GLOBAL FOREST RESOURCES ASSESSMENT 2015

COUNTRY REPORT

Canada

FAO, at the request of its member countries, regularly monitors the world´s forests and their management and uses through the Global Forest Resources Assessment (FRA). This country report is prepared as a contribution to the FAO publication, the Global Forest Resources Assessment 2015 (FRA 2015).

The content and the structure are in accordance with the recommendations and guidelines given by FAO in the document Guide for country reporting for FRA 2015 (http://www.fao.org/3/a-au190e.pdf). These reports were submitted to FAO as official government documents.

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Introductory Text

Place an introductory text on the content of this report

Canadian governments engage in forest management, monitoring and reporting at multiple levels. The Canadian Forest Service of Natural Resources Canada prepares a national State of the Forest report that is tabled in Parliament each year. This report is an important resource; its data and analyses are complementary to the data presented in this data reporting package for CFRQ and FRA. Detailed forest statistics and inventory data may also be obtained at several online information resources. While this CFRQ and FRA reporting package provides data that have been tailored to meet international forest assessment information needs, interested stakeholders are encouraged to pursue additional and more detailed data and information provided by Canada in our State of the Forest and online information resources. Canadian Provincial and Territorial governments also provide detailed data and information products.

Five years ago, Canada submitted a data reporting package for FRA2010 that included many data from Canada's Forest Inventory (CanFI 2001; Power and Gillis 2006). Earlier versions of CanFI were compiled for 1991

(Lowe et al., 1994, 1996), 1986 (Forestry Canada, 1988) and 1981 (Bonnor, 1982). CanFI was a periodic national compilation of data from many different sub-national inventory programs. Each sub-national program delivered high quality information to serve its own business needs, but these data could not provide a platform for nationally consistent strategic forest monitoring or tracking changes over time. Canada therefore established a new National Forest Inventory (NFI), but these data were not yet ready to use for national forest assessment at the time of FRA2010. NFI plots were established across Canada between 2000 and 2006. The NFI data management infrastructure and analysis procedures were then put in place. For the first time, we now provide national forest assessment data for CFRQ and FRA2015 that are based on NFI data.

Canada's NFI monitors 74% of the total land base. All forested ecozones are monitored while the 3 Arctic ecozones are not monitored. The NFI uses a systematic sampling system involving nearly twenty thousand 2 x 2 km "photo" plots located on a 20 x 20 km national grid (Gillis et al. 2005). Permanent ground plots were installed at a randomly selected subset of the photo plots. All plots are being re-measured on a 10 year cycle. The first re-measurement cycle began in 2008 and will be completed in 2017. The second re-measurement will commence in 2018.

The change from CanFI to NFI brings some important changes to our national forest assessment data. It is important not to interpret changes arising from the change in data source as indicative of changes in the forest.

REFERENCES

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Desk Study?

Check "yes" if this survey is a Desk Study, "no" otherwise	
Desk Study?	no

1. What is the area of forest and other wooded land and how has it changed over time?

Documents for this question:

- Guide for country reporting FRA 2015
- FRA 2015 Terms and Definitions

1.1 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 ; 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".
...of which with tree cover *(sub-category)*	Land considered as "Other land", that is predominantly agricultural or urban lands use and has patches of tree cover that span more than 0.5 hectares with a canopy cover of more than 10 percent of trees able to reach a height of 5 meters at maturity. It includes bothe forest and non-forest tree species.
Inland water bodies	Inland water bodies generally include major rivers, lakes and water reservoirs.
Forest expansion	Expansion of forest on land that, until then, was not defined as forest.
...of which afforestation *(sub-category)*	Establishment of forest through planting and/or deliberate seeding on land that, until then, was not defined as forest.
...of which natural expansion of forest *(sub-category)*	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).
Deforestation	The conversion of forest to other land use or the longterm reduction of the tree canopy cover below the minimum 10 percent threshold.
...of which human induced *(sub-category)*	Human induced conversion of forest to other land use or the permanent reduction of the tree canopy cover below the minimum 10 percent threshold.
Reforestation	Natural regeneration or re-establishment of forest through planting and/or deliberate seeding on land already in forest land use.
...of which artificial reforestation *(sub-category)*	Re-establishment of forest through planting and/or deliberate seeding on land already in forest land use.

1.2 National data

1.2.1 Data sources

References to sources of information	Variables	Years	Additional comments

1	Canada's National Forest Inventory (NFI)	Forest and other land	2006	Canada's NFI was established between 2000 and 2006, and is now being re-measured on a ten year cycle. First re-measurement is partially complete. Statistical reports are available online at https://nfi.nfis.org
2	Canada's National Deforestation Monitoring System	Deforestation	all	Data from Canada's National Deforestation Monitoring System provide the basis for analysis and reporting on greenhouse gas emissions from deforestation.
3	Environment Canada. 2013. National Inventory Report 1990-2011: Greenhouse Gas Sources and Sinks in Canada.	Afforestation	all	Data from Canada's National Afforestation Inventory (NAI) provide the basis for analysis and reporting on greenhouse gas removals by afforestation.
4	National Forestry Database	Reforestation	all	http://nfdp.ccfm.org/silviculture/national_e.php Table 6.6 Area of direct seeding Table 6.7 Area planted

1.2.2 Classification and definitions

National class	Definition
Forest area	National Forest Inventory: Land at least 10 percent occupied (by crown cover) by tree species of any size, including young natural stands and all plantations that have yet to reach the minimum crown density. Temporarily non-stocked areas (e.g., recent harvests, burn scars) expected to revert to forests (as defined) are included. The trees must be capable of reaching a mature height of 5 m in situ Deforestation and afforestation monitoring: 25% crown closure or greater with the potential to reach tree height of at least 5 m at maturity in situ and covering an area of 1 ha or greater (having a minimum width of 20 m)
Other wooded land	The land that is either (i) 5 to 10 percent occupied (by crown cover or stocking level) by tree species capable of reaching a mature height of 5 m, or (ii) more than 10 percent occupied (by crown cover or stocking level) by tree species not capable of reaching a mature height of 5 m
Other land with tree cover	Land that has tree cover but is not classified as Forest or Other wooded land.
Deforestation	Direct, human-induced conversion of forest to non-forest land. Does not include temporary forest cover loss such as harvest that is followed by regeneration or forest cover loss resulting from natural disturbances, such as wildfires, insect epidemics or wind storms.

Afforestation	Direct human-induced conversion of land that has not been forested for a period of at least 50 years to forest land through planting, seeding and/or promotion of natural seed sources.

1.2.3 Original data

Original data for Table 1a are from Canada's National Forest Inventory (NFI). These area data are based on the Atlas of Canada 1:1,000,000 scale base map re-projected to Albers Equal Area Conic (ESRI 102001). The arctic ecozones (Arctic Cordillera, Northern Arctic and Southern Arctic) and portions of the Taiga Plains and Hudson Plains ecozones located within Nunavut have no forest and are not inventoried by the NFI. The total area not inventoried is 262,688 thousand ha, of which an estimated 1,691 thousand ha are inland water.

Land Cover

Categories		
	Area (000 ha)	
Vegetated	589,767.50	
…of which treed	362,109.86	
…of which non-treed	227,657.64	
Non-vegetated	146,011.15	
…of which land	58,586.06	
…of which water	87,425.09	
TOTAL	**735,778.65**	

Source: Canada's National Forest Inventory, revised 2006 baseline, available at https://nfi.nfis.org .

Area of forest and non-forest land

Categories		
	Area (000 ha)	
Forest land	347,575.76	
Other wooded land	40,865.66	
Other land with tree cover	8,498.96	
Other land	251,413.18	

TOTAL	648 353.56	

Source: Canada's National Forest Inventory, revised 2006 baseline, available at https://nfi.nfis.org

Area of afforestation

Year	Area (ha)
1988	8664
1989	8664
1990	9714
1991	8137
1992	8157
1993	8605
1994	7562
1995	7184
1996	6572
1997	6460
1998	6088
1999	4807
2000	5855
2001	5411
2002	3644
2003	64
2004	2612
2005	4816
2006	283
2007	676
2008	1377

Source: Environment Canada (2013) supplemented with data directly from Canada's National Afforestation Inventory (NAI) for 1988 and 1989.

Note that the NAI was the original source for Environment Canada (2013) data. The NAI data were collected using an online voluntary reporting system and compilation of historical records by the Canadian Forest Service (White and Kurz, 2005). These data were analysed subsequent to FRA2010 and found to include a number of unverifiable data entries. The national totals were therefore revised downward for use in reporting to the UNFCCC. These data are understood to provide an under-estimate of the true area of afforestation in Canada

Area of deforestation

Year	Area (000 ha)
1988	70.63
1989	68.24
1990	64.04
1991	62.59
1992	58.04
1993	85.93
1994	46.95
1995	42.10
1996	43.15
1997	43.54
1998	47.48
1999	50.43
2000	44.65
2001	44.53
2002	55.29
2003	48.83
2004	50.50
2005	52.27
2006	77.72

2007	49.69
2008	52.30
2009	49.19
2010	49.10
2011	45.91
2012	45.91

Source: Canada's National Deforestation Monitoring System (NDMS)

Area of planting and direct seeding

Year	Area of direct seeding (ha)	Area planted (ha)
1975	37,106	128,105
1976	37,835	120,665
1977	42,584	120,664
1978	38,249	126,629
1979	40,731	101,986
1980	66,060	153,106
1981	45,109	167,362
1982	50,377	190,956
1983	46,860	219,595
1984	32,820	248,897
1985	28,350	274,767
1986	29,561	312,233
1987	40,455	383,564
1988	46,222	431,676
1989	49,660	444,061

1990	40,640	481,292
1991	47,247	469,011
1992	36,008	434,434
1993	28,623	419,338
1994	30,218	445,928
1995	26,303	434,360
1996	32,644	432,415
1997	26,039	454,753
1998	31,522	453,440
1999	25,642	460,269
2000	20,056	459,029
2001	21,260	470,772
2002	18,903	450,886
2003	46,050	435,381
2004	21,728	431,581
2005	19,481	448,338
2006	20,500	465,779
2007	34,546	475,794
2008	20,597	440,669
2009	15,972	395,075
2010	12,096	383,877
2011	11,237	367,588
2012	10,576	347,127

Source: National Forestry Database Tables 6.6 (http://nfdp.ccfm.org/data/compendium/html/comp_66e.html) and 6.7 (http://nfdp.ccfm.org/data/compendium/html/comp_67e.html) available online at http://nfdp.ccfm.org .

1.3 Analysis and processing of national data

1.3.1 Adjustment

NFI revised 2006 baseline data (collected between 2000 and 2006) are reported into the 2005 reporting year for *forest, other wooded land* and *other land with tree cover* areas in Table 1a.

The area of *other land* was calculated as (i) the area estimated by the NFI for other land (251,413 thousand ha) and (ii) other land with tree cover (8,499 thousand ha) for the ecozones that were inventoried, plus (iii) the total area in the ecozones not inventoried by the NFI minus the inland water body area in these ecozones (262,688 – 1,691 = 260,996 thousand ha).

The area of *inland water bodies* was calculated as the area estimated by the NFI (87,425 thousand ha) for the ecozones that were inventoried, plus the area of water in the ecozones not inventoried by the NFI (1,691 thousand ha). In the absence of information about inland water body area changes, the same value is reported for all reporting years.

Forest area for the 1990, 2000 and 2010 reporting years was calculated by treating the 2005 forest area as a base, and adjusting using our original data on forest areas lost (deforestation) and gained (afforestation). Equation 1 shows how forest area in 2010 was calculated by subtracting the area deforested between 2005 and 2010 and adding the area known to have been afforested during this period to the forest area estimated for circa 2005. Equation 2 shows the analogous, reverse calculation for forest area in 2000.

(Equation 1) $F_{2010} = F_{2005} - D_{(2005,2006,2007,2008,2009)} + A_{(2005,2006,2007,2008,2009)}$

(Equation 2) $F_{2000} = F_{2005} + D_{(2004,2003,2002,2001,2000)} - A_{(2004,2003,2002,2001,2000)}$

Insufficient information is available at this time on natural forest expansions and losses at the national level.

Forest area gains and losses are assumed to involve corresponding gains and losses in *other land* because our information is about land-use change (see definitions of afforestation and deforestation in Section 1.2.2). In the absence of information, no net change in the area of *other wooded land* or *other land with tree cover* was assumed.

Deforestation , *Afforestation* and *artificial reforestation* values reported in Table 1b are the five-year averages of the annual source data centred on the FRA2015 reporting years. Original source data on planting and direct seeding were used to report on artificial reforestation.

Total areas of *forest expansion* and *reforestation* are not reported because of insufficient data at this time.

Only trace areas of forest comprised of introduced species are found in Canada. Strict rules govern the sourcing of seeds and seedlings for reforestation.

1.3.2 Estimation and forecasting

Refer to https://nfi.nfis.org for detailed documentation of the NFI data collection, compilation and statistical estimation procedures.

Projections for 2015 were made following the approach illustrated by equation 1 (Section 1.3.1) using deforestation and afforestation data extrapolated forward in time (into 2013, 2014 and 2015) from the most current value (2012).

1.3.3 Reclassification

To avoid confusion and ensure consistency with UNFCCC reporting, original deforestation data are used to report on both "Deforestation" and "…of which human-induced". We follow the UNFCCC definitions for both "deforestation" and "afforestation".

1.4 Data

Table 1a

Categories		Area (000 hectares)				
		1990	2000	2005	2010	2015
CFRQ	Forest	348273	347802	347576	347302	347069
CFRQ	Other wooded land	40866	40866	40866	40866	40866
CFRQ	Other land	520212	520683	520909	521183	521416
CFRQ	... of which with tree cover	8499	8499	8499	8499	8499
CFRQ	Inland water bodies	89116	89116	89116	89116	89116
	TOTAL	998467.00	998467.00	998467.00	998467.00	998467.00

Table 1b

Categories		Annual forest establishment / loss (000 hectares per year)				...of which of introduced species (000 hectares per year)			
		1990	2000	2005	2010	1990	2000	2005	2010
CFRQ	Forest expansion	9	5	2	N/A	N/A	N/A	N/A	N/A
CFRQ	... of which afforestation	9	5	2	N/A	N/A	N/A	N/A	N/A
CFRQ	... of which natural expansion of forest	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CFRQ	Deforestation	65	48	56	48	N/A	N/A	N/A	N/A
CFRQ	... of which human induced	65	48	56	48	N/A	N/A	N/A	N/A
CFRQ	Reforestation	496	482	480	401	N/A	N/A	N/A	N/A
CFRQ	... of which artificial	496	482	480	401	N/A	N/A	N/A	N/A

Tiers

Category	Tier for status	Tier for reported trend
Forest	Tier 3	Tier 1
Other wooded land	Tier 3	Tier 1
Forest expansion	Tier 1	Tier 1
Deforestation	Tier 3	Tier 3
Reforestation	Tier 1	Tier 1

Tier criteria

Category	Tier for status	Tier for reported trend
• Forest • Other wooded land • Afforestation • Reforestation • Natural expansion of forest • Deforestation	**Tier 3** : Data sources: Either recent (less than 10 years ago) National Forest Inventory or remote sensing, with ground truthing, or programme for repeated compatible NFIs **Tier 2** : Data sources: Full cover mapping / remote sensing or old NFI (more than 10 years ago) **Tier 1** : Other	**Tier 3** : Estimate based on repeated compatible tiers 3 (tier for status) **Tier 2** : Estimate based on repeated compatible tier 2 or combination tier 3 and 2 or 1 (tier for status) **Tier 1** : Other

1.5 Comments

Category	Comments related to data definitions etc	Comments on the reported trends
Forest	N/A	Forest area for the 1990, 2000 and 2010 reporting years was calculated by treating the 2005 forest area as a base, and adjusting using our original data on forest areas lost (deforestation) and gained (afforestation), as described in Section 1.3.1. Simple projection was done for 2015 by extrapolating current known forest gain and loss rates into the future from present.
Other wooded land	N/A	In the absence of information, we assumed no net change in the area of other wooded land.
Other land	N/A	It was assumed that forest area gains and losses involve corresponding gains and losses in other land because our original data pertains to land-use change (see definitions of afforestation and deforestation in Section 1.2.2).
Other land with tree cover	N/A	In the absence of information, we assumed no net change in the area of other land with tree cover.

Inland water bodies	N/A	In the absence of specific monitoring information about inland water body area changes, we report the same value for all reporting years.
Forest expansion	Insufficient data on natural expansion of forest and hence on overall forest expansion. At most trace amounts involving introduced species	Afforestation data suggest a decline in area afforested over time, but this is due to reduced monitoring effort. The true trend is not known.
Deforestation	At most trace amounts involving introduced species.	N/A
Reforestation	Insufficient data on natural forest regeneration. Large areas impacted annually by natural disturbances in remote areas are not specifically tracked for regeneration success. Artificial regeneration is reported as total areas of planting and direct seeding. At most trace amounts involving introduced species.	N/A

Other general comments to the table

Quantitative data are not reported in Table 1b for exotic species. Native trees are used predominantly in planting and seeding programs to regenerate harvested forest lands. Some jurisdictions explicitly exclude the use of exotic species for regeneration of forest land, while other jurisdictions have elected to use selected species in certain circumstances. The area of harvested land planted with exotics across Canada accounts for less than 1% in most years. Similarly, there is very limited use of exotic species for afforestation. Any forest expansion that is occurring may be assumed to be dominated by native species. Expected year for completion of ongoing/planned national forest inventory and/or RS survey / mapping or other effort to assess forest area National forest inventory: 2017 Remote sensing survey / mapping: Ongoing Other efforts Canada's NFI is currently in its first 10 year re-measurement cycle, which began in 2008 and will be completed in 2017. The second re-measurement cycle will commence in 2018. Canada is engaged in several national remote sensing survey and mapping initiatives. Wall-to-wall activities are focused on land cover, land cover change (disturbance by type), and stand-level structural attribution (i.e., height, volume, biomass), using access to new and archival Landsat data, MODIS and other sensors. A national survey of lidar transects is being used to develop algorithms for calibration and validation of stand-level structural attributes. Product definition and delivery dates are pending science and technology developments. The outputs are intended to support the NFI and other national programs. Further, other more spatially limited projects are also on-going, with a focus on commercial forests, enhanced forest inventory, value maximization, and fibre quality estimation. REFERENCES Environment Canada (2013) National Inventory Report 1990—2011: Greenhouse Gas Sources and Sinks in Canada. Environment Canada, Ottawa, Ontario. Available at: http://unfccc.int/national_reports/ annex_i_ghg_inventories/national_inventories_submissions/items/7383.php White TM, Kurz WA (2005) Afforestation on private land in Canada from 1990 to 2002 estimated from historical records. The Forestry Chronicle, 81: 491-497.

2. What is the area of natural and planted forest and how has it changed over time?

Documents for this question:

- Guide for country reporting FRA 2015
- FRA 2015 Terms and Definitions

2.1 Categories and definitions

Term	Definition
Naturally regenerated forest	Forest predominantly composed of trees established through natural regeneration.
Naturalized introduced species	Other naturally regenerated forest where the tree species are predominantly non-native and do not need human help to reproduce/maintain populations over time.
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).

Category	Definition
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.
...of which of introduced species *(sub-category)*	Other naturally regenerated forest where the trees are predominantly of introduced species.
...of which naturalized *(sub-sub category)*	Other naturally regenerated forest where the trees are predominantly of naturalized introduced species.
Planted forest	Forest predominantly composed of trees established through planting and/or deliberate seeding.
...of which of introduced species *(sub-category)*	Planted forest where the planted/seeded trees are predominantly of introduced species.
Mangroves	Area of forest and other wooded land with mangrove vegetation.
...of which planted *(sub-category)*	Mangroves predominantly composed of trees established through planting.

2.2 National data

2.2.1 Data sources

	References to sources of information	Variables	Years	Additional comments
1	National Forestry Database http://nfdp.ccfm.org/data/comp_67e.html http://nfdp.ccfm.org/data/comp_66e.html	Planted forests	1988 - 2011	Tables showing area planted and area of direct seeded have been combined.

2	Canada's National Forest Inventory (NFI)	Forest access and stand origin	2006	Canada's NFI was established between 2000 and 2006 and is now being re-measured on a ten year cycle. First re-measurement is partially complete. Statistical reports are available online at nfi.nfis.org
3	National Road Network	Forest access	all	Available at http://www.geobase.ca/geobase/en/data/nrn/index.html
4	BC Digital Road Atlas	Forest access	all	Available at http://archive.ilmb.gov.bc.ca/crgb/products/mapdata/digital_road_atlas_products.htm.
5	BC consolidated cutblocks	Stand origin	2006	Data compiled by the British Columbia provincial government subsequent to NFI establishment; used to supplement NFI information about anthropogenic stand origin
6	Pasher et al. (2013) Development of boreal ecosystem anthropogenic disturbance layers for Canada based on 2008 to 2010 Landsat imagery. Canadian Journal of Remote Sensing, 39(1):42-58.	Forest access	2008-2010	Used to supplement NFI information about anthropogenic disturbance in boreal NFI plots that were established using EOSD land cover data to address the information gaps in these data.

2.2.2 Classification and definitions

National class	Definition
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A

2.2.3 Original data

Canada does not track primary forest, *per se* . Estimates produced for this reporting package are reported directly into Table 2a.

NFD data on area planted are presented in Section 1.2.3.

2.3 Analysis and processing of national data

2.3.1 Adjustment

NFI revised 2006 baseline data (collected between 2000 and 2006) and other data listed in section 2.2.1 are used to estimate the area of primary forest for the 2005 reporting year in Table 2a. The Pasher et al. (2013) disturbance data are not temporally referenced.

The proportion of total forest area reported as primary forest in 2005 was applied to the total forest areas reported for 1990, 2000 and 2010 in Table 1a to calculate the area of primary forest in these reporting years.

2.3.2 Estimation and forecasting

The area of *primary forest* was estimated using information about human activities, human access, and protection status as proxy indicators.

Forests having no record of human activities were identified by interrogating the attributes of every forest stand sampled in the NFI to confirm the absence of anthropogenic treatment or origin in the stand's recorded history.

Proximity to human influence was used as a proxy indicator of ecological process disturbance. Proximity to human settlement, development or road access was evaluated by classifying every NFI 2 x 2 km photo-plot as either accessed or non-accessed. The entire photo-plot was classified as accessed when presence of human settlement or non-forest land use or road access was found in the plot.

Non-accessed forest stands that have no record of human activity were classified as *primary forest* .

Protected forest stands were also classified as *primary forest,* even when they are accessed. It is assumed that protection status precludes the types of human activities that leave clearly visible impacts or cause ecological processes to be significantly disturbed, even when there is human access.

Once all stands sampled by NFI were classified according to the above indicators, the standard NFI statistical procedures were used to estimate the area of *primary forest* . Refer to https://nfi.nfis.org for detailed documentation of the NFI data collection, compilation and statistical estimation procedures.

National Forestry Database statistics on forest area planted or directly seeded annually were used to calculate the area of planted forest. Annual statistics were treated as additive, assuming that no areas were planted twice during the statistical record.

The remainder of forest area was classified as "other naturally regenerated forest".

Simple projection was done for 2015 by extrapolating current planting and seeding rates into the future from present and assuming no change in proportion of primary or other naturally regenerated forest to total forest area.

2.3.3 Reclassification

2.4 Data

Table 2a

Categories		Forest area (000 hectares)				
		1990	**2000**	**2005**	**2010**	**2015**
CFRQ	Primary forest	206638	206359	206225	206062	205924
CFRQ	Other naturally regenerated forest	137057	132098	129641	127265	125361
CFRQ	... of which of introduced species	N/A	N/A	N/A	N/A	N/A
CFRQ	... of which naturalized	N/A	N/A	N/A	N/A	N/A
CFRQ	Planted forest	4578	9345	11710	13975	15784
CFRQ	... of which of introduced species	N/A	N/A	N/A	N/A	N/A
TOTAL		348273.00	347802.00	347576.00	347302.00	347069.00

Table 2b

Primary forest converted to (000 ha)								
1990-2000			**2000-2010**			**2010-2015**		
Other natural regeneration	**Planted**	**Other land**	**Other natural regeneration**	**Planted**	**Other land**	**Other natural regeneration**	**Planted**	**Other land**
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 2c

Categories	Area (000 hectares)				
	1990	**2000**	**2005**	**2010**	**2015**
Mangroves (forest and OWL)	0	0	0	0	0
... of which planted	0	0	0	0	0

Tiers

Category	Tier for status	Tier for reported trend
Primary forest	Tier 1	Tier 1
Other naturally regenerated forest	Tier 1	Tier 1
Planted forest	Tier 3	Tier 3

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Mangroves	Tier 3	Tier 3

Tier Criteria

Category	Tier for status	Tier for reported trend
Primary forest/Other naturally regenerated forest/Planted forest	**Tier 3** : Data sources: Recent (less than 10 years) National Forest Inventory or remote sensing with ground truthing or data provided by official agencies or programme for repeated compatible NFIs **Tier 2** : Data sources: Full cover mapping/ remote sensing or old NFI (more than 10 years) **Tier 1** : Other	**Tier 3** : Estimate based on repeated compatible tiers 3 (tier for status) **Tier 2** : Estimate based on repeated compatible tier 2 or combination tier 3 and 2 or 1 (tier for status) **Tier 1** : Other

2.5 Comments

Category	Comments related to data definitions etc	Comments on reported trend
Primary forest	Tier 1 is indicated for status because the primary forest concept does not apply well in Canada and it is not tracked by Canada's NFI. It is estimated for this report using proxy indicators.	Tier 1 is indicated for trend because the time series of NFI data is not yet long enough to provide statistically robust information on change.
Other naturally regenerating forest	Calculated as the residual forest area not classified as primary or planted forest.	N/A
Planted forest	Calculated as the cumulative area planted or directly seeded since 1975	N/A
Mangroves	N/A	N/A

Other general comments to the table
The primary forest concept does not apply well in Canada. Natural disturbances impact a far greater area of forest annually in Canada than do human disturbances, such that successional stage or forest stand structural characteristics cannot be used to distinguish primary from non-primary forest. Native forest biodiversity is adapted to and dependent upon the mosaic of habitat types that these disturbance regimes provide. Forest management practices in Canada often emulate these patterns in order to achieve wildlife management and biodiversity conservation objectives. Canada therefore does not endorse the use of primary forest as a sustainability indicator. Carle and Holmgren (2003) provide a very useful classification that distinguishes seven levels of naturalness. Most of Canada's forest sector operates in forest area best classified as "other naturally regenerated forest" in Table 2a. These are predominantly "modified natural forests" that are managed for multiple objectives and provide important habitat for native biodiversity. REFERENCE: Carle J, Holmgren P (2003) Definitions Related to Planted Forests. FAO Working Paper 79. Forestry Department, Food and Agriculture Organization of the United Nations (FAO). Rome, Italy.

3. What are the stocks and growth rates of the forests and how have they changed?

Documents for this question:

- Guide for country reporting FRA 2015
- FRA 2015 Terms and Definitions

3.1 Categories and definitions

Category	Definition
Growing stock	Volume over bark of all living trees with a minimum diameter of 10 cm at breast height (or above buttress if these are higher). Includes the stem from ground level up to a top diameter of 0 cm, excluding branches.
Net Annual Increment (NAI)	Average annual volume of gross increment over the given reference period less that of natural losses on all trees, measured to minimum diameters as defined for "Growing stock".
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 2 mm 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.
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 soil depth of 30 cm.

3.2 National data

3.2.1 Data sources

	References to sources of information	Variables	Years	Additional comments
1	Canada's National Forest Inventory (NFI)	growing stock	2006	Canada's NFI was established between 2000 and 2006 and is now being re-measured on a ten year cycle. First re-measurement is partially complete. Statistical reports are available online at https://nfi.nfis.org

2	Canada's National Forest Carbon Monitoring Accounting and Reporting System (NFCMARS)	biomass and carbon	All years	NFCMARS information is from the version used by Canada for the 2013 national GHG inventory report to the UNFCCC (Environment Canada, 2013) and is for the "managed forest" only, which is a 2.3 million km2 subset of the 3.5 million km2 total forest area in Canada.
3	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A

3.2.2 Classification and definitions

National class	Definition
Growing stock	1.3m tall including stump and top as well as defective and decayed wood" /> Total volume inside bark of the main stem for living trees >1.3m tall including stump and top as well as defective and decayed wood
Above-ground biomass	1.3 m tall, including stem, stump, branches, bark and foliage. Does not include understory vegetation. NFCMARS definition: Total above-ground biomass of living trees above the soil including stem, stump, branches, bark, and foliage. Does not include understory vegetation. " /> NFI definition: Total above ground biomass of trees >1.3 m tall, including stem, stump, branches, bark and foliage. Does not include understory vegetation. NFCMARS definition: Total above-ground biomass of living trees above the soil including stem, stump, branches, bark, and foliage. Does not include understory vegetation.
Below-ground biomass	<5 mm diameter) roots" /> Total below-ground biomass of living trees including coarse (#5 mm diameter) and fine (<5 mm diameter) roots
Dead wood	75 mm diameter; and dead coarse roots in the mineral soil approximately #5 mm diameter." /> Mass of dead standing trees including stems, bark, branches and stumps; coarse woody debris on the ground approximately > 75 mm diameter; and dead coarse roots in the mineral soil approximately #5 mm diameter.
Carbon in above-ground biomass	Carbon in live tree stemwood, bark, branches, stumps and foliage.
Carbon in below-ground biomass	Carbon in live tree roots.
Carbon in dead wood	75 mm diameter; and dead coarse roots in the mineral soil approximately #5 mm diameter. " /> Carbon in dead standing trees including stems, bark, branches and stumps; coarse woody debris on the ground approximately > 75 mm diameter; and dead coarse roots in the mineral soil approximately #5 mm diameter.

Carbon in litter	<75 mm diameter; the L horizon comprised of foliar litter plus dead fine roots approximately <5 mm diameter; plus the F, H and O horizons" /> Carbon in fine and small woody debris plus dead coarse roots in the forest floor, approximately #5 and <75 mm diameter; the L horizon comprised of foliar litter plus dead fine roots approximately <5 mm diameter; plus the F, H and O horizons
Soil carbon	All organic carbon in soils to a depth of 1 m, excluding live fine roots and excluding peat

3.2.3 Original data

Growing stock

Leading Genus	Total tree volume (million m^3)
Spruce	22 382.95
Pine	5 610.64
Fir	3 499.29
Hemlock	2 741.27
Douglas-fir	1 652.72
Larch	297.79
Cedar & other conifers	1 267.48
Unspecified conifers	343.84
Poplar	6 176.52
Birch	1 575.33
Maple	1 402.53
Other hardwoods	223.36
Unspecified hardwoods	100.68
Unclassified	46.08
TOTAL	47 320.48

Source: Canada's National Forest Inventory, revised 2006 baseline, available at https://nfi.nfis.org .

Leading Species	Total tree volume (million m^3)
Picea mariana	16 864
Populus tremuloides	4 100
Pinus contorta	3 515
Picea glauca	3 080
Populus spp.	1 883
Pseudotsuga menziesii	1 680
Picea spp.	1 653
Pinus banksiana	1 592
Abies balsamea	1 282
Tsuga spp.	1 277
All others	10 394
TOTAL	47 321

Source: Canada's National Forest Inventory, revised 2006 baseline

Biomass stock

Canada has two complementary sources of information about forest biomass stock:

1. The National Forest Inventory (NFI) provides national estimates that are calculated using statistical survey data that were collected to a nationally consistent set of standards (https://nfi.nfis.org). The strength of the NFI is its national coverage and statistical rigour. The NFI program is new, however, and has not yet been in place long enough to provide information about stock changes.

1. The National Forest Carbon Monitoring, Accounting and Reporting System (NFCMARS) is an internationally recognized system that has been used for reporting to the UNFCCC since 2006 and its core modelling engine, the Carbon Budget Model of the Canadian Forest Sector (CBM-CFS3; Kurz et al. 2009) has been applied in numerous scientific research projects in Canada (e.g., Kurz et al. 2008; Stinson et al. 2011) and internationally (e.g., Zamolodchikov et al. 2008; Pilli et al. 2013). The strength of the NFCMARS is its ability to provide consistent, scientifically rigorous time series tracking of forest ecosystem carbon pools and fluxes since 1990. This information can easily be used to generate information about biomass stocks and stock changes. The NFCMARS only provides information about the "managed forest" area of Canada.

Canada's NFI (data source 1 in Section 3.2.1) is new and still in the process of completing its first re-measurement cycle. Canada is therefore not yet in a position to report biomass or carbon stock changes using NFI. Canada also has a NFCMARS (data source 2 in Section 3.2.1). This system provides reporting on carbon stocks and stock changes since 1990 and was used for FRA2010 reporting. The NFCMARS, however, only

reports for the "managed forest", as defined by Canada for UNFCCC reporting purposes. Canada is using the latter information, based on older data and modelling, in Table 3d and Table 3e in order to provide information on how these reporting variables are changing over time.

Canada defined a " *managed forest* " area for UNFCCC national greenhouse gas inventory reporting purposes. It includes the forest areas potentially available for harvesting, the forest areas managed for other purposes (such as parks), and the forest areas subject to fire suppression. The table below provides the *managed forest* area in context of the total forest area as reported in Table 1a. These areas are five year averages centred on the reporting year. The data on total forest area are from NFI and the data on managed forest area are from NFCMARS.

Managed forest area

	Forest area (1000 hectares)			
	1990	*2000*	*2005*	*2010*
Managed forest	230 064	229 695	229 501	229 302
Forest	348 273	347 802	347 576	347 302

The NFCMARS is continually updated to incorporate improvements in data, model calibration, modelling algorithms and assumptions in order to reduce uncertainties as far as practicable, consistent with IPCC Good Practice Guidance (IPCC 2003). The version of NFCMARS that was used to prepare Canada's 2013 national greenhouse gas inventory report (Environment Canada 2013) was used here.

Canada's "managed forest" delineation map as defined by Canada for UNFCCC reporting purposes was laid over the NFI sample units in order to provide an estimate of biomass and carbon for the managed forest and unmanaged forest based on the NFI baseline statistical survey. These estimates show how the biomass and carbon values from NFCMARS for "managed forest", compare to the overall national forest biomass and carbon values from NFI, which can only be provided for the one time period based on the simple overlay of the managed forest map as noted above.

Total above-ground biomass on forest land

Forest type	
	Million t
Non-managed	6 293
Managed	23 224
Canada	29 516

Source: Canada's National Forest Inventory, revised 2006 baseline, available at https://nfi.nfis.org

Managed forest biomass stocks

Year	Biomass (million t)		
	Above-ground	Below-ground	Dead wood
1989	23 083	5 690	10 133
1990	23 131	5 703	10 054
1991	23 162	5 710	9 992
1992	23 217	5 724	9 910
1993	23 235	5 727	9 857
1994	23 250	5 730	9 804
1995	23 152	5 703	9 836
1996	23 166	5 706	9 781
1997	23 203	5 715	9 708
1998	23 139	5 698	9 724
1999	23 128	5 696	9 684
2000	23 152	5 702	9 614
2001	23 150	5 703	9 577
2002	23 036	5 677	9 630
2003	22 929	5 655	9 684
2004	22 814	5 629	9 728
2005	22 648	5 592	9 819
2006	22 523	5 565	9 877
2007	22 459	5 551	9 889
2008	22 473	5 555	9 845
2009	22 473	5 557	9 836
2010	22 410	5 542	9 858
2011	22 389	5 537	9 841

Source: Canada's NFCMARS, NIR2013 version.

These data are "end of year" values output from CBM-CFS3.

Carbon stock

Total above-ground biomass carbon on forest land

Forest type	
	Million t C
Non-managed	3 146
Managed	11 612
Canada	14 758

Source: Canada's National Forest Inventory, revised 2006 baseline, available at https://nfi.nfis.org .

Managed forest carbon stocks

Year	Carbon (million t)				
	Above-ground	Below-ground	Dead wood	Litter	Soil
1989	11 542	2 845	5 067	11 433	19 687
1990	11 566	2 852	5 027	11 453	19 688
1991	11 581	2 855	4 996	11 468	19 689
1992	11 609	2 862	4 955	11 490	19 691
1993	11 618	2 863	4 928	11 504	19 694
1994	11 625	2 865	4 902	11 519	19 698
1995	11 576	2 851	4 918	11 511	19 702
1996	11 583	2 853	4 891	11 529	19 706
1997	11 601	2 858	4 854	11 551	19 709
1998	11 570	2 849	4 862	11 546	19 713
1999	11 564	2 848	4 842	11 561	19 716
2000	11 576	2 851	4 807	11 585	19 719
2001	11 575	2 852	4 789	11 607	19 723

2002	11 518	2 838	4 815	11 616	19 727
2003	11 464	2 827	4 842	11 632	19 731
2004	11 407	2 815	4 864	11 642	19 734
2005	11 324	2 796	4 909	11 671	19 738
2006	11 262	2 782	4 939	11 688	19 741
2007	11 229	2 775	4 945	11 697	19 745
2008	11 237	2 778	4 923	11 702	19 748
2009	11 236	2 778	4 918	11 699	19 751
2010	11 205	2 771	4 929	11 690	19 756
2011	11 194	2 769	4 921	11 679	19 759

Source: Canada's NFCMARS, NIR2013 version.

These data are "end of year" values output from CBM-CFS3

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3.3 Analysis and processing of national data

3.3.1 Adjustment

Growing stock

No adjustment was made to get volume over bark from the NFI total tree volume (under bark) estimates.

No adjustment was made to account for the minimum diameter threshold in the FAO definition.

Biomass

No adjustments were made to the biomass stock estimates calculated for the managed forest using outputs from the NFCMARS.

Carbon

No adjustments were made to the carbon stock estimates calculated for the managed forest using outputs from the NFCMARS.

3.3.2 Estimation and forecasting

Growing stock

NFI revised 2006 baseline estimations (based on data collected between 2000 and 2006) are reported into the 2005 reporting year in Tables 3a and 3b. No national statistical design-based inventory data are available for estimation of growing stock in 1990 or 2000. Re-measurement of NFI plots is being undertaken on a 10 year cycle with a sampling design and estimation procedures that will enable mid-term reporting as soon as sufficient re-measurement data have passed through all quality control and audit stages. Canada is not yet in a position to report on growing stock in 2010.

Total tree volume inside bark (i.e., wood volume) is modelled as a function of photo-interpreted forest attributes. Species are not always identifiable during photo-interpretation. In such occasions, photo-interpreters indicate the genus, or if absolutely necessary the species is coded as unspecified. The NFI volume data therefore include a mix of species-level, genus-level, and unspecified classifications.

Refer to https://nfi.nfis.org for detailed documentation of the NFI data collection, compilation and statistical estimation procedures.

No projections are made for 2015.

Net Annual Increment

Canada's NFI is currently in the midst of its first re-measurement cycle and therefore does not yet provide information about changes in growing stock or increment.

Biomass stock

Canada's NFI is currently in the midst of its first re-measurement cycle and therefore does not yet provide information about changes in biomass stock.

Biomass data can easily be derived from carbon (C) data, so NFCMARS data were therefore used to report on biomass in order to provide information on biomass stock changes.

NFCMARS outputs are in units of C mass. Inside the NFCMARS core modelling engine, CBM-CFS3 (Kurz et al. 2009), C stocks are calculated by converting merchantable volume inputs to above-ground biomass by applying the models developed by Boudewyn et al. (2007). Below-ground biomass is estimated as function of above-ground biomass (Li et al. 2003). Biomass is then converted to C by applying a generic 0.5 conversion factor. All transfers of C between living and dead pools are tracked, including litterfall, mortality, and disturbance transfers.

NFI estimates of above-ground biomass provide national context for the NFCMARS biomass estimates, which pertain only to the managed forest subset of Canada's total forest area. The table below provides NFI revised 2006 baseline estimates of above-ground biomass with confidence intervals for comparison with NFCMARS output averaged across the years 2000 through 2006 (the period over which NFI baseline data were collected).

Forest type	Above-ground biomass (million t)	
	NFI	NFCMARS
Managed	23224 ±407	22 893
Non-managed	6293 ±165	
Canada	29516 ±440	

No projections are made for 2015 because, in Canada's forests, the future increment, biomass and carbon stocks are highly dependent on the rates of natural disturbances. Because these are highly variable between years and not predictable in advance, a wide range of future carbon dynamics is possible (Kurz et al. 2008).

Carbon stock

Canada's NFI is currently in the midst of its first re-measurement cycle and therefore does not yet provide information about changes in C stock.

Canada's NFCMARS provides full time series information on forest C stocks and stock changes since 1990 for the managed forest, including all 5 major carbon pools. The core model of Canada's National Forest Carbon Monitoring Accounting and Reporting System is the Carbon Budget Model of the Canadian Forest Sector (CBM - CFS 3; Kurz et al. 2009). Various components of this model have been calibrated against a large number of field measurements from a variety of sources, including the NFI (Shaw et al. 2013).

NFI estimates of above-ground biomass carbon provide national context for the NFCMARS carbon estimates, which pertain only to the managed forest subset of Canada's total forest area. The table below provides NFI revised 2006 baseline estimates of above-ground C with confidence intervals for comparison with NFCMARS output averaged across the years 2000 through 2006 (the period over which NFI baseline data were collected).

Forest type	Above-ground carbon (million t C)		
	NFI		NFCMARS
Managed	11612 ±204		11 447
Non-managed	3146 ±83		
Canada	14758 ±220		

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3.3.3 Reclassification

3.4 Data
Table 3a

Category	Growing stock volume (million m^3 over bark)									
	Forest					Other wooded land				
	1990	2000	2005	2010	2015	1990	2000	2005	2010	2015

CFRQ	Total growing stock	N/A	N/A	47320	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CFRQ	... of which coniferous	N/A	N/A	37842	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CFRQ	... of which broadleaved	N/A	N/A	9478	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 3b

Category/Species name			Growing stock in forest (million cubic meters)			
Rank	Scientific name	Common name	1990	2000	2005	2010
1 st	Picea mariana	Black spruce	N/A	N/A	16864	N/A
2 nd	Populus tremuloides	Trembling aspen	N/A	N/A	4100	N/A
3 rd	Pinus contorta	Lodgepole pine	N/A	N/A	3515	N/A
4 th	Picea glauca	White spruce	N/A	N/A	3080	N/A
5 th	Populus	Poplar spp.	N/A	N/A	1883	N/A
6 th	Picea	Spruce spp.	N/A	N/A	1680	N/A
7 th	Pseudotsuga menziesii	Douglas-fir	N/A	N/A	1653	N/A
8 th	Pinus banksiana	Jack pine	N/A	N/A	1592	N/A
9 th	Abies balsamea	Balsam fir	N/A	N/A	1282	N/A
10 th	Tsuga	Hemlock spp.	N/A	N/A	1277	N/A
Remaining			N/A	N/A	10394	N/A
TOTAL			.00	.00	47320.00	.00

THE PRE-FILLED VALUES FOR GROWING STOCK REFER TO THE FOLLOWING THRESHOLD VALUES (SEE TABLE BELOW)

Item	Value	Complementary information
Minimum diameter (cm) at breast height of trees included in growing stock (X)	0	N/A
Minimum diameter (cm) at the top end of stem for calculation of growing stock (Y)	0	N/A
Minimum diameter (cm) of branches included in growing stock (W)	N/A	No branches

Volume refers to above ground (AG) or above stump (AS)	AG	N/A

PLEASE NOTE THAT THE DEFINITION OF GROWING STOCK HAS CHANGED AND SHOULD BE REPORTED AS GROWING STOCK DBH 10 CM INCLUDING THE STEM FROM GROUND LEVEL UP TO A DIAMETER OF 0 CM, EXCLUDING BRANCHES.

Table 3c

Category		Net annual increment (m^3 per hectare and year)				
		Forest				
		1990	2000	2005	2010	2015
CFRQ	Net annual increment	N/A	N/A	N/A	N/A	N/A
CFRQ	... of which coniferous	N/A	N/A	N/A	N/A	N/A
CFRQ	... of which broadleaved	N/A	N/A	N/A	N/A	N/A

Table 3d

Category		Biomass (million metric tonnes oven-dry weight)									
		Forest					Other wooded land				
		1990	2000	2005	2010	2015	1990	2000	2005	2010	2015
CFRQ	Above ground biomass	23148	23121	22675	22436	N/A	N/A	N/A	N/A	N/A	N/A
CFRQ	Below ground biomass	5707	5695	5598	5548	N/A	N/A	N/A	N/A	N/A	N/A
CFRQ	Dead wood	10022	9646	9799	9845	N/A	N/A	N/A	N/A	N/A	N/A
TOTAL		38877.00	38462.00	38072.00	37829.00	.00	.00	.00	.00	.00	.00

Table 3e

Category		Carbon (Million metric tonnes)									
		Forest					Other wooded land				
		1990	2000	2005	2010	2015	1990	2000	2005	2010	2015
CFRQ	Carbon in above ground biomass	11574	11560	11337	11218	N/A	N/A	N/A	N/A	N/A	N/A

CFRQ	Carbon in below ground biomass	2853	2848	2799	2774	N/A	N/A	N/A	N/A	N/A	N/A
CFRQ	*Subtotal Living biomass*	14428	14408	14137	13992	N/A	N/A	N/A	N/A	N/A	N/A
CFRQ	Carbon in dead wood	5011	4823	4900	4923	N/A	N/A	N/A	N/A	N/A	N/A
CFRQ	Carbon in litter	11461	11583	11666	11693	N/A	N/A	N/A	N/A	N/A	N/A
CFRQ	*Subtotal Dead wood and litter*	16472	16406	16566	16615	N/A	N/A	N/A	N/A	N/A	N/A
CFRQ	Soil carbon	19689	19719	19738	19753	N/A	N/A	N/A	N/A	N/A	N/A
TOTAL		50588.00	50533.00	50440.00	50361.00	.00	.00	.00	.00	.00	.00

Tiers

Variable/category	Tier for status	Tier for trend
Total growing stock	Tier 3	Tier 1
Net annual increment	N/A	N/A
Above ground biomass	Tier 2	Tier 2
Below ground biomass	Tier 2	Tier 2
Dead wood	Tier 2	Tier 2
Carbon in above-ground biomass	Tier 2	Tier 2
Carbon in below ground biomass	Tier 2	Tier 2
Carbon in dead wood and litter	Tier 2	Tier 2
Soil carbon	Tier 2	Tier 2

Tier criteria

Category	Tier for status	Tier for reported trend

Total growing stock	Tier 3: Data sources Recent 10 years National Forest Inventory or remote sensing with ground truthing or programme for repeated compatible NFI 10 years Domestic volume functions Tier 2: Data sources/registers and statistics modelling or old NFI 10 years or partial field inventory Tier 1: Other data sources	Tier 3: Estimate based on repeated compatible tiers 3 (tier for status) Domestic growth functions Tier 2: Estimate based on repeated compatible tier 2 or combination tier 3 and 2 or 1 tier for status Tier 1: Other
Net annual increment	Tier 3: Scientifically tested national volume and growth functions Tier 2: Selection of volume and growth functions as relevant as possible Tier 1: Other	Tier 3: Confirmation/adjustment of functions used through scientific work Tier 2: Review work done to seek alternative functions Tier: 1 Other
Biomass	Tier 3: Country-specific national or sub-national biomass conversion expansion factors applied or other domestic or otherwise nationally relevant biomass studies Tier 2: Application of country specific national or sub-national biomass conversion factors from other country with similar climatic conditions and forest types Tier 1: International/regional default biomass expansion factors applied	**Tier 3** : Estimate based on repeated compatible tiers 3 (tier for status) **Tier 2** : Estimate based on repeated compatible tier 2 or combination tier 3 and 2 or 1 (tier for status) **Tier 1** : Other
• Carbon in above ground biomass • Carbon in below ground biomass • Carbon in dead wood and litter • Soil carbon	Tier 3: Country-specific national or sub-national biomass conversion expansion factors applied Tier 2: Application of country specific national or sub-national biomass conversion factors form from other country with similar climatic conditions and forest types Tier 1: International/regional default biomass expansion factors applied	**Tier 3** : Estimate based on repeated compatible tiers 3 (tier for status) **Tier 2** : Estimate based on repeated compatible tier 2 or combination tier 3 and 2 or 1 (tier for status) **Tier 1** : Other

3.5 Comments on growing stock biomass and carbon

Category	Comments related to data definitions etc	Comments on the reported trend
Total growing stock	N/A	No national statistical design-based inventory data are available for estimation of growing stock in 1990 or 2000. Canada is not yet in a position to report on growing stock in 2010.
Growing stock of broadleaved coniferous	N/A	N/A
Growing stock composition	Available data for much of northern boreal and taiga forests are such that species is difficult to determine, and is generally reported as black spruce (Picea mariana). As much as 25 to 35% of the volume reported as black spruce in these areas is likely comprised of other species such as white spruce, Jack pine, balsam fir and tamarack.	N/A
Net annual increment	Canada is not yet in a position to report on national NAI	N/A

Above-ground biomass	N/A	N/A
Below-ground biomass	N/A	N/A
Dead wood	N/A	N/A
Carbon in above-ground biomass	N/A	N/A
Carbon in below-ground biomass	N/A	N/A
Carbon in dead wood	N/A	N/A
Carbon in litter	N/A	N/A
Soil carbon	N/A	N/A

Other general comments to the table
Canada uses definitions for forest carbon pools that follow closely those of the IPCC Good Practice Guidance (IPCC 2003), and that have since been adopted by the FAO. Details of the definitions of biomass and dead organic matter pools used in Canada are described in Table 2 of Kurz et al. (2009). Data for forest biomass (in Table 3d) and forest carbon (in Table 3e) are for the "Managed Forest" as defined by Canada for reporting to the UNFCCC. Refer to Section 3.2.3 for more details. Tables 3d and 3e: Biomass and Carbon in the managed forest only, as described in Section 3.3.2. (see Section 3.2.3 for references) See definition in 3.2.2.

4. What is the status of forest production and how has it changed over time?

Documents for this question:

- Guide for country reporting FRA 2015
- FRA 2015 Terms and Definitions

4.1 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.
Non wood forest product (NWFP)	Goods derived from forests that are tangible and physical objects of biological origin other than wood.
Commercial value of NWFP	For the purpose of this table, value is defined as the commercial market value at the forest gate.
Category	Definition
Production forest	Forest area designated primarily for production of wood, fibre, bio-energy and/or non-wood forest products.
Multiple use forest	Forest area designated for more than one purpose and where none of these alone is considered as the predominant designated function.
Total wood removals	The total of industrial round wood removals and woodfuel removals.
...of which woodfuel	The wood removed for energy production purposes, regardless whether for industrial, commercial or domestic use.

4.2 National data

4.2.1 Data sources

	References to sources of information	Variables	Years	Additional comments
1	Canada's National Forest Inventory (NFI)	Production and multiple use forest	2006	Canada's NFI was established between 2000 and 2006 and is now being re-measured on a ten year cycle. First re-measurement is partially complete. Statistical reports are available online at https://nfi.nfis.org
2	Conservation Areas Reporting and Tracking System (CARTS)	Production forest	N/A	Published and maintained by the Canadian Council on Ecological Areas (CCEA). Available online at: http://www.ccea.org
3	REFERENCES CITED IN SECTION 4	N/A	N/A	N/A

| 4 | Dudley N (ed.) (2008) Guidelines for Applying Protected Area Management Categories. International Union for Conservation of Nature and Natural Resources (IUCN), Gland, Switzerland: IUCN.x +86pp. Available at: https://portals.iucn.org/library/efiles/edocs/PAPS-016.pdf | N/A | N/A | N/A |

4.2.2 Classification and definitions

National class	Definition
Privately owned	NFI ownership codes are defined in Section 18.2.2
Non-protected	IUCN protection status codes are defined in Dudley (2008) and their application to Canadian protected areas can be seen in the CARTS dataset.
Forest land use	The NFI forest land use classification describes lands that support timber harvesting activities.
N/A	N/A

4.2.3 Original data

Area (1000 ha) of forest land by CARTS IUCN category and NFI ownership code.

IUCN protection status	Ownership							Total
	FED	CL	TERR	MUN	ABOR	PR	Other	
Ia	17	315				10	15	357
Ib	0	6468	148		0	8	0	6624
II	4504	9598	351	0	0	26	31	14510
III		1529	101			7	3	1641
IV		321	173		0	17	14	525
V		65	7				2	73
VI	0	104				8	5	117
Other*		37	154			2	0	194

| NA** | 876 | 247953 | 44000 | 930 | 6802 | 21586 | 1386 | 323535 |
| **Total** | 5397 | 266390 | 44935 | 930 | 6802 | 21665 | 1456 | 347576 |

Source: NFI revised 2006 baseline, https://nfi.nfis.org

* Other = protected but no IUCN protection code assigned by CARTS

** NA = not protected.

4.3 Analysis and processing of national data

4.3.1 Adjustment

4.3.2 Estimation and forecasting

NFI revised 2006 baseline data (collected between 2000 and 2006) are used to calculate estimates for the 2005 reporting year. The production forest area in 2005 was estimated as the area of privately owned, non-protected forest, where non-protected forests are those having IUCN class VI, NA and NFI land use class is "forestry".

Protection status information in the NFI is obtained by geographically intersecting the NFI data with the Conservation Areas Reporting and Tracking System (CARTS) geodatabase of protected areas in Canada and protected areas data from the Province of Quebec. Protection status for NFI revised 2006 baseline estimation was determined by considering only protected areas that were established prior to 2007.

The area of multiple use forest in 2005 was estimated as the area of forest not reported as production forest or forest managed primarily for conservation of biodiversity (Table 6).

The area of production and multiple use forests in 1990, 2000 and 2010 were calculated by making adjustments to the 2005 area using the data reported in Table 1a. Changes in total forest area were proportionally allocated to production and multiple use forests because the land-use change monitoring data do not indicate what proportion is occurring in one or the other.

Simple projections were made for 2015 by assuming no change in the proportions of production or multiple use forest areas to total forest area.

4.3.3 Reclassification

4.4 Data
Table 4a

Categories	Forest area (000 hectares)

		1990	2000	2005	2010	2015
CFRQ	Production forest	18373	18349	18337	18322	18310
CFRQ	Multiple use forest	299160	298723	298513	298259	298043

Table 4b

Rank	Name of product	Key species	Commercial value of NWFP removals 2010 (value 1000 local currency)	NWFP category
1 st	Maple Products	N/A	291061	1
2 nd	Christmas Trees	N/A	34957	6
3 rd	Blueberries	N/A	56140	1
4 th	Wild Pelts	N/A	14848	10
5 th	N/A	N/A	N/A	N/A
6 th	N/A	N/A	N/A	N/A
7 th	N/A	N/A	N/A	N/A
8 th	N/A	N/A	N/A	N/A
9 th	N/A	N/A	N/A	N/A
10 th	N/A	N/A	N/A	N/A
TOTAL			397006.00	

2010	
Name of local currency	Canadian dollars

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

Table 4c Pre-filled data from FAOSTAT

Year	FRA 2015 category (1000 m^3 u.b.)	
	Total wood removals	**...of which woodfuel**
1990	162567	6169
1991	160880	6681
1992	170131	6389
1993	175999	6423
1994	183261	5879
1995	188497	5340
1996	183375	5425
1997	188750	5199
1998	176957	3042
1999	198258	2903
2000	201843	2927
2001	185854	2908

2002	196128	2885
2003	181054	2843
2004	207919	2789
2005	203325	3045
2006	184008	2921
2007	164599	3209
2008	139252	3140
2009	116809	3123
2010	141937	3318
2011	149855	3781

Tiers

Category	Tier for status	Tier for reported trend
Production forest	Tier 3	Tier 1
Multiple use forest	Tier 3	Tier 1

Tier Criteria

Category	Tier for status	Tier for reported trend
Production forest Multiple use forest	Tier 3: Updated including field verifications national forest maps including functions Tier 2: Forest maps older than 6 years including forest functions Tier 1: Other	**Tier 3** : Estimate based on repeated compatible tiers 3 (tier for status) **Tier 2** : Estimate based on repeated compatible tier 2 or combination tier 3 and 2 or 1 (tier for status) **Tier 1** : Other

4.5 Comments

Category	Comments related to data definitions etc	Comments on the reported trend
Production forest	N/A	N/A

Multiple use forest	Includes all forest not otherwise classified as production forest or forest managed primarily for conservation of biodiversity. This includes large areas of forest where there is no active forest management but the forests are used for multiple uses by low density local populations. Such areas are sometimes referred to as "unmanaged forest" (e.g., Environment Canada. 2013. National Inventory Report 1990—2011: Greenhouse Gas Sources and Sinks in Canada. Environment Canada, Ottawa, Ontario. Available at: http://unfccc.int/ national_reports/annex_i_ghg_inventories/ national_inventories_submissions/ items/7383.php).	N/A
Total wood removals	Data are sourced from the National Forestry Database Table 5.1 http:// nfdp.ccfm.org/data/compendium/html/ comp_51e.html	N/A
Commercial value of NWFP	Maple Products and Christmas Trees are sourced from the National Forestry Database Tables 5.4 http://nfdp.ccfm.org/ data/compendium/html/comp_54e.html and 5.6 http://nfdp.ccfm.org/data/ compendium/html/comp_56e.html. Low Bush Blueberry Marketed Value ($ '000) are sourced from Agriculture and Agri-Foods Canada http://www.agr.gc.ca/eng/ industry-markets-and-trade/statistics-and-market-information/by-product-sector/horticulture/horticulture-canadian-industry/sector-reports/statistical-overview-of-the-canadian-blueberry-industry-2010/?id=1334583123075#a7. Data for wild pelts are 2009 figure as per CANSIM table 003-0013, Statistics Canada.	N/A

Other general comments to the table
N/A

5. How much forest area is managed for protection of soil and water and ecosystem services?

Documents for this question:

- Guide for country reporting FRA 2015
- FRA 2015 Terms and Definitions

5.1 Categories and definitions

Category	Definition
Protection of soil and water	Forest area designated or managed for protection of soil and water
...of which production of clean water *(sub-category)*	Forest area primarily designated or managed for water production, where most human uses are excluded or heavily modified to protect water quality.
...of which coastal stabilization *(sub-category)*	Forest area primarily designated or managed for coastal stabilization.
...of which desertification control *(sub-category)*	Forest area primarily designated or managed for desertification control.
...of which avalanche control *(sub-category)*	Forest area primarily designated or managed to prevent the development or impact of avalanches on human life assets or infrastructure.
...of which erosion, flood protection or reducing flood risk *(sub-category)*	Forest area primarily designated or managed for protecting communities or assets from the impacts of erosion riparian floods and landslides or for providing flood plain services.
...of which other *(sub-category)*	Forest area primarily designated or managed for other protective functions.
Ecosystem services, cultural or spiritual values	Forest area primarily designated or managed for selected ecosystem services or cultural or spiritual values.
...of which public recreation *(sub-category)*	Forest area designated or managed for public recreation.
...of which carbon storage or sequestration *(sub-category)*	Forest area designated or managed for carbon storage or sequestration.
...of which spiritual or cultural services *(sub-category)*	Forest area designated or managed for spiritual or cultural services.
...of which other *(sub-category)*	Forest area designated or managed for other ecosystem services.

5.2 National data

5.2.1 Data sources

References to sources of information	Variables	Years	Additional comments

1	Canada's National Forest Inventory (NFI)	Protection of soil and water	2006	Canada's NFI was established between 2000 and 2006 and is now being re-measured on a ten year cycle. First re-measurement is partially complete. Statistical reports are available online at https://nfi.nfis.org
2	N/A	N/A	N/A	N/A
3	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A

5.2.2 Classification and definitions

National class	Definition
Publicly owned	NFI ownership codes are defined in Section 18.2.2
N/A	N/A
N/A	N/A
N/A	N/A

5.2.3 Original data

Original ownership data from Canada's NFI are provided in section 4.2.3.

5.3 Analysis and processing of national data

5.3.1 Adjustment

5.3.2 Estimation and forecasting

The area of forest designated for protection of soil and water in 2005 was estimated using NFI revised 2006 baseline data.

The proportion of total forest area reported as designated for protection of soil and water in 2005 was applied to the total forest areas reported in Table 1a for 1990, 2000 and 2010 to estimate the areas designated for soil and water protection in those reporting years.

Simple forecasts were made for 2015 by assuming no change in the proportions of the reported forest categories to the national total forest area (Table 1a).

5.3.3 Reclassification

Protection of soil and water is a designated function of all publicly owned forests.

 We report all publicly owned forests as designated for protection of soil and water because of the legislated soil and water management requirements in place for these lands, but this is not the primary designated function of these forests.

 Production of clean water is the *primary* designated function of watersheds managed by municipalities for water supply. The total area of forest owned by municipalities in Canada is estimated to be 930 thousand hectares, but only a portion of this area is designated *primarily* for protection of soil and water. Insufficient data are available to quantify this portion nationally.

5.4 Data
Table 5a

Categories		Forest area (1000 hectares)				
		1990	**2000**	**2005**	**2010**	**2015**
CFRQ	Protection of soil and water	318289	317859	317652	317402	317189
CFRQ	... of which production of clean water	N/A	N/A	N/A	N/A	N/A
CFRQ	... of which coastal stabilization	N/A	N/A	N/A	N/A	N/A
CFRQ	... of which desertification control	N/A	N/A	N/A	N/A	N/A
CFRQ	... of which avalanche control	N/A	N/A	N/A	N/A	N/A
CFRQ	... of which erosion, flood protection or reducing flood risk	N/A	N/A	N/A	N/A	N/A
CFRQ	... of which other (please specify in comments below the table)	N/A	N/A	N/A	N/A	N/A

Other

N/A

Table 5b

Categories	Forest area (1000 hectares)				
	1990	**2000**	**2005**	**2010**	**2015**
Ecosystem services, cultural or spiritual values	325105	324665	324454	324199	323981
...of which public recreation	N/A	N/A	N/A	N/A	N/A
...of which carbon storage or sequestration	N/A	N/A	N/A	N/A	N/A
...of which spiritual or cultural services	6816	6807	6802	6797	6792
...of which other (please specify in comments below the table)	N/A	N/A	N/A	N/A	N/A

Tiers

Category	Tier for reported trend	Tier for status
Protection of soil and water	Tier 2	Tier 1
Ecosystem services, cultural or spiritual values	Tier 2	Tier 1

Tier criteria

Category	Tier for status	Tier for reported trend
Protection of soil and water	Tier 3: High reliability data derived either from high intensity sample survey or data obtained from national or state agencies responsible for regulations or legislation relating to soil and water protection. Tier 2: Approaches based on low intensity or incomplete sample-based surveys or studies that provide data for specific areas that is extrapolated through statistical analysis to national level estimates. Tier 1: Other	**Tier 3** : Estimate based on repeated compatible tiers 3 (tier for status) **Tier 2** : Estimate based on repeated compatible tier 2 or combination tier 3 and 2 or 1 (tier for status) **Tier 1** : Other

| • Cultural or spiritual values
• Public recreation
• Spiritual or cultural services
• Other | Tier 3: High reliability data derived either from high intensity sample survey or data obtained from national or state agencies responsible for regulations. Tier 2: Approaches based on low intensity or incomplete sample-based surveys or studies that provide data for specific areas that is extrapolated through statistical analysis to national level estimates. Tier 1: Other | **Tier 3** : Estimate based on repeated compatible tiers 3 (tier for status) **Tier 2** : Estimate based on repeated compatible tier 2 or combination tier 3 and 2 or 1 (tier for status) **Tier 1** : Other |

5.5 Comments

Category	Comments related to data definitions etc	Comments on the reported trend
Protection of soil and water	Reported values in Table 5a are classified as Tier 2 because these are estimates based on information pertaining to broad ownership categories, not high intensity sample surveys addressing the designation for protective functions, per se.	N/A
Production of clean water	N/A	N/A
Coastal stabilization	N/A	N/A
Desertification control	N/A	N/A
Avalanche control	N/A	N/A
Erosion, flood protection or reducing flood risk	N/A	N/A
Other protective functions	N/A	N/A
Ecosystem services, cultural or spiritual values	Reported values in Table 5b are classified as Tier 2 because these are estimates based on information pertaining to broad ownership categories, not high intensity sample surveys addressing the designation for protective functions, per se.	N/A
Public recreation	Most public forest lands are accessible to the public for recreation purposes, but only trace areas relative to the overall national forest land area are designated or managed primarily for this purpose.	N/A
Carbon storage or sequestration	Trace areas relative to the overall national forest area are primarily designated or managed for carbon storage or sequestration.	Forest management plans are increasingly including carbon storage and sequestration objectives, but very rarely as a primary management objective. Insufficient data are available to report trends at the national scale.

Spiritual or cultural services	Lands classified as Aboriginal owned in the NFI are classified as being managed primarily for spiritual or cultural services. Protection of culturally sensitive or important areas also occurs on public lands. Areas are set aside in agreements negotiated during consultations between First Nation communities and resource industries.	N/A
Other ecosystem services	N/A	N/A

Other general comments to the table
N/A

6. How much forest area is protected and designated for the conservation of biodiversity and how has it changed over time?

Documents for this question:

- Guide for country reporting FRA 2015
- FRA 2015 Terms and Definitions

6.1 Categories and definitions

Category	Definition
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.
Forest area within protected areas	Forest area within formally established protected areas independently of the purpose for which the protected areas were established.

6.2 National data

6.2.1 Data sources

	References to sources of information	Variables	Years	Additional comments
1	Canada's National Forest Inventory (NFI)	Conservation of biodiversity and forest area within protected areas	2006	Canada's NFI was established between 2000 and 2006 and is now being re-measured on a ten year cycle. First re-measurement is partially complete. Statistical reports data are available online at https://nfi.nfis.org
2	Conservation Areas Reporting and Tracking System (CARTS)	Conservation of biodiversity and forest area within protected areas	N/A	Published and maintained by the Canadian Council on Ecological Areas (CCEA). Available online at: http://www.ccea.org
3	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A

6.2.2 Classification and definitions

National class	Definition
Protected	IUCN protection status codes are defined in Dudley (2008)
N/A	N/A
N/A	N/A
N/A	N/A

6.2.3 Original data

Original protection status data from Canada's NFI are provided in section 4.2.3.

6.3 Analysis and processing of national data

6.3.1 Adjustment

6.3.2 Estimation and forecasting

NFI revised 2006 baseline data (collected between 2000 and 2006) are used to calculate estimates for the 2005 reporting year.

Insufficient data are available on trends, so the total forest area within protected areas in 2005 was reported in Table 1a for 1990, 2000, 2010 and 2015. National land-use change monitoring data indicate that afforestation and deforestation generally do not occur in protected areas. Natural forest expansions and losses in protected areas will be better known when multiple NFI measurement cycles have been completed.

6.3.3 Reclassification

Forest areas having IUCN protection status Ia, Ib, II, III, IV and V were reclassified into FRA categories "forest area within protected areas" and "conservation of biodiversity". Only trace forest areas outside formally designated protected areas, such as privately owned land trusts or other conservation areas not captured in the CARTS geodatabase, are managed *primarily* for conservation of biodiversity, so reported values for both FRA categories are the same.

6.4 Data
Table 6

Categories		Forest area (000 hectares)				
		1990	**2000**	**2005**	**2010**	**2015**
CFRO	Conservation of biodiversity	23924	23924	23924	23924	23924
CFRO	Forest area within protected areas	23924	23924	23924	23924	23924

Tiers

Category	Tier for status	Tier for reported trend
Conservation of biodiversity	Tier 3	Tier 1

Forest area within protected areas	Tier 3	Tier 1

Tier criteria

Category	Tier for status	Tier for reported trend
• Conservation of biodiversity • Forests within protected areas	Tier 3: Data obtained from national or state agencies responsible for conservation and protected area or legislation relating to area protection. Tier 2: Studies that provide data for specific areas that is extrapolated through statistical analysis to national level estimates Tier 1 Other	**Tier 3** : Estimate based on repeated compatible tiers 3 (tier for status) **Tier 2** : Estimate based on repeated compatible tier 2 or combination tier 3 and 2 or 1 (tier for status) **Tier 1** : Other

6.5 Comments

Category	Comments related to data definitions etc	Comments on the reported trend
Conservation of biodiversity	N/A	The true trend is an increase in forest area managed primarily for conservation of biodiversity because new protected areas have been designated since 1990. Insufficient data are available to report quantitatively on these trends, so this increase is not reflected in the reported trend.
Forest area within protected areas	N/A	The true trend is an increase in forest area within protected areas because new protected areas have been designated since 1990. Insufficient data are available to report quantitatively on these trends, so this increase is not reflected in the reported trend.

Other general comments to the table
N/A

7. What is the area of forest affected by woody invasive species?

Documents for this question:

- Guide for country reporting FRA 2015
- FRA 2015 Terms and Definitions

7.1 Categories and definitions

Category	Definition
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.

7.2 National data

7.2.1 Data sources

	References to sources of information	Variables	Years	Additional comments
1	Source: 2005, Criteria and Indicators of Sustainable Forest Management in Canada; Table 1.2e Selected alien plant species associated with forests in Canada (http://www.ccfm.org/ci/rprt2005/English/etpg46.htm).	Woody Invasive Species	N/A	N/A
2	N/A	N/A	N/A	N/A
3	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A

7.2.2 Classification and definitions

National class	Definition
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A

7.2.3 Original data

Woody invasive species.

Threat to	Common name	Scientific name	Distribution	Invasive potential
Integrity of forest ecosystems	Norway maple	*Acer platanoides*	ON, QC, NL	L
	Scotch broom	*Cytisus scoparius*	BC, NS, PEI	P
	Tatarian honeysuckle	*Lonicera tatarica*	ON, NL, NS, NB, PEI	L
	Morrow honeysuckle	*Lonicera tatarica*	ON, NL, NS, NB, PEI	
	White mulberry	*Morus alba*	ON	L
	Norway spruce	*Picea abies*	Eastern Canada	P
	Silver birch	*Betula pendula*	BC, MB, ON, NS, PEI	L
	Glossy buckthorn	*Rhamnus frangula*	MB, ON, QC, NB, NS, PEI	H
	English Ivy	*Hedera helix*	BC, ON	L
	Common gorse	*Ulex europaeus*	BC	?
Natural regeneration of plants				
Urban forests or open areas				
	English holly	*Ilex aquifolium*	BC	?
	Privet	*Ligustrum vulgare*	ON	P
	White poplar	*Populus alba*	BC, AB, SK, MB, ON, QC, NL	L
	European buckthorn	*Rhamnus cathartica*	BC, SK, ON, QC, NS, PEI	H
	Black locust	*Robinia pseudo-acacia*	Southern Canada	L

	Siberian elm	*Ulmus pumila*	Frequently planted as urban tree	P

L=low level invasive; H=high level invasive; P=potentially invasive, ?=unknown

YT=Yukon Territory, BC= British Columbia, AB=Alberta, SK=Saskatchewan. MN= Manitoba, ON=Ontario, QC=Quebec, NB=New Brunswick, NS=Nova Scotia, PEI=Prince Edward Island, NL=Newfoundland and Labrador

There is insufficient area data to complete this table.

7.3 Analysis and processing of national data

7.3.1 Adjustment

7.3.2 Estimation and forecasting

7.3.3 Reclassification

7.4 Data
Table 7

Scientific name of woody invasive species	Forest area affected (000 ha)	
	2005	**2010**
Alliaria petiolata	N/A	N/A
Rhamnus frangula	N/A	N/A
Rhamnus cathartica	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A

N/A	N/A	N/A
Total	N/A	N/A

Tiers

Category	Tier for status	Tier for reported trend
Invasive species	Tier 1	Tier 1

Tier Criteria

Category	Tier for status	Tier for reported trend
Invasive species	Tier 3: Systematic assessment in forest inventory or other survey (e.g. by conservation department) within the last 5 years) Tier 2: Systematic assessment in forest inventory or other survey (e.g. by conservation department conducted more than 5 years ago) Tier 1: Other	**Tier 3** : Estimate based on repeated compatible tiers 3 (tier for status) **Tier 2** : Estimate based on repeated compatible tier 2 or combination tier 3 and 2 or 1 (tier for status) **Tier 1** : Other

7.5 Comments

Category	Comments related to data definitions etc	Comments on the reported trend
Invasive species	N/A	N/A

Other general comments to the table
N/A

8. How much forest area is damaged each year?

Documents for this question:

- Guide for country reporting FRA 2015
- FRA 2015 Terms and Definitions

8.1 Categories and definitions

Category	Definition
Number of fires	Number of fires per year
Burned area	Area burned per year
Outbreaks of insects	A detectable reduction in forest health caused by a sudden increase in numbers of harmful insects.
Outbreaks of diseases	A detectable reduction in forest health caused by a sudden increase in numbers of harmful pathogens, such as bacteria, fungi, phytoplasma or virus.
Severe weather events	Damage caused severe weather events, such as snow, storm, drought, etc.

8.2 National data

8.2.1 Data sources

	References to sources of information	Variables	Years	Additional comments
1	National Forestry Database http://nfdp.ccfm.org/ data/compendium/html/ comp_31e.html)	Fires	2003-2012	N/A
2	National Forestry Database http://nfdp.ccfm.org/ data/compendium/html/ comp_41e.html)	Insects	1990-2012	Accessed July 21, 2014
3	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A

8.2.2 Classification and definitions

National class	Definition
Moderate to severe defoliation	trees that suffer moderate to severe defoliation are those on which 30% or more of the current foliage has been removed
moderate to severe bark beetle-caused mortality	areas where more than 10% of trees have been killed
area damaged (for Table 8b)	average of annual areas affected during the outbreak period
N/A	N/A

8.2.3 Original data

Canada's National Forestry Database (NFD; nfdp.ccfm.org) summarizes forest fire monitoring data and forest health and disease monitoring data collected by provincial and territorial forest management agencies across Canada.

NFD table 3.1 reports the number of fires and area burned.

NFD table 4.1 reports the areas within which moderate to severe defoliation and moderate to severe bark beetle-caused mortality

The NFD data are available at http://nfdp.ccfm.org/data/compendium/html/comp_31e.html and http://nfdp.ccfm.org/data/compendium/html/comp_41e.html

8.3 Analysis and processing of national data

8.3.1 Adjustment

Discretizing national insect damage data into outbreaks for the purposes of reporting into Table 8b involves the application of somewhat arbitrary thresholds. Here we report most recent outbreaks for insects that are reported in the NFD by treating the most recent series of consecutive years since 1990 in which more than 10000 ha were affected as "outbreaks". From a biological stand-point, many of these outbreaks began earlier and continued beyond the series of years indicated. What's more, many of these national statistical summaries also conceal the fact that outbreak dynamics are occurring asynchronously at sub-national geographic scales such that the national data are not describing "an outbreak", but the sum of areas affected from several insect disturbance regimes.

The values reported in Table 8b are the averages of annual areas affected during the periods indicated. Peak areas affected are reported in the comments (Section 8.5).

For more comprehensive annual data, please refer to NFD table 4.1, Provincial and Territorial Government reports, or the National Forest Pest Strategy Information System (PSIS).

The PSIS contains aerial overview survey and remote sensing map data that jurisdictions in Canada use to monitor and report on forest insect outbreak damage and that are used to calculate summary statistics reported in NFD. This system is new and is currently being populated with data. In future, Canada will use these data to calculate and report cumulative outbreak areas. Cumulative outbreak area is the total of all non-overlapping areas that were affected in at least one year during the outbreak. Cumulative outbreak areas are calculated in a GIS by overlaying detailed maps of the areas affected each year.

8.3.2 Estimation and forecasting

8.3.3 Reclassification

8.4 Data

Table 8a

Category		000 ha, number of fires									
		2003		**2004**		**2005**		**2006**		**2007**	
		000 ha	**#**	**000 ha**	**#**	**000 ha**	**#**	**000 ha**	**#**	**000 ha**	**#**
CFRQ	Total land area burned	1743	8230	3184	6680	1672	7542	2256	9831	1544	6931
CFRQ	... of which forest area burned	1743	8230	3184	6680	1672	7542	2256	9831	1544	6931
Category		**2008**		**2009**		**2010**		**2011**		**2012**	
		000 ha	**#**	**000 ha**	**#**	**000 ha**	**#**	**000 ha**	**#**	**000 ha**	**#**
CFRQ	Total land area burned	1721	6298	781	7229	3055	7294	2434	4768	2005	7967
CFRQ	... of which forest area burned	1721	6298	781	7229	3055	7294	2434	4768	2005	7967

Table 8b

Outbreak category	Description/name	Year(s) of latest outbreak	Area damaged (000 hectares)
1	Mountain Pine Beetle	1999-2012	5229
1	Forest tent caterpillar	1990-2012	4854
1	Spruce budworm	1990-2012	3356
1	Large aspen tortrix	1990-2009	1014
1	Bruce spanworm	2007-2011	1005
1	Western spruce budworm	2000-2011	543
1	Jack pine budworm	2005-2012	235
1	Two-year cycle spruce budworm	2006-2011	139

1	Spruce beetle	1993-2012	126
1	Others	1990-2012	2463

Outbreak category
1 Insects
2 Diseases
3 Severe weather events

Tiers

Category	Tier for status	Tier for trend
Area affected by fire	Tier 3	Tier 3
• Insects • Diseases • Severe weather events	Tier 3	Tier 3

Tier criteria

Category	Tier for status	Tier for reported trend
Burned area	**Tier 3** : National fire monitoring routines **Tier 2** : Remote sensing surveys **Tier 1** : Other	**Tier 3** : Estimate based on repeated compatible tiers 3 (tier for status) **Tier 2** : Estimate based on repeated compatible tier 2 or combination tier 3 and 2 or 1 (tier for status) **Tier 1** : Other
• Insects • Diseases • Severe weather events	**Tier 3** : Systematic survey (e.g. via inventory or aerial damage assessment) **Tier 2** : Management records **Tier 1** : Other	**Tier 3** : Estimate based on repeated compatible tiers 3 (tier for status) **Tier 2** : Estimate based on repeated compatible tier 2 or combination tier 3 and 2 or 1 (tier for status) **Tier 1** : Other

8.5 Comments

Category	Comments related to data definitions etc	Comments on the reported trend
Burned area	Land area and forest area burned figures are identical as reporting in the National Forestry Database is based on forest area burned only.	Improved and more comprehensive reporting may result in apparent increases in number of fires and area burned,

Insects	Mountain pine beetle outbreak peaked at 10 Mha in 2007 and affected a cumulative area of 18.3 Mha. Forest tent caterpillar outbreaks were ongoing through 1990 with extremely large areas affected in the 1980s and even larger areas in the 1970s. The largest area affected in any single year since 1990 was 19.2 Mha in 1991. Spruce budworm outbreaks were ongoing through 1990 with extremely large areas affected in the 1980s and even larger areas in the 1970s. The largest area affected in any single year since 1990 was 10.2 Mha in 1992. Large aspen tortrix damage area peaked at 6.0Mha in 2003. Bruce spanworm damage area peaked at 1.7Mha in 2010. Western spruce budworm damage area peaked at 865Kha in 2007. Jack pine budworm damage area peaked at 740Kha in 2006. Two-year cycle spruce budworm damage area peaked at 397Kha in 2009. Spruce beetle damage area peaked at 375Kha in 2003. Other insects includes: Aspen leaf miner, Balsam fir saw fly, Birch leaf miner, Birch skeletonizer, Birch casebearer, Blackheaded budworm, Conifer sawfly, Cedar leaf miner, Douglas-fir beetle, Eastern larch beetle, Emerald ash borer, Gypsy moth, Hemlock looper, Large casebearer, Pine false webworm, Western balsam bark beetle, and many others. Refer to Provincial and Territorial government forest health reports for details.	Refer to http://nfdp.ccfm.org/ for annual data on areas affected by insects.
Diseases	Areas affected by diseases are not easily measured, especially during aerial overview surveys. These areas are therefore not reported in Table 8b. Although root diseases are among the most widespread pathology problems in Canada's forests, the symptoms and damage they cause are difficult to detect and measure. For example, even though Armillaria root disease currently affects, to varying degrees, approximately 200 million hectares of Canada's forested lands each year, the impacts are greatly underestimated. Other forest diseases causing significant damage to Canada's forests include white pine blister rust and Annosus root and butt rot.	N/A
Severe weather events	Severe weather events also affect forest health and structure in Canada, but are not reported in Table 8b.	N/A

Other general comments to the table

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For the purposes of selecting tiers, "National fire monitoring routines" in this case includes provincial fire monitoring routines; the national totals are obtained by adding up the numbers reported by the provinces. Systematic overview surveys are used for monitoring insect damage, but characterizing complex outbreak dynamics and associated damages in the simple structure of Table 8b is such that users of these data are encouraged to exercise caution and, where possible, contact Canada for original data.

9. What is the forest area with reduced canopy cover?

Documents for this question:

- Guide for country reporting FRA 2015
- FRA 2015 Terms and Definitions

Category	Definition
Reduction in canopy cover	Forest that has undergone a reduction of canopy cover of more than 20% between the years 2000 and 2010 within the forest canopy cover range of 30-80% as detected by the MODIS VCF sensor.

Table 9

Category	Area of forest with reduced canopy cover (000 ha)
Reduction in canopy cover	N/A

Tiers

Category	Tier for reported trend
Reduction in canopy cover	N/A

Tier criteria

Category	Tier for reported trend
Reduction in canopy cover	**Tier 3** : Remote sensing with ground truthing and/or Landsat imagery **Tier 2** : Remote sensing using Modis (using pre-filled data provided by FAO) **Tier 1** : Expert opinion

Comments

Category	Comments related to data definitions etc
Reduction in canopy cover	N/A

Other general comments

10. What forest policy and regulatory framework exists to support implementation of sustainable forest management SFM?

Documents for this question:

- Guide for country reporting FRA 2015
- FRA 2015 Terms and Definitions

10.1 Categories and definitions

Category	Definition
Policies supporting sustainable forest management	Policies or strategies that explicitly encourage sustainable forest management.
Legislation and regulations supporting sustainable forest management	Legislation and regulations that govern and guide sustainable forest management, operations and use.

10.2 National data

10.2.1 Data sources

	References to sources of information	Variables	Years	Additional comments
1	Canadian Council of Forest Ministers	N/A	N/A	http://www.sfmcanada.org/en/forest-products/legal-forest-products
2	Canadian Forest Service	N/A	N/A	http://www.nrcan.gc.ca/forests/canada/sustainable-forest-management/13303
3	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A

10.2.2 Classification and definitions

National class	Definition
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A

10.2.3 Original data

10.3 Data

Table 10

Category	National	Sub-national		
		Regional	Provincial/State	Local
Policies supporting sustainable forest management	yes	no	yes	yes
... of which, in publicly owned forests	yes	no	yes	yes
... of which, in privately owned forests	yes	no	yes	yes
Legislation and regulations supporting sustainable forest management	yes	no	yes	yes
... of which, in publicly owned forests	yes	no	yes	yes
... of which, in privately owned forests	yes	no	yes	yes

10.4 Comments

Variable / category	Comments related to data definitions etc

Policies supporting sustainable forest management	Each province and territory develops its own set of forestry legislation and policy. Specific laws may differ between provinces and territories, but all are focused on the same goal: sustainable forest management (SFM) that considers a wide range of values, including communities, wildlife, biodiversity, soils, water and scenery. Governments support SFM with laws, regulations and policies that address land-use planning, forest practices, forest regeneration, Aboriginal interests, public consultation, biodiversity, protected areas, natural disturbances and more. Forestry operations are also bound by some national legislation. The comprehensive laws and regulations enforced by the provinces and territories are designed to address the requirements of federal legislation relevant to forests, such as the Species at Risk Act, the Fisheries Act and the Canadian Environmental Assessment Act. Forestry activities must also comply with international agreements to which Canada is a signatory, such as the Convention on Biological Diversity and the Convention on International Trade in Endangered Species of Wild Fauna and Flora. Forest management on private lands is supported by both provincial and municipal regulations, guidelines and partnership programs. Many private landowners use forest management plans and take advantage of government programs to guide their stewardship and harvesting activities. Some provinces have laws that set standards for forest management practices on private lands. Most provinces have regulatory mechanisms in place to track timber harvested from private lands so that it can be differentiated from public timber (for which royalties must be paid). These mechanisms include regulations for timber scaling, timber marking and transportation. A comprehensive description of policies, strategies, legislation and regulations related to SFM as well as information about compliance monitoring, enforcement and penalties can be found at http://www.sfmcanada.org/en/forest-products/legal-forest-products
Legislation and regulations supporting sustainable forest management	See comments above

Other general comments

11. Is there a national platform that promotes stakeholder participation in forest policy development?

Documents for this question:

- Guide for country reporting FRA 2015
- FRA 2015 Terms and Definitions

11.1 Categories and definitions

Category	Definition
National stakeholder platform	A recognized procedure that a broad range of stakeholders can use to provide opinions, suggestions, analysis, recommendations and other input into the development of national forest policy.

11.2 National data

11.2.1 Data sources

	References to sources of information	Years	Additional comments
1	A Vision for Canada's Forests: 2008 and Beyond	N/A	http://ccfm.org/english/coreproducts-nextnscf.asp
2	N/A	N/A	N/A
3	N/A	N/A	N/A
4	N/A	N/A	N/A

Table 11

Is there a national platform that promotes or allows for stakeholder participation in forest policy development?	yes

11.3 Comments

Category	Comments related to data definitions etc
National stakeholder platform	A Vision for Canada's Forests: 2008 and Beyond http://ccfm.org/english/coreproducts-nextnscf.asp A Vision for Canada's Forests: 2008 and Beyond presents a long-term, strategic vision for achieving sustainable forest management in Canada. During a period of transition for Canada's forests and forest sector, the Vision focuses on two key areas: forest sector transformation and climate change. The Vision continues Canada's leadership in sustainable forest management as demonstrated by past national forest strategies. Although the Canadian Council of Forest Ministers has led the development of the Vision and will continue to champion it, achieving the goals and desired outcomes will require the participation of the entire forest sector. The Vision is intentionally high-level and non-prescriptive, to allow for unique and innovative means of achieving the ultimate vision: to be the best in the world in sustainable forest management and a global leader in forest sector innovation.

Other general comments

12. What is the forest area intended to be in permanent forest land use and how has it changed over time?

Documents for this question:

- Guide for country reporting FRA 2015
- FRA 2015 Terms and Definitions

12.1 Categories and definitions

Category	Definition
Forest area intended to be in permanent forest land use	Forest area that is designated or expected to be retained as forest and is highly unlikely to be converted to other land use.
...of which permanent forest estate *(sub-category)*	Forest area that is designated by law or regulation to be retained as forest and may not be converted to other land use.

12.2 National data

12.2.1 Data sources

	References to sources of information	Variables	Years	Additional comments
1	Canada's National Forest Inventory (NFI)	Protection of soil and water	2006	Canada's NFI was established between 2000 and 2006 and is now being re-measured on a ten year cycle. First re-measurement is partially complete. Statistical reports are available online at https://nfi.nfis.org
2	Conservation Areas Reporting and Tracking System (CARTS)	Production forest	N/A	Published and maintained by the Canadian Council on Ecological Areas (CCEA). Available online at: http://www.ccea.org
3	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A

12.2.2 Classification and definitions

National class	Definition
Public forest land	Forest lands owned by the Federal, Provincial, Territorial or Municipal governments
Protected forest land	Protected forest land (IUCN classes Ia, Ib, II, III, IV, V, VI and "other")
N/A	N/A

N/A	N/A

12.2.3 Original data

Original ownership and protection status data from Canada's NFI are provided in section 4.2.3.

12.3 Analysis and processing of national data

12.3.1 Adjustment

12.3.2 Estimation and forecasting

12.3.3 Reclassification

The proportion of total forest area that was publicly owned or protected as defined in section 12.2.2 in the original data provided in section 4.2.3 was applied to the total forest area in 2010 to calculate area of forest in permanent forest land use and the permanent forest estate in 2010.

12.4 Data
Table 12

Categories		Forest area 2010 (000 ha)
CFRQ	Forest area intended to be in permanent forest land use	317550
CFRQ	... of which permanent forest estate	317550

Tiers

Category	Tier for status
Forest area intended to be in permanent forest land use	Tier 3
Permanent forest estate	Tier 3

Tier Criteria

Category	Tier for status
Forest area intended to be in permanent forest land use	**Tier 3** : National or sub-national land use plans strategy documents or other reports within the past 10 years **Tier 2** : National or sub-national land use plans strategy documents or other reports within the past 20 years **Tier 1** : Other

Permanent forest estate	**Tier 3** : National or sub-national land use plans strategy documents or other reports within the past 10 years **Tier 2** : National or sub-national land use plans strategy documents or other reports within the past 20 years **Tier 1** : Other

12.5 Comments

Category	Comments related to data definitions etc
Forest area intended to be in permanent forest land use	The forest area intended to be in permanent forest land use is effectively the same as the permanent forest estate. Additional private and aboriginal owned forest may also be designated or expected to be retained as forest and is highly unlikely to be converted to other land use but owner intentions are not recorded.
Permanent forest estate	All public forest lands and protected forest lands are expected to be retained as forest and highly unlikely to be converted to other land use. Exceptions occur in the event of land use change activities, but these affect less than 0.02% of the overall forest area in Canada per year.

Other general comments

13. How does your country measure and report progress towards SFM at the national level?

Documents for this question:

- Guide for country reporting FRA 2015
- FRA 2015 Terms and Definitions

13.1 Categories and definitions

Category	Definition
Forest area monitored under a national forest monitoring framework	Forest area monitored by a national monitoring framework or systems that provide measurement based periodic monitoring of forest extent and quality.
Forest reporting at national scale	National reporting of forest extent and characteristics that includes some measure of progress toward sustainable forest management.

13.2 National data

13.2.1 Data sources

	References to sources of information	Variables	Years	Additional comments
1	The State of Canada's Forests	N/A	N/A	The State of Canada's Forests annual report for 2012 features an insightful review of the past year for Canada's forests and forest sector; statistical profiles for Canada and the provinces and territories; and, a sample of the indicators for sustainable forest management, along with the most recent information on how Canada's forests are doing in each area http://cfs.nrcan.gc.ca/series/read/90
2	Criteria and Indicators	N/A	N/A	Canada uses a framework of six criteria and 46 indicators to define, measure and report on progress toward the sustainable management of its forests. Canada is also a member of The Montréal Process – an initiative by 12 countries to use criteria and indicators to define, measure and report on progress toward the conservation and sustainable management of temperate and boreal forests. http://cfs.nrcan.gc.ca/pages/111

3	Canadian Environmental Sustainability Indicators	N/A	N/A	http://www.ec.gc.ca/ indicateurs-indicators/ default.asp? lang=en&n=A132BB91-1
4	Canada's National Forest Inventory (NFI)	N/A	N/A	https://nfi.nfis.org
5	British Columbia forest inventory program	N/A	N/A	http://www.for.gov.bc.ca/hts/
6	Alberta forest inventory program	N/A	N/A	http://srd.alberta.ca/ LandsForests/ VegetationInventoryStandards.aspx
7	Saskatchewan forest inventory program	N/A	N/A	http:// www.environment.gov.sk.ca/ adx/aspx/adxGetMedia.aspx? DocID=3f2bfda8-34e6-46d0-91d1-67 cad1-4c82-b479- baadb117eb29&Filename=Sask +Forest+Vegetation +Inventory.pdf&l=English
8	Manitoba forest inventory program	N/A	N/A	https://mli2.gov.mb.ca//
9	Ontario forest inventory program	N/A	N/A	http://www.mnr.gov.on.ca/ en/ http:// www.applio.lrc.gov.on.ca/ lids/
10	Quebec forest inventory program	N/A	N/A	http://www.mrn.gouv.qc.ca/ forets/inventaire/index.jsp
11	New Brunswick forest inventory program	N/A	N/A	http://www2.gnb.ca/ content/gnb/en/departments/ natural_resources/ ForestsCrownLands.html
12	Prince Edward Island forest inventory program	N/A	N/A	www.gov.pe.ca/forestry
13	Nova Scotia forest inventory program	N/A	N/A	http://novascotia.ca/natr/ forestry/programs/inventory/
14	Newfoundland and Labrador forest inventory program	N/A	N/A	http://www.nr.gov.nl.ca/ nr/forestry/manage/ inv_plan.html
15	Northwest Territories forest inventory program	N/A	N/A	http://www.enr.gov.nt.ca/ _live/pages/wpPages/ inventory_and_analysis.aspx
16	Yukon Territory forest inventory program	N/A	N/A	http:// www.forestry.gov.yk.ca/

13.2.2 Classification and definitions

National class	Definition
N/A	N/A

N/A	N/A
N/A	N/A
N/A	N/A

13.3 Data

Table 13a

Category	% of total forest area	Most recent year	Check all boxes that apply					
			Continuous	Periodic	Permanent ground plots	Temporary ground plots	Aerial/ remote sensing sample based	Aerial/ remote sensing full coverage
Forest inventory	100	2013	yes	yes	yes	yes	yes	yes
Other field assessments	100	2013	no	yes	no	yes	no	yes
Updates to other sources	N/A	N/A						
Expert estimate	N/A	N/A						

Table 13b

Type of forest reporting used at national scale	Check boxes that apply
1 Criteria and Indicators reporting	yes
2 Periodic national state of the forest report	yes
3 Other (please document)	yes
4 None	no

Other type of forest reporting
Canadian Environmental Sustainability Indicators http://www.ec.gc.ca/indicateurs-indicators/default.asp?lang=en&n=A132BB91-1

13.4 Comments

Category	Comments

Forest inventory and other field assessments	Canada's NFI is a design-based statistical survey that covers all of Canada's forests. It is a continuous inventory that employs both permanent ground plots and aerial/remote sensing sampling. A substantial proportion of Canada's forests are also inventoried in greater detail by Provincial and Territorial government forest inventory programs that employ permanent and temporary ground plot networks and full coverage aerial/remote sensing. Many of these are periodic while others are continuous. Private freehold forest lands are also inventoried by the private sector. Some jurisdictions undertake other periodic field assessments. The federal government periodically conducts national remote sensing forest assessments.
N/A	N/A
N/A	N/A

Other general comments

14. What is the area of forest under a forest management plan and how is this monitored?

Documents for this question:

- Guide for country reporting FRA 2015
- FRA 2015 Terms and Definitions

14.1 Categories and definitions

Category	Definition
Forest area with management plan	Forest area that has a long-term documented management plan, aiming at defined management goals which is periodically revised
...of which for production *(sub-category)*	Forest management plan mainly focused on production
...of which for conservation *(sub-category)*	Forest management plan mainly focused on conservation
Monitoring of forest management plans	Government monitoring of forest management plan implementation conducted through field visits or audits of forest management plan performance

14.2 National data

14.2.1 Data sources

	References to sources of information	Variables	Years	Additional comments
1	Questionnaire prepared by the Canadian Forest Service to Provincial and Territorial governments.	Forest area with management plan.	N/A	N/A
2	Questionnaire prepared by the Canadian Forest Service to Provincial and Territorial governments.	Requirements in forest management plans.	N/A	N/A
3	Questionnaire prepared by the Canadian Forest Service to Provincial and Territorial governments.	Percent of area under forest management plan that is monitored annually.	N/A	N/A
4	N/A	N/A	N/A	N/A

14.3 Data

Table 14a

Forest plan type	Forest area 2010 (000 ha)
Forest area with management plan	206035
... of which for production	N/A
... of which for conservation	N/A

Table 14b

Indicate which (if any) of the following are required in forest management plans in your country	
1 Soil and water management	yes
2 High conservation value forest delineation	yes
3 Social considerations community involvement	yes

Table 14c

Percent of area under forest management plan that is monitored annually	100

Tiers

Category	Tier for status
Forest area with management plan	Tier 3
Percent of area under forest management plan that is monitored annually	Tier 3

Tier criteria

Category	Tier for status
Forest area with management plan	**Tier 3** : Reports that describe national records 5 years old or less that contain long-term forest monitoring plans **Tier 2** : Industry or other records indicating the presence of a long-term forest management plan **Tier 1** : Other
Percent of area under forest management plan that is monitored annually	**Tier 3** : Government documentation of monitoring extent **Tier 2** : Reports from forest managers or other documental sources **Tier 1** : Other

14.4 Comments

Category	Comments
Forest area with management plan	The forest area with management plan is less than the total forest area because there are large areas of forest with low population density that are not managed, and it is also less than the area termed "managed forest" for the purposes of UNFCCC reporting (refer to section 3.2.3 for details) because this includes areas where wildfire management is the only forest management activity. Almost all forest management is for multiple uses, so "N/A" is reported for "…of which for production" and "…of which for conservation.
N/A	N/A
N/A	N/A

Other general comments

15. How are stakeholders involved in the management decision making for publicly owned forests?

Documents for this question:

- Guide for country reporting FRA 2015
- FRA 2015 Terms and Definitions

15.1 Categories and definitions

Category	Definition
Stakeholder involvement	Stakeholder involvement is defined as significant inputs into at least one aspect of forest management at the operational scale

Table 15

Please indicate the type of stakeholder involvement in forest management decision making required in your country	
1. Planning phase	yes
2. Operations phase	yes
3. Review of operations	yes

Tiers

Category	Tier for status
Type of stakeholder inputs	Tier 3

Tier criteria

Category	Tier for status
Type of stakeholder inputs	**Tier 3** : Government (national or sub-national) documentation of stakeholder inputs **Tier 2** : Government (national or subnational) requirement but stakeholder inputs not documented **Tier 1** : Other

15.2 Comments

Category	Comments
N/A	N/A
N/A	N/A
N/A	N/A

Other general comments

16. What is the area of forest under an independently verified forest certification scheme?

Documents for this question:

- Guide for country reporting FRA 2015
- FRA 2015 Terms and Definitions

16.1 Categories and definitions

Category	Definition
FSC certification	Forest area certified under the Forest Stewardship Council certification scheme
PEFC certification	Forest area certified under the Programme for the Endorsement of Forest Certification scheme
Other international forest management certification	Forest area certified under an international forest management certification scheme with published standards and is independently verified by a third-party, excluding FSC and PEFC certification.
Certified forest area using a domestic forest management certification scheme	Area certified under a forest management certification scheme with published standards that are nationally recognized and independently verified by a thirdparty

16.2 Data

Table 16a

International forest management certification		Forest area (000 ha)						
		2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
CFRQ	FSC	30	123.25	1030.04	4211.91	4366.27	15231.12	19617.18
CFRQ	PEFC	1040	8210	12750.55	25775.55	35532.55	36134.89	31352.56
CFRQ	Other	0	0	0	0	0	0	0
		2007	**2008**	**2009**	**2010**	**2011**	**2012**	
CFRQ	FSC	24352.52	27312.9	32228.29	40600.81	46272.41	54080.93	
CFRQ	PEFC	39138.77	39375.37	42459.26	50130.76	55074.31	57577.84	
CFRQ	Other	0	0	0	0	0	0	

Table 16b

Domestic forest management certification		Forest area (000 ha)						
		2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
CFRQ	Canadian Standards Association (CSA)	4215	8840	14440	28405	47380	69209.28	73413.01
CFRQ	N/A	0	0	0	0	0	0	0

		2007	2008	2009	2010	2011	2012	
CFRQ	N/A	0	0	0	0	0	0	0
CFRQ	Canadian Standards Association (CSA)	77841.7	82764.82	74625.11	62537.24	57103.77	44291.37	
CFRQ		0	0	0	0	0	0	
CFRQ		0	0	0	0	0	0	

Tier criteria

Category	Tier for status
International forest management certification	Tier 3: International forest management scheme records maintained by the certifying organization for the reporting year Tier 2: International forest management scheme records reported by the certifying organization for a period 2 years prior to the reporting year Tier: 1 Other
Domestic forest management certification	Tier 3: National registry reports for domestic forest management certification maintained by the certifying organization for the reporting year Tier 2: Domestic forest management scheme records reported by the certifying organization for a period 2 years prior to the reporting year Tier: 1 Other

Tiers

Category	Tier for status
International forest management certification	Tier 3
Domestic forest management certification	Tier 3

16.3 Comments

Category	Comments related to data definitions etc
Certified forest area using an international forest management certification scheme	Sustainable Forest Initiative data have been entered under PEFC.
Domestic forest management certification	The Canadian Standards Association has been used for domestic forest management certification.

Other general comments

17. How much money do governments collect from and spend on forests?

Documents for this question:

17.1 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 revenue include: • Goods : roundwood; sawnwood; biomass; woodbased panels; pulp and paper and non-wood forest products. • Services : including concession fees and royalties, stumpage payments, public timber sales revenue taxes and charges based on forest area or yield, taxes on domestic trade and export of forest products, special levies on forestry activities and payments into forest related funds, other miscellaneous inspection, licence and administrative fees levied by forest administrations, permit and licence fees for recreation and other forest related activities.
Public expenditure on forestry	All government expenditure on forest related activities.

17.2 National data

17.2.1 Data sources

	References to sources of information	Variables	Years	Additional comments
1	National Forestry Database – Table 8.1 http://nfdp.ccfm.org/data/compendium/html/comp_81e.html	Forest revenue	1998-2011	From the statement of revenues from the sale of timber on Provincial Crown land.
2	N/A	N/A	N/A	N/A
3	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A

17.3 Data

Table 17

Category	Revenues / expenditures (000 local currency)		
	2000	**2005**	**2010**
Forest revenue	1808132	1558689	566546
Public expenditure on forestry	N/A	N/A	N/A

	2000	2005	2010

| Name of Local Currency | Canadian dollar | N/A | N/A |

17.4 Comments

Category	Comments related to data definitions etc
Forest revenue	Revenues from the sale of crown timber are reported for each province and territory as appropriate to the circumstances in each jurisdiction. They include stumpage charges, rent charges, area/holding charges, reforestation levies, protection fees, permit and license fees, and sales and rentals.
Public expenditure on forestry	N/A
Other general comments	N/A

Other general comments

18. Who owns and manages the forests and how has this changed?

Documents for this question:

- Guide for country reporting FRA 2015
- FRA 2015 Terms and Definitions

18.1 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.
...of which owned by the state at national scale *(sub-category)*	Forest owned by the State at the national scale or administrative units of the public administration or by institutions or corporations owned by the public administration.
...of which owned by the state at the sub-national government scale *(sub-category)*	Forest owned by the State at the sub-national government scale 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 cooperatives corporations and other business entities, private, religious and educational institutions, pension or investment funds, NGOs, nature conservation associations and other private institutions.
...of which individuals *(sub-category)*	Forest owned by individuals and families.
...of which private business entities and institutions *(sub-category)*	Forest owned by private corporations cooperatives companies and other business entities as well as private nonprofit organizations such as NGOs nature conservation associations, and private religious and educational institutions etc.
...of which local tribal and indigenous communities *(sub-category)*	Forest owned by a group of individuals belonging to the same community residing within or in the vicinity of a forest area or forest owned by communities of indigenous or tribal people The community members are coowners that share exclusive rights and duties and benefits contribute to the community development.
Unknown ownership	Forest area where ownership is unknown includes areas where ownership is unclear or disputed.
Categories related to management rights of public forests	**Definition**
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 companies	Forest management rights and responsibilities are transferred from the Public Administration to corporations, other business entities private cooperatives, private nonprofit 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.

18.2 National data

18.2.1 Data sources

	References to sources of information	Variables	Years	Additional comments
1	Canada's National Forest Inventory (NFI)	Ownership	2006	Canada's NFI was established between 2000 and 2006 and is now being re-measured on a ten year cycle. First re-measurement is partially complete. Statistical reports data are available online at https://nfi.nfis.org
2	Prince Edward Island State of the Forest	N/A	2002	http://www.gov.pe.ca/photos/original/af_state_forest.pdf http://www.gov.pe.ca/photos/original/EEF-ForPol-Eng.pdf
3	Nova Scotia Sate of Forest. Unpublished State of the forest, still in editing mode	ownership	2005, 2012	Prov Crown = 1530340 ha and Fed Crown = 156 240 (which includes first Nation's land) Municipal gov lands are included in individual category. Inland water (234,432 ha) was not separated from these totals in the past report which inflated area by ownership. (http://www.novascotia.ca/natr/forestry/reports/State-Of-Forest-Report-April-2008.pdf) Prov Crown = 1856018 ha and Fed Crown = 154372 (which includes first Nation's land) Municipal gov lands are included in individual category. Inland water is not part of these 2012 numbers
4	Ontario Forest Management Plan(s)	FMPs & Annual Reports	2012	The data is sourced from management unit Forest Management Plans and Annual Reports.
5	Alberta	Management rights	N/A	http://srd.alberta.ca/LandsForests/ForestManagement/ForestTenure/Default.aspx (Forest Tenure Data for early 90's not readily available). http://srd.alberta.ca/LandsForests/ForestManagement/ForestManagementFactsStatistics/documents/AreaAvailable-CurrentFactsAndStatistics-2011.pdf

6	British Columbia	N/A	N/A	See 2010 State of the Forests Report 3rd edition. http://www.for.gov.bc.ca/hfp/sof/2010/sof_2010_web.pdf See Timber Tenures in British Columbia, June 2012. http://www.for.gov.bc.ca/ftp/ http://www.for.gov.bc.ca/hth/timber-tenures/community/index.htm http://www.bccfa.ca/index.php/about-community-forestry/status/item/download/124_065b923b624d333a79
7	GNWT, Forest Management Division	N/A	N/A	N/A
8	(1) Yukon Umbrella Final Agreement (UFA), Ch.17. (2) Yukon Devolution Transfer Agreement. (3) Yukon Forest Resources Act	N/A	1993, 2001, 2011	(1) Sets forth the framework for the Land Claims Agreements between First Nations, Gov. of Canada and Gov. of Yukon. (2) Outlines the transfer of government responsibilities from the Gov. of Canada to the Gov. of Yukon (YG) in 2003, including responsibility for forest management. (3) Legislation (and regulations) governing forest resources in Yukon.

18.2.2 Classification and definitions

National class	Definition
Federal	Land owned by the federal government
Aboriginal	Land owned by First Nations
Provincial	Land owned by a provincial government
Territorial	Land owned by a territorial government
Municipal	Land owned by a municipal government
Private	Privately owned land
Other	Ownership information missing or unavailable

18.2.3 Original data

Original ownership data from Canada's NFI are provided in section 4.2.3.

18.3 Analysis and processing of national data

18.3.1 Adjustment

NFI revised 2006 baseline data (collected between 2000 and 2006) are reported into the 2005 reporting year in Table 18a. Areas for the 1990, 2000 and 2010 reporting years were calculated by applying the proportions from 2005 to the total forest areas reported in Table 1a for 1990, 2000 and 2010.

18.3.2 Estimation and forecasting

18.3.3 Reclassification

FRA category	National classes
Public	Federal, Provincial, Territorial and Municipal
…of which state at national scale	Federal
…of which state at sub-national scale	Provincial, Territorial and Municipal
Private	Private and Aboriginal
…of which individuals	Private
…of which business entities	*
…of which local, tribal and indigenous communities	Aboriginal**
Unknown	Other

* Original data do not distinguish between private ownership by individuals versus private ownership by business entities or institutions. All private ownership is reported as "...of which individuals".

** The nature of aboriginal ownership, as classified in the NFI, is such that these lands would be better included under the Public main category, but they are reported here in order to fit into the structure of Table 18a categories and sub-categories.

18.4 Data

Table 18a

Categories			Forest area (1000 hectares)			
			1990	**2000**	**2005**	**2010**
CFRQ	Public ownership		318289	317859	317652	317402
CFRQ	... of which owned by the state at national scale		5408	5401	5397	5393
CFRQ	... of which owned by the state at the sub-national government scale		312881	312458	312255	312009
CFRQ	Private ownership		28525	28486	28467	28445
CFRQ	... of which owned by individuals		21709	21679	21665	21648
CFRQ	... of which owned by private business entities and institutions		0	0	0	0
CFRQ	... of which owned by local, tribal and indigenous communities		6816	6807	6802	6797
CFRQ	Unknown ownership		1459	1457	1457	1455
TOTAL			348273.00	347802.00	347576.00	347302.00

Tiers

Category	Tier for status	Tier for reported trend
Public ownership	Tier 3	Tier 1
Private ownership	Tier 3	Tier 1
Unknown ownership	Tier 3	Tier 1

Tier criteria

Category	Tier for status	Tier for reported trend

| Ownership | Tier 3: National forestry statistics registers of land titles or maps on land ownership or all forest area under one ownership category that is five years old or less. Tier 2:National forestry statistics registers of land titles or maps on land ownership or questionnaires that are more than five years old. Tier 1: Other | **Tier 3** : Estimate based on repeated compatible tiers 3 (tier for status) **Tier 2** : Estimate based on repeated compatible tier 2 or combination tier 3 and 2 or 1 (tier for status) **Tier 1** : Other |

Table 18b - Holder of management rights of public forests

Categories	Forest area (000 hectares)			
	1990	**2000**	**2005**	**2010**
Public Administration	255132	244097	239498	238669
Individuals	2318	2318	2282	2269
Private companies	51874	58110	59978	60971
Communities	7421	11782	14229	14142
Other	1544	1552	1665	1351
TOTAL	318289.00	317859.00	317652.00	317402.00

Category	Tier for reported trend	Tier for status
Public Administration	Tier 3	Tier 3
Individuals	Tier 3	Tier 3
Private companies	Tier 3	Tier 3
Communities	Tier 3	Tier 3
Other	Tier 3	Tier 3

18.5 Comments

Category	Comments related to data definitions etc	Comments on the reported trend
Public ownership	N/A	N/A
Private ownership	Original data do not distinguish between private ownership by individuals versus private ownership by business entities or institutions. All private ownership is reported as individuals.	N/A
Unknown ownership	N/A	N/A

Management rights	N/A	N/A

Other general comments to the table
Ontario - Data for early 90's not readily available.

19. How many people are directly employed in forestry?

Documents for this question:

- Guide for country reporting FRA 2015
- FRA 2015 Terms and Definitions

19.1 Categories and definitions

Category	Definition
Full-time equivalents (FTE)	A measurement equal to one person working full-time during a specified reference period.
Employment in forestry	Employment in activities related to production of goods derived from forests. This category corresponds to the ISIC/NACE Rev. 4 activity A02 (Forestry and logging).

19.2 National data

19.2.1 Data sources

	References to sources of information	Variables	Years	Additional comments
1	Labour Force Survey, Statistics Canada	Labour	1990, 2000, 2005, 2010	N/A
2	Source: Statistics Canada.	N/A	2013	North American Industry Classification System Canada 2007. Statistics Canada – Catalogue No. 12-501-XPE. 771 p.
3	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A

19.2.2 Classification and definitions

National class	Definition

Forestry and Logging	This subsector comprises establishments primarily engaged in growing and harvesting timber on a long production cycle (of ten years or more). Long production cycles use different production processes than short production cycles, which require more horticultural interventions prior to harvest, resulting in processes more similar to those found in the Crop Production subsector. Consequently, Christmas tree production and other production involving production cycles of less than ten years, are classified to the Crop Production subsector. Industries in this subsector specialize in different stages of the production cycle. Reforestation requires production of seedlings in specialized nurseries. Timber production requires natural forests or suitable areas of land that are available for a long duration. The maturation time for timber depends upon the species of tree, the climatic conditions of the region, and the intended purpose of the timber. The harvesting of timber, except when done on an extremely small scale, requires specialized machinery unique to the industry. The gathering of forest products, such as gums, barks, balsam needles and Spanish moss, are also included in this subsector.
Support Activities for Forestry	This industry comprises establishments primarily engaged in performing particular support activities related to harvesting timber. Example Activities Cruising timber Forestfire fighting services Log hauling in the bush (i.e., within the logging limits) Pest control services, forestry Reforestation services Timber cruising Timber valuation
N/A	N/A
N/A	N/A

19.2.3 Original data

Employment by industry (NAICS), Annual Averages

NAICS	1990	2000	2005	2010
113 - Forestry and Logging	53 200	57 100	46 400	32 000
1153 – Support Activities for Forestry	20 200	29 400	23 200	20 000
Total *	**73 400**	**86 500**	**69 600**	**52 000**

* Total includes NAICS codes 113, 1153

Source: Labour Force Survey, Statistics Canada, Special Extraction
NAICS codes utilized:

1131 + 1132 + 1133 – Forestry and Logging
1153 – Support Activities for Forestry

19.3 Data

Table 19

Category		Employment (000 years FTE)			
		1990	2000	2005	2010
CFRQ	Employment in forestry	73.4	86.5	69.6	52
CFRQ	... of which female	8.5	10.6	11.2	7.9

19.4 Comments

Category	Comments related to data definitions etc	Comments on the reported trend
Employment in forestry	N/A	N/A

Other general comments to the table
N/A

20. What is the contribution of forestry to Gross Domestic Product (GDP)?

Documents for this question:

- Guide for country reporting FRA 2015
- FRA 2015 Terms and Definitions

20.1 Categories and definitions

Category	Definition
Gross value added from forestry (at basic prices)	This category corresponds to the ISIC/NACE Rev. 4 activity A02 (Forestry and logging).

20.2 Data

Table 20 (Pre-filled data from UNdata/EUROSTAT)

Category	Million	Currency	Year for latest available information
Gross value added from forestry (at basic prices)	4292	Nominal Canadian dollars	2012

20.3 Comments

Category	Comments
Gross value added from forestry (at basic prices)	Nominal Gross Domestic Product in nominal dollars. Includes Forestry and Logging (NAICS 113). Data for Support Activities for Forestry (NAICS 1153) not available.

Other general comments

21. What is forest area likely to be in the future

Documents for this question:

- Guide for country reporting FRA 2015
- FRA 2015 Terms and Definitions

21.1 Categories and definitions

Category	Definition
Government target/ aspiration for forest area	Government target/aspiration for forest area for a specific year.
Forests earmarked for conversion	Forest area that is allocated/classified or scheduled to be converted into non-forest uses.

21.2 National data

21.2.1 Data sources

	References to sources of information	Variables	Years	Additional comments
1	N/A	N/A	N/A	N/A
2	N/A	N/A	N/A	N/A
3	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A

21.3 Data

Table 21a

Category	Forest area (000 ha)	
	2020	2030
Government target/aspiration for forest area	N/A	N/A

Table 21b

Category	Forest area (000 ha)
	2013
Forests earmarked for conversion	N/A

21.4 Comments

Category	Comments
Government target/aspiration for forest area	N/A

Forests earmarked for conversion	N/A

Other general comments