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Annex to Enquiry

State of Forests and Sustainable Forest Management in Europe 2011

New European Forest Types Complementary documentation



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About this Appendix

The **new European Forest Types** adopted in the Enquiry for the SoEF2011 for pilot reporting of selected pan-European indicators (1.1, 1.2, 1.3, 4.1, 4.3, 4.5) are an update of the proposal for the classification of European forest presented in the EEA Technical Report No 9/2006 (http://reports.eea.europa.eu/technical_report_2006_9/en).

This Appendix is intended as **complementary documentation to the EEA report 2006**, providing information to modifications introduced to the original European Forest Type scheme i.e.:

- new definition of the Category 14;
- addition of new types and new arrangement of already existing types.

1. Classification structure & coverage

The new European Forest Types (EFTs) are organized according to a hierarchical classification system (Figure 1) structured into 14 Categories and 78 Types.

The EFTs scheme is conceived to classify **stocked forest land** of the Pan-European continent, as defined in the Enquiry for the SoEF2011; thus, the EFTs **do not cover temporarily and permanently unstocked forest areas**.

The full list of types nested into the 14 Categories is reported in Table 1. Updated Category 14 and newly introduced types are described in § 2.

Figure 1. Hierarchical structure of the new European Forest Types classification.

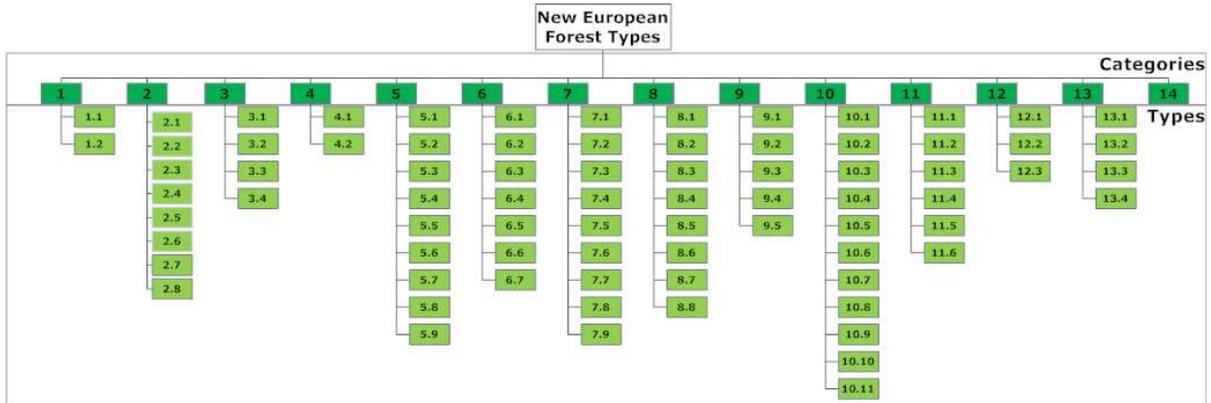


Table 1. New European Forest Types: full list of Category and Types. In italic bold are indicated newly introduced/modified classes compared to EEA (2006).

<i>EFTs – Category level</i>	<i>EFTs – Type level</i>
1. Boreal forest	1.1. Spruce and spruce-birch boreal forest
	1.2 Pine and pine-birch boreal forest
2. Hemiboreal and nemoral coniferous and mixed broadleaved-coniferous forest	2.1 Hemiboreal forest
	2.2 Nemoral Scots pine forest
	2.3 Nemoral spruce forest
	2.4 Nemoral Black pine forest
	2.5 Mixed Scots pine-birch forest
	2.6 Mixed Scots pine-pedunculate oak forest
	2.7 Atlantic Maritime pine forest
	2.8 Nemoral Silver fir forest
3. Alpine forest	3.1 Subalpine larch-arolla pine and dwarf pine forest
	3.2 Subalpine and mountainous spruce and mountainous mixed spruce-silver fir forest
	3.3 Alpine Scots pine and Black pine forest
	3.4 Mountainous birch forest
4. Acidophilous oak and oak-birch forest	4.1 Acidophilous oakwood
	4.2 Oak-birch forest
5. Mesophytic deciduous forest	5.1 Pedunculate oak-hornbeam forest
	5.2 Sessile oak-hornbeam forest
	5.3 Ashwood and oak-ash forest
	5.4 Maple-oak forest
	5.5 Lime-oak forest
	5.6 Maple-lime forest
	5.7 Lime forest
	5.8 Ravine and slope forest
	5.9 Other mesophytic deciduous forests
6. Beech forest	6.1 Lowland beech forest of southern Scandinavia and north central Europe
	6.2 Atlantic and subatlantic lowland beech forest
	6.3 Subatlantic submountainous beech forest
	6.4 Central European submountainous beech forest
	6.5 Carpathian submountainous beech forest
	6.6 Illyrian submountainous beech forest
	6.7 Moesian submountainous beech forest
7. Mountainous beech forest	7.1 South western European mountainous beech forest
	7.2 Central European mountainous beech forest
	7.3 Apennine-Corsican mountainous beech forest
	7.4 Illyrian mountainous beech forest
	7.5 Carpathian mountainous beech forest
	7.6 Moesian mountainous beech forest
	7.7 Crimean mountainous beech forest
	7.8 Oriental beech and hornbeam-oriental beech forest
	7.9 Mountainous Silver fir forest
8. Thermophilous deciduous forest	8.1 Downy oak forest
	8.2 Turkey oak, Hungarian oak and Sessile oak forest
	8.3 Pyrenean oak forest
	8.4 Portuguese oak and Mirbeck's oak Iberian forest
	8.5 Macedonian oak forest
	8.6 Valonia oak forest
	8.7 Chestnut forest
	8.8 Other thermophilous deciduous forests
9. Broadleaved evergreen forest	9.1 Mediterranean evergreen oak forest
	9.2 Olive-carob forest
	9.3 Palm groves
	9.4 Macaronesian laurisilva

<i>EFTs – Category level</i>	<i>EFTs – Type level</i>
	9.5 Other sclerophyllous forests
10. Coniferous forests of the Mediterranean, Anatolian and Macaronesian regions	10.1 Mediterranean pine forest
	10.2 Mediterranean and Anatolian Black pine forest
	10.3 Canarian pine forest
	10.4 Mediterranean and Anatolian Scots pine forest
	10.5 Alti-Mediterranean pine forest
	10.6 Mediterranean and Anatolian fir forest
	10.7 Juniper forest
	10.8 Cypress forest
	10.9 Cedar forest
	10.10 Tetraclinis articulata stands
	10.11 Mediterranean yew stands
11. Mire and swamp forest	11.1 Spruce mire forest
	11.2 Pine mire forest
	11.3 Alder swamp forest
	11.4 Birch swamp forest
	11.5 Pedunculate oak swamp forest
	11.6 Aspen swamp forest
12. Floodplain forest	12.1 Riparian forest
	12.2 Fluvial forest
	12.3 Mediterranean and Macaronesian riparian forest
13. Non-riverine alder, birch or aspen forest	13.1 Alder forest
	13.2 Italian alder forest
	13.3 Birch forest
	13.4 Aspen forest
14. Introduced tree species forest	-

2. New classes: description

Category 14. Introduced tree species forest

Forest dominated by introduced tree species (*sensu* pan-European indicator 4.4). Occur on a wide range of site conditions which otherwise would develop forests of other categories.

Introduced tree species can be identified at regional (recommended) or national level and comprise:

- tree species that are not native to Europe (e.g. *Eucalyptus* spp., *Robinia pseudoacacia*, *Acacia dealbata*, *Ailanthus altissima*, *Prunus serotina*, *Quercus rubra*, *Fraxinus alba*, *Picea sitkensis*, *Pinus contorta*, *Pinus banksiana*, *Pseudotsuga menziesii*, *Tsuga heterophylla*);
- tree species native to Europe, but not naturally occurring within the borders of individual Forest Europe member state;
- tree species native only in some regions of an individual Forest Europe country.

Guidelines for assessing the Category 14 at country level are provided in the Annex to the Enquiry for the SoEF2011.

Category 2

2.7 Atlantic Maritime pine forest

Atlantic coastal forest of *Pinus pinaster* ssp. *Atlantica* of southwestern France and western coasts Iberian peninsula; many forests were originally established by reforestation on sandy coastal dunes (e.g. France, Massif Landais; Portugal, National Pine Forest of Leiria).

The Ibero-Tyrrhenian *Pinus pinaster* ssp. *pinaster* dominated forests of the Mediterranean region (Spain, Corsica, southeastern France, northwestern Italy, Sardinia and Pantelleria) are classified under type 10.1.

2.8 Nemoral Silver fir forest

Silver fir (*Abies alba*) forests of the Atlantic Region, mainly found in the hills of Normandie (France, region d'Alençon, Alpes Mancelles); Silver fir, though originally introduced, regenerates naturally in this Region and it is thus regarded as a native species.

Category 7

7.9 Mountainous Silver fir forest

The type covers Silver fir dominated (*Abies alba*) forests characteristic of the montane level of the major European mountains (Alps, the Dinarides, the Carpathians, the Pyrenees, the Jura, the Hercynian range); it is mainly found in association with mountainous beech forest of types of Category 7.

Examples are fir forests growing on calcareous block slopes of the Dinarides of Slovenia, western Croatia, and Bosnia-Herzegovina, extending north to the Triglav range in the southeastern Alps of Slovenia and south in fragmentary form to the Piva Valley of Montenegro.

Silver fir dominated forests in the Mediterranean region (e.g. Southeastern France, Corsica, Italian Appennine) are classified under type 10.6.

3. Modifications to existing forest types

Besides the new types above, some forest types described in EEA (2006) are arranged in different way in the new European Forest Type scheme. Modifications are described below.

Category 11, the original type “11.1 Conifer dominated or mixed mire forest” is now split into two separate types: “11.1 Spruce mire forest” and “11.2 Pine mire forest”; types are described below.

11.1 Spruce mire forest

This type is a complex of Spruce dominated mires, sometimes mixed with *Betula pubescens*, with variable nutrient status (poor to rich).

Spruce-birch swamps are mainly restricted to depressions in the terrain and often fringe larger mires. Generally they have a thin peat layer. In the boreal area Norway spruce is the dominant tree, giving rise to a ground flora of shade tolerant plants. Grey birch *Betula pubescens* may also form extensive stands, while alders (*Alnus glutinosa*, *A. incana*) and tall-growing *Salix* spp. are more local. The stands often show marked variations between hummocks and depressions, which at least periodically are inundated at the period of snow melting. Such stands have an extremely rich flora with many tall herbs, particularly in nutrient-rich areas. In more nutrient-poor areas bilberry *Vaccinium myrtillus* forms extensive stands (Sjöberg and Ericson, 1997). Typically for the pristine mire tree stands is that the number of stems is high in small diameter classes and decreases abruptly with increasing diameter. As a consequence, tree stands on pristine mires have a highly uneven-age structure.

11.2 Pine mire forest

This type is a complex of Pine dominated mires with variable nutrient status (poor to rich); it is mainly characterized by Scots pine bogs that are typically found as a forest fringe at sites where ombrotrophic conditions prevail (i.e. rainwater constitutes the nutrient source). They develop on hummocks, have a thick peat layer and are very poor in species. *Ledum palustre*, *Vaccinium uliginosum* and a number of other dwarf-shrubs and mosses are commonly found in heath forests. Scots pine bogs may also cover the entire surface of smaller mires in the drier parts of eastern Sweden (Sjöberg and Ericson, 1997).

Ditched mires, no longer presenting the ecological and compositional characters of mire and swamp forests, should be classified into the other Categories, based on biogeographical region and their compositional features.

Category 13, the original type 13.3 is moved to Category 3, type “3.4 Mountainous birch forest” and the original type 13.4 “Other birch forest” is modified into “13.3 Birch forest”. Types are described below.

3.3 Mountainous birch forest

Timberline birch forest dominating the subalpine belt of the mountains of the boreal zone; it is found along the Scandinavian mountain range, where a distinct subalpine belt of birch (*Betula pubescens* spp. *czerepanovii*) creates the border between the alpine zone and the conifer belt at lower elevation.

13.3 Birch forest

Birch forest on non-marshy terrain, dominated by *Betula pendula*, *Betula pubescens* or other endemic birch species (*Betula celtiberica*, *Betula aetnensis*). It includes all pioneer and antropogenically promoted birch formations growing from lowlands to mountainous vegetation levels in Europe.

In northern Europe, there are two main types of birch forests; of bush-grass-type, and herb-type (Nordiska ministerrådet, 1984; Sjörs, 1956; Havas, 1967). The first type is common over most parts of Scandinavia below the subalpine vegetation belt. It is dominated by the birch species *Betula pendula*. These forests have earlier been heavily used as cattle grazed habitats, which nowadays are returning to forest. Included are:

- the herb-type birch forests distributed all over Scandinavia; it grows mainly on older grazed areas which have been abandoned, and there is often rich bush vegetation in these forests. The field layer vegetation is similar to that in Norway spruce forest with low herbs. *Maianthemum bifolium*, *Melampyrum sylvaticum*, and *Oxalis acetosella* are example of dominant species. It is regarded as an unstable forest type which is transformed to conifer forests of low herb type, or to oak or beech in southern areas (Nordiska ministerrådet, 1984).
- the maritime type in the outer archipelagoes of the Baltic Sea, with *Cornus suecica* as a common species in the field layer.

In Eastern Europe birch forest is also typical and widespread on rather poor or wet soil (Chertov, 1981; Abaturv *et al.*, 1982; Vasilevich, 1996; Fedorchuk *et al.*, 2006).

This type also covers a wide range of birch dominated forest of middle and southern Europe; these are notably:

- pioneer and subclimax *Betula pendula* or *Betula pubescens* formations of the North Sea-Baltic plains, the lower Hercynian slopes, the periphery of the Paris Basin, south-western France, north-western Iberia, Insubria and Illyria, within the range of Atlantic and sub-Atlantic acidophilous oak woods;
- *Betula pubescens*, *Betula odorata*, *Betula carpatica* or *Betula pendula* dominated woods beyond and above the present range of oak woods in Scotland and northern England;

- birch, mostly subclimax, stands of the mountainous and subalpine levels of the Alps, the Carpathians, the Apennines, the Pyrenees, the Jura, the Hercynian ranges and the mountains of the Balkan peninsula;
 - *Betula pendula* formations of the upper mountainous level of Corsica, forming extensive subclimax belts on rocky, rapidly eroding soils at the upper forest limit, as well as transition communities in the evolution of lario pine or beech forests;
 - endemic *Betula celtiberica* formations of the upper mountainous and supra-Mediterranean levels of Iberia;
 - endemic *Betula aetnensis* formations of Mount Etna lavas, limited to the 1200-2000 metres level.
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