

# **Compilation of Forestry Terms and Definitions**

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**European Forest Institute  
Internal Report No. 6, 2002**

EFI Internal Report 6, 2002  
Compilation of Forestry Terms and Definitions

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Editor-in-Chief: Risto Päivinen

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## FOREWORD

In June 1994 the European Forest Institute (EFI) had prepared a document of selected terms and definitions for the 'Follow-up of the Second Ministerial Conference on the Protection of Forests in Europe' held in Helsinki in 1993. Excerpts from the 1994 report "Terms and Definitions" were used both within the Second and Third Ministerial Conference on the Protection of Forests in Europe:

- Second Ministerial Conference on the Protection of Forests in Europe, Helsinki, 1993  
European List of Criteria and Most Suitable Quantitative Indicators:  
Explanatory notes:  
<http://www.mmm.fi/english/forestry/policy/minkonf/criteria.htm>
- Third Ministerial Conference on the Protection of Forests in Europe, Lisbon, 1998  
Appendix 2: Explanatory notes for filling in the question for the follow-up of the Helsinki resolutions H1 and H2

The 1994 interim report had been compiled, evaluated and reviewed with the help of a large number of experts of various research fields. Again we would like to express our gratitude. They were namely:

Dr. M.N. Salleh, former President of IUFRO, Mr. E.H. Séné, FAO, Prof. H. Spiecker, Universität Freiburg, Dr. J. Innes, Swiss Federal Institute for Forest, Snow and Landscape Research (now at University of British Columbia), Mr. C. Barr, BA, Institute of Terrestrial Ecology, Prof. M. Kanninen, University of Helsinki, Prof. K. Kuusela, EFI, Prof. V. Koski, Finnish Forest Research Institute, Prof. K. Mielikäinen, Finnish Forest Research Institute, Prof. J. Parviainen, Finnish Forest Research Institute.

As the report was well accepted, at the time EFI felt it appropriate to make the information also available through its Website. Due to the dynamics of change and the introduction of new important terms, the original document has been revised and further developed.

Using the possibilities of Internet publishing, EFI has produced an interactive document giving the user the options to investigate, where available, original, on-line sources of terms and definitions or compare various sources with one another. This interactive investigation may give the user best results for her/his needs. It should be kept in mind, however, as other collections of terms and definitions, EFI's Compilation of Forestry Terms does not by any means claim to be complete but under constant development. Options for including additional forestry related terms or submitting new or additional definitions/links would complement its building and guarantee it to be a useful information source on commonly used terms and definitions in the field of forestry. It will supplement to other initiatives in this field (International Union of Forest Research Organisation (IUFRO) *SilvaVoc* <http://iufro.boku.ac.at/iufro/silvavoc/svdatabase.htm>; FAO *Agrovoc* <http://www.fao.org/agrovoc/>).

We would like to express our thanks to Dr. Gyde Lund, Dr. Jari Parviainen and Dr. Timo Karjalainen for their support in updating this latest addition. We hope you, as a user, will find this Document useful in your work and are open for suggestions for future development.

April 2002,

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Risto Päivinen

Tuomo Hytönen

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## **BRIEF INTRODUCTION TO THE EFI COMPILATION OF FORESTRY TERMS AND DEFINITIONS**

### **SELECTION OF TERMS**

In 1994 the European Forest Institute was asked to prepare a document of selected terms and corresponding definitions for the 'Follow-up of the Second Ministerial Conference on the protection of forests in Europe held in Helsinki in 1993. A literature survey served as the main means for compiling the Forestry Terms and Definitions.

In 2001 the collection of forestry terms was extended to include further terms which are used frequently at the European Forest Institute within its projects. Means of collection were literature review and Internet searches.

The compilation of forestry terms at the European Forest Institute is an ongoing process and this Internal Report represents the current state of progress. A interactive Internet based database on these terms has been established parallel to this report. It will allow continuous updating with additional forestry terms.

### **METHODS OF WORK**

The terms and their definitions were collected from publications and by utilising the Internet. Forestry experts were also consulted to provide their input in the case of some of the compiled terms.

The terms were taken directly from the identified sources. For some terms more than one source are mentioned. This means that the same definition was found within several literature sources without necessarily indicating the most likely original source of that definition. The listing of several sources referring to the same definition was thought to emphasise that a particular definition is more commonly used in scientific literature.

In other cases the extensive search revealed differing definitions and descriptions for the same term. These were separately listed and accompanied by the appropriate source. This approach intended to show that there could be more than one definition for the same term. This is for example very obvious in the case of a basic forestry term, namely 'forest'. There are several international definitions for 'forest' which partly find their origin in international agreements for establishing the possibility of harmonised data collection at the international level. The term 'forest' is also defined differently between individual countries. This was revealed in a study implemented by the EC in 1996 (EC, 1997). A very extensive list of terms related to forest can be found at (<http://home.att.net/~gklund/>).

While compiling the list for one particular forestry term all identified definitions were listed not necessarily in any priority order. It was not the intention of the authors to evaluate or rank the identified definitions and descriptions of the terms, but to provide an overview of what was found to be available on a particular term.

In the final phase forestry experts were consulted to comment the identified definitions and were appropriate direct to further sources or provide an expert opinion. The comments and input from the experts were incorporated to the final version of the document.

### **ACCESS TO THE INTERNET DATABASE**

The aim of this activity has been to produce a comprehensive list of terms that are frequently used within the work and projects of the European Forest Institute. The collection of forestry terms however, is of course far from being complete and the work of adding new terms will be continued. This collection is thought to allow EFI's researchers to build on a base of terms and definitions necessary for their work and allow them in addition to have access to other catalogues on forestry terms and definitions, which are available through the Internet.

The report and the Internet database are accessible to all interested users. They are encouraged to use this collection for their work. They are also encouraged to visit other collections of terms in order to get a comprehensive overview of available information on particular terms. The Internet database can be searched interactively by the user and is available at: <http://www.efi.fi/efidas>. The Internal report can be downloaded as a pdf. Document from the European Forest Institute Website at: <http://www.efi.fi/publications/>.

## **EFI COMPILATION OF FORESTRY TERMS AND DEFINITIONS**

### **ABIOTIC**

1) Not biotic (56)

2) Nonliving (52)

(for example: abiotic damage = damage caused by non-living agents (air pollutants, storms, etc.))

### **ACID RAIN**

Rainwater that has an acidity content greater than the postulated natural pH of about 5.6. It is formed when sulfur dioxides and nitrogen oxides, as gases or fine particles in the atmosphere, combine with water vapor and precipitate as sulfuric acid or nitric acid in rain, snow, or fog. The dry forms are acidic gases or particulates. (52)

### **AFFORESTATION**

1) Artificial establishment by planting or seeding of forest on a non-forest area (e.g. agricultural or other land). (43)

2) Artificial establishment of forest on lands which previously did not carry forest within living memory. (47)

3) The establishment of a tree crop on an area from which it has always been absent. Where such establishment fails and is repeated, the latter may properly be termed reforestation. (40)

### **ANNUAL FELLINGS**

Average annual standing volume of all trees, living or dead, that are felled during the given reference period, including the volume of trees or parts of trees that are not removed. (12)

### **ARTIFICIAL REGENERATION**

Renewal of a tree crop by direct seeding (sowing), or by planting seedlings or cuttings. (33, 39)



**AUTOCHTHONOUS** (synonyms: indigenous, native)

- 1) Species or genotypes which have evolved in the same area, region or biotope and are adapted to the specific predominant ecological conditions at the time of establishment. (4, 27)
- 2) Tree species which have evolved in the same area, region or biotope where the forest stand is growing and are adapted to the specific ecological conditions predominant at the time of the establishment of the stand. (12, 47)

**BIOINDICATOR**

Organism used to establish the presence of an environmental change through its known reaction to specific environmental phenomena. The change may involve the population of the organism, its growth, mortality, reproduction rate, structure, phenology, chemical composition or other parameter. (3)

**BIOLOGICAL DIVERSITY**

The variability among living organisms from all sources including, i.a., terrestrial, marine and aquatic ecosystems and the ecological complexes of which they are part. Includes diversity within species, between species and of ecosystems. (16)

**BIOLOGICAL RESOURCES**

Includes genetic resources, organisms or parts thereof, populations, or any other biotic component of ecosystems with actual or potential use or value for humanity. (50)

**BIOTIC**

- 1) Of or relating to life; especially: caused or produced by living beings (56)
- 2) Living. Living organisms make up the biotic parts of ecosystems. (52)  
(for example: Biotic damage = damage caused by living organisms (fungi, insects etc.))

**BOREAL FOREST**

- 1) One of 3 main forest zones in the world; it is located in northern regions and is characterized by the predominance of conifers. (49)
- 2) Open coniferous forest growing on swampy ground that is commonly covered with lichen. It is the characteristic vegetation of the subpolar region spanning northern Eurasia, between the colder tundra zone to the north and the warmer temperate zone to the south. (51)

## BROADLEAVED

All trees classified botanically as Angiospermae. They are sometimes referred to as "hardwoods" (12)

## BUFFER ZONE

1) An area adjacent to a protected area, on which land use is partially restricted to give an added layer of protection to the protected area itself while providing valued benefits to neighbouring rural communities. (40)

2) A strip of land where disturbances are not allowed, or are closely monitored, to preserve aesthetic and other qualities adjacent to roads, trails, waterways, and recreation sites. (49)

## CARBON BALANCE

Difference between carbon flow into and out of component / reservoir (measure Mg C/ha/year). (8, 9, 20)

## CARBON CYCLE

All carbon reservoirs and exchanges of carbon from reservoir to reservoir by various chemical, physical, geological, and biological processes. Usually thought of as a series of the four main reservoirs of carbon interconnected by pathways of exchange. The four reservoirs, regions of the Earth in which carbon behaves in a systematic manner, are the atmosphere, terrestrial biosphere (usually includes freshwater systems), oceans, and sediments (includes fossil fuels). Each of these global reservoirs may be subdivided into smaller pools, ranging in size from individual communities or ecosystems to the total of all living organisms (biota). (52)

## CARBON FLOW

Flux of carbon from one component into another (measure Mg C/ha/year). (8, 9, 20)

## CARBON FLUX

The rate of exchange of carbon between pools (i.e., reservoirs). (52)

## CARBON POOL

The reservoir containing carbon as a principal element in the geochemical cycle. (52)

## CARBON SEQUESTRATION

The uptake and storage of carbon. Trees and plants, for example, absorb carbon dioxide, release the oxygen and store the carbon. Fossil fuels were at one time biomass and continue to store the carbon until burned. (52)

## CARBON SINK

- 1) Any process, activity or mechanism which removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas from the atmosphere. (13)
- 2) Component, or whole reservoir, into which C flow is greater than out of it (measure Mg C/ha/year), balance positive. (8, 9, 20)
- 3) Carbon reservoirs and conditions that take-in and store more carbon (i.e., carbon sequestration) than they release. Carbon sinks can serve to partially offset greenhouse gas emissions. Forests and oceans are large carbon sinks. (52)

## CARBON SOURCE

- 1) Any process, activity or mechanism which releases a greenhouse gas, an aerosol or a precursor of a greenhouse gas into the atmosphere. (13)
- 2) Component, or whole reservoir, into which C flow is smaller than out of it (measure Mg C/ha/year), balance negative. (8, 9, 20)

## CARBON STORAGE

Component where C is put aside from atmosphere (size measure Mg C/ha). (8, 9, 20)

## CARRYING CAPACITY

- 1) Capacity of an ecosystem to support healthy organisms while maintaining its productivity, adaptability and capability of renewal. (53)
- 2) The maximum number of animals of one or more species that can be supported by a particular habitat or area through the most unfavourable period of the year. (51)
- 3) Maximum average number or biomass of organisms that can be sustained in a habitat over the long term. Usually refers to a particular species, but can be applied to more than one. (55)
- 4) The amount of use an area can sustain—for recreation, for wildlife, etc., without deteriorating in its quality and become unsustainable. (54)

## CLEARCUT

- 1) Entire growing stock is removed in a single felling. (37)
- 2) Clearcut is an area of forest that has been completely cleared of all trees other than small seedlings and occasional saplings, resulting in a change of "forest conditions" i.e. shade, moisture etc. The scale varies between countries. (21, 22)

## CLIMAX FOREST

The final stage of successional development on a forest site under specific climatic and other environmental conditions, leading to a more or less stable equilibrium underlying only minor changes in species composition. (27, 36)

## CLOSED FOREST

Vegetation formation where trees occur in single or multiple stories with crowns interlocking, which, in conjunction with the undergrowth, cover a high proportion (> 40%) of the ground and consequently do not have a continuous dense grass layer at the ground level. (19)

## CONIFEROUS

All trees classified botanically as Gymnospermae. They are sometimes referred to as "softwoods". (12)

## COPPICE AND COPPICE WITH STANDARDS

Forest composed of stool-shoots or root suckers with or without scattered trees (standards), which may be of seedling or coppice origin. (12)

## CRITERION

A distinguishing characteristic of a goal by which it can be judged (e.g., criteria for sustainable forest development include protection of biodiversity and maintaining the productive capacity of forest ecosystems). (26)

## CUTTING (synonym: felling)

Process of felling trees, cutting (or uprooting) standing trees, causing them to fall. (23) (see also Appendice 5)

## DEAD WOOD COMPONENT

Wood left in production forests for maintaining rare, or endangered living organisms. (5)

## DEFOLIATION

- 1) The loss, shedding, or removal of leaves from a tree or other plant, especially prematurely. (48)
- 2) To defoliate = to deprive of leaves, especially prematurely (56)

## DEFORESTATION

Change of land cover with depletion of tree crown cover to less than 10 percent. Changes within the forest class (e.g. from closed to open forest) which negatively affect the stand or site and, in particular, lower the production capacity, are termed forest degradation. (12, 47)

## DOMESTICATED INTRODUCED TREE SPECIES

Introduced tree species planted outside their natural biotope, area or region, which have become established sufficiently well after at least one generation that they have grown satisfactorily, have not shown themselves prone to serious insect or fungal (or other diseases) attack and have been able to regenerate themselves naturally. (12)

## DRAIN

Drain is the volume of those trees which are removed by forestry measures and natural causes from the growing stock (23)  
 $\text{Drain} = \text{Fellings (Removals over bark + Logging residues)} + \text{Natural losses}$   
 (28) (see also Appendice 5)

## EMISSIONS

Release of greenhouse gases and/or their precursors into the atmosphere over a specified area and period of time. (13)

## ENDANGERED SPECIES

Species classified by an objective process (e.g. national "Red Book") as being in The World Conservation Union (IUCN) categories "critically endangered" and "endangered". A species is considered to be critically endangered when it is facing an extremely high risk of extinction in the wild in the immediate future. It is considered "endangered" when it is not critically endangered but is still facing a very high risk of extinction in the wild in the near future. (12, 47)

## ENDEMIC SPECIES

Species is endemic when found only in a certain strictly limited geographical region, i.e. restricted to a specified region or locality. (12, 47)

## ENHANCED GREENHOUSE EFFECT

The concept that the natural greenhouse effect has been enhanced by anthropogenic emissions of greenhouse gases. Increased concentrations of carbon dioxide, methane, and nitrous oxide, CFCs (*chlorofluorocarbons*), HFCs (*hydrofluorocarbons*), PFCs (*perfluorinated compounds*), SF<sub>6</sub> (*sulfur hexafluoride*), NF<sub>3</sub> (*nitrogen trifluoride*), and other photochemically important gases caused by human activities such as fossil fuel consumption, trap more infra-red radiation, thereby exerting a warming influence on the climate.(52)

## EVEN-AGED FOREST

Stand of trees in which there are only small differences in age among the individual trees. Such stands may occur naturally (after forest fires, storm etc.) or artificially (after human involvement). (3, 41)

## EVEN-AGED (HIGH FOREST)

High forest in which the predominant proportion of the trees falls into the same age class, generally resulting in a single storey forest. (12)

## EXOTIC SPECIES (synonyms: introduced species, non-indigenous species)

- 1) Species occurring outside their natural biotope. (4, 27)
- 2) Tree species occurring outside their natural vegetation zone, area or region. Includes hybrids. (12, 47)

## EXPLOITABLE FOREST

Forest and other wooded land on which there are no legal, economic or technical restrictions on wood production. It includes areas where, although there are no such restrictions, harvesting is not currently taking place, for example, areas included in long-term utilization plans or intentions. (12, 40)

## FELLING (synonym: cutting)

Process of felling trees, cutting (or uprooting) standing trees, causing them to fall. (23)

Fellings is the volume of the trees, which are removed from the growing stock by forestry measures (23)

Standing volume of all trees, living or dead, measured overbark to a minimum diameter of 0 cm (d.b.h.) that are felled, including the volume of trees or parts of trees that are not removed from the forest, other wooded land or other felling site.

Includes: silvicultural and pre-commercial thinnings and cleanings left in the forest; and natural losses that are recovered (harvested). (12)

## FOREST

### *General definition:*

Complex ecological system in which trees are the dominant life form. (51)

### *International definitions:*

#### **1) Food and Agriculture Organization of United Nations (FAO) definition (2000):**

Land with tree crown cover (or equivalent stocking level) of more than 10 percent and area of more than 0.5 ha. The trees should be able to reach a minimum height of 5 m at maturity in situ. May consist either of closed forest formations where trees of various storeys and undergrowth cover a high proportion of the ground; or of open forest formations with a continuous vegetation cover in which tree crown cover exceeds 10 percent. Young natural stands and all plantations established for forestry purposes which have yet to reach a crown density of 10 percent or tree height of 5m are included under forest, as are areas normally forming part of the forest area which are temporarily unstocked as a result of human intervention or natural causes but which are expected to revert to forest.

Includes: Forest nurseries and seed orchards that constitute an integral part of the forest; forest roads, cleared tracts, firebreaks and other small open areas within the forest; forest in national parks, nature reserves and other protected areas such as those of special environmental, scientific, historical, cultural or spiritual interest; windbreaks and shelterbelts of trees with an area of more than 0.5 ha and a width of more than 20 m. Rubberwood plantations and cork oak stands are included. (12, 47, 31)

#### **2) Food and Agriculture Organization of United Nations (FAO) definition (1990, for Developed countries):**

Land with tree crown cover (stand density) of more than about 20% of the area. Continuous forest with trees usually growing more than about 7m in height and able to produce wood. This includes both closed forest formulations where trees of various storeys and undergrowth cover a high proportion of the ground and open forest formulations with a continuous grass layer in which tree synusia cover at least 10% of the ground. (40, 46)

#### **3) Food and Agriculture Organization of United Nations (FAO) definition (1990, for Developing countries):**

Ecosystem with a minimum of 10 percent crown cover of trees and/or bamboos, generally associated with wild flora, fauna and natural soil conditions, and not subject to agricultural practices. The term forest is further divided, according to its origin, into two categories: *natural forest* and *plantation forest*. (40, 46)

**4) International Union of Forestry Research Organizations (IUFRO)****definition:**

A land area with a minimum 10% tree crown coverage (or equivalent stocking level), or formerly having such tree cover and that is being naturally or artificially regenerated or that is being afforested. (19)

*National definitions:*

See Appendice 1 for national forest definitions for Austria, Belgium, Czech Republic, Finland, France, Germany, Greece, Ireland, Italy, Liechtenstein, Netherlands, Norway, Poland, Portugal, Spain, Sweden, Switzerland, and United Kingdom, taken from: Study on European Forestry Information and Communication System – Reports on Forestry inventory and survey systems, vol. 1 & 2, European Commission, Luxembourg, 1997; Russian Federation taken from: Pisarenko, A. I., Strakhov, V.V., Päivinen R., Kuusela, K., Dyakun, F.A., & Sdobnova, V.V., 2001 EFI Research Report 11. Brill: Leiden, Boston, Köln, 2001. 102 p.

**FOREST DEGRADATION**

1) Takes different forms, particularly in open forest formations, deriving mainly from human activities such as over-grazing, over-exploration (for firewood or timber), repeated fires, or due to attacks by insects, diseases, plant parasites or other natural sources as cyclones.

In most cases, degradation does not show as a decrease in the area of woody vegetation but rather as a gradual reduction of biomass, changes in species composition and soil degradation. Unsustainable logging practices can contribute to degradation if the extraction of mature trees is not accompanied with their regeneration or if the use of heavy machinery causes soil compaction or loss of productive forest area. (12)

2) Changes within the forest class, for example, from closed to open forest, which negatively affect the stand or site and, in particular, lower the production capacity. These lands are considered apart from deforestation. (40)

**FOREST RESERVE**

1) Non-intervention forest which is usually not managed or exploited. This decision has resulted in some legal status of the reserve (nature conservation area, national park, nature reserve, wilderness area etc.). (3, 7, 36)

2) Forest Reserve often means strict forest reserve, which is the category of most strict protection. (5)

**FOREST TAXA, FOREST SPECIES**

Taxa / species typical for forest ecosystems, differ from those of, e.g., agricultural land. (1)



## FRAGMENTATION OF FORESTS

- 1) Breaking up (by agriculture, streets, clear felling, streams, settlements) of the natural forest canopy. (3, 4, 34)
- 2) a) isolation of forest areas, forest island theory = forest areas fragmented among other land use categories (agricultural land, urban areas etc), or:  
b) fragmentation inside the forest area, due to the forest roads, different forest use practices, fencing etc. (5)

## FRONTIER FORESTS

Large, relatively intact forest ecosystems. A frontier forest must meet the following criteria:

- It is primarily forested
- It is large enough to support viable populations of all species associated with that forest type even in the face of natural disasters of a magnitude to occur once in century.
- Its structure and composition are determined mainly by natural events, and it remains relatively unmanaged by humans, although limited human disturbance by traditional activities is acceptable.
- In forests where patches of trees of different ages occur naturally, the landscape shows this type of heterogeneity.
- It is dominated by indigenous tree species.
- It is home to most, if not all, other plants and animals that typically live in this forest. (50)

## FUNGICIDE

Fungus-destroying substances. (42)

## GENE RESERVE FOREST

The main means by which gene conservation of forest trees is implemented. It refers to a parcel of native forest that is large enough to sample the natural genetic diversity, to permit adequate internal pollination, and to allow the existence of several age classes.

Natural regeneration is preferred, but artificial regeneration with seed from the same forest is allowed. Silviculture, cutting and other active measures are allowed provided that they do not change the genetic composition of the forest. (4)

## GENETIC ADAPTIVE CAPACITY

The potential of a population or a species to evolve and change the genetic composition in accordance with environmental change. (4, 14)

## GENETIC RESOURCES

Generally the multitude of information included in all organisms within a specific geographical area. At the species level it refers to the genetic diversity and its magnitude and distribution within and among populations. (4, 35)

## GREENHOUSE EFFECT

1) Warming of the Earth's surface and lower atmosphere that tends to intensify with an increase in atmospheric carbon dioxide. (51)

2) Warming of the surface and lower atmosphere of a planet (as the earth or Venus) that is caused by conversion of solar radiation into heat in a process involving selective transmission of short wave solar radiation by the atmosphere, its absorption by the planet's surface, and reradiation as infrared which is absorbed and partly reradiated back to the surface by atmospheric gases (56)

3) The effect produced as greenhouse gases allow incoming solar radiation to pass through the Earth's atmosphere, but prevent part of the outgoing infrared radiation from the Earth's surface and lower atmosphere from escaping into outer space. This process occurs naturally and has kept the Earth's temperature about 59 degrees F ( $15^{\circ}\text{C}$ ) warmer than it would otherwise be. Current life on Earth could not be sustained without the natural greenhouse effect. (52)

## GREENHOUSE GASES

1) Those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and re-emit infrared radiation (13)

2) Atmospheric gases which warm the lower atmosphere by absorbing thermal radiation. (58)

## GROSS ANNUAL INCREMENT

Average annual volume of increment over the reference period of all trees, measured to a minimum diameter breast height (d.b.h.) of 0 centimetres (cm). Includes: The increment on trees which have been felled or die during the reference period (12).

Total increase of stem wood, over bark, during a year. It includes the increment of those trees which are part of growing stock at the end of the year and of those trees which have grown but died or been removed during the year (23) (see also Appendice 5)

## GROWTH (synonym: increment)

The difference between the values of a variable at the end and at the beginning of the measuring period. (19) (see also Appendice 5)

## GROWING STOCK

Growing stock volume of stem wood, over bark (23)

The living tree component of the standing volume (12)

## HARVESTING (synonyms: logging, removal)

A method by which the growing stock (or part of it) of a stand is removed. Includes the procedure from felling to long-distance transport. (23)

## HERBICIDE

1) Substance toxic to some plants and used to destroy unwanted vegetation. (42)

2) Chemical substances or living organisms (called bioherbicides) used to kill or control vegetation such as brush, weeds, and competing or undesirable trees. (49)

## INCREMENT (synonym: growth)

Increase in diameter, basal area, height, and volume of individual trees or stands during a given time period. (17) (see also Appendice 5)

## INDICATOR

1) A quantitative measure of an effect, which does not in itself signify whether the change is good or bad. (30)

2) A quantitative measure of change, used to determine whether a criterion has been fulfilled. (3)

## INDICATOR SPECIES

A species used in combination with others to identify the presence of a specific assemblage, community or association. (4)

## INDIGENOUS SPECIES (synonyms: autochthonous species, native species)

1) Species or genotypes which have evolved in the same area, region or biotope and are adapted to the specific predominant ecological conditions at the time of establishment. (4, 27)

2) Tree species which have evolved in the same area, region or biotope where the forest stand is growing and are adapted to the specific ecological conditions predominant at the time of the establishment of the stand. (12, 47)

## INTRODUCED SPECIES (synonyms: non-indigenous species, exotic species)

- 1) Species occurring outside their natural biotope. (4, 27)
- 2) Tree species occurring outside their natural vegetation zone, area or region. Includes hybrids. (12, 47)

## KEYBIOTOPES

Rare, and vulnerable small sized ecosystems inside the forest area mainly in production forests, where endangered species occur. (5)

## KEYSTONE SPECIES

- 1) A species which has a special importance in the functioning of ecosystems. (2)
- 2) A species that plays an important ecological role in determining the overall structure and dynamic relationships within a biotic community. A keystone species presence is essential to the integrity and stability of a particular ecosystem. (49)

## LANDSCAPE ECOLOGY

The study of the distribution patterns of communities and ecosystems, the ecological processes that affect those patterns and changes in pattern and process over time. (49)

## LOGGING (synonym: harvesting)

A method by which the growing stock (or part of it) of a stand is removed. Includes the procedure from felling to long-distance transport. (23)

## MANAGED FOREST (production forests, productive forests)

Forested areas which are treated by using specific silvicultural practices. The stands are treated repeatedly and sometimes in order to achieve multipurpose goals. (27, 36)

## MIXED FOREST / STAND

A stand or forest consisting of two or more tree species which influence significantly the stand ecology. (10, 27)

## MORTALITY (synonym: natural losses) (see also Appendice 5)

## MULTIPLE USE FORESTRY

- 1) The planned utilization of forest resources in such a way that the various needs of people are satisfied on a sustainable basis and that the total of material and non-material benefits provided by the forests for society is as large as possible. (5, 12)
- 2) Management of forests to obtain multiple products and benefits (cf. production forest, protection forest and conservation forest). Multiple use forestry takes an integrated approach towards the different categories of forests and encompasses the scientific, cultural, recreational, historical and amenity values of forest resources. (53)

## NATIVE SPECIES (synonyms: indigenous species, autochthonous species)

- 1) Species or genotypes which have evolved in the same area, region or biotope and are adapted to the specific predominant ecological conditions at the time of establishment. (4, 27)
- 2) Tree species which have evolved in the same area, region or biotope where the forest stand is growing and are adapted to the specific ecological conditions predominant at the time of the establishment of the stand. (12, 47)

## NATURAL FOREST

- 1) A forest which has evolved as a sequence of natural succession but still showing anthropogenic influences. Also, forests that have developed from unmanaged pastures or from fallow land. (3, 25, 36)
- 2) Natural forests are composed of indigenous trees, not planted by man. Or in other words forests excluding plantations. Natural forests are further classified using the following criteria:
  - forest formation (or type): closed/open
  - degree of human disturbance or modification
  - species composition (12)
- 3) A subset of forests composed of tree species known to be indigenous to the area. (40)

## NATURAL LOSSES (synonym: mortality)

- 1) Volume of those trees which die of natural causes. (23)
- 2) Average annual losses to the growing stock during the given reference period, measured to a minimum diameter of 0 cm (d.b.h.), due to mortality from causes other than cutting by man, e.g. natural mortality, diseases, insect attacks, fire, windthrow or other physical damage. (12) (see also Appendice 5)

## NATURAL REGENERATION

Renewal by natural seeding (self-sown seed), sprouting, suckering or layering. (33, 39)

## NET ANNUAL INCREMENT

Average annual volume over the given reference period of gross increment less that of natural losses on all trees to a minimum diameter of 0 cm (d.b.h.). (12)

Net annual increment is gross annual increment minus natural losses. (23)  
(see also Appendice 5)

## NON-INDIGENOUS SPECIES (synonyms: introduced species, exotic species)

- 1) Species occurring outside their natural biotope. (4, 27)
- 2) Tree species occurring outside their natural vegetation zone, area or region. Includes hybrids. (12, 47)

## NON-WOOD PRODUCTS

Consist of goods, services and functions (berries, hunting, non-commodity benefits etc.).

Goods are the physical assets produced either on purpose or fortuitously in combination with the wood production, e.g. cubic metres clean water, number of deer harvested, etc. Rather well quantified and transformed into an economic market value.

Services are less tangible attributes that may be in demand, e.g. recreation opportunities, protection functions, wildlife habitats, etc.

Functions are the ability of a forest area to provide goods and services. (45)

## OLD-GROWTH FOREST

- 1) Ecosystem distinguished by old trees showing structural features characteristic of later stages of stand and successional development. These differ from earlier stages in structure, composition and function. (10)
- 2) The term is mostly used in North America and generally refers to forests that are either wholly natural or have remained undisturbed by humans for several hundred years. (36)

## OPEN FOREST

- 1) Vegetation formations where trees occur with discontinuous, non-interlocking crowns, but with crown coverage of at least 10%. (19)
- 2) Formations with discontinuous tree layer but with a coverage of at least 10 percent and less than 40%. Generally there is a continuous grass layer allowing grazing and spreading of fires. (Examples are various forms of "cerrado", and "chaco" in Latin America, wooded savannas and woodlands in Africa) (12)

## OTHER WOODED LAND

- 1) Land either with a tree crown cover (or equivalent stocking level) of 5–10 percent of trees able to reach a height of 5 m at maturity in situ; or a crown cover (or equivalent stocking level) of more than 10% of trees not able to reach a height of 5 m at maturity in situ (e.g. dwarf or stunted trees) and shrub or bush cover.  
Excludes: Areas having the tree, shrub or bush cover specified above but of less than 0.5 ha and width of 20 m, which are classed under "other land": Land predominantly used for agricultural practices. (12)
- 2) Forest fallow and shrubs. (53)

## PESTICIDE

Substance for destroying pests, especially insects. (42)

## PHYTOCIDE

Used to kill unwanted plants. (42)

## PLANTATION FOREST

- 1) Forests established through the planting or sowing of seed by humans. Plantation forests have the function to produce special forest products or they have been established for protective purposes (e.g. in watersheds). Artificial regeneration, geometric plant spacing, chosen tree species are typical characteristics of these stands. They can be located on high productive sites which occur naturally or have been artificially improved. Intensive management techniques and protection measures help to achieve high quantity and/or quality in very short periods of time. (30, 35)

2) Forest stands established by planting or/and seeding in the process of afforestation or reforestation. They are either:

- of introduced species (all planted stands), or
- intensively managed stands of indigenous species which meet all the following criteria: one or two species at plantation, even age class, regular spacing.

Excludes: Stands which were established as plantations but which have been without intensive management for a significant period of time. These should be considered semi-natural. (12)

3) Forest crop established by seeding or planting nursery-raised stock. (53)

4) Forest established artificially:

- by afforestation on lands which previously did not carry forest within living memory
- by reforestation of land which carried forest before, and involving the replacement of the indigenous species by a new and essentially different species or genetic variety. (40)

## POLLUTION

1) A change in the physical, chemical, or biological characteristics of the air, water, or soil that can affect the health, survival, or activities of humans in an unwanted way. Some expand the term to include harmful effects on all forms of life. (52)

2) Generally, the presence of matter or energy whose nature, location or quantity produces undesired environmental effects, usually a human-made or human-induced alternation of the physical, biological, and radiological integrity of water, air, or soil. (54)

## PRIMARY, PRIMEVAL FOREST

1) Areas of usually old forest with natural forest structure and dynamics, lacking anthropogenic influences from the past to the present. (24, 25, 27, 36)

2) Relatively intact natural forest which has remained essentially unmodified by human activity for the past 60–80 years. (53)

## PROTECTED FORESTS

1) Forest areas legally protected for maintaining the high biodiversity values. Classified often according to The World Conservation Union (IUCN) categories. (5, 18) (see also Appendice 2)

2) Forest areas that comply to the following general principles: existence of legal basis, long term commitment, and explicit designation as protected or protective forest area. (57) (see also Appendice 4, MCPFE proposed protected forest area categories)



## PROTECTION FORESTS

1) Forest areas with restricted management/ or without management for protection against arlences, natural disturbances, erosion, water flow, or for maintaining the catchment areas, watershed management, landscape areas, cultural heritage. (5)

2) The function of forest/other wooded land in providing protection of soil against erosion by water or wind, prevention of desertification, the reduction of risk of avalanches and rock or mud slides; and in conserving, protecting and regulating the quantity and quality of water supply, including the prevention of flooding.

Includes: Protection against air and noise pollution. (12)

## PROVENANCE

1) Local or regional origin of a tree species (27)

2) Origin/source (56)

## (PUBLIC) RIGHT OF ACCESS

General right of access to all natural areas, all forest areas, fields and meadows during non-crop season, undeveloped sea and lake shores and riverbanks as well as to water areas for boating and swimming. Also using water for drinking and household needs, picking berries, mushrooms and flowers which are not protected by law are allowed. Removal of soil material or causing damage to growing trees or crops is prohibited. The right concerns only non-motorized use. The definition varies between countries, depending on the existence of laws of trespass. (3, 38)

## PURE STAND

1) A stand in which a certain percentage, for instance at least 80%, of the trees in the main crown canopy consist of a single species. (33)

2) A stand which consists at least of 90% of one dominant tree species. (10)

## REFORESTATION

1) Artificial (planting, seeding) or natural re-establishment of forest after harvesting/cutting on previously forest or other wooded land. (43)

2) Artificial establishment of forest on lands which carried forest before. (29)

## REGENERATION, REGENERATION METHOD

- 1) The renewal of a tree crop, either by natural or artificial means. (41)
- 2) Re-establishment of a forest stand by natural or artificial means following the removal of the previous stand by felling or as a result of natural causes, e.g. fire or storm. (12)

## REGISTERED SELECTED TREES

At the first stage phenotypically selected superior individuals, often in seed collection stands. Each tree has a code number, and its characteristics are documented by a responsible authority. Progeny testing and recurrent selection verify tested trees that belong to the same category. (27)

## REMOVAL

Fellings excluding logging residues (23)

Fellings that are removed from the forest, other wooded land or other felling site.

Includes: Removals of trees felled during an earlier period and removal of trees killed or damaged by natural causes (natural losses), e.g. fire, windblow, insects and diseases. (12)

## RURAL AREA

Area outside city limits, or densely populated area. (2, 44)

## SEED COLLECTION STAND

Selected seed source that fulfils certain requirements. As a rule the stand should be autochthonous or its origin must be known, and above all it should be superior to average stands. On occasion, non-indigenous stands showing excellent features are also chosen. Seed collection stands are accepted and registered by the national authority. (4, 27)

## SEED TREE METHOD

A tree removal method whereby the entire stand is removed in a final cutting except for selected single seed trees or seed trees in small groups to provide the seed for reproduction. (37)

## SELECTION CUT

A tree removal method that involves periodic cutting of selected trees from all merchantable diameter classes. The method is mostly used in an uneven-aged forest. (11)

## SEMI-NATURAL FOREST

Consists of tree species which would occur naturally on a specific site and show similarities to primary forest. They can be regarded as a reconstruction of the natural forest cover achieved by using various silvicultural practices. Includes planting and seeding of native species. (33, 36)

## SHELTERWOOD METHOD

A tree removal method in which mature trees are removed in a series of cuttings, enabling a new crop to establish under the partial shelter of the old trees from which the seed for regeneration is obtained. The regeneration may also be done artificially. (37)

## SHRUBLAND

An open or closed wooded land of vegetation type where the dominant woody elements are shrubs with 0.5–5 m height on maturity. (19)

## SPECIAL ECOSYSTEMS

Rare small sized forest ecosystems in production forests designated by law for protection without any management (5)

## SUSTAINABLE USE OF FORESTS

Sustainable management is the prerequisite for the sustainable use of forests. Sustainable management means the stewardship and use of forests and forest lands in such a way and at such a rate that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions at local, national, and global levels and that does not cause damage to other ecosystems. (15)

## TEMPERATE FOREST

1) The woodland of rather mild climatic areas; composed mainly of deciduous trees. (49)

2) Vegetation type with a more or less continuous canopy of broad-leaved trees. Such forests occur between approximately 25° and 50° latitude in both hemispheres. Toward the polar regions they grade into boreal forests, which are dominated by evergreen conifers, so that mixed forests containing both deciduous and coniferous trees occupy intermediate areas. Temperate forests usually are classified into two main groups: deciduous and evergreen (51).

## THREATENED SPECIES

A general term to denote species which are endangered, vulnerable, rare, indeterminate, or insufficiently known. See The World Conservation Union (IUCN) red list categories (Appendice 3) for more details. (6)

## TREE

A woody perennial with a single main stem or, in the case of coppice, with several stems, having a more or less definite crown. Includes: Bamboos, palms and other woody plants meeting the above criterion. (12)

## TROPICAL FOREST

A tropical woodland with an annual rainfall of a least 250 cm; marked by broadleaved evergreen trees forming a continuous canopy. (49)

## UNDISTURBED FOREST

Forests which have been excluded from human intervention for a long time, thus allowing natural succession and natural disturbances to occur. (36)

## UNEVEN-AGED FOREST

- 1) A stand in which trees of all or almost all age classes from seedlings to mature trees are represented. (33)
- 2) High forest in which there is a mixture of different age classes. Usually, the trees can not be separated into different storeys. (12)

## UNPRODUCTIVE FOREST

All forest which is not regularly managed and have an increment in volume less than 1 m<sup>3</sup>/ha/year in the foreseeable future. Generally the term also includes protection forest in e.g. critical watersheds. (2, 27)

## URBAN FORESTRY

- 1) Management of publicly and privately owned trees in and adjacent to urban areas. (51)
- 2) The cultivation and management of trees and forests for their present and potential contributions to the physiological, sociological and economic well-being of urban society. (49)

### VIRGIN FOREST (untouched forest)

Areas (or forests) that have never been disturbed by human intervention, showing natural development in structure and dynamics.

The soil, climate, entire flora and fauna and the life processes have not been disturbed or changed by timber management, cattle grazing, or other direct or indirect anthropogenic influences. (36)

### WILDERNESS AREA

Usually large areas, uninhabited and roadless, which allow traditional means of livelihood, such as reindeer husbandry, whereas in North America no human intervention is allowed except controlled recreation. Also, restricted forest use within specified zones of protected wilderness areas may be allowed. (36)

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**Selected www-sources for definitions and translation services  
(in alphabetical order)**

Agrovoc: <http://www.fao.org/agrovoc/>

A database located at the Food and Agriculture Organization (FAO) allowing to search for terms and performing translations into English, French, Spanish and Portuguese starting from any of these languages. The search result of the Agrovoc database (e.g. the term forest) results in an extensive list of terms which can be either related to the term entered to the search (, a broader or narrower term or specified by use. For each term from the list a translation in the above mentioned languages can be performed.

Canadian Forest Service (<http://nrcan.gc.ca/cfs/>)

Glossary of forestry terms

Source: The State of Canada's Forests

[http://nrcan.gc.ca/cfs/proj/sci-tech/arena/gloss\\_e.html](http://nrcan.gc.ca/cfs/proj/sci-tech/arena/gloss_e.html)

Convention on Biological Diversity (<http://www.biodiv.org/>)

Forest Biodiversity Definitions Indicative definitions taken from the Report of the ad hoc technical expert group on forest biological diversity

<http://www.biodiv.org/programmes/areas/forest/definitions.asp>

CBD: Convention text. Article 2. Use of terms

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Includes an extensive terminological survey of protected forest areas from 20 European countries

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Complete, updated Encyclopædia Britannica + selected articles from various sources.
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- Garden web (<http://www.gardenweb.com/>)  
GardenWeb Glossary of Botanical Terms  
approximately 3700 terms relating to botany, gardening, horticulture and landscape architecture <http://glossary.gardenweb.com/glossary/>
- H. Gyde Lund's Forest Information Services (<http://home.att.net/~gklund/>)  
Large collection of definitions online:  
Definitions of forest, deforestation, afforestation, and reforestation  
<http://home.att.net/~gklund/DEFpaper.html>  
Definitions of old growth, pristine, climax, ancient forests, and similar terms.  
(definitions of forest state, stage, and origin)  
<http://home.att.net/~gklund/pristine.html>
- International Union of Forestry Research Organizations (IUFRO)  
(<http://iufro.boku.ac.at/iufro/>)  
SilvaTerm database  
Terminological database for forestry that is being built by SilvaVoc, IUFRO's project on forest terminology. Based mainly on terms and equivalent terms of a trilingual forestry vocabulary produced by T.B. Yerke under an USFS project. The IUFRO Units are completing this basic stock of terms with definitions and additional terms.  
<http://iufro.boku.ac.at/iufro/silvavoc/svdatabase.htm>
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Second Ministerial Conference on the Protection of Forests in Europe, Helsinki, 1993. European List of Criteria and Most Suitable Quantitative Indicators / Explanatory notes:  
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Bioenergy glossary (Finnish-English-German-Russian)  
Bioenergy glossary is a joint project of the University of Joensuu Faculty of Forestry and the Faculty of International Communication in Savonlinna. Currently the glossary consists of four sections: biogas, greenhouse effect, short rotation farming and wood-based fuels, each one of which contains 50–100 terms. <http://gis.joensuu.fi/termit/>

United Nations Economic Commission For Europe (UN-ECE)

(<http://www.unece.org/>)

Terms and definitions applied to UN-ECE/FAO Temporal and Boreal Forest Resource Assessment 2000

<http://www.unece.org/unece/trade/timber/fra/definit.htm>

United Nations Framework Convention on Climate Change (<http://www.unfccc.int/>)

Full text of Convention (definitions in Article 1)

<http://www.unfccc.int/resource/conv/>

University of Vaasa (<http://www.uwasa.fi/>)

Terminology collection: Term online-Forestry

Links to various forestry term collections in Internet

<http://www.uwasa.fi/comm/termino/collect/forestry.html>

World Conservation Union (IUCN) (<http://www.iucn.org/>)

Guidelines for Protected Area Management Categories (available as PDF-file)

<http://wcpa.iucn.org/pubs/pdfs/IUCNCategories.pdf>

IUCN Red List Categories

The threatened species categories prepared by the IUCN Species Survival

Commission <http://www.iucn.org/themes/ssc/redlists/categor.htm>

## APPENDICE 1. National forest definitions from EFICS (European Forestry Information and Communication System) Study

Austria	Belgium	Denmark	Finland	France
<p>All areas covered by woody plants if these criteria are met:  a) minimum area of <b>500 m<sup>2</sup></b> covered by woody plants and  b) width <b>≥ 10 m</b>  of area covered by woody plants and  c) minimum crown coverage of <b>30%</b> (ocular estimation).</p> <p>Note:  Width <b>≥ 10m</b> is required for <i>both</i> stream side areas covered by woody plants if stream width <b>≥ 3m</b>.</p> <p>(page 43)</p>	<p><b>Walloon region</b>  Wooded area are considered and inventoried:  *forests (more than <b>100 ha</b>)  *woods between <b>10 and 100 ha</b>  *small woods with area between <b>10 ares and 10 ha</b>  No crown cover specification. (page 94)</p> <p><b>Flemish region</b>  Forest area <b>≥ 50 ares</b>  width <b>≥ 25m</b>  Cover <b>≥ 20%</b> (excepted for clearcutting or forest damages) (page 112)</p>	<p>Forest is to be or should be planted with tree species which can be developed on the location into high forests with stems, that would stay at least, to a height of <b>6 meters</b></p> <p>the area should be more than <b>0.5 ha</b></p> <p>the areas should be wider than <b>20 meters</b> (at least on average)</p> <p>(page 122)</p>	<p>Forest land has the potential capacity to produce a mean annual increment of at least <b>1 m<sup>3</sup>/ha</b> stemwood, over bark, given an optimum tree species mixture, growing stock volume and prescribed rotations.</p> <p>Scrub land has the potential capacity to produce a mean annual increment of at least <b>0.1 m<sup>3</sup>/ha</b> but less than <b>1.0 m<sup>3</sup>/ha</b> given an optimum tree species mix.</p> <p>Forest land and scrub land combined are called forested land.</p> <p>Waste land, if not naturally treeless, is not given an optimum tree species mix, and it is not able to produce annually more than <b>0.1 m<sup>3</sup>/ha</b></p> <p>(page 186)</p>	<p>Forests: Identified from aerial photos (ocular estimates).  Must have following characteristics:  *either measured trees (diameter <b>&gt;7.5 cm</b>) have a crown cover percentage reaching at least <b>10%</b> (ground projection of crowns) or  *there are more than <b>500 stems per ha</b> that are viable trees (able to make a stand): seedlings, plants or shoots, vigorous, well shaped and regularly distributed.  *These characteristics, identified by photo-interpretation, are then checked up in the field.  *cover at least <b>5 acres</b>, the average width of canopy being at least <b>15 m</b>.G53</p> <p>Other wooded lands: Defined by the same criteria as production forest. Only difference is that their main function is not production. They are not sampled in the forest. They mainly consist of unmanaged forest, protective forest, no-admittance areas.</p> <p>(page 254)</p>

## Sources:

Study on European Forestry Information and Communication System - Reports on forestry inventory and survey systems Volume 1 and 2, European Commission, 1328 p.  
Pisarenko, A. I., Strakhov, V.V., Päivinen R., Kuusela, K., Dyakun, F.A., & Sdobnova, V.V., 2001.  
EFI Research Report 11. Brill: Leiden, Boston, Köln, 2001. 102 p

Germany	Greece	Ireland	Italy	Liechtenstein
<p>Forest within the meaning of the NFI is regardless of the information in the cadastral or similar records any area stocked with woody plants Forest include clear felled or cleared areas, forest roads, forest meadows game pasture, timber yards, pipe routes located in the forest, overgrown heathens and moors, overgrown former meadows, alpine areas and rough grazings as well as dwarf pine and green alder areas. Heathens moors, meadows, alpine areas and rough grazings are considered overgrown when the naturally occurring stocking has an average age of 5 years and at least 50% of the area stocked. Stocked areas in the field or in built-up areas less than 1000 m<sup>2</sup>, strips of woody plants less than 10 m wide and christmas tree and ornamental branch crops as well as parks in residential areas are not forests according to the NFI. Forest area is the sum total of all areas defined as forests, consisting of productive wooded areas and non-wooded areas</p> <p>(page 306)</p>	<p>1) Areas with <b>0.5 ha</b> or <b>30 cm</b> strips with a tree crown closure that covers <b>10%</b> of the area , or areas with <b>250</b> trees of a regeneration size, not used for other purposes or/ and other services.                  2) Areas where trees have been removed with a crown closure less than <b>10%</b> and they have not been used for other purposes.                  3) Areas with regeneration.                  4) Brush lands (areas covered by evergreen broad-leaved trees.</p> <p>(page 371)</p>	<p>High forest: area with a minimum of <b>20%</b> stocking and a yield class of <b>4 m<sup>3</sup>/ha</b> per annum.                  Scrub: area of broadleaf crop consistin of stunted trees or shrubs that lack the potential to develop as high forest.                  Plantable bare land: capable of growing trees.</p> <p>(page 401)</p>	<p>Forest area: a territory with one or more of following characters:                  *purpose to wood or non-wood goods productions currently regarded as forestal                  *contain tree or bush stands with direct or indirect funtion of protection                  *contain spontanous tree or bush stands with naturalist, scenic or recreation function.</p> <p>Included also areas temporarily without a stand because of cutting or exceptional occurrence.</p> <p>Minimum size of a forest area is <b>2000 m<sup>2</sup></b>.                  Minimum width is <b>20 m</b>.                  Canopy coverage of a minimum of <b>20%</b> requested.</p> <p>(page 464)</p>	<p>Same as in Switzerland, except forest/non-forest decision is not made in aerial photographs but on the ground.</p> <p>(page 663)</p>

Sources:

Study on European Forestry Information and Communication System - Reports on forestry inventory and survey systems Volume 1 and 2, European Commission, 1328 p.  
 Pisarenko, A. I., Strakhov, V.V., Päivinen R., Kuusela, K., Dyakun, F.A., & Sdobnova, V.V., 2001.  
 EFI Research Report 11. Brill: Leiden, Boston, Köln, 2001. 102 p

Luxembourg	Netherlands	Norway	Portugal
<p>no formal definition of forest area</p> <p>Statistical Yearbook definition (STATEC). "Wooded land"</p> <p>1.1. Forest areas are composed of wood areas and non-wood areas: Woods are forests, i.e. areas with vegetative cover mainly composed of trees and /or shrubs producing wood or other forest products. The sum of the trees' (shrubs') crown projections has to cover more than 20% of the stand's total area. temporarily unwooded stands (following clear cut or forest fire, recently planted stands, natural regenerations, or any similar stands showing a crown projection of less than 20%) have to be considered as wood areas.</p> <p>1.2. Non-wood forest areas are: forest roads, forest depots, marshlands, and any other area without trees as far as this area is enclosed by forests. Areas abandoned by agriculture for more than 10 years and intended for forest use are also considered as non-wood forest areas. Nurseries and dependences or any other buildings related to forestry development are considered non-wood forest areas as well. Other wooded land are areas showing some forest features being not consistent with the definition under 1.1, i.e. areas of trees with a crown projection of less than 20%, stunt trees, shrublands, or any other areas not mainly used by agriculture.</p> <p>(page 682)</p>	<p>*Land areas of <b>0.5 ha</b> and more and a width of at least <b>30 m</b> that are covered with trees or bushes</p> <p>*With a maturity, a crown closure of <b>20%</b> and over, the crown closure may (temporary) be lower than this figure because of final fellings for example</p> <p>*The tree and brush species present should be able to form forests.</p> <p>(page 727)</p>	<p>*Productive forest land is defined as land with an average potential production equal to or higher than <b>1 m<sup>3</sup>/ha/year</b> (including bark) regardless of current stocking.</p> <p>*Non-productive forest land should have an average potential production of between <b>0.1 and 1.0 m<sup>3</sup>/ha/year</b> regardless of the current stocking, and it should have mineral soil.</p> <p>*Wooded mire has the same production potential as non-productive forest land, with a peat soil.</p> <p>(page 832)</p>	<p>Area greater than <b>2000 m<sup>2</sup></b> and more than <b>15 m</b> wide.</p> <p>*Includes exploitable forests, recently harvested or burned areas, recent seedlings and plantations, and green zones (reserves, protection forest and recreation forest).</p> <p>(page 879)</p>

## Sources:

Study on European Forestry Information and Communication System - Reports on forestry inventory and survey systems Volume 1 and 2, European Commission, 1328 p.

Pisarenko, A. I., Strakhov, V.V., Päivinen R., Kuusela, K., Dyakun, F.A., & Sdobnova, V.V., 2001. EFI Research Report 11. Brill: Leiden, Boston, Köln, 2001. 102 p

Spain	Sweden	Switzerland	United Kingdom
<p>A territory or ecosystem predominantly with tree species and a cover-closure <math>\geq 10\%</math> , also includes "open forest" over cultivated or pasture land where cover-closure <math>\geq 20\%</math> .</p> <p>*Another category is called very open forest, including areas with a cover-closure between <b>5</b> and <b>10 %</b> , with forest trees as dominant vertical vegetation type. Also open forest over natural pastures with c-c between <b>5</b> and <b>20 %</b> is included in this category. Should be excluded from the "forested area" according to EU rules.</p> <p>(page 927)</p>	<p>Forest land is defined as land suitable for forest production, not used for other purposes, and with an average production <math>\geq 1 \text{ m}^3 / \text{ha} / \text{year}</math> during a period of 100 years.</p> <p>*Minimum area considered as forest is <b>0.25</b> ha.</p> <p>(page 983)</p>	<p>Forest area criteria:</p> <p>*Width of the growing stock with canopy closure=100% is at least <b>25 m</b> and with crown closure=20% at least <b>50 m</b>.</p> <p>*Canopy closure <b>between 20%</b> and <b>100%</b> depending on width of the growing stock</p> <p>*Minimum top height <b>3 m</b>. (Exception: afforestations, young growth, mountain alder, mountain pine)</p> <p>(page 1067)</p>	<p>Minimum area <b>2 ha</b>.</p> <p>In general the minimum width is <b>50 m</b>.</p> <p>Areas of scattered trees with distinct crowns constitute woodland if the canopy covers more than <b>20%</b> of the ground.</p> <p>Areas of young trees which have the potential to achieve a canopy cover of more than 20% are also interpreted woodland.</p> <p>Scrub will be included under its predominant photo-interpreted forest type (Conifer, Broadleaf, Mixed) or if not easily differentiated in this way it may be classed as Shrub land.</p> <p>Woodland also includes areas that may temporarily be without tree cover following forest operations such as felling.</p> <p>(page 1127)</p>

Sources:

Study on European Forestry Information and Communication System - Reports on forestry inventory and survey systems Volume 1 and 2, European Commission, 1328 p.  
 Pisarenko, A. I., Strakhov, V.V., Päivinen R., Kuusela, K., Dyakun, F.A., & Sdobnova, V.V., 2001.  
 EFI Research Report 11. Brill: Leiden, Boston, Köln, 2001. 102 p

Czech Republic	Poland	Russia
<p>Forest land is:            *land with forest stands and land after clear cutting ready for reforestation, forest line and soft road of a width less than 4 m.            *forest roads, water surfaces, land above timber line and other land serving for forest management.            Minimum area is <b>0.01 ha</b>, with a minimum width of <b>20 m</b>.</p> <p>(page 1225)</p>	<p>Forest is a ground covered with a forest vegetation, of area above <b>0.1 ha</b>; it includes forest grounds temporarily deprived of forest vegetation, and grounds related to forestry (forest roads, nurseries etc.).</p> <p>(page 1251)</p>	<p>Pisarenko et al. 2001</p> <p>Forest lands:            All lands which are used for growing forest, including both stocked forest lands and temporarily open areas;</p> <p>Stocked forest land: All areas covered by stocked forests, which means areas covered by relative stocking rates of at least 0.4 for young stands, or 0.3 for other stands. The relative stocking is determined as the ratio between the sum of the basal areas of actual stand at breast height and the sum of basal areas of corresponding stands according to yield tables, where the stocking rate of fully closed stands is 1.0.</p> <p>(page XIII)</p>

## Sources:

Study on European Forestry Information and Communication System - Reports on forestry inventory and survey systems Volume 1 and 2, European Commission, 1328 p.

Pisarenko, A. I., Strakhov, V.V., Päivinen R., Kuusela, K., Dyakun, F.A., & Sdobnova, V.V., 2001. EFI Research Report 11. Brill: Leiden, Boston, Köln, 2001. 102 p



## **APPENDICE 2.** IUCN (The World Conservation Union) Categories For Nature Protection

Reference: IUCN Guidelines for Protected Area Management Categories. IUCN (The World Conservation union) – WCPA (The World Commission on Protected Areas) and WCMC (The World Conservation Monitoring Centre), 1994.

**CATEGORY Ia:** Strict Nature Reserve: protected area managed mainly for science

Area of land and/or sea possessing some outstanding or representative ecosystems, geological or physiological features and/or species, available primarily for scientific research and/or environmental monitoring.

**CATEGORY Ib:** Wilderness Area: protected area managed mainly for wilderness protection

Large area of unmodified or slightly modified land, and/or sea, retaining its natural character and influence, without permanent or significant habitation, which is protected and managed so as to preserve its natural condition.

**CATEGORY II:** National Park: protected area managed mainly for ecosystem protection and recreation

Natural area of land and/or sea, designated to (a) protect the ecological integrity of one or more ecosystems for present and future generations, (b) exclude exploitation or occupation inimical to the purposes of designation of the area and (c) provide a foundation for spiritual, scientific, educational, recreational and visitor opportunities, all of which must be environmentally and culturally compatible.

**CATEGORY III:** Natural Monument: protected area managed mainly for conservation of specific natural features

Area containing one, or more, specific natural or natural/cultural feature which is of outstanding or unique value because of its inherent rarity, representative or aesthetic qualities or cultural significance.

**CATEGORY IV:** Habitat/Species Management Area: protected area managed mainly for conservation through management intervention

Area of land and/or sea subject to active intervention for management purposes so as to ensure the maintenance of habitats and/or to meet the requirements of specific species.

**CATEGORY V: Protected Landscape/Seascape:** protected area managed mainly for landscape/seascape conservation and recreation

Area of land, with coast and sea as appropriate, where the interaction of people and nature over time has produced an area of distinct character with significant aesthetic, ecological and/or cultural value, and often with high biological diversity. Safeguarding the integrity of this traditional interaction is vital to the protection, maintenance and evolution of such an area.

**CATEGORY VI: Managed Resource Protected Area:** protected area managed mainly for the sustainable use of natural ecosystems

Area containing predominantly unmodified natural systems, managed to ensure long term protection and maintenance of biological diversity, while providing at the same time a sustainable flow of natural products and services to meet community needs.

### **APPENDICE 3.** IUCN (The World Conservation Union) Red List Categories

Prepared by The World Conservation Union (IUCN) Species Survival Commission  
As approved by the 40th meeting of The World Conservation Union (IUCN) Council,  
Gland, Switzerland  
30 November 1994

*Note: As in previous IUCN categories, the abbreviation of each category (in parenthesis) follows the English denominations when translated into other languages.*

The categories:

#### **EXTINCT (EX)**

A taxon is Extinct when there is no reasonable doubt that the last individual has died.

#### **EXTINCT IN THE WILD (EW)**

A taxon is Extinct in the wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A taxon is presumed extinct in the wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

#### **CRITICALLY ENDANGERED (CR)**

A taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild in the immediate future, as defined by any of the criteria (A to E)

#### **ENDANGERED (EN)**

A taxon is Endangered when it is not Critically Endangered but is facing a very high risk of extinction in the wild in the near future, as defined by any of the criteria (A to E)

#### **VULNERABLE (VU)**

A taxon is Vulnerable when it is not Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium-term future, as defined by any of the criteria (A to D)

## LOWER RISK (LR)

A taxon is Lower Risk when it has been evaluated, does not satisfy the criteria for any of the categories Critically Endangered, Endangered or Vulnerable. Taxa included in the Lower Risk category can be separated into three subcategories:

1) Conservation Dependent (cd). Taxa which are the focus of a continuing taxon-specific or habitat-specific conservation programme targeted towards the taxon in question, the cessation of which would result in the taxon qualifying for one of the threatened categories above within a period of five years.

2) Near Threatened (nt). Taxa which do not qualify for Conservation Dependent, but which are close to qualifying for Vulnerable.

3) Least Concern (lc). Taxa which do not qualify for Conservation Dependent or Near Threatened.

## DATA DEFICIENT (DD)

A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution is lacking. Data Deficient is therefore not a category of threat or Lower Risk. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate. It is important to make positive use of whatever data are available. In many cases great care should be exercised in choosing between DD and threatened status. If the range of a taxon is suspected to be relatively circumscribed, if a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified.

## NOT EVALUATED (NE)

A taxon is Not Evaluated when it is has not yet been assessed against the criteria

## **APPENDICE 4. Ministerial Conference On The Protection Of Forests In Europe (MCPFE) Classification Of Protected And Protective Forests And Other Wooded Land In Europe**

(According to recommendations of the MCPFE Workshop on Protected Forest Areas 28 – 30 November 2001, Køge, Denmark)

The below text and description are taken from the Annex to the Minutes MCPFE Workshop on Protected Forest Areas 28 – 30 November 2001, Køge, Denmark (<http://www.minconf-forests.net/Basic/FS-Documents.html>).

### **Background**

The MCPFE Classification of Protected and Protective Forests and Other Wooded Land in Europe is an outcome of the implementation of the joint “Work-Programme on the Conservation and Enhancement of Biological and Landscape Diversity in Forest Ecosystems 1997 – 2000” of the MCPFE and “Environment for Europe”. It is based on the analysis of national data on protected and protective forests and other wooded land in the European countries, collected in the frame of a supplementary TBFRA2 enquiry in 2000. The aim is to give a comprehensive picture of protected and protective forests and other wooded land in Europe, while keeping links to other international classification systems used for all kinds of protected areas. As comparability at the international level is a goal of this classification, terms and definitions used are in compliance with the TBFRA terminology. In addition, protected forests and protected other wooded land assigned to the classification are in accordance with the IUCN definition of protected areas. The MCPFE Classification of Protected and Protective Forests and Other Wooded Land in Europe should thus provide an important tool for further MCPFE work on the conservation of all types of forests.

### **Category 1. Management Objective Biodiversity**

#### **Category 1.1: Management Objective Biodiversity “No Active Intervention”**

Main characteristics

No active, direct human intervention

Activities other than mentioned below are to be prevented

Activities allowed

Limited public access

Non-destructive research not detrimental to the management objective

## MCPFE Categories

MCPFE CATEGORY		EEA*	IUCN**
1: Management Objective "Biodiversity"	1.1: "No Active Intervention"	A	I
	1.2: "Minimum Intervention"	A	II, (IV)
	1.3: "Conservation Through Active Management"	A	IV, (V)
2: Management Objective "Protection of Landscapes and Specific Natural Elements"		B	III, (V, VI)
3: Management Objective "Protective Functions"		(B)	n.a.

\* References as identified in the Standard Data Form of the Natura 2000 and Emerald networks, and used in the same way in the framework of the Common Database on Designated Areas (CDDA), managed by the EEA on behalf of two other organisations (Council of Europe and UNEP-WCMC). Groups (A, B or C) are related to designation types and not to individual sites.

\*\*Indicative reference: - The equivalence of IUCN Categories V and VI may vary according to the specific management objective (of the forested part) of each individual protected area. - IUCN Category III has biodiversity conservation as its primary management objective. However, it fits more easily under MCPFE category 2 than 1.

### Category 1.2: Management Objective Biodiversity "Minimum Intervention"

Main characteristics

Human intervention limited to minimum

Activities other than mentioned below are to be prevented in the protected area

Activities allowed

Ungulate/game control

Control of diseases/insect outbreaks\*

Public access

Fire intervention

Non-destructive research not detrimental to the management objective

Subsistence resource use\*\*

\* In case of expected large diseases/insect outbreaks control measures using biological methods are allowed provided that no other adequate control possibilities in buffer zones are feasible.

\*\*Subsistence resource use to cover the needs of indigenous people and local communities, in so far as it will not adversely affect the objectives of management

### **Category 1.3: Management Objective Biodiversity “Conservation Through Active Management”**

#### Main characteristics

- Management with active interventions directed to achieve the specific conservation objective of the protected forest area
- Activities mentioned below are to be prevented

#### Activities not allowed

- Resource extraction, harvesting and other silvicultural activities detrimental to management objective

### **Category 2: Management Objective "Protection of Landscapes and Specific Natural Elements"**

#### Main characteristics

- Interventions clearly directed to achieve management objectives landscape diversity, cultural, aesthetic, spiritual and historical values, recreation, specific natural elements
- Restricted use of forest resources
- Clear long-term commitment
- Explicit designation as specific protection regime defining a limited area with special status
- Activities mentioned below are to be prevented

#### Activities not allowed

- Activities negatively affecting characteristics of landscapes or/and specific natural elements

### **Category 3: Management Objective “Protective Functions”**

#### Main characteristics

- Management clearly directed to protect soil and its properties or water quality and quantity or other forest ecosystem functions, or to protect infrastructure and managed natural resources against natural hazards
- Forests explicitly designated in management plan to fulfil protective functions
- Activities mentioned below are to be prevented

#### Activities not allowed

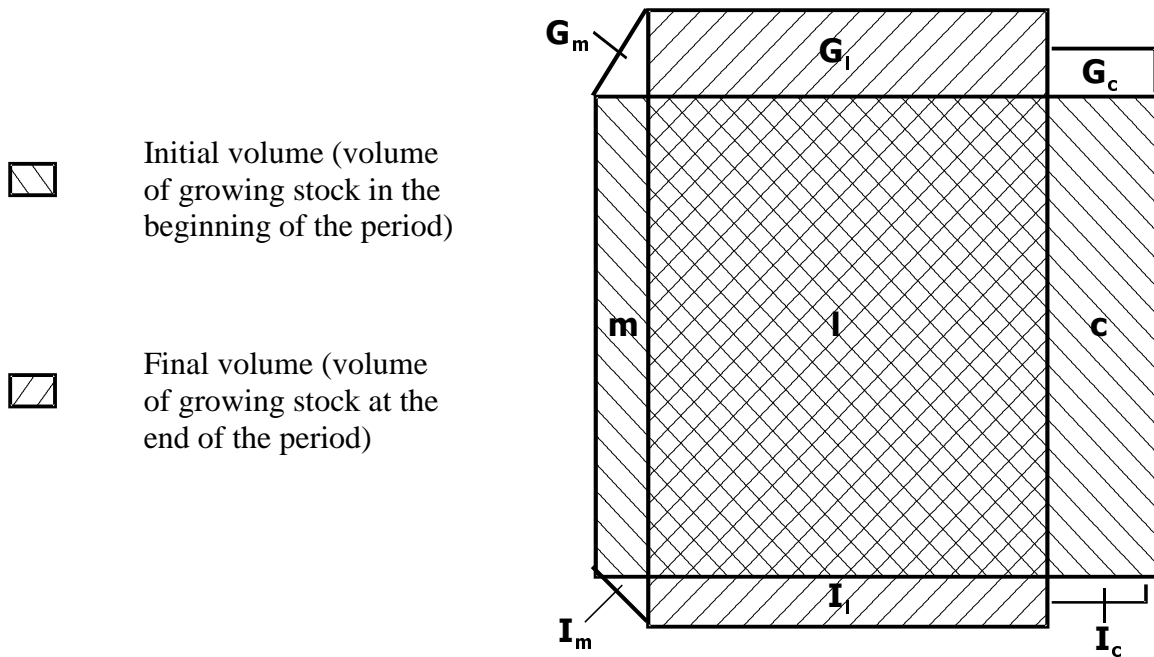
- Any operation negatively affecting soil or water or the ability to protect other ecosystem functions, or the ability to protect infrastructure and managed natural resources against natural hazards

**APPENDICE 5.** Components of increment

Initial volume	$V_1$	$= I + m + c$
Final volume	$V_2$	$= I + G_I + I_I$
Mortality	$M$	$= m + G_m + I_m$
Cut	$C$	$= c + G_c + I_c$
Ingrowth	$I$	$= I_I + I_m + I_c$
Drain	$D$	$= C + M$
Increment of drain	$G_{m+c}$	$= G_m + G_c + I_m + I_c$
Gross increment	$G_g$	$= G_m + G_I + G_c + I$ $= V_2 - V_1 + M + C$
Net increment	$G_n$	$= G_g - M$ $= V_2 - V_1 + C$
Net change	$G_d$	$= V_2 - V_1$

Where

- $I$  = initial volume of survivor trees
- $m$  = initial volume of mortality trees
- $c$  = initial volume of cut trees
- $G_I$  = increment of survivor trees
- $G_m$  = increment of initial volume mortality
- $G_c$  = increment of cut initial volume
- $I_I$  = ingrowth of survivor trees
- $I_m$  = mortality of ingrowth
- $I_c$  = cut ingrowth



Source: Päivinen, R. and Anttila, P. 2001. How reliable is a satellite forest inventory? Discussion Paper. Silva Fennica 35 (1):125-127.