Forestry Department
Food and Agriculture Organization of the United Nations

GLOBAL FOREST RESOURCES ASSESSMENT 2010

COUNTRY REPORT

UNITED STATES OF AMERICA

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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

The national forest inventory of the United States covers the 50 States and all of the nation's associated islands in the Caribbean and Pacific regions.

The main landmass of the United States, containing 48 of the 50 States, is situated in mid-North America (fig. 1), has a central plain with hills and low mountains to the east and rugged mountains and wide valleys to the west. The State of Alaska, on Canada's western border, is dominated by Pacific and Arctic mountains, a central plateau, and the Arctic slope.

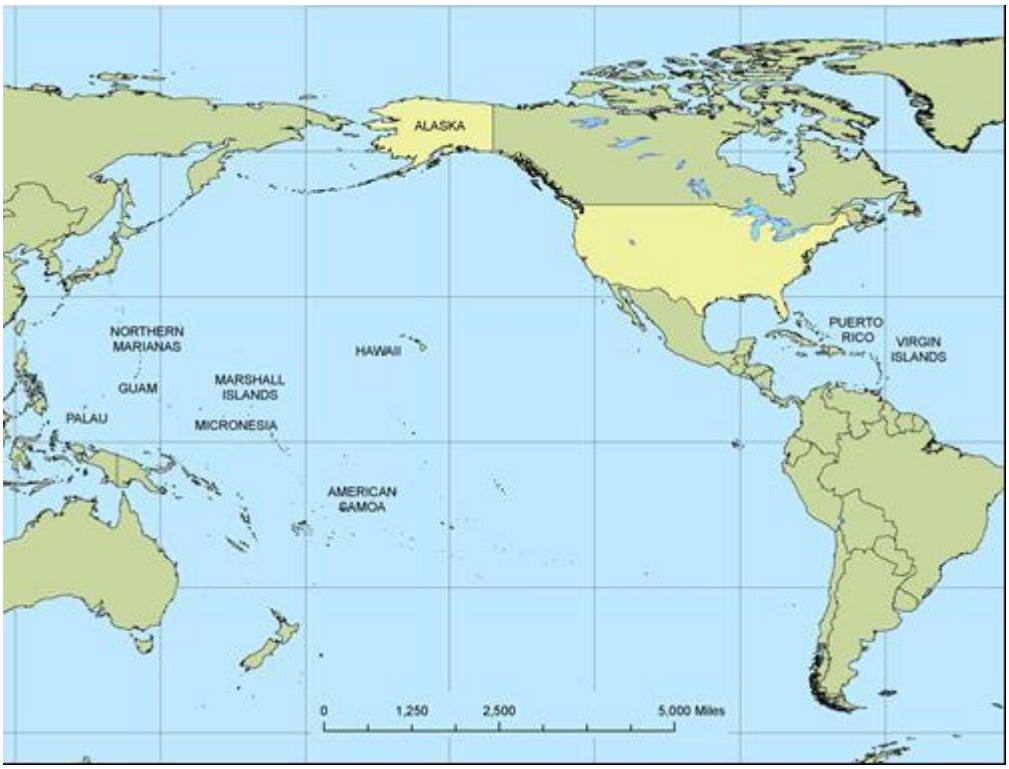

Figure 1. – Geographic location of the United State, territories and freely associated islands

The U.S. Caribbean Islands are composed of Puerto Rico and the U.S. Virgin Islands. In general, the Caribbean Islands are a 4,000-km arc of islands, tectonically uplifted from the sea floor separating the Atlantic Ocean from the Caribbean Sea. Low-lying islands often are capped with limestone from ancient coral reefs, and other islands exhibit volcanic activity that has pushed up steep peaks that divert the moisture-laden north-easterly trade winds upward, greatly increasing rainfall.

The U.S. Pacific Islands are composed of American Samoa, Guam, the State of Hawaii, the Republic of the Marshall Islands, the Federated States of Micronesia, the Commonwealth of the Northern Mariana Islands, and the Republic of Palau. These islands span a vast and diverse area, beginning with Hawaii, 4,000 km west of the U.S. mainland, and extending to Southeast Asia. Land masses vary widely and include small coral atolls, small sand islands, moderate-sized islands of mixed limestone and volcanic substrates, and large, high-elevation, volcanic islands.

This report presents data only for the 50 States. Separate reports will be provided by the United States for Puerto Rico, the U.S. Virgin Islands, American Samoa, Guam, the Republic of the Marshall Islands, the Federated States of Micronesia, the Commonwealth of the Northern Mariana Islands, and the Republic of Palau.

1 Table T1 – Extent of Forest and Other wooded land

1.1 FRA 2010 Categories and definitions

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

This report refers to RPA as a data source. RPA stands for the Resources Planning Act of 1974 (U.S. Public Law 93-378) which mandates periodic resource assessments which are *"to make and keep current a comprehensive survey and analysis of the present and prospective conditions of and requirements for the renewable resources of the forest and range lands of the United States, its territories and possessions, and of the supplies of such renewable resources, including a determination of the present and potential productivity of the land, and of such other facts as may be necessary and useful in the determination of ways and means needed to balance the demand for and supply of these renewable resources, benefits and uses in meeting the needs of the people of the United States."*

1.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
FIADB national database http://fia.fs.fed.us Smith, W. Brad; Miles, Patrick L.; Perry, C; Pugh, S. 2008. Forest Resources of the United States, 2007. Gen. Tech. Rep. WO-xxx. Washington, DC: U.S. Department of Agriculture, Forest Service, Washington Office. (in preparation)	H	Forest land Other land	2007	Forest data from the referenced U.S. report represents FRA data for 2010. Reported data are adjusted for removal of chaparral as a forest cover
2002 data interpolated	H	Forest land Other land	2002	Data for FRA 2005 are based on interpolation between 1997 and 2007 data sources.
Smith, W. Brad; Vissage, John S.; Darr, David R. 2001; Sheffield, Raymond M. Forest Resources of	H	Forest land Other land	1997	Forest data from the referenced U.S. report. Represents FRA data

the United States, 199. Gen. Tech. Rep. NC-219. St. Paul, MN:USDA, Forest Service, North Central Research Station. 190 p.				for 2000. Reported data are adjusted for removal of chaparral as a forest cover.
Waddell, Karen L., Oswald, Daniel D., and Powell, Douglas S. 1989. Forest statistics of the United States, 1987. Resour. Bull. PNW-RB-168. Portland, OR: USDA, Pacific Northwest Research Station. 106 p.	H	Forest land Other land	1987	Forest data from the referenced U.S. report represents FRA data for 1990. Reported data are adjusted for removal of chaparral as a forest cover and for a reporting error in data for National Forests in OR and WA, and forest in west TX which increased the total forest area above the 1987 reported value.
Tiger files from Department of Commerce, Bureau of the Census (http://www.census.gov/geo/www/ua/ua_bdfile.html)	H	Urban areas	2000	Data for delineating urban areas in the U.S. derived by merging urban census tracts with U.S. forest cover map.

1.2.2 Classification and definitions

National class	Definition
Forest land	Land that has at least 10% cover, or equivalent stocking, by forest trees of any size, including land that formerly had such tree cover and that will be naturally or artificially regenerated. Forest land includes transition zones, such as areas between heavily forested and nonforested lands that have at least 10% cover with forest trees and forest areas adjacent to urban and built-up lands. Also included are pinyon-juniper and chaparral areas in the West and afforested areas. The minimum area for classification of forest land is 0.4 hectare. Roadside, streamside, and shelterbelt strips of timber must have a crown width of at least 37 meters to qualify as forest land. Unimproved roads and trails, streams, and clearings in forest areas are classified as forest if less than 37 meters wide.
Other land	Land that has never supported forests and lands formerly forested where use of forest management is precluded by development for other uses. (Note: This includes area used for crops, improved pasture, residential areas, city parks, improved roads of any width and adjoining clearings, powerline clearings of any width, and 0.4- to 1.8-hectare areas of water or streams, sloughs, estuaries, and canals between 37 and 61 meters wide classified by the Bureau of the Census as land. If intermingled in forest areas, unimproved roads and nonforest strips must be more than 37 meters wide, and clearings, etc., more than 0.4 hectare, to qualify as nonforest land.)
Inland water (Census water)	Streams, sloughs, estuaries, and canals more than 60 meters wide; and lakes, reservoirs, and ponds more than 1.8 hectares in size.
Other wooded land	Not currently available. Previously, U.S. unproductive forest area was reported in this category, even though it met FAO forest definition. It was reported as "other wooded land" due to lack of field inventory data.
Other land with tree cover (Subordinated to "Other land")	Currently included in "Other land". Other land with trees has not been previously reported and includes urban land with trees, farm/pastureland with trees, wooded strips, windbreaks, shelterbelts, and other unclassified land with tree cover > 10% and generally greater than 20m wide.

1.2.3 Original data

Forest area of the United States by land class and owner, 1987, 1997, 2002, 2007

Land class	1987	1997	2002	2007	1987	1997	2002	2007
	000 acres				*000 hectares*			
Forest	732,235	741,771	746,499	751,227	296,335	300,195	302,108	304,022
Of which:								
Private	*432,119*	*426,346*	*424,451*	*422,555*	*174,878*	*172,542*	*171,775*	*171,008*
Public	*300,116*	*315,425*	*322,048*	*328,672*	*121,457*	*127,652*	*130,333*	*133,014*
Other wooded land [1]	36,898	36,898	36,898	36,898	*14,933*	*14,933*	*14,933*	14,933
Other land	1,494,746	1,485,210	1,480,482	1,475,754	604,924	601,065	599,151	597,238
...of which with tree cover	*63,742*	*64,713*	*65,698*	*66,699*	*25,796*	*26,189*	*26,588*	*26,993*
Inland water bodies	116,163	116,163	116,163	116,163	47,011	47,011	47,011	47,011
Total for country	2,380,042	2,380,042	2,380,042	2,380,042	963,203	963,203	963,203	963,203

ID= Insufficient data *Conversion factor for hectares is acres x 0.4047*

NOTES

Forest	National data adjusted for removal of chaparral as forest cover.
Other wooded land	Includes chaparral and regional estimates of other wooded land by field units. 2007 data repeated for 1990, 2000 and 2005 due to no offical estimate.
Other land with trees	Based on regional estimates by field units.
Inland water and total	FAOSTAT 2005

Other wooded land and other land with trees estimates (revised)

Land class	*000 ha*	*000 ac*
Urban land with trees (UA)[1]	7,600	18,780
Farm land with trees	8,289	20,482
Shelterbelts, strips, windbreaks, etc	2,818	6,963
Other developed land with trees	8,286	20,474
Total Other land with trees estimate*	**26,993**	**66,699**
Total other wooded land estimate	**14,933**	**36,898**

[1]An urbanized area (UA) consists of densely settled territory that contains 50,000 or more people.
Excludes Hawaii and Alaska.

** Other land with trees for 1990, 2000 and 2005 is very rough estimate, no official basis.*

1.3 Analysis and processing of national data

1.3.1 Calibration

Total land and inland water data are aligned with FAOSTAT 2005 data.
U.S. forest inventory data for 1987, 1997 and 2007 are reported for FRA 1990, 2000 and 2010 respectively. FRA data for 2005 was interpolated.

1.3.2 Estimation and forecasting

No forecasting is used in this report for forest area.

1.3.3 Reclassification into FRA 2010 categories

See comments

1.4 Data for Table T1

FRA 2010 categories	Area (1000 hectares)			
	1990	2000	2005	2010
Forest	296,335	300,195	302,108	304,022
Other wooded land	14,933	14,933	14,933	14,933
Other land	604,924	601,065	599,151	597,238
...of which with tree cover	25,796	26,189	26,588	26,993
Inland water bodies	47,011	47,011	47,011	47,011
TOTAL	**963,203**	**963,203**	**963,203**	**963,203**

1.5 Comments to Table T1

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Forest	Historic data have been revised to remove chaparral as a forest cover in all years and reporting errors in 1987 data. Chaparral does not meet Society of American Forester's guidelines as a forest cover and has been dropped. Chaparral will be included in other wooded land.	In addition to removing chaparral, data for 2005 (national 2002) are now based on trend data between 2000 (national 1997) and 2010 (national 2007).
Other wooded land	Prior to 2005, the United States reported the area of unproductive forest (not capable of producing 1.4 cubic meters per year of average growth at culmination of mean annual increment) as "other wooded land" due to insufficient volume data. The data for the2005 and 2010 report includes an estimate of other wooded land that is more consistent with FRA definitions. These lands, however, are not the same lands reported in FRAs prior to 2005.	This cover will now include chaparral (previously reported as forest) in California and other areas that meet the FRA definition including sparse woodlands in the interior West and wooded pasture in the East. Since trends are only available for the chaparral data, only current data will be reported for this category. These data are estimated from regional databases and are not necessarily complete. Only data for 2010 available.
Other land		This is reported as the balance of lands not in other categories
Other land with tree cover	Includes urban land with trees, farm land with trees, wooded strips, windbreaks, shelterbelts, and other unclassified land with trees.	These data are estimated from regional databases and are not necessarily complete. Only data for 2010 available.
Inland water bodies		FAOSTAT data used

Other general comments to the table
Due to major changes in the national inventory design between 1997 and 2001 from a State by State periodic survey to an annualized survey operating in every State each year, data for 2005 in this report have been interpolated between 1997 and current survey data to better reflect actual trends. This applies to all data in tables 1-8 for this report.

Expected year for completion of ongoing/planned <u>national</u> forest inventory and/or RS survey / mapping	
Field inventory	continuous
Remote sensing survey / mapping	2010-2011

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
FIADB national database http://fia.fs.fed.us Forest Resources of the United States, 2007. See reference in Table 1.	H	Forest ownership	2007	Forest data compiled from most recent inventory data to be used as basis for 2007 U.S. national assessment. Represents FRA data for 2010.
Interpolated data	H	Forest ownership	2002	Data for FRA 2005 are based on interpolation between 1997 and 2007 data sources.
Forest Resources of the United States, 1997. See reference in Table 1.	H	Forest ownership	1997	Forest data from the referenced U.S. report represents FRA data for 2000. Reported data are adjusted for removal of chaparral as a forest cover.
Forest Statistics of the United States, 1987. See reference in Table 1.	H	Forest ownership	1987	Forest data from the referenced U.S. report represents FRA data for 1990. Reported data are adjusted for removal of chaparral as a forest cover and for a reporting error in data for National Forests in OR and WA, and forest in west TX which increased the total forest area above the 1987 reported value.

2.2.2 Classification and definitions

National class	Definition
Public	Includes: Federal--An ownership class of public lands owned by agencies of the U.S. Government. State--An ownership class of public lands owned by States or lands leased by States for more than 50 years. County and municipal--An ownership class of public lands owned by counties or local public agencies, or lands leased by these governmental units for more than 50 years.
Private corporate	An ownership class of forest land that is owned by entities that are legally incorporated. Includes lands previously reported as "forest industry".
Private noncorporate	An ownership class of private lands that are not owned by corporate interests. Includes Native American lands, unincorporated partnerships, clubs, lands leased by corporate interests, etc.
Native American (Tribal)	(a) Lands held in trust by the United States or individual States for Native American tribes or individual Native Americans; (b) Lands owned in fee by Native American tribes whether subject to Federal or State restrictions against alienation or not. Due to insufficient data, this category included in private noncorparate for this report.

2.2.3 Original data

Forest area of the United States by land class, 1987, 1997, 2002, 2007 (revised)

Land class	1987	1997	2002*	2007	1987	1997	2002*	2007
	000 acres				*000 hectares*			
Forest	732,235	741,771	746,499	751,227	296,335	300,195	302,108	304,022
Of which:								
Public	300,116	315,425	322,048	328,672	121,457	127,652	130,333	133,014
Private	432,119	426,346	424,451	422,555	174,878	172,542	171,775	171,008
Individuals	*314,216*	*297,123*	*290,788*	*284,908*	*127,163*	*120,246*	*117,682*	*115,302*
Corporate	*117,903*	*129,223*	*133,663*	*138,102*	*47,715*	*52,297*	*54,093*	*55,890*
Community	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Tribal	*ID*	*ID*	*ID*	*ID*	*ID*	*ID*	*ID*	*ID*
Other wooded land	36,898	36,898	36,898	36,898	14,933	14,933	14,933	14,933
Other land	1,494,741	1,485,205	1,480,477	1,475,749	604,922	601,062	599,149	597,236
...of which with tree cover	*59,938*	*62,111*	*64,364*	*66,699*	*24,257*	*25,136*	*26,048*	*26,993*
Inland water bodies	116,168	116,168	116,168	116,168	47,013	47,013	47,013	47,013
Total for country	2,380,042	2,380,042	2,380,042	2,380,042	963,203	963,203	963,203	963,203

ID= Insufficient data ** Data interpolated.* *Conversion factor for hectares is acres x 0.4047*

NOTES

Corporate	In previous reports the US only reported forest industry here. As these owners have now divested nearly 80% of their lands since 2000, mostly to other corporate ownerships such as TIMOs and REITs, the data have been revised to include all corporate forest land.
Tribal	We currently estimate that there are about 5 million hectares of tribal forest land in the continental 48 States but data for Alaska, which has significant holdings, is unavailable.
Inland water and total	This area is based on FAOSTAT.

Holder of management rights of public forests

	Forest area (1000 acres)			Forest area (1000 hectares)		
Categories	**1987**	**1997**	**2002**	**1987**	**1997**	**2002**
Public Administration*	300,116	315,425	322,048	121,457	127,652	130,333
Individuals						
Private corporations and institutions						
Communities						
Other						
TOTAL	**300,116**	**315,425**	**322,048**	**121,457**	**127,652**	**130,333**

** All rights under owner control, even if contracted.*

2.3 Analysis and processing of national data

2.3.1 Calibration

U.S. data for 1987 and 1997 are used for FRA 1990 and 2000 respectively. Reported data for 2005 are based on interpolation between 1997 and 2007 US data.

2.3.2 Estimation and forecasting

No forecasting for this table.

2.4 Data for Table T2

Table 2a - Forest ownership

FRA 2010 Categories	Forest area (1000 hectares)		
	1990	2000	2005
Public ownership	**121,457**	**127,652**	**130,333**
Private ownership	**174,878**	**172,542**	**171,775**
...of which owned by individuals	*127,163*	*120,246*	*117,682*
...of which owned by private business entities and institutions	*47,715*	*52,297*	*54,093*
...of which owned by local communities	*0*	*0*	*0*
...of which owned by indigenous / tribal communities	*ID*	*ID*	*ID*
Other types of ownership	*0*	*0*	*0*
TOTAL	**296,335**	**300,195**	**302,108**

Note: If other type of ownership is reported, please specify details in comment to the table.
ID = insufficient data

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:		
NOTE: Private corporations still have residual leasing arrangements with private landowners for timber following divestiture of most forest industry lands in the US, primarily in the South. And, indigenous tribes, through various arrangements have "gathering" rights on some public forest lands, but generally not "commercial" harvesting rights.		

Table 2b - Holder of management rights of public forests

FRA 2010 Categories	Forest area (1000 hectares)		
	1990	2000	2005
Public Administration	121,457	127,652	130,333
Individuals	0	0	0
Private corporations and institutions	0	0	0
Communities	0	0	0
Other	0	0	0
TOTAL	**121,457**	**127,652**	**130,333**

2.5 Comments to Table T2

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Public ownership	In the U.S., this is land administered by federal, state, county or municipal entities.	
Private ownership	In the U.S., this is land administered by private individuals, corporations, or other non-public entities. This category includes lands held by, or in trust for, native tribes.	Since 2000, forest industries in the US have divested over 80% of their lands to Timber Investment Management Organizations (TIMOs) or Real Estate Investment Trusts

	(Indigenous people).	(REITs). Many industrial owners retained timber agreements ranging from 10 to 50 years with the new owners. TIMOs and REITs fall under the private corporate ownership category.
Other types of ownership		
Tribal lands	Currently national data shows about 5 million hectares of tribal forest land in the lower 48 States but data for Alaska is incomplete. With insufficient information, no data reported. Currently reported in private non-corporate category.	
Management rights	In the U.S., management rights are generally held by the land owner. In the case of leased lands, these rights are controlled by the owner in collaboration with the management entity.	Many private corporations still have residual leasing arrangements with private landowners for timber following divestiture of most forest industry lands in the US, primarily in the South. Indigenous tribes, through various arrangements have "gathering" rights on some public forest lands, but generally not "commercial" harvesting rights.

Other general comments to the table
Due to major changes in the national inventory design between 1997 and 2001 from a State by State periodic survey to an annualized survey operating in every State each year, data for 2005 in this report have been interpolated between 1997 and current survey data to better reflect actual trends. This applies to all data in tables 1-8 for this report.

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
FIADB national database http://fia.fs.fed.us Forest Resources of the United States, 2007. See reference in Table 1.	H	Forest ownership and land class	2007	Forest data compiled from most recent inventory data to be used as basis for 2007 U.S. national assessment. Represents FRA data for 2010.
Interpolated data	H	Forest ownership and land class	2002	Data for FRA 2005 are based on interpolation between 1997 and 2007 data sources.
Forest Resources of the United States, 1997. See reference in Table 1.	H	Forest ownership and land class	1997	Forest data from the referenced U.S. report represents FRA data for 2000. Reported data are adjusted for removal of chaparral as a forest cover.
Forest Statistics of the United States, 1987. See reference in Table 1.	H	Forest ownership and land class	1987	Forest data from the referenced U.S. report represents FRA data for 1990. Reported data are adjusted for removal of chaparral as a forest cover and for a reporting error in data for National Forests in OR and WA, and forest in west TX which increased the total forest area above the 1987 reported value.
Butler, Brett J. 2008. Family Forest Owners of the United States, 2006. Gen. Tech. Rep. NRS-27. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 72 p.	H	Forest ownership objectives	2006	This report summarizes results from the U.S. Forest Service's National Woodland Owner Survey of the estimated 10 million family forest owners who own 35 percent of forest land in the U.S. Information on forest owner characteristics, ownership histories, ownership objectives, forest uses and forest management practices.
Conservation Biology Institute, Protected Areas Database PAD4 http://www.consbio.org	H	Protected areas	2005	This polygon data set was overlaid on the U.S. forest inventory plot grid to classify plot and area data for IUCN categories 1-5 to verify national inventory data.
National Forest Systems Roadless Area Database	H	NFS Roadless areas	2002	This polygon data set was overlaid on the U.S. forest inventory plot grid to classify plot and area data for National Forest Systems roadless areas. Considered IUCN class 6.

3.2.2 Classification and definitions

National class	Definition
Corporate land	An ownership class of private lands owned by entities that are legally incorporated. Recent divestitures of industry lands to Timber Investment Management Organizations (TIMOs) and Real Estate Investment Trusts (REITs) have clouded the picture for assessing what was once forest industry lands relative to long-term management. Studies are planned to investigate these changes and their implications. Note: Although other forest lands may have production as a primary purpose, no defining data currently exist.
IUCN class	**Category I:** an area of land and/or sea possessing some outstanding or representative ecosystems, geological or physiological features and/or species, available primarily for scientific research and/or environmental monitoring or a large area of unmodified or slightly modified land, and/or sea, retaining its natural character and influence, without permanent or significant habitation, which is protected and managed so as to preserve its natural condition. **Category II:** a natural area of land and/or sea, designated to (a) protect the ecological integrity of one or more ecosystems for present and future generations, (b) exclude exploitation or occupation inimical to the purposes of designation of the area, and (c) provide a foundation for spiritual, educational, recreational, and visitor opportunities, all of which must be environmentally and culturally comparable. **Category III:** an area of land and/or sea containing one or more specific natural or natural/cultural features which are of outstanding or unique value because of their inherent rarity, representative or aesthetic qualities, or cultural significance. **Category IV:** an area of land and/or sea subject to active intervention for management purposes so as to ensure the maintenance of habitats and/or to meet the requirements of specific species. **Category V:** an area of land with coast and sea as appropriate, where the interaction of people and nature over time has produced an area of distinct character with significant aesthetic, ecological, and/or cultural value, and often with high biological diversity. Safeguarding the integrity of this traditional interaction is vital to the protection, maintenance, and evolution of such an area. **Category VI:** an area of land and/or sea containing predominantly unmodified natural systems, managed to ensure long-term protection and maintenance of biological diversity, while providing at the same time a sustainable flow of natural products and services to meet community needs.
Planted forest	Forest stands consisting almost exclusively of planted trees of native or exotic species, and managed to generally maintain this composition at maturity. Management practices may include extensive site preparation before planting and suppression of competing vegetation. Also includes stands where stocking has been augmented substantially by planting.
Roadless area	An area in the National Forest System without any improved roads maintained for travel by standard passenger type vehicles (FSH 1909.12, Section 7.11) Http://ww.fs.fed.us/r4/uinta/projects/planning/docs/roadless/draft_roadless.htm. An area that generally appears to have been primarily affected by the forces of nature, with the imprint of human activity substantially unnoticeable.

3.2.3 Original data

Forest area of the United States by designated function, 1987, 1997, 2002, 2007 (revised)

US data assigned to designated function	Original data							
	1987	1997	2002*	2007	1987	1997	2002*	2007
Forest		*000 acres*				*000 hectares*		
Production	**189,356**	**203,904**	**213,154**	**222,403**	**76,632**	**82,520**	**86,263**	**90,007**
of which :								
All planted forest, public and private	*25,463*	*40,214*	*51,443*	*62,672*	*10,305*	*16,274*	*20,819*	*25,363*
Corporate natural forest (@70%)	*72,010*	*75,379*	*75,149*	*74,918*	*29,142*	*30,506*	*30,413*	*30,319*
NFS natural forest (@22%)	*30,624*	*31,856*	*32,098*	*32,340*	*12,394*	*12,892*	*12,990*	*13,088*
Noncorporate natural forest (@20%)	*61,260*	*56,455*	*54,464*	*52,473*	*24,792*	*22,848*	*22,042*	*21,236*
Protection of soil and water	***ID***	***ID***	***ID***	***ID***	***ID***	***ID***	***ID***	***ID***
Conservation of biodiversity	**172,917**	**180,080**	**183,037**	**186,006**	**69,980**	**72,878**	**74,075**	**75,277**
of which :								
Reserved forest, IUCN 1-5	*44,354*	*51,442*	*63,064*	*74,685*	*17,950*	*20,819*	*25,522*	*30,225*
Roadless forest, IUCN 6	*30,680*	*30,680*	*30,680*	*30,680*	*12,416*	*12,416*	*12,416*	*12,416*
Alaska unreserved natural (80%)	*96,803*	*95,535*	*84,538*	*75,041*	*39,176*	*38,663*	*34,212*	*30,369*
National Land Trust (see note)	*1,080*	*2,422*	*4,756*	*5,600*	*437*	*980*	*1,925*	*2,266*
Social services	***ID***	***ID***	***ID***	***ID***	***ID***	***ID***	***ID***	***ID***
Multiple purpose	**369,961**	**357,787**	**350,308**	**342,818**	**149,723**	**144,796**	**141,770**	**138,738**
Unknown function	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Total - Forest	**732,235**	**741,771**	**746,499**	**751,227**	**296,335**	**300,195**	**302,108**	**304,022**

ID= Insufficient data — ** Data interpolated.* — *Conversion factor for hectares is acres x 0.4047*

NOTES

Production area includes:	All planted forest, public and private.
	Approximately 70% of corporate natural forest (much of this was previously forest industry lands that have been divested since 2000 to TIMOs and REITs but many areas have timber agreements as condition of sale.)
	Approximately 22% of forested lands (excluding planted areas) in National forest ownership are deemed suitable for timber management as a primary emphasis. Individual forests range from zero to 60%. Based on NFS TRAC system records.
	Approximately 20% of private noncorporate natural forest lands have timber as a primary goal based on a recent study of owners of these forests (Butler, 2008).
Production area excludes:	Non-National forest public lands due to lack of data.
Cons. of biodiversity area includes:	All reserved forest (IUCN 1-5)
	All roadless forest (IUCN 6)
	Approximately 80% of unreserved forest in Alaska based on poor access.
	Private conservation areas in lower 48 States reported from National Land Trust Census Report. Assumed to be 40% forest based on land trust estimate. Data are for 1990, 2000 and 2005. Data for 2010 estimated based on projected trend. http://www.landtrustalliance.org/about-us/land-trust-census

Table 3b

Categories	Forest area (1000 acres)				Forest area (1000 hectares)			
	1987	1997	2002*	2007	1987	1997	2002*	2007
Area of permanent forest estate	**300,116**	**315,425**	**322,048**	**328,672**	**121,457**	**127,652**	**130,333**	**133,014**
Forest area within protected areas	**44,354**	**51,442**	**63,064**	**74,685**	**17,950**	**20,819**	**25,522**	**30,225**
Forest area under sustainable forest mgmt	**300,116**	**333,794**	**368,255**	**384,347**	**121,457**	**135,086**	**149,033**	**155,545**
All public forest	*300,116*	*315,425*	*322,048*	*328,672*	*121,457*	*127,652*	*130,333*	*133,014*
SFI certified forest	*0*	*18,369*	*46,207*	*55,675*	*0*	*7,434*	*18,700*	*22,532*
Forest area with management plan	**456,335**	**483,644**	**496,435**	**509,226**	**184,679**	**195,731**	**200,907**	**206,084**
of which :								
All public forest	*300,116*	*315,425*	*322,048*	*328,672*	*121,457*	*127,652*	*130,333*	*133,014*
All private planted forest	*22,950*	*36,384*	*44,773*	*53,162*	*9,288*	*14,725*	*18,120*	*21,515*
Corporate natural forest (@70%)	*72,010*	*75,379*	*75,149*	*74,918*	*29,142*	*30,506*	*30,413*	*30,319*
Noncorporate natural forest (@20%)	*61,260*	*56,455*	*54,464*	*52,473*	*24,792*	*22,848*	*22,042*	*21,236*

ID= Insufficient data — ** Data interpolated.*

NOTES

Area of permanent forest estate	Includes all public forest
Forest area within protected areas	Includes all reserved forest (IUCN 1-5 only)
Forest area under sust. forest mgmt	All public forest plus SFI certified forest (predominantly private) for 1990, 2000, and 2005 reported (www.sfiprogram.org)
Forest area with management plan	Includes all public forest, all planted private forest, 70% of corporate natural forest and 20% of noncorporate private natural forest land.

3.3 Analysis and processing of national data

3.3.1 Calibration

U.S. forest inventory data for 1987, 1997 and 2007 were compiled for use for 1990, 2000 and 2010 FRA assessment data respectively. Data for 2005 are interpolated between US data for 1997 and 2007. National Land Trust data estimated for 2010.

3.3.2 Estimation and forecasting

No forecasting is used in this report for forest area.

3.3.3 Reclassification into FRA 2010 categories

None of the classes in this table have a direct parallel in U.S. national reporting. See Notes in "Original Data" section for how national data was delineated. Data for protected areas reflect IUCN classes 1-5 only.

3.4 Data for Table T3

Table 3a – Primary designated function

FRA 2010 Categories	Forest area (1000 hectares)			
	1990	2000	2005	2010
Production	76,632	82,520	86,263	90,007
Protection of soil and water *	*0*	*0*	*0*	*0*
Conservation of biodiversity	69,980	72,878	74,075	75,277
Social services **	*0*	*0*	*0*	*0*
Multiple use	149,723	144,796	141,770	138,738
Other (please specify in comments below the table)	0	0	0	0
No / unknown	0	0	0	0
TOTAL	**296,335**	**300,195**	**302,108**	**304,022**

** All forest is presumed to protect soil and water as a primary function and it is difficult assign this a single primary function. The National Forests were originally designated to protect water as a major function and several programs such as the Shelterbelt Program of the 1930s and Soil Bank of the 1950s were specifically for soil protection but they are not spatially delineated in data bases.*

*** Most public forest is available for social services and a large portion of private forest is as well. Most of this area is more often delineated as 'multiple use' and not specifically 'social services'.*

Table 3b – Special designation and management categories

FRA 2010 Categories	Forest area (1000 hectares)			
	1990	2000	2005	2010
Area of permanent forest estate	121,457	127,652	130,333	133,014
Forest area within protected areas	17,950	20,819	25,522	30,225
Forest area under sustainable forest management	121,457	135,086	149,033	155,545
Forest area with management plan	184,679	195,731	200,907	206,084

3.5 Comments to Table T3

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Production forest	Includes All planted forest, public and private, approximately 70% of corporate natural forest (much of this was previously forest industry lands that have been divested since 2000 to TIMOs and REITs but many areas have timber agreements as condition of sale.), approximately 22% of forested lands (excluding planted areas) in National forest ownership are deemed suitable for timber management as a primary emphasis, approximately 20% of private noncorporate natural forest lands have timber as a primary goal based on a recent study of owners of these forests. Excludes area of non-federal public land managed primarily for timber due to lack of data.	Production forest trends are revised from those reported in 2005 due improved review of management practices and new information from forest ownership studies.
Protection of soil and water	See Comments in section 3.5 (other comments) for this table.	Protection of soil and water
Conservation of biodiversity	Includes area classified as "reserved" in US forest inventories which coincide with the IUCN classes 1 through 5, roadless areas in the National Forest System (areas without any improved roads maintained for travel by standard passenger type vehicles - FSH 1909.12, Section 7.11) which are IUCN class 6, approximately 80% of unreserved forest in Alaska based on poor access and private conservation areas in lower 48 States reported in the National Land Trust Census Report and assumed to be predominantly forest for estimate but may or may not be all forest land.	It might be suggested that areas of National and State Parks that are not in Protected Areas be designated as primarily for "Social Services". However, since they also play a major role in conservation of biodiversity in the U.S., we have placed them here.
Social services	Although studies show that 85% of the nation's forest is available for outdoor recreation to the entire public or persons selected by private owners, no data exists to identify specific areas for social service as a primary use. And, free public access to private lands has been declining in recent years.	Social services
Multiple purpose	All forest not otherwise classified as to primary function.	Multiple purpose
Other		

No / unknown designation		
Area of permanent forest estate	All public forest land falls into this category. Conservation NGO lands may go in this category but data is not currently available.	
Forest area within protected areas	This estimate comes from national inventory data and coincides with IUCN class 1 through 5. We did not include lands within private conservation trusts.	
Forest area under sustainable forest management	In the U.S. we include all public forest which is covered by the National Environmental Policy Act (NEPA) and the area of private forest with SFI certification.	
Forest area with management plan	All public forest land, all corporate forest lands and private noncorporate forest lands with a management plan as determined by a national private forest owners study are included.	

Other general comments to the table

Due to major changes in the national inventory design between 1997 and 2001 from a State by State periodic survey to an annualized survey operating in every State each year, data for 2005 in this report have been interpolated between 1997 and current survey data to better reflect actual trends. This applies to all data in tables 1-8 for this report.

Information on the "area where forests and other wooded land are managed primarily for soil protection" is not available for the United States. In fact, this type of information lacks relevance in the context of forest management in the United States because soil and water protection are over-riding considerations in the development of forest policy and in forest management practices. Soil and water protection are two of many elements that are considered in developing management regimes that maintain ecosystem function. There is a broad range of other elements that are simultaneously considered, including (but not limited to) site regeneration, water quality, habitat, aesthetic impacts, landscape diversity, endangered species, cultural/spiritual impacts, and others. Therefore, it is difficult to isolate areas in terms of being managed primarily for soil protection.

Measures to protect water and soil values have been in place for a time; however, these measures are constantly being reviewed, updated, revised, and improved (e.g., federal Clean Water Act, Best Management Practices legislation in the various States, etc.).

Management factors that can affect water and soil quality include harvesting close to streams and rivers, road construction techniques, harvesting on steep slopes, skidding methods, mechanized harvesting on soils sensitive to soil compaction, winter harvesting vs. summer harvesting operations, and post harvest site treatments (such as scarification, treatment of debris, etc.). Potential soil disturbance (or degradation) factors include compaction, erosion, loss of organic matter, and loss of productivity. Some areas are more susceptible to damage from these factors than others. For example, sensitive sites include riparian zones, steep slopes, wet and poor soils, shallow soils over bedrock, and soils susceptible to compaction.

In general, the creation of riparian buffer zones is now standard practice throughout most of the country. These zones range from 30 - 50 meters on either side of streams. Most States also have guidelines for road construction to minimize reductions in soil and water quality and aquatic habitats. Mechanized harvesting has accounted for an increasing proportion of the total harvest in recent years. The use of heavy equipment in the forest environment has the potential to cause problems relative to soil compaction. However, two factors mitigate or reduce potential problems related to reductions in soil quality. First, timing harvest activities to minimize site degradation such as winter harvesting in areas where it is feasible or avoiding harvest during seasonal wet periods. Second, through various new decision support tools such as forest ecosystem classification frameworks, management agencies are improving their understanding of a) which types of sites

are sensitive to soil disturbance, b) where these sites are situated, and c) the kinds of modifications in management practices and equipment required to minimize the impacts of harvest operations.

Specifically, the Conservation Reserve Program in the 1980s and 1990s planted over one million hectares of nonforest land to forest for the purpose of soil protection. The Great Shelterbelt Program of the 1930s was also designed to protect soil and planted upwards of 4 million hectares in the central prairie region of the U.S. And the Soil Bank Program of the mid-1950s planted an additional 4 to 6 million hectares.

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
FIADB national database http://fia.fs.fed.us Forest Resources of the United States, 2007. See reference in Table 1.	H	Forest area	2007	Forest data compiled from most recent inventory data to be used as basis for 2007 U.S. national assessment. Represents FRA data for 2010.
Interpolated data	H	Forest area	2002	Data for FRA 2005 are based on interpolation between 1997 and 2007 data sources.
Forest Resources of the United States, 1997. See reference in Table 1.	H	Forest area	1997	Forest data from the referenced U.S. report represents FRA data for 2000. Reported data are adjusted for removal of chaparral as a forest cover.

Forest Statistics of the United States, 1987. See reference in Table 1.	H	Forest area	1987	Forest data from the referenced U.S. report represents FRA data for 1990. Reported data are adjusted for removal of chaparral as a forest cover and for a reporting error in data for National Forests in OR and WA, and forest in west TX which increased the total forest area above the 1987 reported value.
Conservation Biology Institute, Protected Areas Database PAD4 http://www.consbio.org	H	Protected areas	2005	This polygon data set was overlaid on the U.S. forest inventory plot grid to classify plot and area data for IUCN categories 1-5 to verify national inventory data.
National Forest Systems Roadless Area Database	H	NFS Roadless areas	2002	This polygon data set was overlaid on the U.S. forest inventory plot grid to classify plot and area data for National Forest Systems roadless areas. Considered IUCN class 6.

4.2.2 Classification and definitions

National class	Definition
Planted forest	Planted forests are areas deemed to be forest comprised of at least 40 percent of its composition in planted trees of either native or introduced species. Planted forests may be divided into two groups: *Plantations*- Forest stands consisting almost exclusively of planted trees, of native or introduced species, and managed to generally maintain this composition at maturity. Management practices may include extensive site preparation prior to planting and suppression of competing vegetation. *Augmented forest*- Forest stands consisting of at least 40 percent planted trees, of native or introduced species, but not intensively managed to assure dominance of these trees in the stand at maturity. Management practices, however, may include suppression of competing vegetation at the time of planting. Frequently found in the western U.S. where trees are planted to insure regeneration stocking levels are adequate to fully occupy the stand in the future.

4.2.3 Original data

Forest area of the United States by characteristic, 1987, 1997, 2002, 2007								
US data assigned to forest characteristic	Original data							
	1987	1997	2002*	2007	1987	1997	2002*	2007
		000 acres				*000 hectares*		
Primary forest	**172,917**	**180,080**	**183,037**	**186,006**	**69,980**	**72,878**	**74,075**	**75,277**
Reserved forest, IUCN 1-5	*44,354*	*51,442*	*63,064*	*74,685*	*17,950*	*20,819*	*25,522*	*30,225*
Roadless forest, IUCN 6	*30,680*	*30,680*	*30,680*	*30,680*	*12,416*	*12,416*	*12,416*	*12,416*
Alaska unreserved natural (80%)	*96,803*	*95,535*	*84,538*	*75,041*	*39,176*	*38,663*	*34,212*	*30,369*
National Land Trust (see note)	*1,080*	*2,422*	*4,756*	*5,600*	*437*	*980*	*1,925*	*2,266*
Other naturally regenerated forest	**514,993**	**505,946**	**503,108**	**502,054**	**208,418**	**204,756**	**203,608**	**203,181**
...of which have introduced species	*1,464*	*1,484*	*1,493*	*1,502*	593	600	604	608
Planted forest	**44,324**	**55,745**	**60,354**	**63,167**	**17,938**	**22,560**	**24,425**	**25,363**
...of which of introduced species	762	959	1,038	1,086	309	388	420	435
TOTAL	**732,235**	**741,771**	**746,499**	**751,227**	**296,335**	**300,195**	**302,108**	**304,022**
	** Data interpolated.*			*Conversion factor for hectares is acres x 0.4047*				
NOTES								
Primary forest	Includes all roadless and reserved forest, 80% Alaska unreserved natural and all National Land Trust forest (see Conservation of Biodiversity, Table 3).							
Other naturally regenerated forest	Includes all private natural forest. Difficult to attach area to introduced species.							
Introduced species in natrual forest	The U.S. lists 39 major non-native tree species in forests within the continental 48 States. It is difficult to estimate the influence of these species on an area basis as most non-native trees are escaped or naturalizing individuals and relative to the total population of trees in the US are a very small number. According to data, major non-native, non-planted species constitute 0.2% of the total forest trees. The area reported reflects the proportion of the non-native trees relative to the total number of trees on an area basis of 0.2%.							
Planted forest	Includes all planted forest, approximately 1.72% of which are non-native species							

Status of non-native planted forest in U.S. national inventory of forest land

Common Name	Genus	Species	Acres	Hectares	Percent of all planted forest	Percent of all forest
Norway spruce	*Picea*	*abies*	501,453	202,938	0.80%	0.07%
Scotch pine	*Pinus*	*sylvestris*	472,796	191,340	0.75%	0.06%
eucalyptus spp.	*Eucalyptus*	*spp.*	22,766	9,213	0.04%	0.00%
blue spruce	*Picea*	*pungens*	19,187	7,765	0.03%	0.00%
Austrian pine	*Pinus*	*nigra*	18,721	7,576	0.03%	0.00%
European Alder	*Alnus*	*glutinosa*	17,833	7,217	0.03%	0.00%
Siberian elm	*Ulmus*	*pumila*	14,073	5,695	0.02%	0.00%
paulownia, empress-tree	*Paulownia*	*tomentosa*	4,871	1,971	0.01%	0.00%
Chinese tallowtree	*Triadica*	*sebifera*	3,891	1,575	0.01%	0.00%
		TOTAL	**1,075,591**	**435,292**	1.72%	0.14%

Source: Forest Inventory and Analysis, FIADB 2007.

Status of non-native tree species in U.S. national inventory of forest land

Common Name	Genus	Species	Live trees > 2.5cm dbh	Percent of all trees
			million	*percent*
ailanthus	*Ailanthus*	*altissima*	290.0	0.083%
Scotch pine	*Pinus*	*sylvestris*	136.6	0.039%
melaleuca	*Melaleuca*	*quinquenervia*	131.2	0.037%
Norway spruce	*Picea*	*abies*	105.3	0.030%
chinaberry	*Melia*	*azedarach*	85.3	0.024%
white mulberry	*Morus*	*alba*	46.3	0.013%
mimosa, silktree	*Albizia*	*julibrissin*	44.8	0.013%
Siberian elm	*Ulmus*	*pumila*	42.7	0.012%
Bebb willow	*Salix*	*bebbiana*	27.5	0.008%
paulownia, empress-tree	*Paulownia*	*tomentosa*	22.1	0.006%
Russian-olive	*Elaeagnus*	*angustifolia*	21.1	0.006%
Norway maple	*Acer*	*platanoides*	11.8	0.003%
eucalyptus spp.	*Eucalyptus*	*spp.*	6.0	0.002%
camphortree	*Cinnamomum*	*camphora*	5.9	0.002%
grand eucalyptus	*Eucalyptus*	*grandis*	5.9	0.002%
eucalyptus spp.	*Eucalyptus*	*spp.*	5.3	0.002%
Austrian pine	*Pinus*	*nigra*	4.9	0.001%
sweet cherry	*Prunus*	*avium*	4.3	0.001%
citrus spp.	*Citrus*	*spp.*	3.6	0.001%
ginkgo, maidenhair tree	*Ginkgo*	*biloba*	2.3	0.001%
European mountain-ash	*Sorbus*	*aucuparia*	2.0	0.001%
Lombardy poplar	*Populus*	*nigra*	1.5	0.000%
white willow	*Salix*	*alba*	1.4	0.000%
European Alder	*Alnus*	*glutinosa*	1.3	0.000%
silver poplar	*Populus*	*alba*	0.9	0.000%
Tasmanian bluegum	*Eucalyptus*	*globulus*	0.8	0.000%
peach	*Prunus*	*persica*	0.1	0.000%
Chinese chestnut	*Castanea*	*mollissima*	0.2	
oneseed hawthorn	*Crataegus*	*monogyna*	*no data*	
swamp mahogany	*Eucalyptus*	*robusta*	*no data*	
black mulberry	*Morus*	*nigra*	*no data*	
sour cherry	*Prunus*	*cerasus*	*no data*	
European plum	*Prunus*	*domestica*	*no data*	
Mahaleb plum	*Prunus*	*mahaleb*	*no data*	
geiger tree	*Cordia*	*sebestena*	*no data*	
mango	*Mangifera*	*indica*	*no data*	
tamarind	*Tamarindus*	*indica*	*no data*	
coconut palm	*Cocos*	*nucifera*	*no data*	
		Total non-native	**1,011**	**0.288%**
Total non-native other than major planted species			**747**	**0.213%**

4.3 Analysis and processing of national data

4.3.1 Calibration

The U.S. national inventory lists 39 major non-native tree species in forests within the continental 48 States. It is difficult to estimate the influence of these species on an area basis as most non-native trees are escaped or naturalizing individuals and relative to the total population of trees in the US are a very small number. According to data, major non-native, non-planted species constitute 0.2% of the total forest trees. The area reported reflects the proportion of the non-native trees relative to the total number of trees on an area basis of 0.2%.

4.3.2 Estimation and forecasting

No forecasting done for this table.

4.4 Data for Table T4

Table 4a

FRA 2010 Categories	Forest area (1000 hectares)			
	1990	2000	2005	2010
Primary forest	69,980	72,878	74,075	75,277
Other naturally regenerated forest	208,418	204,756	203,608	203,382
...of which of introduced species	593	600	604	608
Planted forest	17,938	22,560	24,425	25,363
...of which of introduced species	309	388	420	435
TOTAL	**296,335**	**300,195**	**302,108**	**304,022**

Note: See "original data" for information of introduced species area in natural forest.

Table 4b

FRA 2010 Categories	Area (1000 hectares)			
	1990	2000	2005	2010
Rubber plantations (Forest)	0	0	0	0
Mangroves (Forest and OWL)	240	198	195	190
Bamboo (Forest and OWL)	0	0	0	0

n/a = not applicable

NOTE: Mangroves predominantly in southern Florida, data from FAO Forestry Paper 153, The world's mangroves 1980–2005 (http://www.fao.org/forestry/49663/en/). Some mangroves also occur in Mississippi, Louisiana and Texas.

4.5 Comments to Table T4

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Primary forest	Includes all Conservation of Biological diversity forest from Table 3.	Increase due to increase in IUCN designated forest.
Other naturally regenerating forest	Balance of forest not in primary or planted categories. The U.S. has about 39 common introduced and domesticated tree species in forests within the continental 48 States. It would be difficult to estimate this variable on an area basis as trees are escaped or naturalizing individuals. Relative to the total population of trees in the US, these species are a very small percentage.	According to data, major non-native, non-planted species constitute 0.2% of the total forest trees. The area reported reflects the proportion of the non-native trees relative to the total number of trees on an area basis of 0.2% of total forest area.
Planted forest	Based on national inventory plot data. Data for 1987 estimated based on trends. Estimate of introduced species based on data from national inventories.	
Rubber plantations	Not applicable to U.S. main report.	.
Mangroves	Mangroves predominantly in southern Florida, data from FAO Forestry Paper 153, The world's mangroves 1980–2005 (http://www.fao.org/forestry/49663/en/)	
Bamboo	Not applicable to U.S. main report.	

Other general comments to the table
Due to major changes in the national inventory design between 1997 and 2001 from a State by State periodic survey to an annualized survey operating in every State each year, data for 2005 in this report have been interpolated between 1997 and current survey data to better reflect actual trends. This applies to all data in tables 1-8 for this report.

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
Tree Planters Notes	H	Annual tree planting	1990-2006	http://www.rngr.net/Publications/tpn/
FIADB national database http://fia.fs.fed.us Forest Resources of the United States, 2007. See full reference in Table 1.	H	Planted forest	1987-2006	

5.2.2 Classification and definitions

National class	Definition
New planting	Estimated area of tree planting on previously nonforest land
Replanting	Estimated area of tree planting on previously planted land after harvest
Conversion	Estimated area of tree planting on previously natural forest land
Natural extension of forest	Estimated area of natural regeneration of trees on previously nonforest land

5.2.3 Original data

Category	000 acres			000 hectares		
	1990	2000	2005	1990	2000	2005
Afforestation	628	475	300	254	192	122
Reforestation	2,201	1,987	1,498	891	804	606
of which replant	1,542	1,541	1,227	624	624	497
Natural extend	326	470	700	132	190	283

NOTES

Afforestation	Estimated planting of nonforest acres
Reforestation	Estimated conversion to planted and replanting of previously planted areas minus lost planted forest
of which replant	Estimated replanting of previously planted areas only
Natural extend	Estimated net change in forest area not the result of new planting of nonforest

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

5.3 Analysis and processing of national data

Data were generated on a "must have been" basis incorporating reported annual total area planted, estimated rate of conversion, estimated rate of replanting, estimated rate of new planting and estimated rate of lost planting to arrive at category estimates. Natural extension based on average total forest area change net of new planting and lost planting.

5.3.1 Calibration

Not needed.

5.3.2 Estimation and forecasting

Not needed.

5.3.3 Reclassification into FRA 2010 categories

See "original data".

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	254,185	192,353	121,532	4,000	2,000	2,000
Reforestation	890,556	804,226	606,215	*ID*	*ID*	*ID*
...of which on areas previously planted	624,064	623,533	496,693	*ID*	*ID*	*ID*
Natural expansion of forest	131,752	190,333	283,324	*ID*	*ID*	*ID*

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	Based total planted area data from annual Tree Planters Notes adjusted for estimated rates of new planting.	Planting of non-native species assumed to be predominantly afforestation. Major species are Norway spruce (*Picea abies*) and Scotch pine (*Pinus sylvestris*).
Reforestation	While nearly three-fourths of all reforestations in the U.S. is by natural means, this data includes only planting of previously planted or converted natural forest areas net of lost planted areas.	As designed, this table ignores the dominant form of regeneration in the U.S. which is natural (about 2/3 of all forest regeneration).
Natural expansion of forest	This is net natural extension forest [may include deforestation offset by expansion] This is particularly prominent in the interior regions of the U.S. where lower productivity forests are expanding mainly due to decades of fire suppression.	

Other general comments to the table
Due to major changes in the national inventory design between 1997 and 2001 from a State by State periodic survey to an annualized survey operating in every State each year, data for 2005 in this report have been interpolated between 1997 and current survey data to better reflect actual trends. This applies to all data in tables 1-8 for this report. It should be noted that this table reflects only regeneration by planting and natural extension of forest on previously nonforest land. Of the annual 4.5 million hectares of forest that have some form of harvesting in the U.S., nearly two-thirds naturally regenerate with native species.

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	Additional comments
FIADB national database http://fia.fs.fed.us Forest Resources of the United States, 2007. See reference in Table 1.	H	All live and growing stock volume	2007	Forest data compiled from most recent inventory data to be used as basis for 2007 U.S. national assessment. Represents FRA data for 2010.
Interpolated data	H	All live and growing stock volume	2002	Data for FRA 2005 are based on interpolation between 1997 and 2007 data sources.
Forest Resources of the United States, 1997. See reference in Table 1.	H	All live and growing stock volume	1997	Forest data from the referenced U.S. report represents FRA data for 2000. Reported data are adjusted for addition of estimated volume on forest lands not field inventoried (reserved and unproductive forest).
Forest Statistics of the United States, 1987. See reference in Table 1.	H	All live and growing stock volume	1987	Forest data from the referenced U.S. report represents FRA data for 1990. Reported data are adjusted for a reporting error in data for National Forests in OR and WA, and forest in west TX which increased the total forest area above the 1987 reported value and for addition of estimated volume on forest lands not field inventoried (reserved and unproductive forest).
Little, Elbert L., Jr. 1979. Checklist of United States trees (native and naturalized). Agric. Handb. 541. Washington, DC. U.S.D.A., Forest Service, 375 p.	H	Tree species and status	1979	Updated using PLANTS database information to compile current list of tree species in U.S. See next entry.
PLANTS database http://plants.usda.gov/	H	Plant species	2000	Used to update data from Little, 1979.
FIA Database Http://fia.fs.fed.us	H	Tree species, volume	2007	

6.2.2 Classification and definitions

National class	Definition
Growing-stock volume (US definition)	A classification of net volume under bark that includes live trees of commercial species meeting specified standards of quality or vigor on productive forest land. When associated with volume, includes only trees 12.7 cm d.b.h. and larger from stump height of 0.3 m to a top diameter of 10.0 cm. This will be used as the US estimate of volume (after adding 14% for bark) of commercial species for FRA 2010.
All live volume (FRA growing stock)	Volume under bark of all living trees more than 12.7 cm in diameter at breast height on all forest land. Includes the stem from stump height of 0.3m to a top diameter of 10.0 cm. Sound cull trees, trees on unproductive forest and protected forest are included. This will be used as the basis for the US estimate of growing stock volume (after adding 14% for bark) for FRA 2010.

6.2.3 Original data

FRA category	Forest volume (million cuft overbark)				Forest volume (million m3 overbark)			
	1990	2000	2005	2010	1990	2000	2005	2010
Total growing stock	1,098,946	1,160,090	1,246,335	1,332,580	38,832	40,993	44,040	47,088
... of which coniferous	799,692	765,514	841,143	970,192	28,258	27,050	29,722	34,282
... of which broadleaved	299,254	394,576	405,192	362,388	10,574	13,943	14,318	12,805
Growing stock of commercial specie	987,248	1,062,540	1,141,027	1,219,515	34,885	37,546	40,319	43,092

Note: National data is reported underbark. Data were adjusted upward by an average of 14% to account for bark.

6.3 Analysis and processing of national data

See Classification and definitions for application of national data for FRA use.

6.3.1 Calibration

Historic growing stock volume was estimated for 1990 and 2000 (1987 and 1997 national inventories) for previously uninventoried lands (reserved and unproductive forest areas). Data for 2005 (2002 national inventory) were interpolated. Data presented now represent all forest land for current and historic.

6.3.2 Estimation and forecasting

No forecasting is used in this report for forest volume. However, data gaps for volume on reserved and unproductive forest for years prior to 1997 and earlier were estimated. Estimates for top 10 species were adjusted to represent volume on all forest land.

6.3.3 Reclassification into FRA 2010 categories

Growing stock volume for FRA definition is approximately all live volume by U.S. definition. Commercial volume by FRA definition is approximately growing stock volume by U.S. definition.

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	38,832	40,993	44,040	47,088	ID	ID	ID	ID
... of which coniferous	28,258	27,050	29,722	34,282	ID	ID	ID	ID
... of which broadleaved	10,574	13,943	14,318	12,805	ID	ID	ID	ID
Growing stock of commercial species	34,885	37,546	40,319	43,092	ID	ID	ID	ID

ID = insufficient data

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	*Pseudotsuga menziesii*	Douglas-fir	4,523	4,775	5,296
2nd	*Pinus taeda*	Loblolly pine	2,875	2,869	2,817
3rd	*Pinus ponderosa*	Ponderosa pine	1,865	1,969	1,899
4th	*Tsuga heterophylla*	Western hemlock	1,540	1,626	1,564
5th	*Pinus contorta*	Lodgepole pine	1,327	1,400	1,433
6th	*Acer rubrum*	Red maple	1,127	1,312	1,614
7th	*Quercus alba*	White oak	1,059	1,118	1,234
8th	*Liriodendron tulipifera,*	Yellow-poplar	851	898	1,043
9th	*Quercus rubra*	Northern Red oak	848	895	884
10th	*Acer saccharum*	Sugar maple	769	812	1,147
Remaining			22,048	23,317	25,109
TOTAL			38,832	40,993	44,040

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)	12.7	For FRA, volume of all live trees from U.S. inventories is used for growing stock.
Minimum diameter (cm) at the top end of stem for calculation of growing stock (Y)	10.0	
Minimum diameter (cm) of branches included in growing stock (W)	n/a	Not included.
Volume refers to "above ground" (AG) or "above stump" (AS)	AS	

[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	The U.S. reports the volume of all live trees on all forest land as growing stock for this report. Prior reports did not include growing stock on unproductive and reserved forest.	Data for previously unreported forest areas (unproductive and reserved forest in 1990, 2000, and 2005) have been estimated based on current volume relationships for these lands. All data are adjusted for overbark values.
Growing stock of broadleaved / coniferous	The U.S. reports all angiosperm species as broadleaf and all gymnosperm species as coniferous. Volume is for all years are for all forest land.	See above
Growing stock of commercial species	This variable reports all live volume of commercial species on all forest land	See above.
Growing stock composition	Full species level data are now presented for all forest land in all reporting years. This includes both commercial and non-commercial species.	See above

Other general comments to the table
Due to major changes in the national inventory design between 1997 and 2001 from a State by State periodic survey to an annualized survey operating in every State each year, data for 2005 in this report have been interpolated between 1997 and current survey data to better reflect actual trends. This applies to all data in tables 1-8 for this report. Readers are advised that the numbers presented here for volume on "forest" more accurately reflect data presented for the United States. Previous FAO reports did not include volume data for some forest categories such as protected areas. Thus historic total volume of "growing stock" presented here will be higher than previous FAO reports. See comments for Table T1.

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
US Environmental Protection Agency. 2008. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2006. EPA 430-R-08-005. United States Environmental Protection Agency, Office of Atmospheric Programs, Washington, D.C. Available at http://epa.gov/climatechange/emissions/usinventoryreport.html (15 August 2008).	H	Data and methods	All	The Land-Use Change and Forestry chapter and Annex 3.12 provide details of the data and methods.
USDA Forest Service. 2008. Forest Inventory and Analysis National Program: Data and Tools. Washington, DC: U.S. Department of Agriculture, Forest Service. [A website: http://fia.fs.fed.us/tools-data/default.asp] (15 August 2008).	H	Forest inventory data	All	This is the principal source of US Forest Service's Forest Inventory and Analysis data and documentation.
Smith, James E.; Heath, Linda S.; Nichols, Michael C. 2007. U.S. forest carbon calculation tool: forest-land carbon stocks and net annual stock change. Gen. Tech. Rep. NRS-13. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 28 p	H	Use of inventory data	All	This publication provides the basic methods applied to forest inventory data.
Jenkins, J.C., D.C. Chojnacky, L.S. Heath, R.A. Birdsey (2003) National-scale biomass estimators for United States tree species. Forest Science, 49:12-35.	H	Live tree	All	The allometric equations applied to tree data. See US EPA (2008) for the application of these equations to older, plot-level, inventories.
Birdsey, R.A. 1996. Carbon storage for major forest types and regions in the conterminous United States. Pages 1-26 and 261-379 *in* R. N. Sampson and D. Hair, editors. Forest and Global Change Volume 2: Forest	H	Live understory	All	See US EPA (2008) for factors.

Management Opportunities for Mitigating Carbon Emissions. American Forests, Washington D. C.				
See Annex 3.12 of US EPA (2008)	H	Dead wood	All	
Penman, J., M. Gytarsky, T. Hiraishi, [et al.], eds. (2003) Good practice guidance for land use, land use change, and forestry. Hayama, Kanagawa, Japan: Institute for Global Environmental Strategies for the Intergovernmental Panel on Climate Change. 502 p.	H	Reporting guidelines	All	

7.2.2 Classification and definitions

National class	Definition
Above-ground biomass	All living biomass above the soil including stem, stump, branches, bark, seeds, and foliage – includes trees and understory vegetation.
Below-ground biomass	All living biomass of coarse living roots greater than 2 mm diameter – includes trees and understory vegetation.
Dead wood biomass	All non-living woody biomass with a diameter greater than or equal to 7.5 cm at transect intersection either standing, lying on the ground, or in the soil.
Litter biomass	The litter itself, fumic, and humic layers, and all non-living biomass with a diameter less than 7.5 cm at transect intersection, lying on the ground.
Soil biomass	All organic material in soil to a depth of 1 meter but excluding the coarse roots of the above pools.

7.2.3 Original data

Estimates of biomass stocks are based on published conversion factors and methods (Smith et al. 2007) applied to publicly available forest inventory data (USDA Forest Service 2008). Values presented for the conterminous United States are based on 1) summaries prepared by the US Forest Service for the US Environmental Protection Agency and published as part of the inventory of US greenhouse gas emissions and sinks (US EPA 2008), and 2) the assumption that the mass of live and dead wood is 50 percent carbon (that is, biomass is 2x carbon).

7.3 Analysis and processing of national data

The methodology is consistent with recommendations of the Intergovernmental Panel on Climate Change (IPCC) Good Practice Guidance for Land Use, Land-Use Change, and Forestry (Penman et al. 2003).

Forest inventory data was downloaded from the Internet and processed according to methods provided with the data (USDA Forest Service 2008). Subsequent conversion and annualization of stocks was according to Smith et al. (2007). Biomass stocks do not include the litter and soil organic carbon pools, which are included with carbon stock. Additional details, appropriate citations, and any changes since publication of cited methods are available in US EPA (2008).

Thresholds used by the United States are the following:

Specification of country threshold values	Unit	Value	Complementary information
1. Minimum diameter at breast height of trees included in Above-ground Biomass stock	cm	2.54	
2. Minimum diameter of branches included in Above-ground Biomass stock	cm	0	
3. Minimum diameter of roots included in below-ground Biomass stock	cm	2	
4. Minimum diameter of dead wood included in biomass stock	cm	7.5	
5. Foliage included in biomass stock	Yes/No	Yes	
6. Have any of the above thresholds (points 1 to 4) changed since 1990	Yes/No	No	Change in forest area base since 1990 will affect comparisons using older reports.
7. If yes, then attach a separate note giving details of the change	Attachment	No	

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	28,280	30,033	31,089	32,217	ID	ID	ID	ID
Below-ground biomass	5,621	5,963	6,174	6,399	ID	ID	ID	ID
Dead wood	4,707	4,985	5,127	5,282	ID	ID	ID	ID
TOTAL	**38,608**	**40,981**	**42,390**	**43,898**	ID	ID	ID	ID

ID = insufficient data

7.5 Comments to Table T7

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Above-ground biomass		
Below-ground biomass		
Dead wood		

Other general comments to the table
Due to major changes in the national inventory design between 1997 and 2001 from a State by State periodic survey to an annualized survey operating in every State each year, data for 2005 in this report have been interpolated between 1997 and current survey data to better reflect actual trends. This applies to all data in tables 1-8 for this report.

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)	Years	Additional comments
US Environmental Protection Agency. 2008. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2006. EPA 430-R-08-005. United States Environmental Protection Agency, Office of Atmospheric Programs, Washington, D.C. Available at http://epa.gov/climatechange/emissions/usinventoryreport.html (15 August 2008).	H	Data and methods	All	The Land-Use Change and Forestry chapter and Annex 3.12 provide details of the data and carbon conversion methods.
USDA Forest Service. 2008. Forest Inventory and Analysis National Program: Data and Tools. Washington, DC: U.S. Department of Agriculture, Forest Service. [A website: http://fia.fs.fed.us/tools-data/default.asp] (15 August 2008).	H	Forest inventory data	All	This is the principal source of US Forest Service's Forest Inventory and Analysis data and documentation.
Smith, James E.; Heath, Linda S.; Nichols, Michael C. 2007. U.S. forest carbon calculation tool: forest-land carbon stocks and net annual stock change. Gen. Tech. Rep. NRS-13. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 28 p	H	Inventory-to-carbon conversion methods	All	This publication provides the basic methods applied to forest inventory data.
Jenkins, J.C., D.C. Chojnacky, L.S. Heath, R.A. Birdsey (2003) National-scale biomass estimators for United States tree species. Forest Science, 49:12-35.	H	Live tree carbon	All	The allometric equations applied to tree data. See US EPA (2008) for the application of these equations to older, plot-level, inventories.

Birdsey, R.A. 1996. Carbon storage for major forest types and regions in the conterminous United States. Pages 1-26 and 261-379 *in* R. N. Sampson and D. Hair, editors. Forest and Global Change Volume 2: Forest Management Opportunities for Mitigating Carbon Emissions. American Forests, Washington D. C.	H	Live understory carbon	All	See US EPA (2008) for carbon conversion factors.
See Annex 3.12 of US EPA (2008)	H	Dead wood carbon	All	
Smith, J.E., and L.S. Heath. 2002. A model of forest floor carbon mass for United States forest types. Northeastern Research Station Research Paper NE-722, U.S. Department of Agriculture, Forest Service, Newtown Square, PA, 37 p.	H	Litter carbon	All	
Amichev, B. Y. and J. M. Galbraith. 2004. A Revised Methodology for Estimation of Forest Soil Carbon from Spatial Soils and Forest Inventory Data Sets. Environmental Management 33, Supplement 1: S74-S86.	H	Soil organic carbon	All	See US EPA (2008) for carbon conversion factors.
Penman, J., M. Gytarsky, T. Hiraishi, [et al.], eds. (2003) Good practice guidance for land use, land use change, and forestry. Hayama, Kanagawa, Japan: Institute for Global Environmental Strategies for the Intergovernmental Panel on Climate Change. 502 p.	H	Reporting guidelines	All	

8.2.2 Classification and definitions

National class	Definition
Above-ground carbon	Carbon in all living biomass above the soil including stem, stump, branches, bark, seeds, and foliage – includes trees and understory vegetation.
Below-ground carbon	Carbon in all living biomass of coarse living roots greater than 2 mm diameter – includes trees and understory vegetation.
Dead wood carbon	Carbon in all non-living woody biomass either standing, lying on the ground (but not including litter), or in the soil.
Litter carbon	Carbon in the litter itself, fumic and humic layers, and all non-living biomass, such as small woody debris, with a diameter less than 7.5 cm at transect intersection, lying on the ground.
Soil carbon	Carbon in all organic material in soil to a depth of 1 meter but excluding the coarse roots of the above pools.

8.2.3 Original data

Estimates of carbon stocks are based on published carbon conversion factors and methods (Smith et al. 2007) applied to publicly available forest inventory data (USDA Forest Service 2008). Values presented for the conterminous United States are based on summaries prepared by the US Forest Service for the US Environmental Protection Agency and published as part of the inventory of US greenhouse gas emissions and sinks (US EPA 2008).

8.3 Analysis and processing of national data

The methodology is consistent with recommendations of the Intergovernmental Panel on Climate Change (IPCC) Good Practice Guidance for Land Use, Land-Use Change, and Forestry (Penman et al. 2003).

Forest inventory data was downloaded from the Internet and processed according to methods provided with the data (USDA Forest Service 2008). Subsequent carbon conversion and annualization of carbon stocks was according to Smith et al. (2007). Additional details, appropriate citations, and any changes since publication of cited methods are available in US EPA (2008).

8.3.1 Estimation and forecasting

Forecasting is not used and carbon stocks are calculated to be consistent with volume estimates provided in this report using a biomass expansion factor (BEF) approach. Data for 2000 is form the 1997 national inventory estimate, 2010 is from the 2007 national inventory estimate and 2000 is interpolated between these values.

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	14,140	15,016	15,544	16,109	ID	ID	ID	ID
Carbon in below-ground biomass	2,811	2,982	3,087	3,199	ID	ID	ID	ID
Sub-total: Living biomass	**16,950**	**17,998**	**18,632**	**19,308**	ID	ID	ID	ID
Carbon in dead wood	2,354	2,492	2,564	2,641	ID	ID	ID	ID
Carbon in litter	4,398	4,520	4,578	4,654	ID	ID	ID	ID
Sub-total: Dead wood and litter	**6,752**	**7,013**	**7,142**	**7,295**	ID	ID	ID	ID
Soil carbon	15,300	15,455	15,482	15,534	ID	ID	ID	ID
TOTAL	**39,002**	**40,465**	**41,255**	**42,138**	ID	ID	ID	ID

ID = insufficient data

Soil depth (cm) used for soil carbon estimates	100cm

8.5 Comments to Table T8

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Carbon in above-ground biomass	As noted in Section 8.2.2	
Carbon in below-ground biomass	As noted in Section 8.2.2	
Carbon in dead wood	As noted in Section 8.2.2	
Carbon in litter	As noted in Section 8.2.2	
Soil carbon	Estimates are based on regional averages according to forest type and do not reflect effects of past land use change.	

Other general comments to the table
Due to major changes in the national inventory design between 1997 and 2001 from a State by State periodic survey to an annualized survey operating in every State each year, data for 2005 in this report have been interpolated between 1997 and current survey data to better reflect actual trends. This applies to all data in tables 1-8 for this report.

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
National Interagency Fire Center (NIFC): http://www.nifc.gov/	H	Fire affected area, number of fires and percent planned fire		Fire data reflect all area affected by fires. Data specifically for forest area burned is not currently available.

9.2.2 Classification and definitions

National class	Definition
Disturbance by fire	Total area affected by fire. Data are not available by forest/nonforest.

9.2.3 Original data

Fire statistics for the United States, 1988-2006

Year	Area burned	Fires	Prescribed acres	Fires	Average area burned	Number fires	Percent planned fire
	acres	*number*	*acres*	*number*	*000 ha*	*number*	*percent*
2006	9,873,745	96,385	2,720,545	24,429			
2005	8,689,389	66,753	2,310,346	7,756	**3,098**	**73,057**	**34%**
2004	8,097,880	65,461	2,462,286	8,840			
2003	3,960,842	63,629	2,836,013	22,868			
2002	7,184,712	73,457	2,684,806	29,788			
2001	3,570,911	84,079	1,649,249	5,909			
2000	7,393,493	92,250	1,192,220	4,697	**2,113**	**84,663**	**32%**
1999	5,626,093	92,487	1,993,596	5,937			
1998	2,329,704	81,043	878,290	4,277			
1997	2,856,959	66,196	n/a	n/a			
1996	6,065,998	96,363	n/a	n/a			
1995	1,840,546	82,234	n/a	n/a	**1,346**	**76,542**	**n/a**
1994	4,073,579	79,107	n/a	n/a			
1993	1,797,574	58,810	n/a	n/a			
1992	2,069,929	87,394	n/a	n/a			
1991	2,953,578	75,754	n/a	n/a			
1990	5,452,874	122,763	n/a	n/a	**1,711**	**112,440**	**n/a**
1989	3,264,126	121,714	n/a	n/a			
1988	7,398,888	154,573	n/a	n/a			

Source: National Interagency Fire Center, Boise ID. [http://www.nifc.gov/]
Note: Values to the right are 5-year averages.

9.3 Analysis and processing of national data

The values presented in the reporting table below are 5-year averages, where the figures for 1990 are averages for the period 1988-1992, figures for 2000 are averages for 1998-2002 and figures for 2005 are averages for 2003-2006.

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	1,711	112,440	2,113	84,663	3,098	73,057
... of which on forest	1,198	78,708	1,479	59,264	2,169	51,140
... of which on other wooded land	222	14,617	275	11,006	403	9,497
... of which on other land	291	19,115	359	14,393	526	12,420

** Data revised based on new data from National Interagency Fire Center. Forest and other wooded land data prorated based on burn severity/NLCD overlays of major fires for 2004-2007. Ratios for 2005 applied to total fire area for 1990 and 2000. Number of fires prorated according to fire area for each period.*
ID = insufficient data- US does not currently split out these categories in wildland fire statistics.

Table 9b

FRA 2010 category	Proportion of forest area affected by fire (%)		
	1990	2000	2005
Wildfire	ID	68%	66%
Planned fire	ID	32%	34%

Note: The values presented are 5-year averages, where the figures for 1990 are not available, figures for 2000 are averages for 1998-2002 and figures for 2005 are averages for 2003-2006.

9.5 Comments to Table T9

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Area affected by fire	Recent data on burn serverity overlaid on NLCD lifeform data used to distribute burn area.	Data for 1990 and 2000 based on applying 2005 ratios to 1990 and 2000 total fire areas. Number of fires distributed basedon same ratios as area.
Number of fires	As reported.	
Wildfire / planned fire	**Wildfire**- An unplanned, unwanted wildland fire including unauthorized human-caused fires, escaped wildland fire use events, escaped prescribed fire projects, and all other wildland fires where the objective is to put the fire out. **Prescribed Fire**- Any fire ignited by management actions to meet specific objectives. A written, approved prescribed fire plan must exist, and NEPA requirements (where applicable) must be met, prior to ignition.	The US began reporting planned vs. wildfire in 1999. Data for 1990 is unavailable but assumed to be similar to reported years.

Other general comments to the table
Glossary of terms: http://www.nwcg.gov/pms/pubs/glossary/index.htm

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 Insect and Disease Conditions in the United States. Issued annually by United States Department of Agriculture, Forest Service, Forest Health Protection. Washington, DC	M	Insects and disease areas of outbreak are defined areas of host type having one or more multi-tree spots per 394 hectares	1979 to present	Information is collected during aerial surveys of forested areas of the United States. National Standards for Aerial Surveys are available on the internet at: http://www.fs.fed.us/foresthealth/publications/id/id_guidelines.html
FIADB national database http://fia.fs.fed.us Forest Resources of the United States, 2007. See reference in Table 1.	H	Non-native species occurrence	2007	Forest data compiled from most recent inventory data to be used as basis for 2007 U.S. national assessment. Represents FRA data for 2010.

10.2.2 Classification and definitions

National class	Definition
Disturbance by insects	Based on aerial surveys.
Disturbance by diseases	Based on aerial surveys.
Other disturbance	Limited data

10.2.3 Original data

Area affected by major woody forest invasives 1/

Common name	*Scientific name*	Area	Source
Trees		*000 ha*	
Tallowtree, Popcorntree	*Triadica sebifera*	1,545	2/ *National*
Tree-of-Heaven	*Ailanthus altissima*	1,394	3/ *National*
Silktree, Mimosa	*Albizia julibrissin*	456	2/ *National*
Chinaberrytree	*Melia azedarach*	437	3/ *National*
White mulberry	*Morus alba*	370	3/ *National*
Princesstree, Paulownia	*Paulownia tomentosa*	294	3/ *National*
Siberian elm	*Ulmus pumila*	197	3/ *National*
Melaleuca	*Melaleuca quinquenervia*	86	3/ *National*
Bebb willow	*Salix bebbiana*	56	3/ *National*
Russian Olive	*Elaeagnus angustifolia*	41	3/ *National*
Shrubs			
Chinese / European Privet	*Ligustrum sinense*	6,463	2/ *South only*
Non-native roses (Multiflora, Macartney, Cherokee)	*Rosa multiflora, bracteata, laevigata*	2,161	2/ *South only*
Japanese / Glossy Privet	*Ligustrum japonicum*	670	2/ *South only*
Other honeysuckle (Amur, Morrow's, Tatarian, Sweet-breath-of-spring)	*Lonicera amur, morrowii , tatarica, fragrantissima*	551	2/ *South only*
Autumn Olive	*Elaeagnus umbellata*	262	2/ *South only*
Sacred Bamboo, Nandina	*Nandina domestica*	93	2/ *South only*
Winged Burning Bush	*Euonymus alata*	22	2/ *South only*
Silverthorn, Thorny Olive	*Elaeagnus pungens*	24	2/ *South only*
Saltcedar	*Tamarix ramosissima*	14	4/ *National*
Vines			
Japanese Honeysuckle	*Lonicera japonica*	19,004	2/ *South only*
Kudzu	*Pueraria montana*	235	2/ *South only*
Common/Bigleaf periwinkles	*Vinca minor, major*	97	2/ *South only*
Nonnative climbing yams-air yam/chinese yam	*Dioscorea oppositifolia, alata, bulbifera*	102	2/ *South only*
Chinese/Japanese wisteria	*Wisteria sinensis, floribunda*	77	2/ *South only*
Winter Creeper	*Euonymus fortunei*	26	2/ *South only*
Oriental Bittersweet	*Celastrus orbiculatus*	21	2/ *South only*
English Ivy	*Hedera helix*	31	2/ *South only*
	TOTAL	**34,730**	

NOTE: The total forest area affected by woody invasive species is not necessary the sum of the values above, as these may be overlapping. Area reported is area affected by woody invasives, not actual area covered by the invasive species.

1/ http://www.invasive.org/eastern/srs/ http://www.invasive.org/publications/InvasivesOfWesternAndPacificForests.pdf

2/ http://srsfia2.fs.fed.us/nonnative_invasive/southern_nnis.php

3/ FIADB, http://www.fia.fs.fed.us

4/ Robinson, T. W. 1965. Introduction, spread, and aerial extent of saltcedar (Tamarix) in the western states. Professional Paper 491-A. Washington, DC: U.S. Department of the Interior, Geological Survey. 11 p.

Native and exotic forest insects and pathogens with major known or potential impacts

Based on: http://tncweeds.ucdavis.edu/products/gallery/regionlist.html

Region/impact				Common name	Scientific name	Major tree species affected
N	S	RM	PC	**Exotic forest insects and pathogens with major (M), lesser (L) and potential (P) impacts**		
L	L			Ambrosia beetle	*Xylosandrus crassiusculus*	Oaks, elms, sweetgum, and other hardwoods
	L			Ambrosia beetle	*Xylosandrus mutilatus*	Pines, hardwood trees, and shrubs
	L			Ambrosia beetle	*Xyleborus glabratus*	Sassafras, redbay and other Lauraceae
L	P	P	P	Asian longhorned beetle	*Anoplophora glabripennis*	Maple and various hardwood species
L	M	L	L	Balsam woolly adelgid	*Adelges piceae*	Fraser fir
		L	L	Banded elm bark beetle	*Scolytus schevyrewi*	Various elms
L	P	P	P	Brown longhorned spruce beetle	*Tetropium fuscum*	Red spruce
P	M	P	P	Cactus moth	*Cactoblastis cactorum*	Prickly pear cacti
M	M			Chestnut gall wasp	*Dryocosmus kuriphilus*	American chestnut and Allegheny chinkapin
L	P	P	P	Common or larger pine shoot beetle	*Agrilus planipennis*	Pine species
L	P	P	P	Emerald ash borer	*Agrilus planipennis*	Ash species
M	M	P		European gypsy moth	*Lymatria dispar L.*	Oaks and various hardwood species
M	M			Hemlock woolly adelgid	*Adelges tsugae*	Eastern hemlock
L		L	L	Larch casebearer	*Coleophora laricella*	Tamarack. Larch
			M	Mediterranean pine engraver beetle	*Orthotomicus erosus*	Conifers, especially pines
P				Red/golden-haired pine bark beetle	*Hylurgus ligniperda*	Pines
L	L			Shot-hole bore	*Xyleborus similis*	Broad range of hardwoods and pines
			L	Spruce aphid	*Elatobium abietinum*	Sitka spruce
		M		Spruce aphid	*Elatobium abietinum*	Engelmann spruce, Colorado blue spruce
M	M			Beech bark disease	*Nectria coccinea var. faginata*	American beech
M	M			Butternut canker	*Sirococcus clavigignenti-juglandacearum*	Butternut
M	M			Chestnut blight	*Cryphonectria parasitica*	American chestnut and Allegheny chinkapin
L		M	M	Dwarf mistletoe	*Arceuthobium M. Bieb.*	primarily western conifers
M	M			Dogwood anthracnose	*Discula destructiva*	Flowering dogwood, western dogwoods
M	M			Dutch elm disease	*Ophiostoma ulmi*	American elm and other elm species
	L			Laurel wilt	*Ophiostoma sp.*	Sassafras, redbay and other Lauraceae
	M			Lobate lac scale	*Paratachardina lobata subsp. lobata*	Wax myrtle, cocoplum, myrsine, tropical woody diots
M	M			Oak wilt	*Ceratocystis fagacearum*	Quercus, oak spp.
	L			Ohi'a rust	*Puccinia psidii*	Myrtaceae, myrtles
M	M			Phytophthora root rot	*Phytophthora cinnamomi*	American chestnut and Allegheny chinkapin
			M	Pine pitch canker	*Fusarium circinatum*	Pines
			M	Port-Orford-cedar root disease	*Phytophthora lateralis*	Port-Orford-cedar
			L	Sudden oak death pathogen	*Phytophthora ramorum*	Douglas-fir, redwood, grand fir
P	P		M	Sudden oak death pathogen	*Phytophthora ramorum*	Oak species and other woody plants
M	M			White pine blister rust	*Cronartium ribicola*	Eastern white pine
X	X	X	X	Woodwasp and Amylostereum complex	*Sirex noctilio*	Pine species
N	S	RM	PC	**Native forest insects and pathogens with major (M), lesser (L) and potential (P) impacts**		
		M	M	Mountain Pine Beetle	Dendroctonus ponderosae	Pinus spp
		M		Spruce Beetle	Dendroctonus rufipenis	Picea spp.
	M			Southern Pine Beetle	Dendroctonus frontalis	Pinus spp
		M	M	Western Spruce Budworm	Choristoneura occidentalis	Pseudotsuga, Abies spp.
M				Spruce Budworm	Choristoneura fumiferana	Abies spp.
N	S	RM	PC	**Exotic forest pests and pathogens that could threaten forests if they are introduced**		
X	X	X	X	Asian gypsy moth	*Lymantria dispar*	Hardwood and coniferous species
X	X	X	X	Chilean carpenter worm	*Chilecomadia valdiviana*	Oaks, alder, willows, elms, other hardwoods
X	X	X	X	Citrus longhorned beetle	*Anoplophora chinensis*	Maples and various hardwood species
X	X	X	X	Eurasian nun moth	*Lymantria monacha*	Hardwood and coniferous species
X	X	X	X	European oak bark beetle	*Scolytus intricatus*	Oaks and other hardwoods
X		X	X	European spruce beetle	*Ips typographus*	Spruce (especially Picea engelmannii)
X	X	X	X	Pine flat bug	*Aradus cinnamomeus*	Alder, birch, willow, other hardwoods and conifers
X	X	X	X	Alder dieback	*Phytophthora alni*	Alders
X	X	X	X	Oak dieback	*Phytophthora kernoviae*	Oaks
X	X	X	X	Unnamed Phytophthora disease	*Phytophthora*	Beech, rhododendron, tulip tree, magnolia

N = North, S = South, RM = Rocky Mountain, PC = Pacific Coast

M	Regions with established exotic forest insects and pathogens with major impacts
L	Regions with established exotic forest insects and pathogens with lesser impacts
P	Regions with exotic forest pests and pathogens that could threaten forests if they spread from sites where already present
X	Regions where exotic forest pests and pathogens that could threaten forests if they are introduced

Insect damage summary

Insect damage	Year					5-yr Avg.
	1988	1989	1990	1991	1992	
			000 ha			
Total	7,057	5,335	6,986	9,181	9,172	**7,546**

Insect damage	Year					5-yr Avg.
	1998	1999	2000	2001	2002	
Total	2,375	3,957	3,788	13,339	8,019	**6,296**

Insect damage	Year					5-yr Avg.
	2003	2004	2005	2006	2007	
			000 ha			
Total	7,174	5,555	5,004	5,303	5,167	**5,640**

Source: Borys Tkacz

10.3 Analysis and processing of national data

The values presented in the reporting table below are 5-year averages, where the figures for 1990 are averages for the period 1988-1992, the figures for 2000 are averages for 1998-2002 and the figures for 2005 are averages for 2003-2007.

Data for invasive tree species are taken from the latest national forest inventory databases and only include areas affected by major invasive tree species. Data for shrubs and vines only available for the South.

10.4 Data for Table T10

Table 10a – Disturbances

FRA 2010 category	Affected forest area (1000 hectares)		
	1990	2000	2005
Disturbance by insects	7,546	6,296	5,640
Disturbance by diseases	ID	17,380	ID
Disturbance by other biotic agents			
Disturbance caused by abiotic factors			
Total area affected by disturbances			

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)
Gypsy Moth (*Lymantria dispar*)	*Quercus spp., Salix spp., Betula spp., Populus spp., Tilia spp.*	1989-1993	3,000	10
Mountain Pine Beetle (*Dendroctonus ponderosae*)	*Pinus spp.*	2005-2007	1,600	20
Spruce Beetle (*Dendroctonus rufipenis*)	*Picea spp.*	1995-1997	445	20
Southern Pine Beetle (*Dendroctonus frontalis*)	*Pinus spp.*	2000-2002	5,600	10
Western Spruce Budworm (*Choristoneura occidentalis*)	*Pseudotsuga, Abies spp.*	1983-1987	5,300	20
Spruce Budworm (*Choristoneura fumiferana*)	*Abies spp.*	1983-1985	2,600	20

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

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

Scientific name of woody invasive species	Forest area affected 2005 (1000 hectares)
Lonicera japonica (vine)	19,004
Ligustrum sinense (shrub)	6,463
Rosa multiflora, bracteata, laevigata (shrub)	2,161
Triadica sebifera (tree)	1,545
Ailanthus altissima (tree)	1,394
Total forest area affected by woody invasive species*	**34,730**

** Total is for all invasives listed in "original data" and not just top 5 listed here.*

Note: The total forest area affected by woody invasive species is not necessary the sum of the values above, as these may be overlapping. Area reported is area affected by woody invasives, not actual area covered by the invasive species. Top five listed, see original data for other major species.

10.5 Comments to Table T10

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Disturbance by insects	Area with defoliation and mortality caused by insects collected by observers in aircraft flying 400 to 800 m above ground level. Data prior to 1997 are for five major insects. Data since 1997 are for significant damage caused by all insects.	Total area affected has declined since 1990 due to decrease in defoliation by gypsy moth and spruce budworm and mortality by southern pine beetle. Mortality caused by western bark beetles has been increasing.
Disturbance by diseases	Consistent national-scale data on the area affected by all forest diseases are not collected. Diseases, in most cases, attack individual species and are difficult to estimate on an area basis, especially if forests are highly mixed. A more useful metric might be the percent of the total species population affected by a specific disease.	
Disturbance by other biotic agents	Consistent national-scale data on area affected by other biotic agents are not collected.	
Disturbance caused by abiotic factors	Consistent national-scale data on area affected by abiotic factors are not collected. Data for ozone damage has been collected and is being evaluated.	
Major outbreaks	Estimates of area affected were collected by observers in aircraft flying 400 to 800 meters above ground level.	
Invasive species	Data are for major invasive tree species nationally. Non-tree woody invasives reported for the South region only except Tamarix (saltcedar).	

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
Howard, J.L. 2007. U.S. Timber Production, Trade, Consumption, and Price Statistics 1965 to 2005. Res. Pap. FPL-RP-637. Madison, WI: U.S. Department of Agriculture, Forest Products Laboratory. 91 p. http://www.fpl.fs.fed.us/documnts /fplrp/fpl_rp637.pdf	H	Roundwood products, fuelwood	1990, 2000, 2005	Data from Table 5b and 7b was used for roundwood removals. Data was increased by 14% to account for bark.
Howard, J.L. 2007. U.S. Timber Production, Trade, Consumption, and Price Statistics 1965 to 2005. Res. Pap. FPL-RP-637. Madison, WI: U.S. Department of Agriculture, Forest Products Laboratory. 91 p. http://www.fpl.fs.fed.us/documnts /fplrp/fpl_rp637.pdf	H	Industrial wood	1990, 2000, 2005	Data are assumed to be under bark.
An analysis of the situation in the U.S. 1952-2050 PNW-GTR-560. http://www.fs.fed.us/pnw/pubs/gtr560/gtr560_part1.pdf	H	Industrial wood	1990, 2000, 2005	Data are assumed to be under bark.
FRA 2000: Global Forest Resources Assessment 2000. Main Report. FAO Forestry Paper 140. FAO, Rome.	H	Wood fuel	2000	1990 prorated on 2000 values.

11.2.2 Classification and definitions

National class	Definition
Industrial wood	All commercial roundwood products except fuelwood.
Removals	The net volume of trees (under bark), live or dead, of a specified minimum diameter (generally the same as for growing stock) removed from the forest during a specified year, or average for a reference period, by harvesting or cultural operation such as thinning or stand improvement, or by land clearing. Includes the volume of trees or parts of trees that are part of a harvest operation but are not removed from the forest.
Roundwood products	Logs, bolts, and other round timber generated from harvesting trees for industrial or consumer use.
Fuelwood	Wood used for conversion to some form of energy, primarily in residential use.
Industrial roundwood value	Estimated average stumpage value of logs, bolts, and other round timber generated from harvesting trees for industrial or consumer use.
Fuelwood value	Estimated average stumpage value of wood used for conversion to some form of energy, primarily in residential use.

11.2.3 Original data

VOLUME	Volume in 1000 cubic meters of roundwood UNDER bark			Volume in 1000 cubic meters of roundwood OVER bark		
FRA 2010 Category	Forest			Forest		
	1990	2000	2005	1990	2000	2005
Industrial Roundwood**	437,889	434,860	421,935	499,193	495,740	481,006
Woodfuel***	85,724	45,420	44,826	97,725	51,779	51,101
TOTAL	523,613	480,280	466,761	596,919	547,519	532,108
VALUE				Value of roundwood removal (1000 USD)		
Industrial Roundwood**				9,846,758	18,445,540	22,599,020
Woodfuel				338,175	335,443	312,046
TOTAL				10,184,933	18,780,983	22,911,066

* Overbark conversion estimated by multiplying underbark value by 1.14.
**Logging residues and other removals are not included.
*** We have estimated that about 67% of woodfuel comes from forest and there mostly from dead trees and logging residues. Studies have shown that a fair portion (33%) of woodfuel in the U.S. comes from yards, fencerows, pasture and dead trees outside forest.
Source: Howard, J.L. 2007. U.S. Timber Production, Trade, Consumption, and Price Statistics 1965 to 2005. FPL-RP-637. USDA FS, Madison, WI. 91 p. Tables 6b and 7b.

11.3 Analysis and processing of national data

To deal with annual variations, the figures are an average of a five year period for any reference year: 1988 to 1992 for 1990, 1998 to 2002 for 2000 and 2003 to 2007 for 2005.

The following procedure was applied to derive data for the volume tables:

FRA class	U.S. reporting process
Industrial wood removal	All removals for industrial roundwood products by U.S. definition (which are reported under bark) adjusted upward by 14% to report volume including bark.
Woodfuel removal	All removals for fuelwood by U.S. definition (which are reported under bark) adjusted upward by 14% to report volume including bark.

The stumpage value for industrial roundwood was estimated using the following steps for 1990, 2000 and 2005 (2005 was estimated by interpolating using projections from the 2003 RPA Timber Assessment to 2010):

1. Obtain stumpage value estimates in 1982 dollars from Table 15 of the 2003 RPA Timber Assessment (http://www.fs.fed.us/pnw/pubs/gtr560/gtr560_part1.pdf).
2. Convert stumpage values to $ per cubic foot using factors from tables B-11 and B-9 from An Analysis of the timber situation in the United States: 1989-2040. 1989. USDA FS GTR-RM-199.
3. Weight $ per cubic foot values by production in Table 13 of the 2003 RPA Timber Assessment to obtain values in weighting them by amounts of production in table 13 to obtain average national value per cubic foot for each of 4 categories-softwood and hardwood sawtimber, softwood and hardwood pulpwood.
4. Weighted values in 1982 dollars were multiplied by roundwood production amounts from tables 6a and 7a in "U.S. Timber Production, Trade, Consumption, and Price Statistics 1965-2005" (projections to 2005 based on table 13 of the 2003 Timber Assessment) to obtain total stumpage value in 1982 dollars for 1990, 2000, and 2005. See http://www.fpl.fs.fed.us/documnts/fplrp/fpl_rp637.pdf
5. Values in 1982 dollars were converted to current year dollars using the producer price index. See http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=economic_indicators&docid=22ja07.txt.pdf

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.)	499,193	495,740	481,006	97,725	51,779	51,101
... of which from forest	499,193	495,740	481,006	65,476	34,692	34,238
Unit value (local currency / m^3 o.b.)	19.73	37.21	46.98	3.46	6.48	6.11
Total value (1000 local currency)	9,846,758	18,445,540	22,599,020	338,175	335,443	312,046

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. Estimates for woodfuel removals from forest have been revised based on new estimates of the proportion from forest.

	1990	2000	2005
Name of local currency	US $	US $	US $

U.S. Federal Reserve System, Board of Governors

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	Volume of industrial roundwood removals are assumed to be under bark.	The reported general trend is decreasing.
Total volume of woodfuel removals	Estimated based on Department of Energy and FPL-RP-637 data.	The reported general trend is decreasing.
Unit value	Estimated based on cubic meters per cord and the stumpage sale price.	The reported general trend is volatile.
Total value	The FRA 2010 categories and definitions for fuelwood and industrial roundwood values were added from the previous report.	The total value for industrial roundwood increased and the total value for fuelwood declined.

Other general comments to the table
Difference between estimates provided in the FRA 2005 and FRA 2010 reflect an improved estimate of the volume of woodfuel from forest based on residential fuelwood studies which indicate a significant portion of woodfuel in the U.S. comes from trees outside forest (small woodlots, fencerows, yards, urban areas, etc).

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
Data have been compiled from tariff and trade data from the U.S. Department of Commerce and the U.S. International Trade Commission	H	Export Value	2007	
Muir, P.S.; Norman, K.N, and Sikes, K.G. 2006. Quantity and value of commercial moss harvest from forests of the Pacific Northwest and Appalachian regions of the U.S. The Bryologist 109(2):197-214.	H	Percent of total value represented by National Forest and Bureau of Land management Data	2006	Used to evaluate the total percent of domestic removals and exports represented by data from NFS and BLM statistics
National Forest Systems Permit and Contract Data 2007	H	Nontimber plant products, all categories	2007	Revised to represent approximately 20% of domestic Nontimber plant products collected in forests, nationwide, based on the percent of total forestland base occupied by National Forest System land and revised with 2007 data (*Susan Alexander, USDA Forest Service Regional Economist, Region 10, personal communication 2008*)
Bureau of Land Management Permit and Contract Data 2007	H	Nontimber plant products, all categories	2007	Revised to represent approximately 2% domestic Nontimber plant products collected in forests, nationwide, based on the percent of total forestland base occupied by Bureau of Land Managemet land (*Susan Alexander, USDA Forest Service Regional Economist, Region 10, personal communication 2008*)
National Honey Board	H	Honey	2007	Includes commercial honey growers only.

12.2.2 Classification and definitions

National class	Definition
Export of Nonwood Products	Export value of nonwood products. Includes both wild and cultivated where separation is not possible. Blueberries and ginseng numbers represent wild harvest only.
Domestic Nonwood Forest Products	Domestic quantities and values of nonwood products. Primarily wild, but may include domestics where separation is not possible (e.g. honey and Christmas trees)

12.2.3 Original data

Table 12a. United States Exports of Non-Wood Forest Products

Rank	Name of product	Key species	Unit	NWFP removals 2007		NWFP category
				Quantity	(000$)	
1st	Pecans, Fresh or Dried, Whole or Shelled (HTC 802901000, 802901500)	*Carya illinoinensis*			189,511	1
2nd	Foliage, Branches and Other Parts of Plants, without Flowers or Buds, and Grasses Suitable for Bouquets or for Ornamental Purposes, Fresh or Dried and/or Otherwise Prepared (HTC 604910000, 604990000)	Mixed			134,400	6
3rd	Wild Blueberries, Fresh, Frozen, or Dried, Cooked or Uncooked, Canned or Loose (HTC 813402010, 81040024, 811902024, 2008991910)	*Vaccinium* spp.			52,645	1
4th	Ginseng Roots, Wild, Fresh or Dried, Whether or not Cut, Crushed or Powdered (HTC 1211200040)	*Panax quinquefolius*			38,362	3
5th	Cranberries and Other Fruits of the Genus Vaccinium Except Blueberries, Fresh (HTC 810400050)	*Vaccinium* spp. (except blueberries)			33,503	1
6th	Honey, Natural, Any-Packaged or Unpackaged (HTC 409000055, 409000025)	Mixed			12,095	1
7th	Maple Sugar and Maple Syrup (HTC 1702200000)	*Acer saccharum*			9,353	1
8th	Pine Oil (HTC 3805901000)	*Pinus* spp.			6,813	7
9th	Gum, Wood, or Sulfate Turpentine Oils (HTC 3805100000)	*Pinus* spp.			4,907	7
10th	Vanilla Beans (HTC 905000000)	*Vanilla planifolia*			3,081	1
All other plant products					852	
All other animal products						
TOTAL					**485,521**	

Table 12b. United States Domestic Values of Non-Wood Forest Products

Rank	Name of product	Key species	Unit	NWFP removals 2007		NWFP category
				Quantity	(000$)	
1st	Christmas Trees	*Mixed Softwoods*	Each	33,795,608	1,226,764	8
2nd	Maple Syrup	*Acer saccharum*	US Gallon	1,640,000	41,700	1
3rd	Furbearing Animals	*Ondatra zibethicus, Procyon lotor, Vulpes vulpes*	Each	5,739,873	40,603	10
4th	Foliage/Limbs/Boughs/Mosses/ Mistletoe/Burls	*Mixed*	US Ton	42,537	10,450	5
5th	Mushroom/Fungus	*Mixed*	US Ton	8,322	3,370	1
6th	Feed/Forage	*Mixed*	US Ton	1,082,565	1,750	2
7th	Transplants	*Mixed*	Each	61,288	1,262	6
8th	Honey	*Mixed*	US Ton	15,040	1,250	11
9th	Seeds and Cones	*Pinus spp., Pseudotsuga spp.*	Bushel	1,700	120	8
10th	Fruits and Berries	*Vaccinium spp.*	US Ton	176,000	30	1
All other plant products					108	
All other animal products						
TOTAL					**1,327,407**	

12.3 Analysis and processing of national data

12.3.1 Estimation and forecasting

Data have been compiled from tariff and trade data from the U.S. Department of Commerce and the U.S. International Trade Commission, 2007. No forecasting was used. Omission of categories (e.g. game animals) indicates either data was unavailable or data exist only for cultivated or captive production and harvest.

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	*Mixed Softwoods*	Each	33,795,608	1,226,764	8
2nd	Maple Syrup	*Acer saccharum*	US Gallon	1,640,000	41,700	1
3rd	Furbearing Animals	*Ondatra zibethicus, Procyon lotor, Vulpes vulpes*	Each	5,739,873	40,603	10
4th	Foliage/Limbs/Boughs/ Mosses/Mistletoe/Burls	*Mixed*	US Ton	42,537	10,450	5
5th	Mushroom/Fungus	*Mixed*	US Ton	8,322	3,370	1
6th	Feed/Forage	*Mixed*	US Ton	1,082,565	1,750	2
7th	Transplants	*Mixed*	Each	61,288	1,262	6
8th	Honey	*Mixed*	US Ton	15,040	1,250	11
9th	Seeds and Cones	*Pinus spp., Pseudotsuga spp.*	Bushel	1,700	120	8
10th	Fruits and Berries	*Vaccinium spp.*	US Ton	176,000	30	1
All other plant products					108	
All other animal products					ID	
TOTAL					**1,327,407**	

ID = insufficient data
US ton = 0.90718 metric tons *US gallon = 3.75 litres* *Bushel = 35.2 litres*

	2005
Name of local currency	US $

12.5 Comments to Table T12

Variable / category	Comments related to data, definitions, etc.
10 most important products	Variable names for Exports consist of combined categories from the United States International Trade Commission. Variables ranked based on export value. Variable names for Domestics consist of combined categories from National Forest Service and Bureau of Land Management Data, along with other National Data Sources. Some domestic data has been expanded to the national level from public land data based on Muir 2006 (see data sources).
Other plant products	
Other animal products	
Value by product	Although we attempted to expand the data to represent the entire value collected from the forest, values listed still likely represent a fraction of the true value of non-timber products removed from United States forests (see Muir et al. 2006 for examples).
Total value	Although we attempted to expand the data to represent the entire value collected from the forest, values listed still likely represent a fraction of the true value of non-timber products removed from United States forests (see Muir et al. 2006 for examples).

Other general comments to the table
Export quantities not available. Pecans and Honey are primarily agricultural products in the United States, but have been included here. Some Harmonized Tariff Codes (HTC) were combined into single categories. Harmonized trade codes used in each product category are listed in the "Name of Category" box in the primary table, above. Problems with the 20% and 2% generalizations: some products are regional, so it may be a mistake to generalize across the United States. Some products come primarily off public land, while some come primarily off private land, so the percentages used here may under or over estimate products. Honey data came from the National Honey Board, which includes commercial honey growers, only. Data presented in this table may not be directly comparable to similar tables presented in the United States because of differences in the combination of products within product categories. Additionally, the values presented for domestic dollars in this table represent totals coming from the forest, and are underestimates of value at first point of sale, wholesale, and retail.

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
U.S. Department of Labor, Bureau of Labor Statistics. Sawmills and wood preservation: 313211 & Logging: 101133	H	Primary production of goods	1990, 2000, 2005	
U.S. Department of Labor, Bureau of Labor Statistics. Forest and Conservation Workers: 45-4011	H	Employment in mgmt of protected areas	2005	

13.2.2 Classification and definitions

National class	Definition
Primary production of goods	Labor Department data on sawmills and wood preservation and logging.

13.2.3 Original data

As presented in reporting table.

13.3 Analysis and processing of national data

13.3.1 Reclassification into FRA 2010 categories

The source data for the employment category is the U.S. Department of Labor, Bureau of Labor Statistics. Since the completion of FRA 2005, some of the classifications have changed. The classification Sawmills and Planning Mills (NAICS 31-2421) has changed to Sawmills and Wood Preservation (NAICS 31-3211). The Logging classification has remained under the same name, but the NAICS code has changed from 31-2410 to 10-1133.

13.4 Data for Table T13

FRA 2010 Category	Employment (1000 years FTE)		
	1990	2000	2005
Employment in primary production of goods	ID	163.9	160.3
...of which paid employment	103.1	97.8	83.8
...of which self-employment	ID	66.1	67.8
Employment in management of protected areas	ID	ID	8.7

ID = insufficient data.

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	The FRA 2010 categories and definitions for primary production of goods were added from the previous report.	The reported general trend is declining.
Paid employment / self-employment		
Employment in management of protected areas	There was not a definition given for this category.	

Other general comments to the table

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		X	Yes
			No
If Yes above, provide:	Year of endorsement	1969	
	Reference to document	National Environmental Policy Act (NEPA). Public Law 91-190, 42 U.S.C. 4321-4347. An Act to establish a national policy for the environment, to provide for the establishment of a Council on Environmental Quality, and for other purposes. See U.S. Code at: (http://www.gpoaccess.gov/uscode/)	
National forest programme (nfp)			Yes
		X	No
If Yes above, provide:	Name of nfp in country		
	Starting year		
	Current status		In formulation
			In implementation
			Under revision
			Process temporarily suspended
	Reference to document or web site		
Law (Act or Code) on forest with national scope		X	Yes, specific forest law exists
			Yes, but rules on forests are incorpo-rated in other (broader) legislation
			No, forest issues are not regulated by national legislation
If Yes above, provide:	Year of enactment	Over 100 national laws and statues beginning with the 1897 Organic Act (Public Law No. 2)	
	Year of latest amendment	Varies by individual law or statute.	
	Reference to document	U.S. Code (http://www.gpoaccess.gov/uscode/)	

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	To date, all states with an active forestry presence have policy statements through State Forestry Agencies	
Sub-national Laws (Acts or Codes) on forest	X	Yes
		No
If Yes above, indicate the number of regions/states/provinces with Laws on forests	To date, all states with an active forestry presence have state forestry best management practices programs. http://www.afandpa.org/Template.cfm?section=Forestry	

14.3 Comments to Table T14

Variable / category	Comments related to data, definitions, etc.
Forest policy statement with national scope	Generally, the National Environmental Policy Act (NEPA). Public Law 91-190, 42 U.S.C. 4321-4347can be considered a national policy statement. The Act establishes a national policy for the environment and provides for the establishment of a Council on Environmental Quality.
National forest programme (nfp)	There is no single national forest program in the U.S. The U.S. Forest Service Research as well as State and Private Forestry branches provide research, support and statistics on all U.S. forests.
Law (Act or Code) on forest with national scope	There are over 100 national laws specific to natural resource management and policy in the U.S.
Sub-national forest policy statements	Sub-national policy statements are determined by State Forestry or environmental agencies.
Sub-national Laws (Acts or Codes) on forest	Sub-national laws or codes are enacted by the various States.

Other general comments to the table

15 Table T15 – Institutional framework

15.1 FRA 2010 Categories and definitions

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

15.2 Data for Table T15

Table 15a – Institutions

FRA 2010 Category	2008	
Minister responsible for forest policy formulation : please provide full title Secretary of Agriculture (FS) Secretary of the Interior (NPS,FWS,BLM) Heads of 50 State Natural Resource Depts.	There is no single Minister responsible for forest policy formulation in the U.S. Two major federal departments with a total of 4 sub-agencies and 50 State agencies have primary responsibility for forest policy.	
Level of subordination of Head of Forestry within the Ministry Varies, but generally 2nd level within departments		1st level subordination to Minister
	X	2nd level subordination to Minister
		3rd level subordination to Minister
		4th or lower level subordination to Minister
Other public forest agencies at national level	Other national agencies with some forest management responsibility: Department of Defense (DOD) Department of Energy (DOE)	
Institution(s) responsible for forest law enforcement	Each agency within each department or State generally maintains law enforcement staff or has collaborative arrangements with State law enforcement agencies.	

Table 15b – Human resources

FRA 2010 Category	Human resources within public forest institutions					
	2000		2005		2008	
	Number	%Female	Number	%Female	Number	%Female
Total staff	ID	ID	ID	ID	29,637	38%
...of which with university degree or equivalent	ID	ID	ID	ID	17,423	37%

ID = insufficient data.

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

15.3 Comments to Table T15

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Minister responsible for forest policy formulation		
Level of subordination of Head of Forestry within the Ministry	Varies, but generally 2nd level within departments Department sub-agency abbreviations listed: FS = Forest Service (Agriculture Dept.) NPS = National Park Service (Interior Dept.) BLM = Bureau of Land Management (Interior Dept.) FWS = Fish and Wildlife Service (Interior Dept.)	
Other public forest agencies at national level	Other federal departments with limited forest management responsibility DOD = Department of Defense DOE = Department of Energy	
Institution(s) responsible for forest law enforcement		
Human resources within public forest institutions	Staffing data are for U.S. Forest Service only and does not include other federal agencies that may have some limited forest research.	

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
The Food and Agricultural Education Information System (FAEIS). FAEIS is located at Virginia Tech. University. http://faeis.ahnrit.vt.edu/	H	Graduation of students in forest-related education	1999-2000, 2004-2005, 2006	The Food and Agricultural Education Information System (FAEIS) is a USDA program which compiles nationwide higher education data for agriculture, natural resources, family & consumer sciences/human sciences, veterinary medicine and other related disciplines. Most current data was used for 2008 which was 2006-07.
USDA Forest Service Education Level Profile	H	All Forest Service R&D permanent employees at Research Stations, International Institute of Tropical Forestry and Forest Products Lab	2008	Most recent data.
Food and Agricultural Education Information System (FAEIS). FAEIS Office is located at Virginia Tech. University. http://faeis.ahnrit.vt.edu/	H	University staff working in fields of Forest Engineering, Forest Management/Forest Resources Management, Forest Resources Production and Management, Forest Sciences and Biology, Forestry, General, Forestry, Other, Urban Forestry	2007	USDA program which compiles nationwide higher education data for agriculture, natural resources, family & consumer sciences/human sciences, veterinary medicine and other related disciplines. Data represent 42 reporting Universities.

16.2.2 Original data

FRA 2010 Category	Graduation [1] of students in forest-related education					
	2000		2005		2007-08	
	Number	%Female	Number	%Female	Number	%Female
Doctor's degree (PhD)	188	29%	264	38%	283	37%
Master's degree (MSc) or equivalent	638	45%	834	46%	955	44%
Bachelor's degree (BSc) or equivalent	2,802	39%	3,055	34%	4,172	38%
Forest technician certificate / diploma	52	19%	55	22%	94	19%
FRA 2010 Category	**Professionals working in publicly funded forest research centres [2]**					
	2000		2005		2007-08	
	Number	%Female	Number	%Female	Number	%Female
Doctor's degree (PhD)	ID	ID	ID	ID	696	21%
Master's degree (MSc) or equivalent	ID	ID	ID	ID	499	35%
Bachelor's degree (BSc) or equivalent	ID	ID	ID	ID	620	37%
Total	1,816	29%	1,880	31%	1,815	31%

See references for data sources. Only totals available for 2000 and 2005 professionals working in public research centers. Data on professionals only includes US Forest Service Research and 42 reporting Universities. Does not include professionals performing forest research at other Federal or State agencies or public institutions without forestry departments.

16.3 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	638	45%	834	46%	955	44%
Bachelor's degree (BSc) or equivalent	2,802	39%	3,055	34%	4,172	38%
Forest technician certificate / diploma	52	19%	55	22%	94	19%
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)	ID	ID	ID	ID	696	21%
Master's degree (MSc) or equivalent	ID	ID	ID	ID	499	35%
Bachelor's degree (BSc) or equivalent	ID	ID	ID	ID	620	37%
Professionals, all degrees	1,816	29%	1,880	31%	1,815	31%

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.

16.4 Comments to Table T16

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Graduation of students in forest-related education	Graduation statistics based on degrees in: Environmental Science, Environmental Studies, Environmental Health Engineering, Fishing and Fisheries Sciences and Management, Forest Engineering, Forest Management, Forest Sciences and Biology, Forestry, Hydrology and Water Resources Science, Land Use Planning and Mgmt/Development, Natural Resources Conservation and Research, Natural Resources Management and Policy, Other Natural Resources and Conservation, Parks Recreation and Leisure Facilities Management, Urban Forestry, Wildlife Biology, Wildlife and Wildlands Science and Management, Wood Science and Wood Products	
Professionals working in public forest research centres	Data for professionals only includes US Forest Service Research and 42 reporting Universities. Does not include professionals performing forest research at other Federal or State agencies or public institutions without forestry departments.	Only totals available for 2000 and 2005 professionals working in public research centers. Shown at bottom of main table.

Other general comments to the table

17 Table T17 – Public revenue collection and expenditure

17.1 FRA 2010 Categories and definitions

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

17.2 National data

17.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
US Dept of Commerce, Bureau of Census. 2008. 2002 Economic Census	M (federal taxes are estimated for forestry and logging businesses)	Forest revenue -- Taxes and fees paid to the federal government by industries (by NAICS code)	2002	
State government web sites	M (date for data varies by state and is missing for many states with lower timber harvest)	Forest revenue - excise and severance taxes paid by forest landowners to states when timber is harvested	dates for state data range from 1992 to 2007	
USDA Forest Service, WO Budget Staff	H	Total Domestic funding for the USDA Forest Service - Appropriations master spreadsheet: Program funding level	2000, 2005	

USDA Forest Service, WO State and Private Forestry Budget Staff	H	Transfer payments from Forest Service to States	2005	
USDA Natural Resources Conservation Service WO Staff	H	Transfer payments for forestry practices under the WHIP and EQUIP programs	2005	
USDA Farm Services Administration WO staff	M (general estimate for recent years)	Transfer payments for forestry practices under the Conservation Reserve (CRP) program	recent years general estimate	
Association of State Foresters	M (data is missing for some states and is estimated)	Total public expenditures by State forestry agencies	2004	

17.3 Analysis and processing of national data

For Domestic funding - Total public expenditure, transfer payments, and operational expenses were estimated as follows.

1) FS expenditures were represented by the Program Level (anticipated expenditures) for the FS in each year (2000, 2005). The actual expenditures may differ somewhat but are not as readily available. FS Program Level includes payments to states that support forestry activities.
2) FS transfers to states were obtained from FS Washington Office State and Private Forestry Budget Staff.
3) Estimates of total State Expenditures (including amounts from the FS) were obtained from the Association of State foresters for 2004.
4) Estimates of State Expenditures that came from the FS were obtained from the Association of State foresters and differ from FS estimates.
5) Estimates of transfer payments for the forestry practices under the USDA NRCS WHIP and EQUIP programs and USDA FSA CRP program were obtained from NRCS and FSA WO staff.
6) Total public expenditure was estimated as (1) + (3) - (4) + (5). Estimates of (4) and (5) for 2000 were made using detailed FS Program level data.
7) Total transfer payments to support forestry were estimated as including FS transfer payments to states (2) plus and estimated equal amount in matching funds by states plus amounts from the WHIP, EQUIP and CRP programs (5) .
8) Total operational expenditures were estimated as (6) - (7). See comments below

17.4 Data for Table T17

Table 17a - Forest revenues

FRA 2010 Categories	Revenues (1000 local currency)	
	2000*	2005
Forest revenue	1,279,000	*unavailable*

** Data shown is for 2002.*

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	4,968,932	5,236,549	*unavailable*	*unavailable*		
Transfer payments	396,038	640,756	*unavailable*	*unavailable*		
Total public expenditure	5,364,970	7,173,427	*unavailable*	*unavailable*		

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
	Fire suppression assistance, restoration after fire, conservation easements	

** State data portion for 2004.*

17.5 Comments to Table T17

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Domestic funding	Domestic funding includes funding from the US Forest Service, State Forestry agencies, and from forestry practice transfer payments from USDA NRCS (WHIP, EQUIP programs) and USDA FSA (CRP program).	
Forest revenue	Government revenue from forestry activities includes the amount of federal taxes and fees paid in 2002 (placed in the table under 2000) by 3 categories of forest products industry - forestry and logging, wood products, and paper products. It also includes estimated excise and severance taxes paid by forest landowners when timber is harvested. It does not include taxes paid to states or local governments by forest sector firms or firms that provide forest-based recreation.	
Operational expenditure	Operational expenditures include expenditures by the US Forest Service and state governments for forest management and in the US Forest Service it includes research expenditures. Information is not provided on forestry operational expenditures by the Dept of Interior Bureau of Land Management, the Dept of Defense or by county or city governments. Information is not available on operational expenditures by "External " entities such as conservation organizations.	
Transfer payments	Transfer payments include amounts sent from the US Forest Service to states. It also includes estimated matching funds by states equal to the amount from the US Forest Service. They also include forestry practice funds provided by the USDA NRCS EQUIP and WHIP programs and the USDA FSA CRP program. A small part	

	of these funds goes part to fund state employees who provide technical assistance to landowners, businesses and communities, and does not exclusively go to "non-government and private-sector institutions, enterprises, communities or individuals". Information is not available on transfer payments by "External " entities such as conservation organizations to "non-government and private-sector institutions, enterprises communities or individuals"	
Total Public Expenditures	Total public expenditures include the budget for USDA Forest Service programs and for state forestry programs. It does not include forestry expenditures by the Department of Interior for BLM land or for forestry expenditures of counties and cities.	

Other general comments to the table
Domestic funding by governments is likely to be underestimated by the amount expended by government agencies other than the US Forest Service, USDA NRCS, USDA FSA, and State forestry agencies (e.g Dept of Defense, Dept of Interior, Bureau of Land Management). Data on operational expenses or transfers payments were not obtained on funding from "External" entities. Transfer payments include some funding of state technical support activities - not all goes to "non-government and private-sector institutions, enterprises communities or individuals"