10.3 Analysis and processing of national data

10.3.1 Estimation and forecasting

For insect damage, there is a problem of going from area showing damage (the normal basis for monitoring) to area newly affected in a year. Any figures would be speculative, and probably not comparable with figures reported for other types of damage. It is therefore preferred to adopt for the UK a much higher threshold "cause mortality or such severe dieback that the forest ecosystem changes" (the FAQ guidance leaves it open to countries to choose their own criteria). Regular monitoring data are not available on this basis, but expert advice is that on this basis the area newly affected in a year is less than 1,000 hectares on average.

For damage by fungi, there is again the problem of converting from area showing damage to area newly affected in a year. If we adopt a higher threshold "cause mortality or such severe dieback that the forest ecosystem changes" (as for insects) then the figures are likely to round down to 0 thousand hectares for each year.

For disturbance by other biotic agents (mainly mammal damage), NIWT records the proportion of forest area with damage present, not the area damaged in a single year. Where present, mammal damage is likely to have been persistent for many years, so the presence of new damage need not imply that the area is newly affected. There can be overlaps between the areas recorded with mammal bark stripping and mammal browsing. The highest category recorded (more than 50% of trees affected) applied to more than 30,000 ha; as even this may not be enough to exceed the threshold adopted for FRA reporting, a plausible assumption is around 3 thousand hectares newly affected in each year.

For disturbance by abiotic factors(windblow), the relevant area is the average annual area of growing stock windblown, rather than the much larger area affected by windblow. NIWT reports the area of blown woodland that remained uncleared at the survey date. To convert this to an estimate of the area blown in a year, we need an assumption about the average lag before clearance. Some may be cleared quickly, if it has good quality timber in a sizeable area with good access, but other areas may be left uncleared for years; there will also be variations between species in extent of timber deterioration over time. If we assume that the area blown remains uncleared for 1 year on average, the area blown in a year would be about the same as the area recorded by NIWT. Estimate similar level for 1990, 2000 and 2005 (5 year averages), as there were no catastrophic storms with estimated windthrown growing stock exceeding 2 million m^3 or 2000 ha in any of these periods (the last was in October 1987).

Given the high threshold adopted for reporting, there is likely to be little overlap between areas damaged from more than one cause, so add the areas to get total area affected in a year.

For invasive species, assume that the same percentage of UK woodland was affected in 2005 as was found for GB woodland in 1995-99 (3.7%). Applying this to the total UK woodland area for 2005 gives an estimate of 105,000 ha affected.

10.3.2 Reclassification into FRA 2010 categories

No reclassification undertaken

10.4 Data for Table T10

Table 10a – Disturbances

FRA 2010 category	Affected forest area (1000 hectares)		
	1990	2000	2005
Disturbance by insects	1	1	1
Disturbance by diseases	0	0	0
Disturbance by other biotic agents	3	3	3
Disturbance caused by abiotic factors	6	6	6
Total area affected by disturbances	**10**	**10**	**10**

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)
Pine beauty moth *(Panolis flammea)*	*Pinus contorta*	1987	*	6-7 years
Pine looper moth (*Bupalus piniarius)*	*Pinus sylvestris, P. contorta*	2004	*	6-7 years
Phytophthora ramorum	*Quercus falcata*	2003	*	
Phytophthora kernoviae	*Fagus sylvatica, Quercus spp*	2004	*	
Phytophthora disease of alder	*Alnus spp*	1993	15% of affected areas	
Oak Processionary Moth (*Thaumetopoea processionea*)	*Quercus spp*	2006	*	
Horse chestnut leaf miner (*Cameraria ohridella*)	*Aesculus hippocastanum*	2008	*	
Horse Chestnut Bleeding Canker (*Pseudomonas syringae* pathovar *aesculi*)	*Aesculus hippocastanum*	2003	Around 50% showed symptoms	
Great spruce bark beetle *Dendroctonus micans)*	*Picea spp*	1995	Local mortality but widespread distribution	
Red band needle blight (*Dothistroma septosporum)*	*Pinus nigra var maritima, Pinus spp*	2007	70% of stands of P. nigra	
Dutch elm disease (*Ophiostoma ulmi)*	*Ulmus procera*	1960s	25 million trees, most before 1990	
Green spruce aphid (*Elatobium*	*Picea abies, P. sitchensis*	2008	Virtually	Frequent but

abietinum)			all spruce in UK	not cyclic
Oak pinhole borer (*Platypus cylindrus)*	*Quercus spp*	2008	*	

Note: Area affected refers to the total area affected during the outbreak. (* = <500 ha)

P. ramorum and *P.kernoviae* have affected a limited number of trees; the main hosts are *Rhododendron ponticum* and *Viburnum spp* for *P.ramorum*, and *R. ponticum* for *P.kernoviae*

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

Scientific name of woody invasive species	Forest area affected 2005 (1000 hectares)
Rhododendron ponticum	105
Total forest area affected by woody invasive species	105

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		
Disturbance by diseases		
Disturbance by other biotic agents		
Disturbance caused by abiotic factors	Windblown trees.	
Major outbreaks		
Invasive species		

Other general comments to the table

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.

11.2 National data

11.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
JQ1 (and previous TB1) international returns	M	All	1988 to 2007	Updated to include JQ1 data submitted in 2008
Economic Accounts for Forestry	M	All	1988 to 2007	UK working sheets for 1998 and 2002, for unit values

11.2.2 Classification and definitions

National class	Definition
Removals	Removals of timber, mostly estimated from reported deliveries to wood processing industries

11.2.3 Original data

Removals 1988-1992 (000 m3 underbark)

	1988	1989	1990	1991	1992	Ave 98-02	1992 r
Total removals	**5792**	**6273**	**6275**	**6352**	**6383**	**6215**	**6546**
Softwood removals	4806	5143	5291	5376	5699	5263	5859
Hardwood removal	986	1131	984	976	684	952	687
Woodfuel	**197**	**229**	**229**	**229**	**229**	**223**	**232**
Softwood woodfuel	79	98	98	98	98	94	100
Hardwood woodfuel	118	131	131	131	131	129	132
Sawlogs	**3331**	**3657**	**3638**	**3483**	**3438**	**3509**	**3561**
Softwood sawlogs	2856	3044	3121	2925	3135	3016	3255
Hardwood sawlogs	475	613	517	558	303	493	306

Source: 1988 to 1992 from TB1 and related databases in 1994; 1992r from JQ1/TB1 database in 2001.

Removals 1998-2002 (000 m3 underbark)

	1998	**1999**	**2000**	**2001**	**2002**	**Ave 98-02**
Total removals	**7,595**	**7,774**	**7,791**	**7,881**	**7,789**	**7766**
Softwood removals	6,968	7,184	7,219	7,328	7,247	7189
Hardwood removal	627	590	572	553	542	577
Fuelwood	**229**	**229**	**229**	**229**	**229**	**229**
Softwood fuelwood	98	98	98	98	98	98
Hardwood fuelwood	131	131	131	131	131	131
Sawlogs	**4295**	**4570**	**4570**	**4675**	**4735**	**4569**
Softwood sawlogs	4072	4372	4396	4515	4593	4390
Hardwood sawlogs	223	198	174	160	142	179

Source: current JQ1 database

Removals 2003-2007 (000 m3 underbark)

	2003	**2004**	**2005**	**2006**	**2007**	**Ave 03-07**
Total removals	**8073**	**8325**	**8524**	**8430**	**9018**	**8474**
Softwood removals	7581	7877	8005	8047	8632	8028
Hardwood removal	492	448	519	383	386	446
Fuelwood	**229**	**229**	**317**	**317**	**459**	**310**
Softwood fuelwood	98	98	98	98	196	118
Hardwood fuelwood	131	131	219	219	263	193
Sawlogs	**4935**	**5086**	**5046**	**5313**	**5715**	**5219**
Softwood sawlogs	4814	5006	4983	5257	5657	5117
Hardwood sawlogs	121	80	63	56	58	76

Source: current JQ1 database

Average unit values for sales from Forestry Commission direct working (Financial years ending March, £/m^3)

£/m^3 underbark	**1988-89**	**1989-90**	**1990-91**	**1991-92**	**1992-93**	**Average 88-89 to 92-93**
C Sawlogs	35.55	36.79	38.33	32.94	31.93	35.11
C pulpwood / chipwood	15.30	16.22	20.80	21.23	20.23	18.75
Firewood	12.64	12.77	12.89	13.01	13.11	12.88

Source: working sheets for Economic Accounts for Forestry, 1998

£/m^3 standing volume	**1998-99**	**1999-2000**	**2000-01**	**2001-02**	**2002-03**	**Average 98-99 to 02-03**
C Sawlogs	26.17	23.98	23.86	22.87	21.84	23.74
C pulpwood / chipwood	19.43	17.49	16.78	16.59	16.25	17.31
Firewood	11.02	11.96	10.88	18.05	12.28	12.84

Source: Forest Enterprise harvesting & marketing data, in working sheets for Economic Accounts for Forestry, 2002 + update

£/m^3 standing volume	2003-04	2004-05	2005-06	2006-07	2007-08	Average 03-04 to 07-08
C Sawlogs	21.20	21.46	21.88	22.13	26.44	22.62
C pulpwood / chipwood	15.60	14.65	14.77	14.73	15.19	14.99
Firewood	11.83	12.92	13.02	13.36	13.03	12.83

Source: Forest Enterprise harvesting & marketing data, as above.

11.3 Analysis and processing of national data

11.3.1 Estimation and forecasting

Scaling up 1988-2002 by ratio of 1992r to original 1992, and from underbark to overbark

Estimation for 1990

	1988 to 1992 ave ub	1992r/ 1992	Overbark/ underbark	Ave 1988-1992 ob	Unit value £	Total value £m
Total removals	**6215**			**7157**		**178.0**
Softwood removals	5263			6063		
Hardwood removal	952			1094		
Woodfuel	**223**			**256**	**11.50**	**2.9**
Softwood woodfuel	94	1.018	1.120	108		
Hardwood woodfuel	129	1.006	1.143	148		
Sawlogs	**3509**			**4077**	**31.35**	**127.8**
Softwood sawlogs	3016	1.038	1.120	3507		
Hardwood sawlogs	493	1.010	1.143	569		
All others	**2483**			**2824**	**16.74**	**47.3**
All others softwood	2153	1.015	1.120	2448		
All others hardwood	330	0.996	1.143	376		

Source: Unit values from Forestry Commission sales (averages over 5 financial years), divided by 1.12 to convert from underbark to overbark unit values.

Estimation for 2000

	Ave 1998-2002 ub	Overbark/ underbark	Ave 1998-2002 ob	Unit value £	Total value £m
Total removals	**7766**		**8711**		**202.9**
Softwood removals	7189		8052		
Hardwood removal	577		659		
Woodfuel	**229**		**259**	**14.26**	**3.7**
Softwood woodfuel	98	1.120	110		
Hardwood woodfuel	131	1.143	150		
Sawlogs	**4569**		**5121**	**26.38**	**135.1**
Softwood sawlogs	4390	1.120	4916		
Hardwood sawlogs	179	1.143	205		
All others	**2968**		**3330**	**19.23**	**64.0**
All others softwood	2702	1.120	3026		
All others hardwood	266	1.143	304		

Sources: Unit values from Forestry Commission sales (averages over 5 financial years) divided by 0.9 to convert standing to felled overbark unit values.

Estimation for 2005

	Ave 2003-2007 ub	Overbark/ underbark	Ave 2003-2007 ob	Unit value £	Total value £m
Total removals	**8474**		**9501**		**206.7**
Softwood removals	8028		8992		
Hardwood removal	446		509		
Woodfuel	**310**		**352**	**14.26**	**5.0**
Softwood woodfuel	118	1.120	132		
Hardwood woodfuel	193	1.143	220		
Sawlogs	**5219**		**5818**	**25.14**	**146.2**
Softwood sawlogs	5117	1.120	5731		
Hardwood sawlogs	76	1.143	87		
All others	**2945**		**3331**	**16.65**	**55.5**
All others softwood	2794	1.120	3129		
All others hardwood	177	1.143	202		

Source: Unit values from Forestry Commission sales (averages over 5 financial years) divided by 0.9 to convert standing to felled overbark unit values.

Note – all estimations are copied from a spreadsheet using unrounded data.

11.3.2 Reclassification into FRA 2010 categories

No reclassification undertaken.

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.)	6,901	8,452	9,149	256	259	352
... of which from forest	6,901	8,452	9,149	256	259	352
Unit value (local currency / m^3 o.b.)	25.37	23.56	22.05	11.50	14.26	14.26
Total value (1000 local currency)	175,085	199,159	201,715	2,900	3,700	5,000

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

	1990	2000	2005
Name of local currency	GBP	GBP	GBP

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	The removals figures reported in JQ1 are considered to give good coverage of industrial roundwood, all from forests.	
Total volume of woodfuel removals	The figures reported in JQ1 for woodfuel for years up to 2007 were expert estimates, primarily for forests. Some additional information was obtained for JWEE 2008, and better information is being compiled from	

	new surveys in 2009. These may indicate additional volumes of woodfuel, including wood from areas outside forests, but figures are not available for use in FRA 2010.	
Unit value		
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
Jenny Wong (personal communication, 2004)	M/L	All others	2000	Compilation for FRA 2005, using sources identified below
Roger Hay, British Christmas Tree Growers Association (personal communication, 2005)	M	Christmas trees	various 1990 to 2004	
Forestry Statistics 2004	M	Christmas trees	96/97 to 03/04	Data for state forest service sales only.

The estimates provided by Jenny Wong (personal communication, 2004) were based on an assessment of the following sources:

- Dyke A. and Primrose D. (2002) Non-timber forest product study. Scottish Forest Industries Cluster.
- Murray M. and Simcox H. (2003) Use of wild living resources in the United Kingdom – A review. UK Committee for IUCN.
- Prendergast H.D.V. and Sanderson H. (2004) Britain's wild harvest. Royal Botanic Gardens, Kew.
- Sanderson H. and Prendergast H.D.V. (2002) Commercial uses of wild and traditionally managed plants in England and Scotland. Royal Botanic Gardens, Kew.
- Wong J. and Dickinson B. (2003) Current status and development potential of woodland and hedgerow, Wild Resources Limited, Bangor.

12.2.2 Classification and definitions

National class	Definition
Venison	Meat from deer. The data used here are from deer culls, so exclude farmed deer.
Christmas trees	All conifers sold as Christmas trees. Most are from Christmas tree plantations managed by specialist Christmas tree growers and state forest services, not from general woodland.

12.2.3 Original data

Plant products

Christmas trees

- A study by Interviewing Research Ltd for BCTGA in 1997 (published 1998) estimated 6 million trees sold, of which 1-1.5 million imported.
- The latest estimate for 2004 (from BCTGA) is 7.5 million trees sold (including around 1 million imports).
- BCTGA estimate that UK production in 1990 was around 2.5 million trees.
- Figures for sales of Christmas trees by state forest services (FC and FS) are reported in Forestry Statistics 2004, table 2.14. They average around 160,000 trees for 1996-1998, and around 70,000 trees since 2000. These figures are not used here to estimate trends in quantities sold, because they only make up a small part of the total market.

Typical retail and wholesale prices in 2004, for a 6ft (1.8m) tree, estimated by BCTGA:

	Retail	Wholesale
Norway spruce	£12 - £20	£4 - £6
Firs	£22 - £35	£6 - £12
Pine	£23 - £30	£5 - £8

All other estimates are taken from Wong 2004 (personal communication) and are shown below. They can generally be taken as relating to the year 2000, except where other dates are stated.

Plant products – food

The most important products are Mushrooms (*Boletus, Chanterelle* etc.), Berries (*Vaccinium, Rubus*) and Flowers (*Sambucus nigra*).

Estimates (commercial collection only)

Product	Weight	Unit	Total value

		(tonnes)	price (£ kg^{-1})	£
Commercial	Nettles	2.5	9	22,500
	Bilberries	4.0	4.0	16,000
	Elderflowers	100.0	2.6	260,000
	Mushrooms	50.0	7.5	375,000
	Oak leaves	5.0	?	
	Sloes	0.9	0.27	243
TOTAL		162.4		677,743

A price of £7.90/kg for bilberries is given in the sources quoted, but seems to be a retail price. In the above table this has been adjusted down by 50% to £4.00/kg as an estimated wholesale price.

Plant products – fodder
Occasional use in hard winters (*Corylus avellana*, *Ilex*, *Salix* etc.)

Plant products – medicines and aromatic products
Yew clippings (*Taxus baccata*) – estimate 15 tonnes and £5,000.

Plant products – colorants and dyes
The only information available is for oak tan bark (*Quercus petraea* & *Q. robur*) for a tannery in Devon (SW England). The estimated quantity is 13.5 tonnes; the price is not known.

Plant products – utensils, handicrafts and construction
Mainly willow (*Salix* spp.). Products include coppice and other wood for greenwood working as well as twigs for bessoms and rushes etc for basket weaving. There are few figures for the volume of this market but it is likely to be reasonably large. This is currently excluded from the table.

Ornamental plants
In addition to Christmas trees (see above) this includes any material collected for ornamental use, e.g. foliage and moss for use by florists and horticultural products (hanging baskets, wreaths etc.). Includes Moss (*Hypnum jutlandicum, Sphagnum, Hylocomium splendens, Pleurozium schreberi* etc.). Estimate 45 tonnes and value £4.1 million.

Exudates
Mainly Birch sap (*Betula* spp.) – no estimate available.

Other plant products
The estimate is for tree seed – 13 tonnes, value £150,000.

Animal products

Honey
Honey is derived from hedgerow trees such as hawthorn, lime etc. and understorey wildflowers. Annual honey production estimated at 4000 tonnes per year for 2000 and 6000 tonnes for 2003-4. Beeswax represents 1.5% of the honey harvest [Carreck & Williams (1999) http://www.beefarmers.co.uk/files/vofbeesreport.pdf]. An educated guess puts the amount of honey harvested from forests and trees (in hedgerows) at around 3% of the total harvest, so about 200 tonnes for 2005. The advent of Verroa in 1995 severely affected honey production and the increase from 2000 to date probably represents recovery as bee farmers adjust to Verroa losses and control measures.

Average wholesale price of UK sourced honey: £4.40 per kg in 2000 and.£4.00 per kg in 2004.

Venison (deer meat)
Estimated figures derived from data for deer culls:
1990: 800 tonnes, 2000: 2600 tonnes, 2005: 3500 tonnes
It is assumed that all culled deer are dependent on woodland for at least some of the year.

The estimated wholesale value for total deer cull, including that not sold:
1990: £0.8 million, 2000: £2.6 million, 2005: £3.5 million (all valued at £1/kg).

Other wild game from woodlands such as woodcock and wood pigeon are taken in relatively large numbers but contribute little to the overall weight produced and their meat is very low value, so they have been omitted. Reared woodland game i.e. pheasant have been excluded.

12.3 Analysis and processing of national data

12.3.1 Estimation and forecasting

For Christmas trees in 2005, use BCTGA estimate of total sold in 2004 (7.5 million) and subtract 1 million for imports, to get estimate of 6.5 million UK production. Use £8/tree as an average wholesale value, based on average of the range of original data for 2004.

For venison, original data give estimates for all years including 2005. For all other categories, assume same level in 2005 as in these earlier estimates.

12.3.2 Reclassification into FRA 2010 categories

No reclassification undertaken.

12.4 Data for Table T12

Rank	Name of product	Key species	Unit	NWFP removals 2005		NWFP category
				Quantity	Value (1000 local currency)	
1st	Christmas trees	*Picea, Abies Pinus*	number	6500000	52000	6
2nd	Foliage and moss	*Hypnum, Sphagnum, etc*	tonnes	45	4100	6
3rd	Venison	*Cervus elaphus, Capreolus capreolus*	tonnes	3500	3500	12
4th	Honey	*Bombus spp*	tonnes	200	800	11
5th	Mushrooms	*Boletus, Cantharellus, etc*	tonnes	50	375	1
6th	Elderflowers	*Sambucus nigra*	tonnes	100	260	1
7th	Tree seed		tonnes	13	150	8
8th	Nettles	*Urtica dioica*	tonnes	2.5	22	1
9th	Yew clippings	*Taxus baccata*	tonnes	15	5	3
10th	Bilberries	*Vaccinium myrtillus*	tonnes	4	4	1
All other plant products					0	
All other animal products					0	
TOTAL					**61216**	

	2005
Name of local currency	GBP

12.5 Comments to Table T12

Variable / category	Comments related to data, definitions, etc.
10 most important products	These are the 10 most important commercial products for which data are available. See other notes about non-commercial collection.
Other plant products	
Other animal products	
Value by product	
Total value	This is the total of commercial value of products identified in original data above. See general comment below on non-commercial collection, and also notes in original data about categories for which no data available.

Other general comments to the table

In addition to the commercial collection of plant food products shown here, there is believed to be substantial non-commercial collection of food products, particularly blackberries (*Rubus*) and wild mushrooms. One local rural survey estimated that on average each person collects 2.2kg of blackberries a year; applying this to the 2 million total rural population in UK gives a speculative estimate for blackberries of 4400 tonnes. If valued at around £3/kg (the typical wholesale market price in 2004), would give additional total value of around £13 million. It could be argued that non-commercial collection should be valued at the (higher) retail price, because that is the price the individuals would otherwise have to pay. This is excluded from the table, because the estimate is speculative, and we have no estimates (even speculative) for other food products.

No estimate is available for non-commercial collection of wild mushrooms. In a recent survey in Scotland about 4% of those interviewed said they had collected mushrooms at some time in the last 5 years, compared with about 13% who had picked berries at some time.

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
Forest Employment Surveys 1998/99, 1993/94 and 1988/89	M	All	Various 1989 to 1999	
Labour Force Survey	M	Employees /self employment	1992 to 2003	As used for MCPFE 2007

13.2.2 Classification and definitions

National class	Definition
Establishment	All activities involved in planting or assisting natural regeneration.
Maintenance	All activities involved in forest management, between establishment and harvesting.
Harvesting / extraction	All activities involved in harvesting and extraction to roadside, including production of timber from thinning operations, but excluding construction of forest roads.
Forest nurseries	Private sector and state nurseries that grow trees from seed.
Roads	Forest road/bridge construction or maintenance.
Other forest	Includes recreation and wildlife management.

13.2.3 Original data

GB employment FTEs

National class	1988/89	1993/94	1998/99
Establishment	4320	2770	2529
Maintenance	2245	3725	3364
Harvesting / extraction	10715	9290	4770
Forest nurseries	545	580	624
Roads		630	407
Other forest	1725	1735	982
Total forest	19550	18730	12676

The Labour Force Survey data, as compiled by International Data providers for MCPFE indicators 2007, show approximately 50/50 split between employees and self-employment for forestry (NACE[2] 02) in UK.

13.3 Analysis and processing of national data

13.3.1 Estimation and forecasting

Estimate for 1990 = weighted average of 1988/89 and 1993/94
Estimate for 2000 = extrapolation from 1998/99, using annual rate of change
Estimate for 2005 = further extrapolation, reduced rate of decline
All figures increased by 3% (based on forest area) to expand from GB to UK, then rounded to nearest thousand

13.3.2 Reclassification into FRA 2010 categories

Management of protected areas = 40% of maintenance and other forest
Primary production of goods = all other employment

13.4 Data for Table T13

FRA 2010 Category	Employment (1000 years FTE)		
	1990	2000	2005
Employment in primary production of goods	18	9	8
...of which paid employment	9	4	4
...of which self-employment	9	5	4
Employment in management of protected areas	2	2	2

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		
Paid employment / self-employment		
Employment in management of protected areas		

Other general comments to the table

[2] NACE = "Nomenclature Generale des Activites Economiques dans l`Union Europeenne" (General Name for Economic Activities in the European Union)

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
		X	No
If Yes above, provide:	Year of endorsement		
	Reference to document		
National forest programme (nfp)		X	Yes
			No
If Yes above, provide:	Name of nfp in country	UK National Forest Programme (includes UK Forestry Standard)	
	Starting year	2003	
	Current status		In formulation
			In implementation
		X	Under revision
			Process temporarily suspended
	Reference to document or web site	UK Forestry Standard: http://www.forestry.gov.uk/PDF/fcfc001.pdf/$FILE/fcfc001.pdf	
Law (Act or Code) on forest with national scope		X	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	1967	
	Year of latest amendment	2006	
	Reference to document	Forestry Act 1967	

In case 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	X	Yes
		No
If Yes above, indicate the number of regions/states/provinces with forest policy statements	4	
Sub-national Laws (Acts or Codes) on forest		Yes
	X	No
If Yes above, indicate the number of regions/states/provinces with Laws on forests		

14.3 Comments to Table T14

Variable / category	Comments related to data, definitions, etc.
Forest policy statement with national scope	In 1999 forestry in the UK became a devolved issue, meaning responsibility for forests (at national level, including funding) transferred from the Westminster Government to the Scottish Parliament for Scotland and the Welsh Assembly Government for Wales. The development of international forestry policy and related discussions remains as a central responsibility for the UK Westminster Government. The Scottish Forestry Strategy has been reviewed and a new version was launched in 2006. England's Forestry Strategy was reviewed, and a new version titled a strategy for England's Trees Woods and Forests was launched in 2007. The Welsh Forestry Strategy has been reviewed. Since devolution the challenge to the Government departments, the Devolved Administrations, private forestry organisations, NGO's and representative bodies has been to ensure effective communication and appropriate consultation with stakeholders in the development forest policies.
National forest programme (nfp)	The UK NFP, published in 2003 was developed in line with the MCPFE approach. It includes the country Forestry Strategies and the UK Forestry Standard. The UK Forestry Standard was first published in 1998 and updated in 2004; it is currently under revision.
Law (Act or Code) on forest with national scope	The Forestry Act 1967 and later amendments. The Government of Wales Act 1998, the Scotland Act 1998 and the Forestry Commission Regulatory Reform Order 2006.
Sub-national forest policy statements	The Forestry Commission has by agreement with the devolved administrations identified a number of regulations, processes issues which the Forestry Commission leads and implements on a cross sectoral basis, The Forestry Commission operates across Great Britain (GB) as a cross border public body. Forestry is the responsibility of Ministers in England, Scotland and Wales; certain GB functions such as international forest policy, EU matters and Plant Health are not devolved and remain the responsibility of the Westminster parliament.
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.

15.1.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Forestry Commission staff records	H	Human resources	2000, 2005, 2008	GB only – exclude N Ireland

15.2 Data for Table T15

Table 15a – Institutions

FRA 2010 Category	2008	
Minister responsible for forest policy formulation : please provide full title	Secretary of State for Environment, Food & Rural Affairs Also ministers in devolved administrations	
Level of subordination of Head of Forestry within the Ministry	X	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	Forest Research Forest Enterprise England Forest Enterprise Scotland Forest Service (Northern Ireland)	
Institution(s) responsible for forest law enforcement	Forestry Commission Forest Service	

Table 15b – Human resources

FRA 2010 Category	Human resources within public forest institutions					
	2000*		2005		2008	
	Number	%Female	Number	%Female	Number	%Female
Total staff	569	44%	1344	33%	1350	35%
...of which with university degree or equivalent	78	13%	206	25%	223	37%

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.
3. Figures for 2000* are not comparable – see comments below.

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		
Other public forest agencies at national level		
Institution(s) responsible for forest law enforcement		
Human resources within public forest institutions	FC staff databases were interrogated by Human Resources division to provide total numbers of staff and numbers with degrees (T Edwards, personal communications, Feb and Mar 2009). All figures exclude Forest Research. All figures exclude Forest Enterprise and its successor agencies, but this change in organisational structure results in a change in coverage between 2000 and later years – see comments on trends. Figures exclude N Ireland.	The figures for 2000 exclude Forest Enterprise (FE), which was a GB-wide agency responsible for managing state forests. The figures for 2005 and 2008 exclude FE England and FE Scotland. This means that the later figures include the following staff that were excluded for 2000: Business Units (e.g. engineering), operational support and staff in Wales managing state forests.

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 a 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
HESA Student Returns	H	students	Various 2000 to 2008	Number of students in higher education
Forestry Commission staff records	H	professionals	2000, 2005, 2008	Professionals working in Forest Research

16.2.2 Original data

Students

Data were provided by the Higher Education Statistics Agency (HESA). According to the 1999/00, 2004/05, 2005/06, 2006/07 and 2007/08 HESA Student Returns, the number of First Degree and Postgraduate Masters students studying the principal subject of Forestry, by gender, were:

Academic Year	Masters		First Degree	
	Female	Male	Female	Male
07/08	30	95	25	150
06/07	25	105	65	155
05/06	5	75	70	170
04/05	15	65	80	160
99/00	20	60	50	275

Data are rounded to the nearest multiple of 5.

Professionals

The only publicly funded forest research centre in the UK is Forest Research (FR), an agency of the Forestry Commission (FC). FC staff databases were interrogated by Human Resources division to provide numbers of professional staff in FR with degrees, each member of staff being shown once according to their highest level of degree (T Edwards, personal communication, Feb 2009).

16.3 Analysis and processing of national data

16.3.1 Estimation and forecasting

Students

Most Masters degrees are one year, so the number of students is a reasonable estimate of the numbers graduating.

A majority of first degrees are 3 years, with a significant minority lasting 4 years. Assume an average of 3.3 years, to convert the statistics for numbers of students into estimates of numbers graduating. For 2008, take the average of the previous three years.

Round all estimated numbers and percentages to the nearest multiple of 5, to reflect the rounding in the original data.

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	80	25%	80	20%	125	25%
Bachelor's degree (BSc) or equivalent	100	20%	75	35%	65	25%
Forest technician certificate / diploma	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

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)	31	19%	50	32%	52	37%
Master's degree (MSc) or equivalent	9	33%	27	41%	28	46%
Bachelor's degree (BSc) or equivalent	45	35%	38	42%	44	34%

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	Much of third row out of scope for HESA. Sent request to Lantra 22/12/08, particularly for third row; they are compiling data for a Feb report. Chased again in March and May.	
Professionals working in public forest research centres		

Other general comments to the table
Publicly funded research centre staff without degrees are not covered by FRA data collection – T15 excludes all in research but the second part of 16.4 only asks about those with degrees.

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
Forestry statistics 2008, tables 7.4 and 7.5 and related databases	H	all	2000-01 to 2007-08	
Forest Research Annual Report & Accounts	H	all	2000-01 to 2007-08	
Forest Service Annual Report & Accounts	H	all	2000-01 to 2007-08	

17.2.2 Classification and definitions

National class	Definition
Funding public forests – net expenditure	Expenditure in GB on public forests, from Annual Reports & Accounts of FE England, FE Scotland and FC Wales, net of timber income and RCH income. Excludes cost of capital.
Grants and partnership funding	Transfer payments, mainly to private sector, for forest planting, management, etc. EU co-financing is not subtracted from total grant expenditure.
Other Forestry Commission expenditure	Expenditure on policy, regulation and administration, research, international work and the part of GB support service costs not recovered.

17.2.3 Original data

According to the definition, forest revenue excludes the income of publicly owned business entities (the income from timber, recreation etc is subtracted in calculating the net funding for public forests). It also excludes the revenue from general taxation (income tax, corporation tax, VAT on products, etc). In general, the UK government does not obtain revenue from taxes or fees specific to forestry, so on these definitions revenue is negligible.

The largest source of external funding is EU co-funding for grants. The only other significant external funding is Forest Research income from EU and other non-FC sources.

Forest Research prepares separate Annual Reports & Accounts, but its figures are also consolidated into Forestry Commission Accounts. Accounts for Forest Service (Northern Ireland) are completely separate. All figures are in £ million and are for financial years to 31 March.

Forestry Commission
GB totals, from Forestry Statistics 2008 tables 7.4 and 7.5 (EU co-funding for each year and data for first 3 years from same FC Annual Report sources)

	Funding public forests net expenditure	Grants and partnership funding	Other Forestry Commission expenditure	EU co-funding for grants
2000-01	34.2	40.6	49.1	14.8
2001-02	49.2	38.7	49.8	14.2
2002-03	74.2	37.8	45.2	11.6
2003-04	66.4	40.6	58.9	11.4
2004-05	62.1	44.8	50.8	12.0
2005-06	65.6	46.0	57.8	10.9
2006-07	64.0	61.5	61.7	12.5
2007-08	59.5	71.6	66.1	12.5

Note: other FC expenditure shown here double-counts FC funding for Forest Research. This will be corrected for Forestry Statistics 2009, but needs to be adjusted below.

Forest Research
GB totals, from Forest Research Annual Report & Accounts

	Total Expenditure	Total Income	of which from FC	of which from EU and other
2000-01	11.8	12.4	11.3	1.1
2001-02	11.8	12.4	11.2	1.3
2002-03	11.9	12.5	10.8	1.7
2003-04	12.4	12.8	11.2	1.7
2004-05	13.2	13.6	11.5	2.1
2005-06	13.9	14.4	12.3	2.0
2006-07	15.1	15.6	13.2	2.4
2007-08	15.5	14.6	13.1	1.5

Forest Service
Northern Ireland totals, from Forest Service Annual Report & Accounts

	Net operating cost	Of which, cost of capital	Grant payments EU funded	Grant payments national element
2000-01	20.2	13.4	1.0	0.7
2001-02	20.4	13.4	1.2	0.7
2002-03	19.3	13.4	1.2	0.8
2003-04	14.3	7.9	0.7	0.7
2004-05	15.3	8.3	1.0	0.8
2005-06	14.9	8.8	1.3	0.7
2006-07	14.6	9.5	1.3	0.8
2007-08	16.0	10.7	1.1	1.2

17.3 Analysis and processing of national data

17.3.1 Estimation and forecasting

For year 2000, use 2000-01
For year 2005, use 2005-06

17.3.2 Reclassification into FRA 2010 categories

Operational expenditure (net)

	2000	**2005**
Funding public forests FC	34.2	65.6
Other FC expenditure (as reported)	65.6	57.8
Less FC funding to FR (double-counted)	*-11.3*	*-12.3*
FS net operating cost	20.2	14.9
Less FS cost of capital	*-13.4*	*-8.8*
Less FS grants	*-1.7*	*-2.0*
Total operational expenditure	**93.6**	**115.2**
Less external funding (FR)	*-1.1*	*-2.0*
Domestic funding	**92.5**	**113.2**

Transfer payments

	2000	**2005**
Grants & partnership funding FC	40.6	46.0
Grant payments FS	1.7	2.0
Total transfer payments	**42.3**	**48.0**
EU funded (FC)	14.8	10.9
EU funded (FS)	1.0	1.3
Total EU funded	**15.8**	**12.2**
Total domestically funded	**26.5**	**35.8**

17.4 Data for Table T17

Table 17a - Forest revenues

FRA 2010 Categories	Revenues (1000 local currency)	
	2000	2005
Forest revenue	0	0

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	92500	115200	1100	2000	93600	117200
Transfer payments	26500	35800	15800	12200	42300	48000
Total public expenditure	119000	153000	16900	14200	135900	165200

If transfer payments are made for forest management and conservation, indicate for what specific objective(s) - Please tick all that apply.		
	X	Reforestation
	X	Afforestation
	X	Forest inventory and/or planning
	X	Conservation of forest biodiversity
	X	Protection of soil and water
	X	Forest stand improvement
	X	Establishment or maintenance of protected areas
	X	Other, specify below
	Provision of recreation infrastructure	

Comments to Table T17

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Forest revenue		
Operational expenditure	As noted above, this includes the net expenditure on public forests, which receive government funding to provide public benefits. It does not include the part of expenditure that is offset by timber and other income.	
Transfer payments		

Other general comments to the table