Food and Agriculture Organization of the United Nations

# Global Forest Resources Assessment 2020

## Report

## Sweden

Rome, 2020

FAO has been monitoring the world's forests at 5 to 10 year intervals since 1946. The Global Forest Resources Assessments (FRA) are now produced every five years in an attempt to provide a consistent approach to describing the world's forests and how they are changing. The FRA is a country-driven process and the assessments are based on reports prepared by officially nominated National Correspondents. If a report is not available, the FRA Secretariat prepares a desk study using earlier reports, existing information and/or remote sensing based analysis.

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# Introduction

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### Introductory text

The most important producers of official forestry statistics, in Sweden are the Swedish Forest Agency, the Swedish National Forest Inventory at the Swedish University of Agricultural Sciences and Statistics Sweden.

**Swedish Forest Agency**

The Swedish Forest Agency (Skogsstyrelsen) is the Government's expert authority on forests and forest policy. Their mission is to work for a sustainable utilization of the Swedish forests according to the guidelines given by the Parliament and the Government. The SFA (Swedish Forest Agency) is as well responsible for producing Official Statistics of Sweden’s forest.

**National Inventory of Landscapes in Sweden**

National Inventory of Landscapes in Sweden (NILS) is a nation-wide environmental protection programme, financed by the Swedish Environmental Protection Agency (SEPA), but performed by the Swedish University of Agricultural Sciences (SLU) that monitors the conditions and changes in the Swedish landscape and how these changes influence the conditions for biodiversity. The programme was started in 2003.

**Swedish Forest Soil Inventory**

The Swedish Forest Soil Inventory (SFSI), financed by SEPA, but performed by SLU, carries out long-term monitoring on the permanent sample plots of the Swedish National Forest Inventory. The Programme has been ongoing since 1983.

**National Forest Inventory**

The Swedish National Forest Inventory (NFI), financed and performed by SLU, is an annual inventory covering the entire area of Sweden. It is performed as a sampling survey with low sampling fraction. The objective of the inventory is to provide basic data for planning and control of the forest resource at the national and regional level and to give basic data for forest research. The main task is therefore to give information on the state and change of the forest resource and of land use. The Swedish NFI has been ongoing since 1923. Since 1953, the inventory has covered the entire country every year. Since 1983, the annual sample has consisted of some 17,000 systematically distributed circular plots. Of these, 10,000–11,000 fall on productive forest land. The inventory consists of permanent plots with a radius of 10 m as well as temporary ones with a radius of 7 m. The permanent plots are re-inventoried after 5 years, thus allowing an effective estimation of changes. The main observations on all land are land use category, ownership category, growing stock, growth, tree distribution and recent felling. On productive forest land: terrain conditions, vegetation cover, maturity class, age, site quality, recent and suggested silvicultural measures, the degree of stocking damage and regeneration status (in young stands). From 2003 a modified methodology was introduced in the NFI, where also areas within National parks and Nature reserves were visited in the field. From 2016 the NFI also performs inventory on Forestland within the Alpine region. This has made it possible to estimate the total Forestland, OWL and Other land area Sweden only using NFI-data. In FRA 2015 this was made by using proportions on Forest, OWL and Other land within the Alpine region from another inventory programme (NILS) and applying this on the NFI area estimate of the Alpine region.

Calibration of earlier reported figures has been made to adjust time series not to show the modified methodology, but instead reasonably realistic trends. In this report no calibration to a fixed national area according to the UN has been made. Instead, the area of Inland water bodies is fixed and the land class Other land has been used for balancing the total national area. Estimates for 2005, 2010 and 2015 has been made using NFI-data for other land of which with tree cover, while the figures for 1990 and 2000 has been set to the same area as for 2010 as an expert judgment of marginal change. In all, this has lead marginal changes overall. The results of the NFI are in most cases unbiased, but may have significant sample errors. To secure a good precision for the estimates usually mean values from several years is used, generally a five year period. In the reporting for FRA 2020 data from the inventory years 2013-2017 has been used.

**Target-tailored Forest Damage Inventory**

The Swedish Target-tailored forest damage inventory (TFDI) is aiming at providing data for operational decision making at local level and linked to specific damage event and are undertaken at the Swedish University of Agricultural Sciences. Although the Swedish NFI is an objective and uniform inventory of forest damage in Swedish forests at national and regional scales, less common or less widespread occurrences of forests pests and pathogens are difficult to survey solely through large-scale monitoring programmes. There is a need for complementary tailored inventories to facilitate timely delivery of relevant information. TDFIs are developed to give a rapid response to requested information on specific damage. The TDFIs are carried out in limited and concentrated samples, with flexible but robust methods and design.

**Statistics Sweden**

Statistics Sweden bears overall responsibility for coordination and supervising official statistics in Sweden. They also have particular responsibility for official statistics in certain broad social fields for example the labor market, the economy, trade and industry, population and welfare, housing and construction. The forestry sector benefits especially from the statistics on industrial production and consumption of raw materials, foreign trade with forest- and forest industry products and transports of timber and stocks of timber, chips and sawn wood.

**Swedish Rescue Services Agency**

The Swedish Rescue Services Agency annually collects turn-out reports from the municipal fire brigades and read them into a national turn-out database from which statistics on forest fire can be drawn.

**National Data and Transformation/Reclassification**

The detailed information from the National Forest Inventory is annually recorded in a database. National reported statistics are extracted according to national definitions and needs. Original data can be extracted from the database according to the defined query put to the database. Depending on definitions and restrictions entered in the query different primary data can be extracted from the database.

In case of Sweden, when reporting for the FRA 2020, Sweden will in most cases not need to transform or “Reclassify” national forest data to FRA reporting tables with appurtenant classes and definitions. The main bulk of national information for the FRA 2020 global reporting tables can be extracted as primary data from the detailed NFI database using FRA 2020 variables and definitions. However, since major changes have been made in the NFI methodology from 2003, earlier reported figures have been adjusted using expert judgements to reflect the actual lack of obvious trends. Additional data on protected land has also been extracted from the Swedish Forest Agency registers.

# 1 Forest extent, characteristics and changes

## 1a Extent of forest and other wooded land

### National data

#### Data sources

| | | |
|---|---|---|
| **1990** | **References** | Fridman, J., Holm, S., Nilsson, M., Nilsson, P., Ringvall, A., Ståhl, G., 2014. Adapting National Forest Inventories to changing requirements - the case of the Swedish National Forest Inventory at the turn of the 20th century. Silva Fennica vol. 48 no. 3 article id 1095. http://dx.doi.org/10.14214/sf.1095. |
| | **Methods used** | National Forest Inventory |
| | **Additional comments** | |

| | | |
|---|---|---|
| **2000** | **References** | Fridman, J., Holm, S., Nilsson, M., Nilsson, P., Ringvall, A., Ståhl, G., 2014. Adapting National Forest Inventories to changing requirements - the case of the Swedish National Forest Inventory at the turn of the 20th century. Silva Fennica vol. 48 no. 3 article id 1095. http://dx.doi.org/10.14214/sf.1095. |
| | **Methods used** | National Forest Inventory |
| | **Additional comments** | |

| | | |
|---|---|---|
| **2010** | **References** | Fridman, J., Holm, S., Nilsson, M., Nilsson, P., Ringvall, A., Ståhl, G., 2014. Adapting National Forest Inventories to changing requirements - the case of the Swedish National Forest Inventory at the turn of the 20th century. Silva Fennica vol. 48 no. 3 article id 1095. http://dx.doi.org/10.14214/sf.1095. |
| | **Methods used** | National Forest Inventory |
| | **Additional comments** | |

| | | |
|---|---|---|
| **2015** | **References** | Fridman, J., Holm, S., Nilsson, M., Nilsson, P., Ringvall, A., Ståhl, G., 2014. Adapting National Forest Inventories to changing requirements - the case of the Swedish National Forest Inventory at the turn of the 20th century. Silva Fennica vol. 48 no. 3 article id 1095. http://dx.doi.org/10.14214/sf.1095. |
| | **Methods used** | National Forest Inventory |
| | **Additional comments** | |

#### Classifications and definitions

| 1990 | National class | Definition |
|---|---|---|
| | Forest | According to FAO definition |
| | Other wooded land | According to FAO definition |
| | Other land | |

| | | |
|---|---|---|
| | | According to FAO definition |

| | National class | Definition |
|---|---|---|
| 2000 | Forest | According to FAO definition |
| | Other wooded land | According to FAO definition |
| | Other land | According to FAO definition |

| | National class | Definition |
|---|---|---|
| 2010 | Forest | According to FAO definition |
| | Other wooded land | According to FAO definition |
| | Other land | According to FAO definition |

| | National class | Definition |
|---|---|---|
| 2015 | Forest | According to FAO definition |
| | Other wooded land | According to FAO definition |
| | Other land | According to FAO definition |

### Original data and reclassification

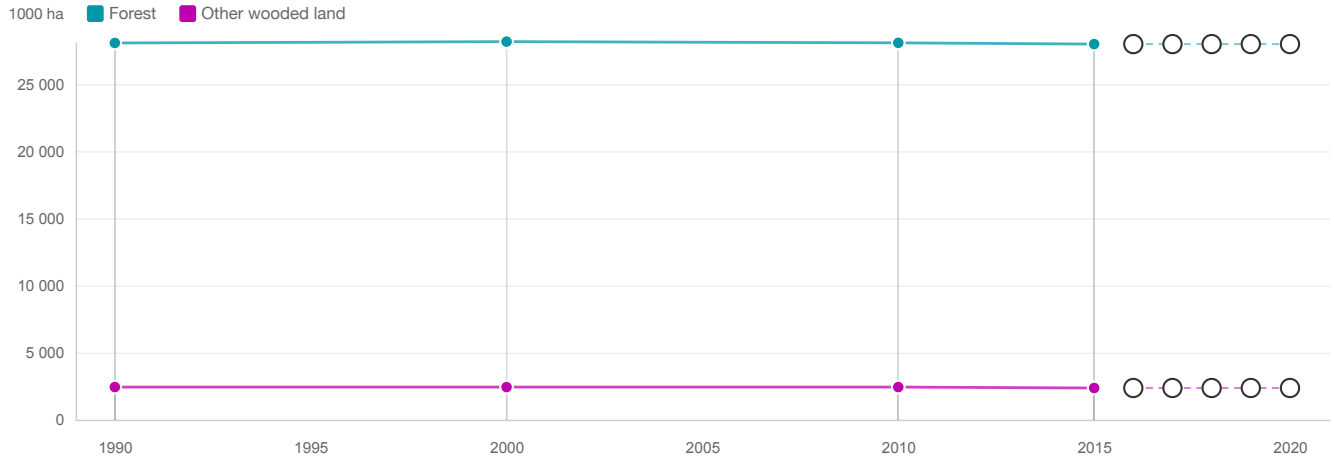
| | Classifications and definitions | | FRA classes | | |
|---|---|---|---|---|---|
| | **Class** | **Area (1000 ha)** | **Forest** | **Other wooded land** | **Other land** |
| 1990 | Forest | 28 063.00 | 100.00 % | 0.00 % | **0.00 %** |
| | Other wooded land | 2 432.00 | 0.00 % | 100.00 % | **0.00 %** |
| | Other land | 10 579.00 | 0.00 % | 0.00 % | **100.00 %** |
| | **Total** | **41 074.00** | **28 063.00** | **2 432.00** | **10 579.00** |

| 2000 | Classifications and definitions | | FRA classes | | |
|---|---|---|---|---|---|
| | **Class** | **Area (1000 ha)** | **Forest** | **Other wooded land** | **Other land** |

| | | | | | |
|---|---|---|---|---|---|
| | Forest | 28 163.00 | 100.00 % | 0.00 % | **0.00 %** |
| | Other wooded land | 2 432.00 | 0.00 % | 100.00 % | **0.00 %** |
| | Other land | 10 479.00 | 0.00 % | 0.00 % | **100.00 %** |
| | **Total** | **41 074.00** | **28 163.00** | **2 432.00** | **10 479.00** |

| | **Classifications and definitions** | | **FRA classes** | | |
|---|---|---|---|---|---|
| | **Class** | **Area (1000 ha)** | **Forest** | **Other wooded land** | **Other land** |
| **2010** | Forest | 28 073.00 | 100.00 % | 0.00 % | **0.00 %** |
| | Other wooded land | 2 432.00 | 0.00 % | 100.00 % | **0.00 %** |
| | Other land | 10 569.00 | 0.00 % | 0.00 % | **100.00 %** |
| | **Total** | **41 074.00** | **28 073.00** | **2 432.00** | **10 569.00** |

| | **Classifications and definitions** | | **FRA classes** | | |
|---|---|---|---|---|---|
| | **Class** | **Area (1000 ha)** | **Forest** | **Other wooded land** | **Other land** |
| **2015** | Forest | 27 980.00 | 100.00 % | 0.00 % | **0.00 %** |
| | Other wooded land | 2 364.00 | % | 100.00 % | **%** |
| | Other land | 10 387.00 | 0.00 % | 0.00 % | **100.00 %** |
| | **Total** | **40 731.00** | **27 980.00** | **2 364.00** | **10 387.00** |


1000 ha
Forest
Other wooded land
25 000
20 000
15 000
10 000
5 000
0
1990
1995
2000
2005
2010
2015
2020

| FRA categories | Area (1000 ha) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1990 | 2000 | 2010 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Forest (a) | 28 063.00 | 28 163.00 | 28 073.00 | 27 980.00 | 27 980.00 | 27 980.00 | 27 980.00 | 27 980.00 | 27 980.00 |
| Other wooded land (a) | 2 432.00 | 2 432.00 | 2 432.00 | 2 364.00 | 2 364.00 | 2 364.00 | 2 364.00 | 2 364.00 | 2 364.00 |
| **Other land (c-a-b)** | **10 236.00** | **10 136.00** | **10 226.00** | **10 387.00** | **10 387.00** | **10 387.00** | **10 387.00** | **10 387.00** | **10 387.00** |
| **Total land area (c)** | **40 731.00** | **40 731.00** | **40 731.00** | **40 731.00** | **40 731.00** | **40 731.00** | **40 731.00** | **40 731.00** | **40 731.00** |

The FAOSTAT land area figure for the year 2015 is used for all reference years

| Climatic domain | % of forest area 2015 | Override value |
|---|---|---|
| Boreal | **71.00** | 73.50 |
| Temperate | **29.00** | 26.50 |
| Sub-tropical | **0.00** | |
| Tropical | **0.00** | |

## Comments

- Proportion of Forest and OWL within the alpine region is updated with NFI-data from field inventory 2016 & 2017. This lead to a decrease of the total Forest and OWL area since new estimate is slightly lower than the previous estimate based on other data and therefore the 2015 estimate does not match FRA 2015 figures.
- 2016-2020 figures are "no change" estimates based on 2015
- New estimate of proportions of Climatic domain using NFI-data and climatic regions from the Nordic council according to above. Therefore we inserted "Override values".

# 1b Forest characteristics

## National Data

### Data sources + type of data source eg NFI, etc

NFI

Fridman, J., Holm, S., Nilsson, M., Nilsson, P., Ringvall, A., Ståhl, G., 2014. Adapting National Forest Inventories to changing requirements - the case of the Swedish National Forest Inventory at the turn of the 20th century. *Silva Fennica* vol. 48 no. 3 article id 1095. http://dx.doi.org/10.14214/sf.1095.

### National classification and definitions

Up to 1950 expert judgements based on forest-history research. From 1950 NFI-data is used, i.e. the annual re-forested area with modelled proportion of re-forestation on already silvicultured area.

### Original data

Up to 1950 expert judgement. From 1950 NFI-database.

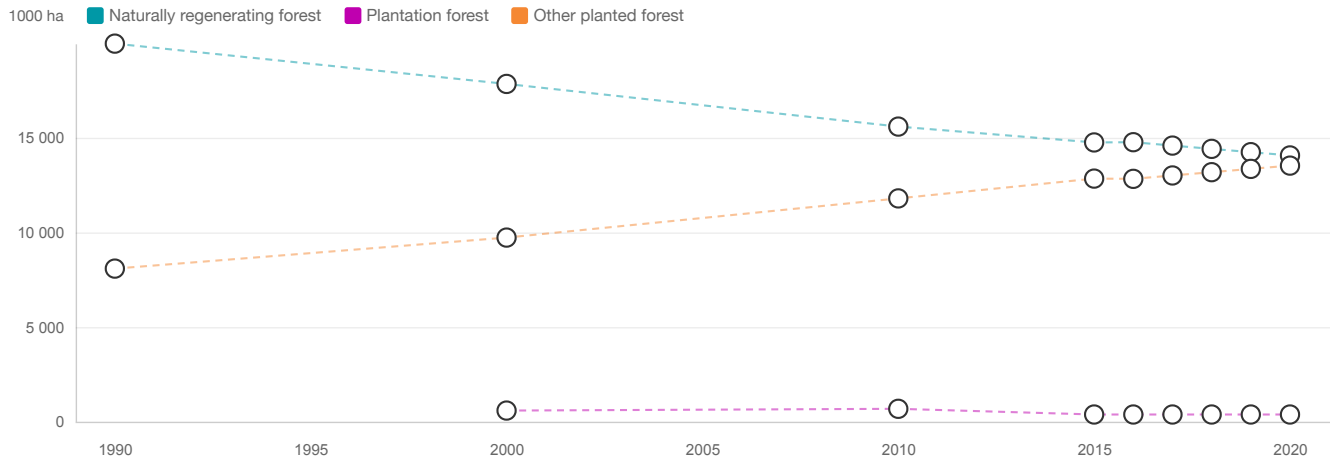
## Analysis and processing of national data

### Estimation and forecasting

Forecasting 2018-2020 is made through extrapolation of the annual change in ration between categories, using 2013 and 2017 as datapoints.

### Reclassification into FRA 2020 categories

-


1000 ha
Naturally regenerating forest
Plantation forest
Other planted forest
15 000
10 000
5 000
0
1990
1995
2000
2005
2010
2015
2020

| FRA categories | Forest area (1000 ha) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1990 | 2000 | 2010 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Naturally regenerating forest (a) | 19 974.00 | 17 845.00 | 15 592.00 | 14 754.00 | 14 767.00 | 14 588.00 | 14 415.00 | 14 241.00 | 14 068.00 |
| **Planted forest (b)** | **8 089.00** | **10 318.00** | **12 481.00** | **13 226.00** | **13 213.00** | **13 392.00** | **13 565.00** | **13 739.00** | **13 912.00** |
| Plantation forest | | 590.00 | 683.00 | 382.00 | 382.00 | 382.00 | 382.00 | 382.00 | 382.00 |
| …of which introduced species | | 70.00 | 105.00 | 63.00 | 63.00 | 63.00 | 63.00 | 63.00 | 63.00 |
| Other planted forest | 8 089.00 | 9 728.00 | 11 798.00 | 12 844.00 | 12 831.00 | 13 010.00 | 13 183.00 | 13 357.00 | 13 530.00 |
| **Total (a+b)** | **28 063.00** | **28 163.00** | **28 073.00** | **27 980.00** | **27 980.00** | **27 980.00** | **27 980.00** | **27 980.00** | **27 980.00** |
| **Total forest area** | **28 063.00** | **28 163.00** | **28 073.00** | **27 980.00** | **27 980.00** | **27 980.00** | **27 980.00** | **27 980.00** | **27 980.00** |

### Comments

Data on the area of silvicultural measures up to 1950 from historical sources (expert judgement). From 1953 NFI-data on silvicultural measures. From 1983 the annual area in southern Sweden is reduced since clear-felling of silvicultured area should not be counted. Same method for middle Sweden from 1993. In northern Sweden all clear-felled area is still performed on areas that never has been silvicultured before.

In the NFI-field work we directly assess the stand characteristics in terms of naturalness (or lack of naturalness)

1. Natural or near-natural Forest (Occurence of Large dead-wood trees, no silvicultural measures during the last 25 years, stand age > 150 years, un-even aged stand, large dbh-distribution, two or more tree-layers)

2. Plantation forest (Productive forestland (national definition), No occurrence of old dead wood, one tree species is dominating >85%, extremely evenaged, only one tree-layer)

3. Normal forest (stands that are not classified as 1 or 2)

# 1c Primary forest and special forest categories

## National Data

### Data sources + type of data source eg NFI, etc

NFI

Fridman, J., Holm, S., Nilsson, M., Nilsson, P., Ringvall, A., Ståhl, G., 2014. Adapting National Forest Inventories to changing requirements - the case of the Swedish National Forest Inventory at the turn of the 20th century. *Silva Fennica* vol. 48 no. 3 article id 1095. http://dx.doi.org/10.14214/sf.1095.

### National classification and definitions

- Temporarily unstocked: Not regenerated forestland (Egentlig kalmark A1) + Forest < 1.3m (B2))
- Recently regenereted: Combination of NFI plot description of forestry measures performed within five years before inventory: Planting, seeds, seed-trees and understorey regeneration

### Original data

NFI estimates:

| 1000 ha | | | | | |
|---|---|---|---|---|---|
| | 1990 | 2000 | 2005 | 2010 | 2015 |
| Temporarily unstocked | 1140 | 1027 | | 1003 | 961 |
| Recently regenerated | 1262 | 1138 | | 962 | 863 |
| Temporarily unstocked and/or recently regenerated | 2402 | 2164 | | 1964 | 1824 |
| Alpine birch areas | | | 751 | 751 | 751 |
| Productive Forestland with a high degree of naturalness | | | 595 | 641 | 516 |
| Subalpine spruce forests | | | 783 | 973 | 982 |
| Primary Forest | | | 2129 | 2365 | 2249 |

## Analysis and processing of national data

### Estimation and forecasting

Forecasting: No change

### Reclassification into FRA 2020 categories

Primary forest was classified using NFI variables:

1. Productive Forestland (national definition) with a high degree of naturalness (stand age > 150 yrs, no forestry measures during the last 25 years, occurrence of large dead trees (dbh>25 cm), two or more tree-layers)
2. Forest within the alpine area (mainly alpine birch areas). This area was earlier estimated using other data sources than NFI-data but since NFI performs field work in the alpine area from 2016 the NFI estimate of this area is now used for all reporting years.
3. Subalpine spruce forests

| FRA categories | Area (1000 ha) | | | | |
|---|---|---|---|---|---|
| | 1990 | 2000 | 2010 | 2015 | 2020 |
| Primary forest | | 2 129.00 | 2 365.00 | 2 249.00 | 2 249.00 |
| Temporarily unstocked and/or recently regenerated | 2 402.00 | 2 164.00 | 1 964.00 | 1 824.00 | 1 824.00 |
| Bamboos | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Mangroves | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rubber wood | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

### Comments

- 2 417 000 ha of Primary forest was reported for 2010 in FRA2015 but a change of method for estimating forest in the Alpine area (-150000 ha) gave this lower estimate for 2010. Not possible to estimate earlier than 2010 due to lack of data.
- The variation in the area of Primary forest is due to variation in the area of productive forestland with a high degree of naturalness. However this estimate has a very high coeficient of variation so the changes is not statistically signifficant.
- Due to changes in the NFI-methods estimates for 2005 (data from 2003-2007) is used for the reporting of Primary Forest 2000
- Since the NFI-methods for productive forestland outside reserves has been consistent trough out the whole period we can report Temporarily unstocked and/or recently regenerated area for all reporting years using 5-year averages from NFI-data

# 1d Annual forest expansion, deforestation and net change

## National Data

### Data sources + type of data source eg NFI, etc

Fridman, J., Holm, S., Nilsson, M., Nilsson, P., Ringvall, A., Ståhl, G., 2014. Adapting National Forest Inventories to changing requirements - the case of the Swedish National Forest Inventory at the turn of the 20th century. *Silva Fennica* vol. 48 no. 3 article id 1095. http://dx.doi.org/10.14214/sf.1095.

### National classification and definitions

Landuse change based on permanent NFI-plot analysis for landuse change

### Original data

NFI databas

## Analysis and processing of national data

### Estimation and forecasting

NFI-data used for estimates and forecasting using present annual estimates.

### Reclassification into FRA 2020 categories

Not needed

| FRA categories | Area (1000 ha/year) | | | |
|---|---|---|---|---|
| | 1990-2000 | 2000-2010 | 2010-2015 | 2015-2020 |
| Forest expansion (a) | 21.49 | 11.82 | 19.55 | 13.05 |
| …of which afforestation | 8.87 | 11.82 | 19.55 | 13.05 |
| …of which natural expansion | 12.62 | 0.00 | 0.00 | 0.00 |
| Deforestation (b) | 11.49 | 20.82 | 38.15 | 13.05 |
| Forest area net change (a-b) | **10.00** | **-9.00** | **-18.60** | **0.00** |

### Comments

Figures modified to fit according to the Swedish climate reporting

# 1e Annual reforestation

## National Data

### Data sources + type of data source eg NFI, etc

Fridman, J., Holm, S., Nilsson, M., Nilsson, P., Ringvall, A., Ståhl, G., 2014. Adapting National Forest Inventories to changing requirements - the case of the Swedish National Forest Inventory at the turn of the 20th century. *Silva Fennica* vol. 48 no. 3 article id 1095. http://dx.doi.org/10.14214/sf.1095.

### National classification and definitions

NFI-registrations include silvicultural measures including time for measure.

### Original data

NFI database

## Analysis and processing of national data

### Estimation and forecasting

NFI-estimates. Forecastimg using present annual reforestation estimate

### Reclassification into FRA 2020 categories

Not needed

| FRA categories | Area (1000 ha/year) | | | |
|---|---|---|---|---|
| | 1990-2000 | 2000-2010 | 2010-2015 | 2015-2020 |
| Reforestation | 122.45 | 126.99 | 166.81 | 134.72 |

### Comments

Planting, sewing and natural regeneration using seed-trees included. Silviculture measures on non-forestland excluded.

Averages of annual reforestation for the years 1990-1999, 2000-2009, 2010-2014, 2015-2016, i.e. only two years of data för the period 2015-2020.

# 1f Other land with tree cover

## National Data

### Data sources + type of data source eg NFI, etc

NFI-data

### National classification and definitions

The Swedish figures of Other land with tree cover has been incorrectly reported in previous FRAs. For areas not fulfilling the criterias of Forest or OWL we do not have data on crown cover or potential tree height. To be able to report anything we can only use existance of trees as an indicator otherwise Sweden will report "No data"

### Original data

NFI database

## Analysis and processing of national data

### Estimation and forecasting

Forecast=No change

### Reclassification into FRA 2020 categories

As stated above we can not due to lack of data on crown cover and potential height on Other land report according to the FRA2020 definitions. Therefore we use the indicator "Existing trees" instead. Should this be incorrect Sweden will report "No data" för this table

| FRA categories | Area (1000 ha) | | | | |
|---|---|---|---|---|---|
| | 1990 | 2000 | 2010 | 2015 | 2020 |
| Palms (a) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Tree orchards (b) | | | | | |
| Agroforestry (c) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Trees in urban settings (d) | | | | | |
| Other (specify in comments) (e) | | | | | |
| **Total (a+b+c+d+e)** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |
| Other land area | **10 236.00** | **10 136.00** | **10 226.00** | **10 387.00** | **10 387.00** |

### Comments

The Swedish figures of Other land with tree cover (Power lines, roads, small patches within agricultureland) has been incorrectly reported in previous FRAs. For areas not fulfilling the criterias of Forest or OWL we do not have data on crown cover or potential tree height, i.e. Sweden can not report on this other than Missing data. The Swedish NFI has no data on trees in any other category..

# 2 Forest growing stock, biomass and carbon

## 2a Growing stock

### National Data

#### Data sources + type of data source eg NFI, etc

NFI

Fridman, J., Holm, S., Nilsson, M., Nilsson, P., Ringvall, A., Ståhl, G., 2014. Adapting National Forest Inventories to changing requirements - the case of the Swedish National Forest Inventory at the turn of the 20th century. *Silva Fennica* vol. 48 no. 3 article id 1095. http://dx.doi.org/10.14214/sf.1095.

#### National classification and definitions

According to FRA definitions except that figures reported is minimum dbh 0 cm, i.e. not according to the FRA definitions

#### Original data

NFI database

### Analysis and processing of national data

#### Estimation and forecasting

Forecasting 2016-2020 is made by extrapolation of the annual change in m3/ha per categories (excluding mountain birch areas since the estimates are to varying using only two years of field data), using 2010 and 2015 estimates.

For the first time Sweden have performed field work within the Alpine region and therefore we now have figures for growing stock in Forest and OWL also from this area. However since this was started in 2016 we only have two years of data and will then calibrate data where growing stock from Alpine areas was not included using data from 2016 and 2017 for growing stock within the Alpine area.

Sweden can only produce comparable statistics back to 2005 since inventory within reserves was started in 2003. **Therefore reporting figure for 2000 is for NFI-data from 2003-2007, i.e. reporting year 2005.  Also datapoint 1990 is the same as for 2000 (2005) .**

Figures reported is minimum dbh 0 cm, i.e. not according to the FRA definitions

#### Reclassification into FRA 2020 categories

Sweden can not reclassify according to the FRA regeneration classes (Naturally/Planted). Sweden do not keep track on when and how forests have been regenerated and in the Swedish NFI we only discribe forest history 25 years before inventory, i.e. for forests with stand age >= 25 years no information is registered on regeneration type.

| FRA categories | Growing stock m³/ha (over bark) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1990 | 2000 | 2010 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Naturally regenerating forest | | | | | | | | | |
| Planted forest | | | | | | | | | |
| …of which plantation forest | | 158.40 | 162.40 | 191.70 | 198.00 | 203.40 | 209.20 | 215.00 | 220.90 |
| …of which other planted forest | | | | | | | | | |
| Forest | 113.48 | 113.08 | 117.36 | 124.29 | 125.55 | 126.81 | 128.07 | 129.33 | 130.59 |
| Other wooded land | 5.74 | 5.74 | 5.34 | 7.06 | 7.47 | 7.88 | 8.29 | 8.70 | 9.11 |

| FRA categories | Total growing stock (million m³ over bark) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1990 | 2000 | 2010 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Naturally regenerating forest | | | | | | | | | |
| Planted forest | | | | | | | | | |
| …of which plantation forest | 93.46 | 93.46 | 110.92 | 73.23 | 75.64 | 77.70 | 79.91 | 82.13 | 84.38 |
| …of which other planted forest | | | | | | | | | |
| Forest | 3 184.67 | 3 184.67 | 3 294.65 | 3 477.63 | 3 512.89 | 3 548.14 | 3 583.40 | 3 618.65 | 3 653.91 |
| Other wooded land | 13.96 | 13.96 | 12.99 | 16.69 | 17.66 | 18.63 | 19.60 | 20.57 | 21.54 |

### Comments

Data from NFI-plots used for estimates on growing stock, however due to long rotation periods in Swedish forestry (60-140 yrs) field data do not include forest history back to time of regeneration. However growing stock for plantations is included since this is defined by other characters than regeneration methods.

# 2b Growing stock composition

## National Data

### Data sources + type of data source eg NFI, etc

NFI

Fridman, J., Holm, S., Nilsson, M., Nilsson, P., Ringvall, A., Ståhl, G., 2014. Adapting National Forest Inventories to changing requirements - the case of the Swedish National Forest Inventory at the turn of the 20th century. *Silva Fennica* vol. 48 no. 3 article id 1095. http://dx.doi.org/10.14214/sf.1095.

### National classification and definitions

According to FRA definitions except that figures reported is minimum dbh 0 cm, i.e. not according to the FRA definitions

### Original data

NFI database

## Analysis and processing of national data

### Estimation and forecasting

For the first time Sweden have performed field work within the Alpine region and therefore we now have figures for growing stock in Forest and OWL also from this area. However since this was started in 2016 we only have two years of data and will then calibrate data where growing stock from Alpine areas was not included using data from 2016 and 2017 for growing stock within the Alpine area.

Sweden can only produce comparable statistics back to 2005 since inventory within reserves was started in 2003. **Therefore reporting figure for 2000 is for NFI-data from 2003-2007, i.e. reporting year 2005. Also datapoint 1990 is the same as for 2000 (2005) .**

Forecasting=Species distribution according to 2015 x Total growing stock 2020

### Reclassification into FRA 2020 categories

Not needed

| FRA categories | Scientific name | Common name | Growing stock in forest (million m³ over bark) | | | | |
|---|---|---|---|---|---|---|---|
| | | | 1990 | 2000 | 2010 | 2015 | 2020 |
| **Native tree species** | | | | | | | |
| #1 Ranked in terms of volume | Picea abies | Norway Spruce | 1 302.73 | 1 302.73 | 1 313.40 | 1 385.84 | 1 456.09 |
| #2 Ranked in terms of volume | Pinus sylvestris | Scots pine | 1 206.64 | 1 206.64 | 1 251.99 | 1 315.66 | 1 382.35 |
| #3 Ranked in terms of volume | Betula sp. | Birch | 480.66 | 480.66 | 504.87 | 524.09 | 550.66 |
| #4 Ranked in terms of volume | Populus tremula | Aspen | 43.37 | 43.37 | 51.04 | 52.97 | 55.66 |
| #5 Ranked in terms of volume | Quercus robur | English oak | 31.42 | 31.42 | 37.16 | 39.43 | 41.42 |
| #6 Ranked in terms of volume | Alnus Incana | Black alder | 26.59 | 26.59 | 32.35 | 37.33 | 39.22 |
| #7 Ranked in terms of volume | Fagus sylvatica | Beech | 22.89 | 22.89 | 17.58 | 23.09 | 24.26 |
| #8 Ranked in terms of volume | Alnus incana | Grey alder | 13.66 | 13.66 | 13.62 | 16.24 | 17.07 |
| #9 Ranked in terms of volume | Salix caprea | Goat willow | 14.94 | 14.94 | 14.85 | 15.48 | 16.26 |
| #10 Ranked in terms of volume | Sorbus aucuparia | Rowan | 5.88 | 5.88 | 6.59 | 6.33 | 6.65 |
| **Remaining native tree species** | | | 13.52 | 13.52 | 16.63 | 18.03 | 18.94 |
| **Total volume of native tree species** | | | **3 162.30** | **3 162.30** | **3 260.08** | **3 434.49** | **3 608.58** |
| **Introduced tree species** | | | | | | | |
| #1 Ranked in terms of volume | Pinus contorta | Lodgepole pine | 22.37 | 22.37 | 34.57 | 43.14 | 45.33 |
| #2 Ranked in terms of volume | | | | | | | |
| #3 Ranked in terms of volume | | | | | | | |
| #4 Ranked in terms of volume | | | | | | | |
| #5 Ranked in terms of volume | | | | | | | |
| **Remaining introduced tree species** | | | | | | | |

| FRA categories | Scientific name | Common name | Growing stock in forest (million m³ over bark) | | | | |
|---|---|---|---|---|---|---|---|
| | | | 1990 | 2000 | 2010 | 2015 | 2020 |
| **Native tree species** | | | | | | | |
| **Total volume of introduced tree species** | | | **22.37** | **22.37** | **34.57** | **43.14** | **45.33** |
| **Total growing stock** | | | **3 184.67** | **3 184.67** | **3 294.65** | **3 477.63** | **3 653.91** |

### Comments

For 1990 proportions from 2005 is used. For data point 2000 data from 2005 (NFI-data 2003-2007) has been used since data within reserves is missing before 2003. For volume within alpine areas 2000/2005, 2010 and 2015 volume/ha within mountain birch areas have been estimated and the total by multiplying with the area of Forest within the mountain birch area using data from 2016 & 2017, i.e. same volume/ha for all datapoints but total area from the different periods..

# 2c Biomass stock

## National Data

### Data sources + type of data source eg NFI, etc

NFI

Fridman, J., Holm, S., Nilsson, M., Nilsson, P., Ringvall, A., Ståhl, G., 2014. Adapting National Forest Inventories to changing requirements - the case of the Swedish National Forest Inventory at the turn of the 20th century. *Silva Fennica* vol. 48 no. 3 article id 1095. http://dx.doi.org/10.14214/sf.1095.

### National classification and definitions

-

### Original data

-

## Analysis and processing of national data

### Estimation and forecasting

-

### Reclassification into FRA 2020 categories

-

| FRA categories | Forest biomass (tonnes/ha) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1990 | 2000 | 2010 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Above-ground biomass | 66.42 | 66.42 | 68.74 | 70.96 | 71.26 | 71.56 | 71.86 | 72.17 | 72.47 |
| Below-ground biomass | 22.23 | 22.23 | 23.16 | 23.85 | 23.94 | 24.05 | 24.16 | 24.26 | 24.37 |
| Dead wood | 3.56 | 3.56 | 4.45 | 4.79 | 4.86 | 4.94 | 5.02 | 5.10 | 5.18 |

### Comments

For 2000 we are using data from 2005 (NFI-data 2003-2007) since data within reserves is missing before 2003. For volume within apline areas 2000 (2005), 2010 and 2015 volume/ha within mountain birch areas have been estimated and the total by multiplying with the area of Forest within the mountain birch area using data from  2016 & 2017, i.e. same volume/ha for all datapoints but total area from the different periods.

Sweden can only produce comparable statistics back to 2005 since inventory within reserves was started in 2003. **Therefore reporting figure for 2000 is for NFI-data from 2003-2007, i.e. reporting year 2005.  Also datapoint 1990 is the same as for 2000 (2005) .**

# 2d Carbon stock

## National Data

### Data sources + type of data source eg NFI, etc

NFI

Fridman, J., Holm, S., Nilsson, M., Nilsson, P., Ringvall, A., Ståhl, G., 2014. Adapting National Forest Inventories to changing requirements - the case of the Swedish National Forest Inventory at the turn of the 20th century. *Silva Fennica* vol. 48 no. 3 article id 1095. http://dx.doi.org/10.14214/sf.1095.

### National classification and definitions

-

### Original data

-

## Analysis and processing of national data

### Estimation and forecasting

-

### Reclassification into FRA 2020 categories

-

| FRA categories | Forest carbon (tonnes/ha) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1990 | 2000 | 2010 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Carbon in above-ground biomass | 33.21 | 33.21 | 34.37 | 35.48 | 35.63 | 35.78 | 35.93 | 36.09 | 36.24 |
| Carbon in below-ground biomass | 11.12 | 11.12 | 11.58 | 11.92 | 11.97 | 12.03 | 12.08 | 12.13 | 12.19 |
| Carbon in dead wood | 1.78 | 1.78 | 2.22 | 2.39 | 2.43 | 2.47 | 2.51 | 2.55 | 2.59 |
| Carbon in litter | 24.25 | 24.25 | 24.15 | 25.96 | 25.96 | 25.96 | 25.96 | 25.96 | 25.96 |
| Soil carbon | 53.10 | 53.10 | 55.34 | 55.98 | 55.98 | 55.98 | 55.98 | 55.98 | 55.98 |

| | |
|---|---|
| **Soil depth (cm) used for soil carbon estimates** | 50.00 |

### Comments

Sweden can only produce comparable statistics back to 2005 since inventory within reserves was started in 2003. **Therefore reporting figure for 2000 is for NFI-data from 2003-2007, i.e. reporting year 2005. Also datapoint 1990 is the same as for 2000 (2005) .**

Above-ground biomass and Deadwood biomass x 0.5 = carbon in AGB and deadwood

Carbon in litter and soil is estimated using data from the Swedish Forest Soil Inventory that takes soil and humus samples from a sub-set of the permanent sample plots of the Swedish NFI. Soil samples are analysed on nutrient content, carbon pH etc.

# 3 Forest designation and management

## 3a Designated management objective

### National Data

#### Data sources + type of data source eg NFI, etc

See table under Original data. Row 1 - 7 data from Swedish NFI. Row 8 - 12 data from Swedish Forest Agency (SFA), based on sample surveys of forest properties (8) and notifications of final felling (12) or registry of habitat protection areas and Nature conservation agreements (row 9 and 10).

#### National classification and definitions

See table under Original data.

#### Original data

| | | | 1990 | 2000 | 2010 | 2015 |
|---|---|---|---|---|---|---|
| NFI data | | | | | | |
| 1 | Forest | 1000 ha | 28 063,00 | 28 163,00 | 28 073,00 | 27 980,00 |
| | | | | | | |
| 3 | Productive Forest | 1000 ha | 23 222,00 | 23 222,00 | 23 222,00 | 23 503,32 |
| 4 | Productive forest within protected areas (NP, NR, NVO) | 1000 ha | 392,00 | 766,69 | 945,54 | 847,69 |
| 5 | Productive forest outside protected areas (NP, NR, NVO) | 1000 ha | 22 830,00 | 22 455,31 | 22 276,46 | 22 655,63 |
| | | | | | | |
| 6 | Improductiv Forest within protected areas (NP, NR, NVO) mountain area | 1000 ha | 398,00 | 398,00 | 398,00 | 398,00 |
| 7 | Improductiv Forest within protected areas (NP, NR, NVO) outside mountain area | 1000 ha | 603,00 | 603,00 | 691,00 | 806,00 |
| | | | | | | |
| SFA data | | | | | | |
| 8 | Voluntary set-asides | 1000 ha | 0,00 | 704,50 | 1 248,00 | 1 173,80 |
| 9 | Habitat protection areas | 1000 ha | 0,00 | 0,61 | 21,38 | 24,41 |
| 10 | Nature conservation agreements | 1000 ha | 0,00 | 0,66 | 30,21 | 129,65 |
| 11 | Natura 2000 outside protected areas | 1000 ha | 0,00 | 0,00 | 0,00 | 83,37 |
| | | | | | | |
| 12 | Environmental cons. at operation | % | 0,0% | 4,5% | 4,5% | 7,8% |
| 13 | Environmental cons. at operation = (5-8-9-10-11)x12 | 1000 ha | 0,00 | 978,73 | 943,96 | 1 657,06 |
| | | | | | | |
| FRA Primary designated management objektive | | | | | | |
| a | Production = (5-8-9-10-11-13) | 1000 ha | 22 830,00 | 20 770,81 | 20 032,91 | 19 587,34 |
| b | Protection of soil and water | 1000 ha | | | | |
| c | Conservation of biodiversity = (4+6+7+8+9+10+11+13) | 1000 ha | 1 393,00 | 3 452,19 | 4 278,09 | 5 119,98 |

| | | | | | | |
|---|---|---|---|---|---|---|
| d | Social services | 1000 ha | | | | |
| e | Multiple use = (1-3-6-7) | 1000 ha | 3 840,00 | 3 940,00 | 3 762,00 | 3 272,68 |
| f | Other | 1000 ha | | | | |
| g | None/unknown | 1000 ha | | | | |

## Analysis and processing of national data

### Estimation and forecasting

No forecasting have been done. There is a ongoing work to establish protected areas and the area of volentary set-asides and the area of envirionmental considerations at operation activities (fellings) will probably change to 2020, but it is difficult to make an expert judgement of the development.

### Reclassification into FRA 2020 categories

**Primary designated management objective**

Production - productive forest (> 1m3/ha and year) outside protected forest, voluntary set-asides and evironmental considerations at operations (fellings).

Conservation of biodiversity - Protected forest, voluntary set-asides and evironmental considerations at operations (fellings).

Multiple use - improductive forest (< 1m3/ha and year).

**Total area with designated management objective**

Production - productive forest (> 1m3/ha and year) outside protected forest, voluntary set-asides and evironmental considerations at operations (fellings).

Protection of soil and water, Conservation of biodiversity and Social Services are all objectives for the protected forests, voluntary set-asides, evironmental considerations at operations (fellings) and protection of improductive forest (< 1m3/ha and year).

### Primary designated management objective

| FRA 2020 categories | Forest area (1000 ha) | | | | |
|---|---|---|---|---|---|
| | 1990 | 2000 | 2010 | 2015 | 2020 |
| Production (a) | 22 830.00 | 20 770.81 | 20 032.91 | 19 587.34 | 19 587.34 |
| Protection of soil and water (b) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Conservation of biodiversity (c) | 1 393.00 | 3 452.19 | 4 278.09 | 5 119.98 | 5 119.98 |
| Social Services (d) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Multiple use (e) | 3 840.00 | 3 940.00 | 3 762.00 | 3 272.68 | 3 272.68 |
| Other (specify in comments) (f) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| None/unknown (g) | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |
| Total forest area | **28 063.00** | **28 163.00** | **28 073.00** | **27 980.00** | **27 980.00** |

### Total area with designated management objective

| FRA 2020 categories | Forest area (1000 ha) | | | | |
|---|---|---|---|---|---|
| | 1990 | 2000 | 2010 | 2015 | 2020 |
| Production | 22 830.00 | 20 770.81 | 20 032.91 | 19 587.34 | 19 587.34 |
| Protection of soil and water | 5 233.00 | 7 392.19 | 8 040.09 | 8 392.66 | 8 392.66 |
| Conservation of biodiversity | 5 233.00 | 7 392.19 | 8 040.09 | 8 392.66 | 8 392.66 |
| Social Services | 5 233.00 | 7 392.19 | 8 040.09 | 8 392.66 | 8 392.66 |
| Other (specify in comments) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

### Comments

# 3b Forest area within protected areas and forest area with long-term management plans

## National Data

### Data sources + type of data source eg NFI, etc

**Forest area within protected areas**

Register data for Nature reserves and National parks from the Swedish Environmental Protection Agency (SEPA). For Biotope protection areas, Nature conservation agreement areas register data from Swedish Forest Agency (SFA).

**Forest area with long-term forest management plan**

Ad-hoc survey of forest management plan production; Ragnar Spross, Swedish Forest Agency.

### National classification and definitions

Not relevant

### Original data

Original data submitted in table

## Analysis and processing of national data

### Estimation and forecasting

**Forest area within protected areas**

There is a ongoing work to establish new Nature reserves, Biotope protection areas and Nature conservation agreements in Sweden but we have choseen not to predict the rate in which the area will increase in the years 2018-2020. Thus no change for the years 2018-2020.

**Forest area with long-term forest management plan**

There is no ongoing survey of the area with a forest management plan in Sweden. The data submitted is based on expert judgements.

For the years 1990 and 2000: From 1980 to 1993 the state conducted an inventory on 90 % on the forest owned by individuals (ÖSI). The inventory resulted in an stand register with recomendations on next silviculture action for each stand. The information from ÖSI has been assumed to have a value for 15 years, ie until the year 2000. For al other owner categories we have assumed that 100 % of the forest has an management plan.

For the years 2010 - 2017: Based on an ad-hoc survey on forest management plan production it is assumed that new plans are produced for 560 tusen hectars annually on forest owned by individuals. Also assuming that the plans have a value for 15 years this would convert to at total area of 8.4 million hectars, or 61 % of the forest owned by individuals. For al other owner categories we have assumed that 100 % of the forest has an management plan.

For the years 2018 - 2020 no change is assumed.

### Reclassification into FRA 2020 categories

Not needed

| FRA categories | Area (1000 ha) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1990 | 2000 | 2010 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Forest area within protected areas | 737.68 | 1 788.83 | 2 024.28 | 2 121.03 | 2 143.25 | 2 165.93 | 2 165.93 | 2 165.93 | 2 165.93 |
| Forest area with long-term forest management plan | 26 675.00 | 26 770.00 | 22 721.00 | 22 680.00 | 22 680.00 | 22 680.00 | 22 680.00 | 22 680.00 | 22 680.00 |
| ...of which in protected areas | 737.68 | 1 788.83 | 2 024.28 | 2 121.03 | 2 143.25 | 2 165.93 | 2 165.93 | 2 165.93 | 2 165.93 |

## Comments

**Forest area within protected areas**

Refers to IUCN categories I - IV. Compared to table 4.9 in the SoEF questionaire the area in IUCN category V have been substracted from the area reported in MCPFE Class 2.

**Forest area with long-term forest management plan**

At https://www.skogsstyrelsen.se/mina-sidor/ there is a web portal where all forest owners have the possibility to log in to see information about their forest property in an digital map (forestry map). In the web portal there are raster information on standing volume, height of the forest, basal area, basal area weighted mean diameter, risk areas for landslides and depth to the water table. The information is based on information from a airborne laser scanning made during the years 2009-2015. In 2018 the government has commissioned the land survey agency (Lantmäteriet) to conduct a new laser scanning of al forest land, which have started in summer 2018. In coming years the information on the web portal will therefore be updated. In the web portal is also recommendations of precommercial thinning and thinning on stand level (based on remote sensing) and information of areas with a high biological conservation value (key habitats and other areas with high conservation value) and with high cultural value. This service to the forest owners in Sweden could be seen to have some of the same effects as a management plan, and since the forestry map covers 98 % of the forest in Sweden, you could argue that the area with long term management plan in Sweden is 98 %. In the FRA context, however, we have concluded that the forestry map not satisfies all criteria in the FRA definition of a management plan. Explanatory note 2 states that a management plan may include details on operations planned for individual operational units (stands or compartments) but may also be limited to provide general strategies and activities planned to reach the management goals. We have interpreted explanatory note 2 as there should be either operations planed for stands or general strategies. The forestry map has, so far, very little in that regard, except from recommendations for precommercial thinning and thinning. However, we expect more to be developed in coming years. It is notable that the incentives for forest owners to have a traditional management plan probably will decrease as the information that is general available will increase.

# 4 Forest ownership and management rights

# 4a Forest ownership

## National Data

### Data sources + type of data source eg NFI, etc

NFI data on ownership are assessed by GIS-analysis using co-ordinates of the plots and GIS-analysis by national cadastre from the Swedish Land survey

Fridman, J., Holm, S., Nilsson, M., Nilsson, P., Ringvall, A., Ståhl, G., 2014. Adapting National Forest Inventories to changing requirements - the case of the Swedish National Forest Inventory at the turn of the 20th century. *Silva Fennica* vol. 48 no. 3 article id 1095. http://dx.doi.org/10.14214/sf.1095.

### National classification and definitions

Classification of ownership by the Swedish land survey

### Original data

NFI-database

## Analysis and processing of national data

### Estimation and forecasting

Estimates directly using NFI-data. No forecasting

### Reclassification into FRA 2020 categories

Not needed

| FRA categories | Forest area (1000 ha) | | | |
|---|---|---|---|---|
| | 1990 | 2000 | 2010 | 2015 |
| Private ownership (a) | 21 435.00 | 21 511.00 | 21 508.00 | 21 756.00 |
| …of which owned by individuals | 13 883.00 | 13 932.00 | 13 752.00 | 13 700.00 |
| …of which owned by private business entities and institutions | 6 955.00 | 6 980.00 | 6 976.00 | 7 173.00 |
| …of which owned by local, tribal and indigenous communities | 597.00 | 599.00 | 780.00 | 883.00 |
| Public ownership (b) | 6 628.00 | 6 652.00 | 6 565.00 | 6 224.00 |
| Unknown/other (specify in comments) (c) | **0.00** | **0.00** | **0.00** | **0.00** |
| Total forest area | **28 063.00** | **28 163.00** | **28 073.00** | **27 980.00** |

## Comments

# 4b Holder of management rights of public forests

## National Data

### Data sources + type of data source eg NFI, etc

NFI data on ownership are assessed by GIS-analysis using co-ordinates of the plots and GIS-analysis by national cadastre from the Swedish Land survey

Fridman, J., Holm, S., Nilsson, M., Nilsson, P., Ringvall, A., Ståhl, G., 2014. Adapting National Forest Inventories to changing requirements - the case of the Swedish National Forest Inventory at the turn of the 20th century. *Silva Fennica* vol. 48 no. 3 article id 1095. http://dx.doi.org/10.14214/sf.1095.

### National classification and definitions

Classification of ownership by the Swedish land survey

### Original data

NFI-database

## Analysis and processing of national data

### Estimation and forecasting

Estimates directly using NFI-data. No forecasting

### Reclassification into FRA 2020 categories

Not needed

| FRA categories | Forest area (1000 ha) | | | |
|---|---|---|---|---|
| | 1990 | 2000 | 2010 | 2015 |
| Public Administration (a) | 6 628.00 | 6 652.00 | 6 565.00 | 6 224.00 |
| Individuals (b) | 0.00 | 0.00 | 0.00 | 0.00 |
| Private business entities and institutions (c) | 0.00 | 0.00 | 0.00 | 0.00 |
| Local, tribal and indigenous communities (d) | 0.00 | 0.00 | 0.00 | 0.00 |
| Unknown/other (specify in comments) (e) | **0.00** | **0.00** | **0.00** | **0.00** |
| Total public ownership | **6 628.00** | **6 652.00** | **6 565.00** | **6 224.00** |

## Comments

# 5 Forest disturbances

# 5a Disturbances

## National Data

### Data sources + type of data source eg NFI, etc

Swedish NFINFI

Fridman, J., Holm, S., Nilsson, M., Nilsson, P., Ringvall, A., Ståhl, G., 2014. Adapting National Forest Inventories to changing requirements - the case of the Swedish National Forest Inventory at the turn of the 20th century. *Silva Fennica* vol. 48 no. 3 article id 1095. http://dx.doi.org/10.14214/sf.1095.

### National classification and definitions

In case of at least 10% of main-stems are damaged the cause is registerd in the field.

### Original data

Not relevant in this case.

## Analysis and processing of national data

### Estimation and forecasting

No forecasting.

### Reclassification into FRA 2020 categories

Not needed since the damaging agents are identified in the field

| FRA categories | Area (1000 ha) | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
| Insects (a) | | | | | | 54.60 | | | | | 68.40 | | | | | 47.10 | | |
| Diseases (b) | | | | | | 159.70 | | | | | 179.20 | | | | | 104.70 | | |
| Severe weather events (c) | | | | | | 690.40 | | | | | 237.50 | | | 394.00 | | 421.00 | | |
| Other (specify in comments) (d) | | | | | | | | | | | | | | | | | | |
| **Total (a+b+c+d)** | – | – | – | – | – | **904.70** | – | – | – | – | **485.10** | – | – | **394.00** | – | **572.80** | – | – |
| Total forest area | **28 163.00** | – | – | – | – | – | – | – | – | – | **28 073.00** | – | – | – | – | **27 980.00** | **27 980.00** | **27 980.00** |

## Comments

| |
|---|
| Stands with at least 10% of trees damaged (main stems) |
| 2015 = Annual average (2013 - 2017) |
| (a) Insect damage = Annual new damage |
| (b) Diseases = Present existing damage |
| (c) Damage caused by severe damage events = Annual new damage. 2013: Storms (windthrown and broken trees), northern Sweden. Data from TFDI |
| (d) Ungulates and vilt = Annual new damage. |

# 5b Area affected by fire

## National Data

### Data sources + type of data source eg NFI, etc

MSB (Swedish Civil Contingencies Agency) Official statistics. Nummber and area of fires reported to MSB by the local Fire and Rescue Services.

### National classification and definitions

Productive forest land - Forest according to FAO definition but excludes areas with a production capacity less then 1 m3 per hectar and year.

Other land with trees - Land with sparse tree cover which normally produces less than 1 m3 per hectar and year. E.g zone between forest and wetlands, montaneous conifer and birchforests, areas where christmas trees and  coppice for bioenergy are grown. Parks and green urban areas.

### Original data

| Burnt area (hectar), 2000–2017 | | | | |
|---|---|---|---|---|
| **Year** | **Total** | **Productive forest land** | **Other land with trees** | **Land without trees** |
| 2000 | 1546 | 780 | 328 | 436 |
| 2001 | 1250 | 409 | 286 | 555 |
| 2002 | 2603 | 876 | 413 | 1313 |
| 2003 | 3889 | 1305 | 1012 | 1572 |
| 2004 | 1877 | 895 | 550 | 431 |
| 2005 | 1545 | 664 | 474 | 407 |
| 2006 | 5688 | 4645 | 537 | 505 |
| 2007 | 1085 | 521 | 308 | 255 |
| 2008 | 5455 | 4280 | 721 | 453 |
| 2009 | 1405 | 730 | 282 | 392 |
| 2010 | 527 | 143 | 145 | 238 |
| 2011 | 935 | 344 | 306 | 284 |
| 2012 | 482 | 108 | 85 | 288 |
| 2013 | 1503 | 477 | 315 | 710 |
| 2014 | 14662 | 10498 | 2123 | 2041 |
| 2015 | 596 | 256 | 95 | 243 |
| 2016 | 1293 | 709 | 260 | 323 |
| 2017 | 1411 | 432 | 167 | 811 |

## Analysis and processing of national data

### Estimation and forecasting

Not relevant in this case.

### Reclassification into FRA 2020 categories

The national classes “productive forest land” plus “ other land with trees” are approximated to correspond well to forest

| FRA categories | Area (1000 ha) | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
| Total land area affected by fire | 1.55 | 1.25 | 2.60 | 3.89 | 1.88 | 1.55 | 5.69 | 1.09 | 5.46 | 1.41 | 0.53 | 0.94 | 0.48 | 1.50 | 14.66 | 0.60 | 1.29 | 1.41 |
| …of which on forest | 1.11 | 0.70 | 1.29 | 2.32 | 1.45 | 1.14 | 5.18 | 0.83 | 5.00 | 1.01 | 0.29 | 0.65 | 0.19 | 0.79 | 12.62 | 0.35 | 0.97 | 0.60 |

### Comments

The Swedish Civil Contingencies Agency have done work to improve on the data series on forest fires since it was last reported to JRC. This work has led to that the extent of some fires have been revised which have effected the data especially in 2008 and 2009. The data serie reported here are thus more accurate.

# 5c Degraded forest

| | | |
|---|---|---|
| **Does your country monitor area of degraded forest** | | No |
| If "yes" | What is the national definition of "Degraded forest"? | |
| | Describe the monitoring process and results | |

### Comments

# 6 Forest policy and legislation

## 6a Policies, Legislation and national platform for stakeholder participation in forest policy

### National Data

#### Data sources + type of data source eg NFI, etc

Not relevant in this case.

#### National classification and definitions

Not relevant in this case.

#### Original data

Not relevant in this case.

| Indicate the existence of | Boolean (Yes/No) | |
|---|---|---|
| | National | Sub-national |
| Policies supporting SFM | Yes | Yes |
| Legislations and regulations supporting SFM | Yes | No |
| Platform that promotes or allows for stakeholder participation in forest policy development | Yes | Yes |
| Traceability system(s) for wood products | Yes | No |

### Comments

The Swedish forest policy originates from the governmental bill from 1993 in which the environmental goal is put on pair with the production goal. The governmental bill from 1993 was influated by the international policy development of sustainable development. The forest policy is since then further developed in forest and environmental bills. The goverment, before submitting a bill, usually assigns a commision or a investigator. During the work of the commision, stakeholders are invitied to contribute to the work in a counsel. The Swedish forest agency also invites stakeholders in the forest sector and NGO's to a National sectoral counsel and regional sectoral counsels. The county administrative boards have similar regional counsels concerning environmental issues.

During 2018 the government has resolved on a national forest program for Sweden. In the development of the national forest program there have been several working goups with stakeholder participation. Also in the implementation of the forest program there will be stakeholder participation both on national and regional level.

The most important regulations regulating forest management is the Swedish Forestry act and the Swedish Environmental Code. In the Forestry act there is regulations concerning the obligation to reforest after final felling, to notify the authority (Swedish Forest Agency) befor final felling, the protection of low productive forest, allowed formes of cuttings, higest allowable cut within each forest property, actions to avoid forest damage (by insect and so on) and actions to take environmental considerations at forest operations. The Swedish Environmental Code regulates the protection of land (including forest) in nature reserves, biotop protection areas and so on and stipulates the obligation to consult with the authority before conducting forest operations which may affect the natural environment.

Traceability systems for wood products are present in the forest certification shemes of FSC and PEFC. Some 60 % of the forest area in Sweden is certified according to these shemes.

# 6b Area of permanent forest estate

## National Data

### Data sources + type of data source eg NFI, etc

Not relevant in this case.

### National classification and definitions

Not relevant in this case.

### Original data

Not relevant in this case.

| FRA 2020 categories | Forest area (1000 ha) | | | | | |
|---|---|---|---|---|---|---|
| | Applicable? | 1990 | 2000 | 2010 | 2015 | 2020 |
| Area of permanent forest estate | No | | | | | |

### Comments

The concepts of permanent forest land use or permanent forest estate does not exist in Sweden. The law does not forbid land use changes from forest to other land use, but the forest authority should be notified. Generally the land use situation has been very stable in Sweden over a long time period (century). There are at present no significant conversions of forests to other land use and no such changes can be foreseen.

# 7 Employment, education and NWFP

## 7a Employment in forestry and logging

### National Data

#### Data sources + type of data source eg NFI, etc

Labour Force Survey from EUROSTAT prefilled to the Joint Forest Europe / UNECE / FAO Questionnaire on Pan-European Indicators for Sustainable Forest Management table 6.5

#### National classification and definitions

Not relevant in this case

#### Original data

Not relevant in this case

| FRA 2020 categories | Full-time equivalents (1000 FTE) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1990 | | | 2000 | | | 2010 | | | 2015 | | |
| | Total | Female | Male | Total | Female | Male | Total | Female | Male | Total | Female | Male |
| Employment in forestry and logging | | | | 16.17 | | 14.60 | 23.57 | 2.43 | 21.17 | 22.47 | 2.40 | 20.07 |
| …of which silviculture and other forestry activities | | | | | | | | | | | | |
| …of which logging | | | | | | | | | | | | |
| …of which gathering of non wood forest products | | | | | | | | | | | | |
| …of which support services to forestry | | | | | | | | | | | | |

### Comments

Data is not available for the sub-categories.

# 7b Graduation of students in forest-related education

## National Data

### Data sources + type of data source eg NFI, etc

1990, 2000, 2005 and 2010 data from SLU. Number of graduation at doctoral degree not available for those years.

2015 data from Swedish Higher Education Authority (UKÄ).

### National classification and definitions

The data refers to graduation in Skogsvetenskap which corresponds to the English term Forest Science

### Original data

Not relevant in this case.

| FRA 2020 categories | Number of graduated students | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1990 | | | 2000 | | | 2010 | | | 2015 | | |
| | Total | Female | Male | Total | Female | Male | Total | Female | Male | Total | Female | Male |
| Doctoral degree | | | | | | | | | | 9.00 | 4.00 | 5.00 |
| Master's degree | 65.00 | | | 64.00 | 16.00 | 48.00 | 57.00 | 21.00 | 36.00 | 24.00 | 8.00 | 16.00 |
| Bachelor's degree | 36.00 | | | 16.00 | 3.00 | 13.00 | 19.00 | 6.00 | 13.00 | 64.00 | 28.00 | 36.00 |
| Technician certificate / diploma | 111.00 | | | 7.00 | 0.00 | 7.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Total | | | | | | | | | | 97.00 | 40.00 | 57.00 |

### Comments

empty cells means n/a

# 7c Non wood forest products removals and value 2015

## National Data

### Data sources + type of data source eg NFI, etc

Game Meat - Number of animals per species from SEPA for the hunting seasong 2015/2016. Consumable weight per species and animal from SCB. Skogsräkenskaper - en delstudie avseende fysiska räkenskaper. SCB Rapport 1999:3. Value per species and Kg from Eliasson, Peter 1994. Svenska miljöräkenskaper. Bilaga. Umeå universitet, Sweden.

Wild berries - from Hörnsten, Lisa 2002. Bär och svamp. In Statsskogsutredningen. SOU 2002:40. Sweden

Christmas trees - from Paulmann, Linda. 2002. Julgransodlingar i Sverige - utbud, efterfrågan och lönsamhet. SLU, Sweden.

### National classification and definitions

Not relevant in this case.

### Original data

Not relevant in this case.

| | Name of NWFP product | Key species | Quantity | Unit | Value (1000 local currency) | NWFP category |
|---|---|---|---|---|---|---|
| #1 | Game meat | Moose, Wild boar, Roe deer | 20 214 | Ton | 676 000 | 12 Wild meat |
| #2 | Wild berries | Bilberry, Cowberry | 35 875 | Ton | 301 000 | 1 Food |
| #3 | Christmas trees | Picea abies | 2 800 | 1000 pcs. | 168 000 | 6 Ornamental plants |
| #4 | Mushroom | | | | | 1 Food |
| #5 | | | | | | |
| #6 | | | | | | |
| #7 | | | | | | |
| #8 | | | | | | |
| #9 | | | | | | |
| #10 | | | | | | |
| **All other plant products** | | | | | | |
| **All other animal products** | | | | | | |
| **Total** | | | | | **1 145 000** | |

| | |
|---|---|
| **Name of currency** | Swedish Krona (SEK) |

### Comments

# 8 Sustainable Development Goal 15

# 8a Sustainable Development Goal 15

### SDG Indicator 15.1.1 Forest area as proportion of total land area 2015

| Indicator | Percent | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2000 | 2010 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Forest area as proportion of total land area 2015 | 69.14 | 68.92 | 68.69 | 68.69 | 68.69 | 68.69 | 68.69 | 68.69 |

| | |
|---|---|
| **Name of agency responsible** | Swedish Forest Agency |

### SDG Indicator 15.2.1 Progress towards sustainable forest management

| Sub-Indicator 1 | Percent | | | | | | |
|---|---|---|---|---|---|---|---|
| | 2000-2010 | 2010-2015 | 2015-2016 | 2016-2017 | 2017-2018 | 2018-2019 | 2019-2020 |
| Forest area annual net change rate | -0.03 | -0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| | |
|---|---|
| **Name of agency responsible** | Swedish Forest Agency |

| Sub-Indicator 2 | Forest biomass (tonnes/ha) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2000 | 2010 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Above-ground biomass stock in forest | 66.42 | 68.74 | 70.96 | 71.26 | 71.56 | 71.86 | 72.17 | 72.47 |

| | |
|---|---|
| **Name of agency responsible** | Swedish Forest Agency |

| Sub-Indicator 3 | Percent (2015 forest area baseline) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2000 | 2010 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Proportion of forest area located within legally established protected areas | 6.39 | 7.23 | 7.58 | 7.66 | 7.74 | 7.74 | 7.74 | 7.74 |

| Name of agency responsible | Swedish Environmental Protection Agency |
|---|---|

| Sub-Indicator 4 | Percent (2015 forest area baseline) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2000 | 2010 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Proportion of forest area under long-term forest management plan | 95.68 | 81.20 | 81.06 | 81.06 | 81.06 | 81.06 | 81.06 | 81.06 |

| Name of agency responsible | Swedish Forest Agency |
|---|---|

| Sub-Indicator 5 | Forest area (1000 ha) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2000 | 2010 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Forest area under independently verified forest management certification schemes | 11 856.50 | 13 475.41 | 15 575.28 | 16 371.47 | 16 600.75 | 16 853.03 | – | – |