

Estonian Forest Site Types in Terms of the Habitat Directive

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Paal J. 2002. Estonian Forest Site Types in Terms of the Habitat Directive. *Baltic Forestry*, 8 (1): 21–27.

To overcome the confusion in understanding the Habitat Directive types named in Annex 1, several countries have been forced to prepare for that purpose a national interpretation manual. In the current paper it is discussed, how the correspondence was found between the Estonian forest typology and the Directive types.

Key words: classification, forest typology, Habitat Directive.

Introduction

The Habitat Directive of the European Union (Council directive 92/43/EEC of May, 21, 1992 on the conservation of natural habitats and of wild fauna and flora) aims to ensure the preservation of wild flora and fauna species by protecting their habitats as well as preserving the endangered habitats themselves. For that purpose a network of protected areas or areas with restricted economic usage, called Natura 2000, will be established. The list of habitat types and species having an all-European importance, is presented in the Annex 1 and Annex 2 of the Directive, respectively.

Annex 1 is a revised version of CORINE classification (Coordinated Information on the Environment of Europe; CORINE biotopes manual, issued in 1991), having in general the same shortcomings. The main confusion here is connected with the intermixing of different discrimination criteria on the same hierarchy level of the classification. If we look, for example, at subsection 90 'Forests of boreal Europe', then, for identification of the type 9020 'Fennoscandian hemiboreal natural old broad-leaved deciduous forests (*Quercus*, *Tilia*, *Acer*, *Fraxinus* or *Ulmus*) rich in epiphytes' the following criteria are important: (i) geographical location, (ii) stand age, (iii) species composition in tree layer and, (iv) presence of epiphytes. At the same time, for the type 9060 'Coniferous forest on, or connected to, glaciofluvial eskers', besides the species composition (coniferous trees), only their location on certain landscape facies with a particular genesis is determinative and nothing is said about either geographical location, age or epiphytes. Several types like 9070 'Fennoscandian wooded pastures', are defined only according to their physiognomy. The

same inconsistency can be noted in defining other habitat types. Moreover, the ecological amplitude (or volume) of different habitat types is extremely variable. From this point of view the most remarkable type among forests is 9010 'Western taiga', embracing very different forests on a huge territory extending over many states.

To overcome the confusion in understanding the Habitat Directive types named in Annex 1, the Scientific Working Group under the Habitats Committee published in 1996 the "Interpretation manual of European Union habitats". Still, in the manual the types are not characterized equally and their unambiguous comprehension is not guaranteed. Particularly inadequate is often the explanation of types from the aspect of boreal nature conditions. With additional types of boreal region, taken into account in the second version of the manual (Interpretation Manual of European Union Habitats, issued in 1999) this deficiency has been rectified only partly.

In later discussions the General Directorate XI officers have explained (personal comments), that the manual should not be taken as a very imperative, and that in every country different limits for the interpretation of habitat types should be established in accordance with the peculiarities of local nature. Therefore, in recent years a national Habitat Directive interpretation manual has been published or prepared in several countries (e.g. Brown et al. 1997; Löfroth 1997; Airaksinen, Karttunen 1998; Ssymank et al. 1998; Buchwald, Søgaard 2000; Kabucis 2000; Rašomavičius 2001). In the current paper we will describe how a correspondence was established between the Estonian forests classification and Habitat Directive (in detail cf. Paal 2001b).

Estonian forest typology

Estonian forest typology is following the Finnish approach, where the central concept and classification unit is the forest site type. Site types are defined by the ground vegetation of mature or stable stands, and communities having a similar undergrowth composition are merged into one type. In the boreal and boreo-nemoral vegetation zone the species composition in moss and field layers indicates the general abiotic conditions rather well (Cajander 1926; Frey 1973). In that way, the forest site type provides a biological expression of biotope characteristics in terms of the forest growth quality of the site, and “the forest site-type may be defined as a set of forests with a similar silvicultural effect (i.e. a complex of similar natural factors influencing the vegetation)” (Lõhmus 1995). The forest site types are divided into forest types according to the dominating tree species, and one site type may therefore include more than one forest type. The forest site types confined to mineral soil are specified using the name of some characteristic ground vegetation species (e.g. heather site type), whereas for the site types of peatland forests, the names of the mire types (e.g. bog site type) are used. The name of a forest type consists of the name of site type and the name of dominating tree species (e.g. bilberry spruce forest, bog pine forest, Table 1). The forest site types are merged on the basis of soil trophicity and landscape features (Lõhmus 1984).

Habitat Directive Annex 1 and Estonian forest typology

90 Forests of boreal Europe
9010 Western taiga

The main criteria for distinguishing these forests is that they are old and natural, but young forest stages regenerating naturally after fire are also included.

Excluding all other more exactly specified woodland habitat types and following the corrected terminology of Paal (2001a), from the Estonian forests type groups in this Habitat Directive type can be included such as: (i) ‘eutrophic alvar forests’, (ii) ‘oligotrophic boreal heaths forests’, (iii) ‘oligo-mesotrophic boreal forests’, (iv) ‘mesotrophic boreal forests’ and, (v) ‘eutrophic paludifying forests’ [only *Molinia* site type = *Carex* and *Equisetum* site types in Lõhmus (1984, 1995)] and, (vi) ‘oligotrophic paludifying forests’ (Table 2) satisfying the primeval forest and/or natural forest criteria. Eerik Leibak (personal comment) has estimated the primeval forest criteria as follows:

Table 1. Approximate correspondence between the officially accepted forest site typology (Lõhmus 1984, 1995) and the Estonian vegetation habitat classification (Paal 1997, 2001a). FSTG – forest site type group, TG – type group, FST – forest site type, ST – site type, SuT – subtype

Paal, 1997, 2001a	Lõhmus, 1984, 1995
I. Forests on mineral soil	
TG: Eutrophic alvar forests and shrublands	Alvar FSTG
<i>Arcostaphylos</i> alvar forest/shrubland ST	<i>Arcostaphylos alvar</i> FST
<i>Calamagrostis</i> alvar forest/shrubland ST	<i>Calamagrostis alvar</i> FST
<i>Sesleria</i> alvar forest/shrubland ST	<i>Sesleria alvar</i> FST
TG: Oligotrophic boreal heath forests	Heath FSTG
<i>Cladonia</i> boreal heath FST	<i>Cladonia</i> FST
<i>Calluna</i> boreal heath FST	<i>Calluna</i> FST
TG: Oligo-mesotrophic boreal forests	Mesotrophic FSTG
<i>Vaccinium vitis-idaea</i> boreal FST	<i>Vaccinium vitis-idaea</i> FST
<i>Vaccinium myrtillus</i> boreal FST	<i>Vaccinium myrtillus</i> FST
TG: Mesotrophic boreal forests	Meso-eutrophic FSTG
<i>Oxalis</i> boreal FST	<i>Oxalis-Vaccinium myrtillus</i> FST <i>Oxalis</i> (typical) FST
TG: Meso-eutrophic boreo-nemoral	not included
hillock forests	
<i>Antennaria</i> boreo-nemoral hillock FST	Alvar FSTG – <i>Calamagrostis</i> FST (partly) and meso-eutrophic FSTG – <i>Hepatica</i> FST (partly) – i.e. dry forests on hillocks with calcareous till
<i>Fragaria</i> boreo-nemoral hillock FST	
<i>Corylus</i> boreo-nemoral hillock FST	
TG: Eutrophic boreo-nemoral forests	Meso-eutrophic FSTG – <i>Hepatica</i> FST
<i>Hepatica</i> boreo-nemoral FST	Nemoral FSTG – <i>Aegopodium</i> FST
<i>Aegopodium</i> boreo-nemoral FST	not included, partly: nemoral FSTG – <i>Aegopodium</i> FST (under klint)
<i>Lunaria</i> boreo-nemoral FST	
II. Floodplain forest and shrublands	
TG: Floodplain forests	not included
<i>Humulus</i> floodplain FST	Nemoral FSTG – <i>Dryopteris</i> FST (on floodplains)
Floodplain willow shrublands	not included
<i>Salix</i> floodplain shrubland SuT	
III. Paludifying forests	
TG: Eutrophic paludifying forests	Nemoral FSTG – <i>Dryopteris</i> FST (typical)
<i>Dryopteris</i> paludifying FST	Herb-rich wet mixed FSTG – <i>Filipendula</i> FST
<i>Filipendula</i> paludifying FST	Herb-rich wet mixed FSTG – <i>Carex</i> and <i>Equisetum</i> FSTs
<i>Molinia</i> paludifying FST	Dwarf-shrub sphagnum paludified FSTG
TG: Oligotrophic paludifying forests	<i>Polytrichum</i> FST
<i>Polytrichum</i> paludifying FST	<i>Vaccinium uliginosum</i> FST
<i>Vaccinium uliginosum</i> paludifying FST	
IV. Peatland forests	
TG: Eutrophic to meso-eutrophic (minerotrophic) swamp forests	Grass fen FSTG
<i>Calla</i> swamp forest	alder fen FST
<i>Carex elongata</i> floodplain swamp FST	not included, partly: alder or birch fens on floodplains
Spring swamp FSuT	not included, partly: alder or birch fens in spring swamps
Stagnant water swamp FST	birch fen FST
TG: Mesotrophic (mixotrophic) bog forests	Bog moss FSTG
Mesotrophic (mixotrophic) bog FST	transition bog FST
TG: Oligotrophic (ombrotrophic) bog forests	Bog moss FSTG
Oligotrophic (ombrotrophic) bog FST	bog FST
V. Drained peatland forests	
TG: Drained peatland forests	Full-drained swamp FSTG
<i>Vaccinium myrtillus</i> drained peatland FST	<i>Myrtillus</i> full-drained swamp FST
<i>Oxalis</i> drained peatland FST	<i>Oxalis</i> full-drained swamp FST

(i) In the tree layer several species are represented; the age of trees varies; trees of the previous forest generation are also present; age of dominant trees varies by more than the three age classes, i.e. for deciduous trees at least 30 years and for coniferous at least 60 years;

(ii) Trees of different age constitute clusters; in gaps between them, clumps of younger specimens are growing;

(iii) Windfall and dead standing trees constitute more than 5% of the total number of growing trees, but not considering gaps more than 10%. Windfall at

Table 2. Correspondence between the Habitat Directive Annex I habitat types and Estonian forest site types. Code numbers and names of the Estonian forest site types are presented after Paal (2001a). Notations as in Table 1.

Natura code	Habitat Directive type	Estonian forest site type
90	Forests of boreal Europe	
9010	Western taiga	1.1.1 Eutrophic alvar forests and shrublands TG 1.1.2 Oligotrophic boreal heath forests TG 1.1.3 Oligo-mesotrophic boreal forests TG 1.1.4 Mesotrophic boreal forest TG 1.3.1.3 <i>Molinia</i> paludifying forest ST 1.3.2 Oligotrophic paludifying forest TG
9020	Fennoscandian hemiboreal natural old broad-leaved deciduous forests (<i>Quercus</i> , <i>Tilia</i> , <i>Acer</i> , <i>Fraxinus</i> or <i>Ulmus</i>) rich in epiphytes	1.1.6.1 <i>Hepatica</i> boreo-nemoral forest ST 1.1.6.2 <i>Aegopodium</i> boreo-nemoral forest ST 1.1.5 Meso-eutrophic boreo-nemoral hillock forests TG
9050	Fennoscandian herb-rich forests with <i>Picea abies</i>	1.1.6.1 <i>Hepatica</i> boreo-nemoral forest ST 1.1.6.2 <i>Aegopodium</i> boreo-nemoral forest ST 1.3.1.2 <i>Filipendula</i> paludifying forest ST
9060	Coniferous forests on, or connected to, glaciolluvial eskers	1.1.5 Meso-eutrophic boreo-nemoral forests TG
9070	Fennoscandian wooded pastures	presented, but not as a typological unit
9080	Fennoscandian deciduous swamp woods	1.3.1.1 <i>Dryopteris</i> paludifying forest ST 1.3.1.2 <i>Filipendula</i> paludifying forest ST 1.3.1.3 <i>Molinia</i> paludifying forest ST 1.4.1.1 Microtrophic stagnant water swamp forest ST 1.4.1.2 <i>Calla</i> swamp forest ST
91	Forests of Temperate Europe	
9180	<i>Tilio-Acerion</i> forests of slopes, screes and ravines	1.1.6.3 <i>Lunaria</i> boreo-nemoral forest ST
9110	Bog woodland	1.4.2.1 Mesotrophic bog forest ST 1.4.3.1 Oligotrophic bog forest ST
91E0	Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padiom</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>)	1.4.1.1 <i>Carex elongata</i> floodplain swamp forest SuT 1.4.1.2 <i>Calla</i> swamp forest ST
91F0	Riparian mixed forests of <i>Quercus robur</i> , <i>Ulmus laevis</i> and <i>Ulmus minor</i> , <i>Fraxinus excelsior</i> or <i>Fraxinus angustifolia</i> , along the great rivers (<i>Ulmion minoris</i>)	1.2.1.1 <i>Humulus</i> floodplain forest ST

the last stages of decay, totally covered by bryophytes or vasculars, constitutes not less than one third of all fallen trees;

(iv) No signs of tree felling are visible, only evidence of the occasional cutting of some trees to free paths or the chopping up of some single logs for a bonfire could be detected;

(v) Natural water regime of the stand is not disturbed in any way, there are no ditches for drainage and also no spoiling side-effects from neighbouring areas can be detected;

(vi) Among fungi, lichens, bryophytes and/or vasculars there are always some hemerophobic species, usually more than 10 species for every listed group.

Forests are considered to be natural, where

(i) several species are represented in the tree layer, the age of dominant tree species varies by more than two age classes, i.e. for deciduous trees, at least 20 years and for coniferous trees, at least 40 years;

(ii) If the average age of trees is approximately the same, then for coniferous species it must be more than 100 years and for deciduous species, more than 80 years;

(iii) Clusters of trees of various age are usually absent but clumps of younger trees are growing among older ones or the former form another sub-layer;

(iv) Windfall and dead standing trees constitute, not considering gaps, 5-10% of the total number of growing trees. Windfall at the last stages of decay, totally covered by bryophytes or vasculars, constitutes less than one third of all fallen trees;

(v) No signs of woodcutting are visible, or only signs of selective felling of single trees, causing no remarkable changes in species proportions in the tree layer, are detectable (exceptionally, if the stand has been developed on a former clear-cutting area, the average age of the first sub-layer must be not less than 100 years for deciduous species and 120 years for coniferous species);

(v) The recent water regime of the stand is natural or sub-natural, i.e. ditches for drainage are absent, or the previous drainage system has deteriorated and no longer functions;

(vi) Among fungi, lichens, bryophytes and/or vasculars are to be found some hemerophobic species, but usually not more than 10 species for every listed group.

From the State Forest Survey Database where the typology of Lõhmus (1984, 1995) has been kept, excerpts will be retrieved using the following criteria:

I * *Arctostaphylos*, *Sesleria*, *Cladonia*, *Calluna*, *Rhodococcum* (= *Vaccinium*), *Myrtillus*, *Oxalis*, *Vaccinium uliginosum* or *Polytrichum* forest site types,

* dominating tree species is *Pinus sylvestris*, the average age in the first layer is more than 100 years,

* dominating tree species is *Picea abies*, the average age in the first layer is more than 90 years,

* dominating tree species is *Betula* spp. or *Alnus glutinosa*, the average age in the first layer is more than 80 years,

* dominating tree species is *Populus tremula*, the average age in the first layer is more than 60 years.

II * *Calamagrostis*, *Hepatica* or *Aegopodium* forest site types,

* dominating tree species is *Pinus sylvestris*, the average age in the first layer is more than 100 years,

* dominating tree species is *Betula* spp. or *Alnus glutinosa*, the average age in the first layer is more than 80 years,

* dominating tree species is *Populus tremula*, the average age in the first layer is more than 60 years.

Such excerption gives us, of course, only certain summary of old forests, which can then be used to find primeval and natural forests in nature.

9020 Fennoscandian hemiboreal natural old broad-leaved deciduous forests (*Quercus*, *Tilia*, *Acer*, *Fraxinus* or *Ulmus*) rich in epiphytes

Into this type fit well (i) from 'meso-eutrophic boreo-nemoral hillock forest' type group *Fragaria* site type and *Corylus* site type, except spruce dominated stands, (ii) from 'eutrophic boreo-nemoral forests' type group the deciduous stands of *Hepatica* site type and *Aegopodium* site type (Table 2). Also the very rare old oak and ash stands of 'eutrophic alvar forests' type group belong here. 'Meso-eutrophic boreo-nemoral hillock forests' have up to now not been included in the Estonian official forest typology (Lõhmus 1984) (Table 1) and, therefore, the relevant data are lacking from the State Forest Survey Database. The other stands of this Habitat Directive type can be found according to the criteria:

* *Calamagrostis*, *Sesleria*, *Oxalis*, *Hepatica* or *Aegopodium* forest site type,

* dominating tree species are *Quercus robur*, *Tilia cordata*, *Acer platanoides*, *Fraxinus excelsior*, *Ulmus glabra* or *U. laevis*, the average age in the first layer is more than 50 years.

9030 Natural forests of primary succession stages of landupheaval coast

Under this habitat type very disparate kinds of forests are considered; the main criteria are connected with land upheaval and undeveloped soils.

In Estonia, half of the territory is affected by neotectonical land upheaval, being most remarkable on the northwestern coast (up to 3 mm yr⁻¹; Vallner et al. 1988). This habitat type was added to the Habitat Directive Annex I list following a motion by Finland and Sweden, and only the coastal region of the northern part of the Bay of Bothnia were considered (Airaksinen, Karttunen 1998). Therefore, there is no reason to accept this type for Estonia, besides, our coastal forests can be treated better under types 2180 'Wooded dunes of the Atlantic, Continental and Boreal region' or 9010 'Western taiga'.

9050 Fennoscandian herb-rich forests with *Picea abies*

Forests representing the given habitat type usually occur in low-lying areas with fine sediments and good water regime. Characteristic are distinct layers of vegetation, the field layer being dominated by herbs and grasses.

In Estonia the spruce dominated stands of *Dryopteris* and *Filipendula* site types from the 'eutrophic paludifying forests' type group, as well as *Hepatica*

and *Aegopodium* site types from the 'eutrophic boreo-nemoral forests' type group should belong to this type (Table 2). From the State Forest Survey Database they can be identified by the criteria:

* *Calamagrostis*, *Hepatica*, *Aegopodium*, *Dryopteris* or *Filipendula* forest site type,

* dominating tree species is *Picea abies*, the average age in the first layer is more than 70 years.

9060 Coniferous forests on, or connected to, glaciofluvial eskers

This habitat type is represented in Estonia by coniferous stands of 'meso-eutrophic boreo-nemoral hillock forests' type group (Table 2). Search from the State Forest Survey Database is not possible for the same reason as in the case of habitat type 9020.

9070 Fennoscandian wooded pastures

Wooded pastures are not connected with any specific ecological features or certain characteristic plant species; they are distinguished merely according to their physiognomy. Therefore, they do not have any corresponding type in forest classification either.

These communities are confined more to the western Estonia and western islands. The species content and layer structure of wooded pastures are rather similar to that of wooded meadows; the difference lies mainly in whether their turf layer has developed and maintained due to the pasturing or due to moving (Kukk, Kull 1997). Treating wooded pastures in Estonian conditions together with forest habitat types is to some extent problematic, but taking into account the rapid degradation and a decrease in these areas, efforts for their maintenance obviously need to be made.

Estonian wooded pastures and meadows have been inventoried rather intensively in recent years (see, e.g. Leibak, Lutsar 1996; Kukk, Kull 1997; Lühamaa et al., 2001). The data are available in the Estonian Fund for Nature and in the Estonian Seminal Community Conservation Association.

9080 Fennoscandian deciduous swamp woods

Forests of this habitat type are growing on wet localities under the permanent influence of surface water and are often flooded annually.

In Estonia, swamp forests are common and occur in a rather large variety of ecotopes. Therefore it is reasonable to interpret this habitat type quite broadly also. To that, the *Dryopteris* and *Filipendula* site type (except spruce dominated stands) could be attached from the 'eutrophic paludifying forests' type group; all forests of the 'meso-eutrophic to eutrophic

swamp forests' type group also belong to this habitat type (Table 2). From the State Forest Survey Database these forests can be found using the criteria:

I * *Dryopteris* forest site type,

* dominating tree species is *Betula spp.* or *Populus tremula*, the average age in the first layer is more than 60 years,

II * *Filipendula*, *Carex*, *Equisetum* or birch fen forest site type,

* dominant tree species are deciduous, the average age of them in the first layer is more than 50 years,

III * alder fen forest site type,

* dominating tree species are deciduous (except *Ulmus laevis*, *U. glabra*, *Quercus robur*, *Tilia cordata*), the average age of them in the first layer is more than 50 years,

91 Forests of Temperate Europe

9180 *Tilio-Acerion* forests of slopes, screes and ravines

Habitats of this type occupy in Estonia sites of particular geomorphology and ecology – The North Estonian Klint. Forests growing here are to some extent analogous to eutrophic elm-ash forests (*Ulmoglabrae-Tilietum cordatae*) in southern Scandinavia (Diekmann 1994), representing in Estonia their north-easternmost variants.

According to the Estonian vegetation habitat classification (Paal 1997, 2001a) the klint forests belong to the *Lunaria* forest site type of the 'eutrophic boreonemoral forests' type group. In the Estonian official forest site type classification (Lõhmus 1984, 1995) these forests are ignored (Table 1).

91D0 Bog woodland

In Finland this habitat type is interpreted very broadly and it includes almost all wooded mires (Airaksinen, Kerttunen 1998), while the forests on less than 30 cm thick peat layer are treated in habitat type 9010 'Western taiga'. In Estonia, the forests of 'oligo-mesotrophic bog' type group and of 'oligotrophic bog' type group should belong to this habitat type (Table 2). From the State Forest Survey Database these forests can be found according to the criteria:

I * alder fen or birch fen forest site type,

* dominating tree species is *Pinus sylvestris* or *Picea abies*, the average age of them in the first layer is more than 80 years,

II * transitional bog or bog forest site type;

* dominating tree species has the average age more than 80 years;

* growing stock is more than 100 m³ ha⁻¹.

91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)

According to the Estonian official forest classification (Lõhmus 1984, 1995) these forests are included among the alder fens. In the classification of Estonian vegetation habitats (Paal 1997, 2001a) *Carex elongata* floodplain swamp forest subtype corresponds exactly to this habitat type (Table 2). From the State Forest Survey Database, habitats of considered type can be partly identified if one first excerpts the border zones of certain larger rivers and then delimits *Carex* site type and alder fen site type stands with the average age more than 50 years.

91F0 Riparian mixed forests of *Quercus robur*, *Ulmus laevis* and *Ulmus minor*, *Fraxinus excelsior* or *Fraxinus angustifolia*, along the great rivers (*Ulmion minoris*)

For this habitat type we can find correspondency again only in the Estonian vegetation habitat classification where the proper type is the *Humulus* floodplain forest site type (Table 2). Research from the State Forest Survey Database has the same limits as the search of sites of the previous type.

Conclusions

Despite the shaky logic used in the compilation of typology in the Habitat Directive list, for types confined to nature conditions more or less similar to the Estonian ones, it is possible to find corresponding forest site type or types in the Estonian forest classifications. For that purpose, the general Estonian vegetation habitat classification is more flexible than the official forest site type typology, ignoring the habitats occurring within limited areas.

The opposite statement is also true: we can find for every Estonian forest site type a corresponding habitat type from the Habitat Directive Annex 1, though sometimes only stands with a certain dominating tree (i. e. certain forest type) must be selected, whereas the other forest type(s) of the same site type is/are congruent with other habitat type(s) of the directive.

Acknowledgements

Kaili Viilma, Pille Tomson, Outi Airaksinen, Eerik Leibak, Aleksei Lotman and Kalle Eller took part in the discussions dealing with finding correspondence between the Habitat Directive and Estonian

forest typology. The author wants to express his sincere thanks to all of them. English was revised by Ilmar Part.

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Received 4 December 2001

ЭСТОНСКИЕ ТИПЫ УСЛОВИЙ МЕСТОПРОИЗРАСТАНИЯ ЛЕСОВ И ПОСТАНОВЛЕНИЕ ЕВРОПЕЙСКОГО СОЮЗА О МЕСТООБИТАНИЯХ

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Резюме

Постановление Европейского Союза о местообитаниях предусматривает создание специальной сети охраняемых территорий, называемой Natura 2000 для обеспечения лучшей охраны ценных местообитаний и видов подверженных опасности. Список соответствующих типов местопроизрастаний (*habitat types*) приведен в приложении I постановления. В связи с тем, что указанные типы установлены по очень разным признакам и имеют сильно отличающийся объем, во всех странах где проводится работа по организации этой сети, возникает ряд серьезных недоразумений при сопоставлении научно обоснованных систем типов условий местопроизрастания растительности с Постановлением.

9010 Западная тайга. В этот тип следует отнести старые хвойные леса для которых более узкого типа в Постановлении не имеется.

9020 Бореопеморальные старые широколиственные леса Фенноскандии. Из Эстонских лесов сюда подходят насаждения *Hepatica* и *Aegopodium* типов местопроизрастаний.

9030 Фенноскандинавские ельники с богатым травяным покровом. Данному типу соответствуют ельники *Calamagrostis*, *Hepatica*, *Aegopodium*, *Dryopteris* и *Filipendula* типов местопроизрастаний.

9060 Хвойные леса на гляциофлювиальных озлах. К этому типу относятся сосняки и ельники растущие на карбонатной морене на соответствующих формах рельефа.

9070 Фенноскандинавские лесопастбища. Данный тип, который выделяют просто по общему облику и образу использования растительности, не имеет четких различий с лесолугами. Эти сообщества в Эстонии очень богаты видами трав и нуждаются в тщательном внимании, так как сильно зарастают вследствие прекращения использования.

9080 Фенноскандинавские лиственные заболоченные леса. Учитывая большое разнообразие и распространение таких лесов в Эстонии, настоящий тип интерпретируется довольно широко. К нему относят березняки и осинники *Dryopteris*, *Filipendula*, *Carex* и *Equisetum* типов местопроизрастаний, а также топяные черноольшанники и леса низинных болот.

9180 Леса типа *Tilio-Acerion* на склонах, в оврагах и ущельях. Этому типу хорошо соответствуют широколиственные леса на россынях у подножья Северо-Эстонского глинта.

91D0 Лесопокрываемые болота. В данный тип входят переходные и верховые болота покрытые лесом.

91E0 Аллювиальные леса с *Alnus incana* и *Fraxinus excelsior* включают заболоченные пойменные леса *Carex elongata* типа местопроизрастания.

91F0. Береговые смешанные леса с *Quercus robur*, *Ulmus laevis*, *U. minor*, *Fraxinus excelsior* или *F. angustifolia*. В Эстонии к данному типу относят пойменные леса произрастающие на береговых валах рек.

Ключевые слова: классификация, типология лесов, Постановление о местообитаниях.