



Strasbourg, 02 September 2013  
[pa10e\_2013.doc]

**T-PVS/PA (2013) 10**

CONVENTION ON THE CONSERVATION OF EUROPEAN WILDLIFE  
AND NATURAL HABITATS

**Group of Experts on  
Protected Areas and Ecological Networks**

---

5<sup>th</sup> meeting  
18-19 September 2013  
Council of Europe, Strasbourg, France

Interpretation Manual  
of the habitats targeted by Resolution No.4 (1996)  
Second draft

*Document prepared by Douglas Evans  
(European Topic Centre on Biological Diversity) and Marc Roekaerts*

---

This document will not be distributed at the meeting. Please bring this copy.  
Ce document ne sera plus distribué en réunion. Prière de vous munir de cet exemplaire

## Table of contents

<b>INTRODUCTION</b> .....	<b>- 3 -</b>
<b>EXPLANATORY NOTES</b> .....	<b>- 4 -</b>
<b>A MARINE HABITATS</b> .....	<b>- 6 -</b>
<b>B COASTAL HABITATS</b> .....	<b>- 16 -</b>
<b>C INLAND SURFACE WATERS</b> .....	<b>- 21 -</b>
<b>D MIRES, BOGS AND FENS</b> .....	<b>- 33 -</b>
<b>E GRASSLANDS AND LANDS DOMINATED BY FORBS, MOSSES OR LICHENS</b> .....	<b>- 40 -</b>
<b>F HEATHLAND, SCRUB AND TUNDRA</b> .....	<b>- 51 -</b>
<b>G WOODLAND, FOREST AND OTHER WOODED LAND</b> .....	<b>- 60 -</b>
<b>H INLAND UNVEGETATED OR SPARSELY VEGETATED HABITATS</b> .....	<b>- 101 -</b>
<b>X HABITAT COMPLEXES</b> .....	<b>- 103 -</b>

## Introduction

Resolution No.4 listing the habitat types to be protected by the Emerald network of Areas of Special Conservation Interest (ASCI's) under the Berne Convention was adopted in 1996. The 1996 list of habitat types was taken from the Palaearctic classification (Devilliers & Devilliers-Terschuren 1996).

However as the Palaearctic classification is no longer supported the Standing Committee of the Convention on the conservation of European wildlife and natural habitats agreed in December 2010 to adopt a revised edition of Resolution 4 based on the EUNIS habitats classification developed and supported by the European Environment Agency and its European Topic Centre on Biological Diversity. This change will allow for future revision of Resolution 4, including the addition of new habitat types.

In most cases habitat types from the Palaearctic classification had an equivalent in the EUNIS system but in some cases one Palaearctic habitat type has become two or more EUNIS classes or two or more Palaearctic classes relate to one EUNIS class. In a small number of cases, the original habitat type now has a slightly wider definition.

Experience from the European Union's Natura 2000 network has shown the value of a guide to interpreting habitat types, many of which can be variable (Evans 2010). A draft manual to help identify the Resolution 4 habitat types was prepared by the PHARE Topic Link on Nature Conservation in 2000 (PTL-NC 2000), largely based on information derived from the PHYSIS database and focused on the central European countries included in the PHARE programme. The present version uses information from the EEA's EUNIS website supplemented with information from a variety of other sources, including the PHARE manual and the European Union's Interpretation Manual of European Union Habitats (European Commission 2007). The aim is to allow those responsible for site selection for the Emerald Network to identify the Resolution 4 habitat types and to ensure as much coherence in the interpretation of the habitat types between countries as possible.

### **Second Edition of the Manual (2013)**

Comments have been received from several sources, largely as a result of the first Emerald biogeographic Seminars held in 2011 (West Balkans), 2012 (Switzerland) and 2013 (Norway) and the ongoing Emerald projects with Central and Eastern Europe and the South Caucasus. The authors particularly thank Raymond Delarze, Elena Belonovskaya and Nikolay Sobolev for their assistance.

For some habitats the text has been revised and various errors have been corrected, particularly in the description and associated plant communities and species. The list of associated plant communities have been revised following Schaminée et al (2012). The layout has been slightly modified to ease the use of the manual.

Further comments are welcome and will help to improve future editions of this Manual.

## Explanatory notes

### Habitat type code and name

Codes and names are taken from the current version of the EUNIS habitats classification which is a hierarchical system. Habitat types listed on Resolution 4 are indicated with an exclamation mark (!) and highlighted in grey, e.g.

### ! *A1.22 Mussels and furoids on moderately exposed shores*

Other habitat types are listed purely as headings, for example 'A Marine habitats' and 'A1 Littoral rock and other hard substrata' and help place the Emerald habitat types in the EUNIS classification system.

### Plant communities

Where appropriate the plant communities associated with the habitat type are given, they are mostly based on the synopsis of European syntaxa published by the European Vegetation Survey (Rodwell et al 2002).

### Species

A short list of species characteristic for the habitat type, and in some instances for sub types, is given, generally, species noted in the description are not repeated here. The list is not exhaustive and not all species listed will be found in every example of a habitat type, especially for habitat types with a wide geographical range..

### Corresponding class in other classifications

The correspondence to other classification systems, both national and regional, is given for a limited number of classifications.

### EU Habitats Directive Annex I

Relationship between the Resolution 4 habitat type and those listed on Annex I of the EU Habitats Directive.

### Associated Habitat types

In some instances, notes are given to indicate that a given habitat is often found in association with another. For example 'A2.5 Coastal saltmarshes and saline reedbeds often occur as a component of 'X01 Estuaries'.

### References

Only bibliographic references other than those given in EUNIS are listed.

Where there is no entry for a given heading, the heading has been omitted

## References

Council of Europe (2010) *Revised Annex I of Resolution 4 (1996) of the Bern Convention on endangered natural habitat types using the Eunis Habitat Classification*. T-PVS/PA(2010)10 revE 09. Strasbourg.

<https://wcd.coe.int/wcd/com.instranet.InstraServlet?command=com.instranet.CmdBlobGet&InstraneImage=1763389&SecMode=1&DocId=1648180&Usage=2>

Delarze R. & Gonseth Y. (2008) *Guide des milieux naturels de Suisse*. 2<sup>nd</sup> ed. Rossolis, Bussigny.

Devilliers P. & Devilliers-Terschuren J., (1996). *A classification of Palaearctic habitats*. Nature and environment, No. 78, Council of Europe, Strasbourg, 194 p.

European Commission (2013) *Interpretation Manual of European Union Habitats –EUR28*  
[http://ec.europa.eu/environment/nature/legislation/habitatsdirective/docs/Int\\_Manual\\_EU28.pdf](http://ec.europa.eu/environment/nature/legislation/habitatsdirective/docs/Int_Manual_EU28.pdf)

Evans, D. (2010). Interpreting the habitats of Annex I: past, present and future. *Acta Botanica Gallica* 157 (4) 677-686.

PTL-NC (2000) *Interpretation Manual of the Emerald Habitats*. (Unpublished report)

Rodwell, J., Schaminee, J., Mucina, L., Pignatti, S., Dring, J. & Moss, D. (2002). *The Diversity of European Vegetation. An overview of Phytosociological Alliances and their relationships to EUNIS Habitats*. Landbouw, natuurbeheer en visserij, Wageningen.

Schaminée J, Chytrý M, Hennekens SM, Mucina L, Rodwell JS & Tichý L. (2012) *Development of vegetation syntaxa crosswalks to EUNIS habitat classification and related data sets*. Unpublished report for the EEA.

## A Marine habitats

### A1 Littoral rock and other hard substrata

#### A1.1 High energy littoral rock

##### ! A1.11 Mussel and/or barnacle communities

###### Description

Communities on very exposed to moderately exposed upper and mid eulittoral bedrock and boulders dominated by the mussel *Mytilus edulis* (A1.111), barnacles *Chthamalus* spp. and/or *Semibalanus balanoides* and limpets *Patella* spp. (A1.112, A1.113). Several variants are identified. Some shores are characterised by dense bands of the barnacle *Semibalanus balanoides* and the limpet *Patella vulgata* (A1.113). The barnacles may be covered by *Porphyra umbilicalis* on the upper shore of exposed sites. Cracks and crevices in the rock provide a refuge for small individuals of the mussel *M. edulis*, winkles *Littorina saxatilis* and the whelk *Nucella lapillus*. Red seaweeds also frequently occupy damp crevices, particularly *Ceramium shuttleworthianum*, *Corallina officinalis*, *Osmundea pinnatifida* and encrusting coralline algae, but the non-vesiculate form of the wrack *Fucus vesiculosus* might be present (A1.1132). Large numbers of the winkle *Littorina littorea* often dominate fields of large boulders or shores with a more mixed substratum (A1.1133). There is much regional variation affecting the zonation of barnacles in the British Isles. In the north-west *C. montagui* and/or *C. stellatus* can form a distinct band above *S. balanoides*. In the south-west *C. montagui* and/or *C. stellatus* can be the dominant barnacles throughout the eulittoral zone (A1.1121). On the east coasts *S. balanoides* is able to extend to the upper shore due to the absence of *Chthamalus* spp. and thereby any competition. The lichen *Lichina pygmaea* may be prominent, especially in the south, where it can form distinct patches or even a separate zone among the *Chthamalus* spp. (A1.1122). In areas of soft rock (e.g. shales), the barnacles may be scarce or absent and the rock dominated by *P. vulgata*.

###### EU Habitats Directive Annex I

Included in 1170 Reefs

###### Associated Habitat types

This habitat type is found in the mid to upper eulittoral on very to moderately exposed shores below the lichen dominated biotopes (B3.11) and is typically characterised by patches of mussels *M. edulis* interspersed with barnacles. Below A1.11 is a community dominated by the wrack *Himanthalia elongata* and red seaweeds such as *C. officinalis*, *Mastocarpus stellatus* and *O. pinnatifida* (A1.12). With decreasing wave exposure *F. vesiculosus* is able to survive, gradually replacing the barnacles and *P. vulgata* biotope (A1.213). On such moderately exposed shores A1.11 may occur on steep and vertical faces, while fucoids dominate the flatter areas (A1.1132, A1.213).

### ***A1.14 Mediterranean and Black Sea communities of lower mediolittoral rock very exposed to wave action***

#### **! A1.141 Association with *Lithophyllum byssoides***

##### **Description**

This association is characterised by the red alga species *Lithophyllum byssoides* (ex *Lithophyllum lichenoides*). This is one of the most important bio-constructors of the Mediterranean "trottoir", particularly important because of its high aesthetic interest and its conservation value.

##### **Species**

*Lithophyllum byssoides*, *Lithophyllum lichenoides*

##### **Corresponding class in other classifications**

##### **EU Habitats Directive Annex I**

Included in 1170 Reefs

### **A1.2 Moderate energy littoral rock**

#### **! A1.22 *Mussels and furoids on moderately exposed shores***

##### **Description**

Mid and lower eulittoral exposed to moderately exposed bedrock, often with nearby sediment, may be densely covered by large individuals of the mussel *Mytilus edulis*. Three biotopes have been described: In the mid eulittoral, the mussels may form a band or large patches with scattered bladder wrack *Fucus vesiculosus* (A1.221). In the lower eulittoral a range of red seaweeds including *Mastocarpus stellatus* and *Palmaria palmata* occur amongst the mussels (in higher abundance than the mid eulittoral) (A1.222). Clay outcrops in the mid to lower eulittoral may be bored by a variety of piddocks including *Pholas dactylus*, *Barnea candida* and *Petricola pholadiformis*, while the surface is characterised by small clumps of the mussel *M. edulis*, the barnacle *Elminius modestus* and the winkle *Littorina littorea* (A1.223). Ephemeral green seaweeds such as *Enteromorpha intestinalis* and *Ulva lactuca* commonly occur on the shells of the mussels. Barnacles are common on both the mussel valves and on patches of bare rock, where the limpet *Patella vulgata* is found as well, often at high abundance. The whelk *Nucella lapillus* and a range of littorinids also occur within the mussel bed. A dense *M. edulis* community may be found on more sheltered coasts on mixed substrata (A2.721).

##### **EU Habitats Directive Annex I**

Included in 1170 Reefs

##### **Associated Habitat types**

Above this habitat type is a *M. edulis* and *S. balanoides* dominated zone or a *F. vesiculosus* dominated biotope (A1.213). In the lower eulittoral zone below is a zone dominated by the wrack *Fucus serratus*, *M. edulis* and a variety of red seaweeds (A1.21) while kelp dominate the sublittoral fringe.

## A1.4 Features of littoral rock

### ! A1.44 *Communities of littoral caves and overhangs*

#### Description

Where caves and overhangs occur on rocky shores, the shaded nature of the habitat diminishes the amount of desiccation suffered by biota during periods of low tides which allows certain species to proliferate. In addition, the amount of scour, wave surge, sea spray and penetrating light determines the unique community assemblages found in upper, mid and lower shore caves and overhangs on the lower shore. Biotopes from the surrounding shore such as A1.111, A1.113 or any of the fucoid communities occasionally extend into cave entrances. A1.113 often extends some way into the cave. Other open shore biotopes may also be found within caves, such as the green seaweed *Prasiola stipitata* on cave roofs where birds roost (B3.112), and localised patches of green algae where freshwater seepage influences the rock (A1.451). Rockpools containing encrusting coralline algae (A1.411), fucoids and kelp (A1.412) and hydroids and littorinid molluscs may occur also on the floor of cave entrances. In general, the biomass and diversity of algal species found in upper and mid-shore littoral caves decreases with increasing depth into the cave as the light levels diminish. Fucoids are usually only found at the entrances to caves, but red algae, and filamentous and encrusting green algae are able to penetrate to lower light intensities towards the back of the cave, and mats of the turf forming red seaweed *Audouinella purpurea* and/or patches of the green seaweed *Cladophora rupestris* may occur on the upper walls (A1.444). Brownish velvety growths of the brown algae *Pilinia maritima* occurring in mats with the red alga *A. purpurea* on cave walls and upper littoral levels of cliffs (A1.443) should not be confused with the green (A1.442) or golden brown algal stains often found above this zone on the ceilings of the caves (A1.443; A1.441). Below is a zone of *Verrucaria mucosa* and/or *Hildenbrandia rubra* on the inner and outer reaches (A1.445). Fauna usually only occur on the lower and mid walls of the caves and generally comprise barnacles, anemones and tube-forming polychaetes (A1.448; A1.449) depending on the level of boulder scour or wave surge. Where the floors of caves consist of mobile cobbles and small boulders, little algae and fauna occur due to the effects of scouring (A1.44A). Vertical or steeply sloping cave walls and overhangs on the mid and lower shore, subject to wave-surge but without scour, support a rich biota of sponges, hydroids, ascidians and shade-tolerant red algae (A1.447, A1.446 or A1.4461).

#### Species

*Cladophora rupestris*, *Hildenbrandia rubra*, *Prasiola stipitata*

#### EU Habitats Directive Annex I

8330 Submerged or partially submerged sea caves

## A2 Littoral sediment

### ! A2.2 Littoral sand and muddy sand



### **Description**

Shores comprising clean sands (coarse, medium or fine-grained) and muddy sands with up to 25% silt and clay fraction. Shells and stones may occasionally be present on the surface. The sand may be duned or rippled as a result of wave action or tidal currents. Littoral sands exhibit varying degrees of drying at low tide depending on the steepness of the shore, the sediment grade and the height on the shore. The more mobile sand shores are relatively impoverished (A2.22), with more species-rich communities of amphipods, polychaetes and, on the lower shore, bivalves developing with increasing stability in finer sand habitats (A2.23). Muddy sands (A2.24), the most stable within this habitat complex, contain the highest proportion of bivalves.

Situation: A strandline of talitrid amphipods (A2.211) typically develops at the top of the shore where decaying seaweed accumulates. Fully marine sandy shores occur along stretches of open coast, whilst muddy sands are often present in more sheltered lower estuarine conditions and may be subject to some freshwater influence.

Temporal variation: Littoral sandy shore environments can change markedly over seasonal cycles, with sediment being eroded during winter storms and accreted during calmer summer months. The particle size structure of the sediment may change from finer to coarser during winter months, as finer sediment gets resuspended in seasonal exposed conditions. This may affect the sediment infauna, with some species only present in summer when sediments are more stable. More sheltered muddy sand shores are likely to be more stable throughout the year, but may have a seasonal cover of green seaweeds during the summer period, particularly in nutrient enriched areas or where there is freshwater input.

### **EU Habitats Directive Annex I**

Can occur as part of the following;-

1130 Estuaries

1140 Mudflats and sandflats not covered by seawater at low tide

1150 Coastal lagoons

1160 Large shallow inlets and bays

## **! A2.3 Littoral mud**

### **Description**

Shores of fine particulate sediment, mostly in the silt and clay fraction (particle size less than 0.063 mm in diameter), though sandy mud may contain up to 40% sand (mostly very fine and fine sand). Littoral mud typically forms extensive mudflats, though dry compacted mud can form steep and even vertical structures, particularly at the top of the shore adjacent to saltmarshes. Little oxygen penetrates these cohesive sediments, and an anoxic layer is often present within millimetres of the sediment surface. Littoral mud can support communities characterised by polychaetes, bivalves and oligochaetes. Most muddy shores are subject to some freshwater influence, as most of them occur along the shores of estuaries. Mudflats on sheltered lower estuarine shores can support a rich infauna, whereas muddy shores at the extreme upper end of estuaries and which are subject to very low salinity often support very little infauna.

Situation: Muddy shores are principally found along the shores of estuaries where there is enough

shelter from wave action to allow fine sediment to settle. Muddy shores may also be present in sheltered inlets, straits and embayments which are not part of major estuarine systems.

Temporal variation: *Enteromorpha* spp. and *Ulva lactuca* may form mats on the surface of the mud during the summer months, particularly in areas of nutrient enrichment or where there is significant freshwater influence.

### **Plant communities**

#### **Species**

*Ulva lactuca*

#### **EU Habitats Directive Annex I**

Can occur as part of the following;-

1130 Estuaries

1140 Mudflats and sandflats not covered by seawater at low tide

1150 Coastal lagoons

1160 Large shallow inlets and bays

## **! A2.4 Littoral mixed sediments**

#### **Description**

Shores of mixed sediments ranging from muds with gravel and sand components to mixed sediments with pebbles, gravels, sands and mud in more even proportions. By definition, mixed sediments are poorly sorted. Stable large cobbles or boulders may be present which support epibiota such as fucoids and green seaweeds more commonly found on rocky and boulder shores. Mixed sediments which are predominantly muddy tend to support infaunal communities which are similar to those of mud and sandy mud shores.

Situation: It is probable that there are broad transition areas between areas of mudflat or sandy mudflat, and mixed sediment biotopes where the sediment consists principally of mud but has significant proportions of gravel and sand mixed in. Gravelly mud may occur in patches on mudflats. Similarly, there is unlikely to be an easily defined boundary between areas of mixed sediment with stable cobbles and boulders, and boulder fields which fall into the rocky shore category.

#### **Species**

*Aphelochaeta marioni*, *Cerastoderma edule*, *Corophium volutator*, *Melinna palmate*, *Scrobicularia plana*, *Streblospio shrubsolii*, *Tubificoides benedii*, *Tubificoides pseudogaster*

#### **EU Habitats Directive Annex I**

1130 Estuaries

1140 Mudflats and sandflats not covered by seawater at low tide

1150 Coastal lagoons

1160 Large shallow inlets and bays

## ! A2.5 Coastal saltmarshes and saline reedbeds

includes the following subtypes separately listed in or split units from the 1998 version:

- A2.521 Atlantic and Baltic brackish saltmarsh communities
- A2.531 Atlantic upper shore communities
- A2.542 Atlantic lower shore communities
- A2.5514 *Salicornia veneta* swards
- A2.5515 Black Sea annual *Salicornia*, *Suaeda* and *Salsola* saltmarshes
- A2.553 Atlantic *Sagina maritima* communities

### Description

Angiosperm-dominated stands of vegetation, occurring on the extreme upper shore of sheltered coasts and periodically covered by high tides. The vegetation develops on a variety of sandy and muddy sediment types and may have admixtures of coarser material. The character of the saltmarsh communities is affected by height up the shore, resulting in a zonation pattern related to the degree or frequency of immersion in seawater.

### Plant communities

*Aegopodium podagrariae*, *Salicornio-Puccinellion*, *Eleocharition uniglumis*, *Armerion maritimae*, *Salicornion patulae*, *Glauco maritimae-Juncion maritime*, *Limonion ferulacei*, *Thero-Atriplicion*, *Thero-Suaedion*, *Juncion maritime*, *Frankenion pulverulentae*, *Hordeion marini*, *Suaedion braunblanqueti*, *Arthrocnemion glauci*, *Caricion fuscae*, *Cypero-Spergularion salinae*, *Puccinellio-Spergularion salinae*, *Agropyron pungentis*, *Puccinellion phryganodis*, *Limoniastrion monopetali*, *Salicornion herbaceae*, *Puccinellion limosae*, *Romulion*, *Atriplicion littoralis*, *Saginion maritimae*, *Salicornion fruticosae*, *Agropyro-Artemision coerulescentis*, *Thero-Salicornion*, *Puccinellion maritimae*, *Plantaginion crassifoliae*, *Honckenyo-Crambion maritimae*, *Suaedion verae*, *Trifolion squamosi*, *Spartinion maritimae*, *Saginetea maritimae*, *Saginetalia maritimae*, *Salicornietalia fruticosae*, *Thero-Salicornietea*, *Glauco-Puccinellietalia*, *Crypsidetalia aculeatae*, *Thero-Salicornietalia*

### Species

*Anthemis glaberrima*, *Aster sorrentinii*, *Corophium volutator*, *Hippuris tetraphylla*, *Hydrobia ulvae*, *Kosteletzkya pentacarpos*, *Ligularia sibirica*, *Linum maritimum*, *Manayunkia aestuarina*, *Primula nutans*, *Puccinellia fasciculata ssp. pungens*, *Puccinellia phryganodes*, *Rumex rupestris*, *Salicornia veneta*, *Salsola daghestanica*, *Suaeda prostrata*, *Camphorosma songorica*, *Armeria vulgaris*, *Blysmus rufus*, *Carex marina*, *Carex salina*, *Gentianopsis detonsa*, *Glaux maritima*, *Imperata cylindrica*, *Limonium caspium*, *Scirpoides holoschoenus*, *Spergularia salina*

### EU Habitats Directive Annex I

1130 Estuaries

1150 Coastal lagoons

1160 Large shallow inlets and bays

1310 *Salicornia* and other annuals colonizing mud and sand

1320 *Spartina* swards (*Spartinion maritimae*)

1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)

1410 Mediterranean salt meadows (*Juncetalia maritimi*)

1420 Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*)

1630 Boreal Baltic coastal meadows

**Associated Habitat types**

A2.5 Coastal saltmarshes and saline reedbeds often occur as a component of X01 Estuaries

**A2.6 Littoral sediments dominated by aquatic angiosperms****! A2.61 Seagrass beds on littoral sediments****Description**

Beds of submerged marine vascular plants ('seagrasses') growing on coastal sediments in shallow water. Depth varies with water quality but is usually 30m or less.

Mediterranean communities dominated by *Posidonia oceanica* (*Posidonium oceanica*) should be considered as A5.535 *Posidonia* beds, a subtype of !A5 Sublittoral sediment.

**Plant communities**

*Zosterion marinae*

**Species**

*Zostera sp.*

**EU Habitats Directive Annex I**

1140 Mudflats and sandflats not covered by seawater at low tide

1160 Large shallow inlets and bays

**References**

Green, E P., & F T. Short. 2003. *World Atlas of Seagrasses*. UNEP World Conservation Monitoring Centre, University of California Press, Berkeley

**A2.62 Marine Cyperaceae beds****! A2.621 Eleocharis beds****Description**

Emergent *Eleocharis parvula* or *Eleocharis acicularis* formations of brackish seas, sea inlets, estuaries, permanent pools of mud or sand flats, and coastal lagoons, occurring in the open sea only in the Baltic, limited to coastal waterbodies elsewhere, and very rare.

**Plant communities**

*Scirpion parvuli*, *Ruppion maritimae*

**Species**

*Eleocharis parvula*, *Eleocharis acicularis*

## A2.7 Littoral biogenic reefs

### ! A2.72 *Littoral mussel beds on sediment*

#### Description

Sediment shores characterised by beds of adult mussels *Mytilus edulis* occur principally on mid and lower eulittoral mixed substrata (mainly cobbles and pebbles on muddy sediments) in a wide range of exposure conditions. In high densities the mussels bind the substratum and provide a habitat for many infaunal and epifaunal species. This biotope is also found in lower shore tide-swept areas, such as in the tidal narrows of Scottish sealochs. A fauna of dense juvenile mussels may be found in sheltered firths, attached to algae on shores of pebbles, gravel, sand, mud and shell debris with a strandline of furoid algae.

#### Species

*Ascophyllum nodosum*, *Fucus vesiculosus*, *Mytilus edulis*

#### Corresponding class in other classifications

#### EU Habitats Directive Annex I

Included in 1170 Reefs

## ! A3 Infralittoral rock and other hard substrata

includes the following subtypes separately listed in or split units from the 1998 version:

- A3.71 Robust faunal cushions and crusts in surge gullies and caves
- A3.74 Caves and overhangs in infralittoral rock

#### Description

Infralittoral rock includes habitats of bedrock, boulders and cobbles which occur in the shallow subtidal zone and typically support seaweed communities. The upper limit is marked by the top of the kelp zone whilst the lower limit is marked by the lower limit of kelp growth or the lower limit of dense seaweed growth. Infralittoral rock typically has an upper zone of dense kelp (forest) and a lower zone of sparse kelp (park), both with an understorey of erect seaweeds. In exposed conditions the kelp is *Laminaria hyperborea* whilst in more sheltered habitats it is usually *Laminaria saccharina*; other kelp species may dominate under certain conditions. On the extreme lower shore and in the very shallow subtidal (sublittoral fringe) there is usually a narrow band of dabberlocks *Alaria esculenta* (exposed coasts) or the kelps *Laminaria digitata* (moderately exposed) or *L. saccharina* (very sheltered). Areas of mixed ground, lacking stable rock, may lack kelps but support seaweed communities. In estuaries and other turbid-water areas the shallow subtidal may be dominated by animal communities, with only poorly developed seaweed communities.

#### Species

*Alaria esculenta*, *Laminaria digitata*, *L. hyperborea*, *L. saccharina*

#### Corresponding class in other classifications

#### EU Habitats Directive Annex I

1170 Reefs

8330 Submerged or partially submerged sea caves

## ! A4 Circalittoral rock and other hard substrata

includes the following subtypes separately listed in or split units from the 1998 version:

- A4.24 Mussel beds on circalittoral rock
- A4.26 Mediterranean coralligenous communities moderately exposed to hydrodynamic action
- A4.32 Mediterranean coralligenous communities sheltered from hydrodynamic action
- A4.71 Communities of circalittoral caves and overhangs

### Description

Circalittoral rock is characterised by animal dominated communities (a departure from the algae dominated communities in the infralittoral zone). The circalittoral zone can itself be split into two sub-zones; upper circalittoral (foliose red algae present but not dominant) and lower circalittoral (foliose red algae absent). The depth at which the circalittoral zone begins is directly dependent on the intensity of light reaching the seabed; in highly turbid conditions, the circalittoral zone may begin just below water level at mean low water springs (MLWS). The biotopes identified in the field can be broadly assigned to one of three energy level categories: high, moderate and low energy circalittoral rock (used to define the habitat complex level). The character of the fauna varies enormously and is affected mainly by wave action, tidal stream strength, salinity, turbidity, the degree of scouring and rock topography. It is typical for the community not to be dominated by single species, as is common in shore and infralittoral habitats, but rather comprise a mosaic of species. This, coupled with the range of influencing factors, makes circalittoral rock a difficult area to satisfactorily classify; particular care should therefore be taken in matching species and habitat data to the classification.

### Species

*Pachymatisma johnstonia*, *Halichondria panacea*, *Esperiopsis fucorum*, *Myxilla incrustans*, *Tubularia indivisa*, *Balanus crenatus*, *Alcyonium digitatum*, *Sabellaria spinulosa*, *Neocrania anomala*, *Ciona intestinalis*, *Ascidia mentula*, *Alcyonium digitatum*, *Metridium senile*

### EU Habitats Directive Annex I

1170 Reefs

8330 Submerged or partially submerged sea caves

## ! A5 Sublittoral sediment

includes the following subtypes separately listed in or split units from the 1998 version:

- A5.627 Baltic mussel beds in the infralittoral photic zone

### Description

Sediments and associated fauna in the sublittoral near shore zone (i.e. covering the infralittoral and circalittoral zones), typically extending from the extreme lower shore down to the edge of the bathyal zone (200 m). Sediment ranges from boulders and cobbles, through pebbles and shingle, coarse sands, sands, fine sands, muds, and mixed sediments. Those communities found in or on sediment are described within this broad habitat type.

### **Species**

*Echinocardium cordatum*, *Cerastoderma glaucum*, *Amphiura* spp, *Virgularia mirabilis* *Nephrops norvegicus*, *Laminaria saccharina*, *Phymatolithon calcareum*, *Modiolus modiolus*, *Mytilus edulis*, *Lophelia pertusa*.

### **EU Habitats Directive Annex I**

1110 Sandbanks which are slightly covered by sea water all the time

1120 *Posidonia* beds (*Posidonion oceanicae*)

1170 Reefs

## **A6 Deep-sea bed**

### **A6.9 Vents, seeps, hypoxic and anoxic habitats of the deep sea**

#### **A6.91 Deep-sea reducing habitats**

#### **! A6.911 Seeps in the deep-sea bed**

#### **Description**

Deep-sea habitats characterised by chemical conditions. These habitats are often indicated by the presence of seeping or bubbling gases or liquids, hypoxic and/or anoxic conditions in the water column above.

## B Coastal habitats

### B1 Coastal dunes and sandy shores

#### ! B1.3 Shifting coastal dunes

##### Description

Mobile sands of the coasts of the boreal, nemoral, steppe, Mediterranean and warm-temperate humid zones, unvegetated or occupied by open grasslands; they may form tall dune ridges or, particularly along the Mediterranean and the Black Sea, be limited to a fairly flat upper beach, still subject in part to inundation.

##### Plant communities

*Verbascion pinnatifidii*, *Ononido ramosissimae*-*Polycarpion niveae*, *Agropyron juncei*, *Agropyro-Minuartion peploidis*, *Honckenyo-Elymion arenarii*, *Traganion moquinii*, *Elymion gigantei*, *Ammophilion arundinaceae*,

##### Species

*Ammophila arenaria*, *Anchusa crispa*, *Elymus farctus*, *Eryngium maritimum*, *Honkenya peploides*, *Mertensia maritime*

##### EU Habitats Directive Annex I

Includes:

1640 Boreal Baltic sandy beaches with perennial vegetation

2110 Embryonic shifting dunes

2120 Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes')

##### Associated Habitat types

Often found as a complex with other dune habitats such as B1.4 to B1.8 (all included in Resolution 4).

#### ! B1.4 Coastal stable dune grassland (grey dunes)

##### Description

Fixed or semifixed dunes of the coasts of the boreal, nemoral, steppe, mediterranean and warm-temperate humid zones, with the perennial grasslands, chamaephyte-dotted grasslands, forblands, subshrub or succulent communities that stabilise them and the therophyte communities that may occupy the grassland clearings.

##### Plant communities

*Corynephorion canescentis*, *Bromion erecti*, *Violion caninae*, *Euphorbio portlandicae*-*Helichryson stoechadis*, *Potentillion anserinae*, *Galio littoralis*-*Geranion sanguinei*,



*Helianthemion guttati*, *Plantagini-Festucion ovinae*, *Festucion beckeri*, *Anthyllido hamosae-Malcolmion lacerate*, *Traganion moquinii*, *Linaria pedunculatae*, *Koelerion arenariae*, *Thero-Airion*, *Hyperico perforati-Scleranthion perennis*, *Crucianellion maritima*, *Geranion sanguinei*, *Scabiosion ucranicae*, *Juncion squarrosi*, *Helichryson picardii*, *Ammophiletalia*, *Crucianelletalia maritima*, *Artemisio-Koelerietalia*

### **Species**

*Anchusa crispa*, *Apium repens*, *Arnica montana*, *Artemisia pancicii*, *Carduus myriacanthus*, *Colchicum corsicum*, *Dianthus arenarius ssp. arenarius*, *Dracocephalum austriacum*, *Euphrasia marchesettii*, *Galium litorale*, *Gentianella anglica*, *Helianthemum caput-felis*, *Jasione lusitanica*, *Kosteletzkya pentacarpos*, *Linaria ficalhoana*, *Linaria flava*, *Muscari gussonei*, *Narcissus triandrus*, *Narcissus triandrus ssp. capax*, *Rouya polygama*, *Rumex rupestris*, *Sisymbrium supinum*, *Stipa bavarica*, *Thesium ebracteatum*, *Thymus carnosus*

### **EU Habitats Directive Annex I**

Includes:

2130 Fixed coastal dunes with herbaceous vegetation ('grey dunes')

2210 *Crucianellion maritima* fixed beach dunes

2220 Dunes with *Euphorbia terracina*

2230 *Malcolmietalia* dune grasslands

2240 *Brachypodietalia* dune grasslands with annuals

### **Associated Habitat types**

Often found as a complex with other dune habitats such as B1.3 to B1.8 (all included in Resolution 4).

## **! B1.5 Coastal dune heaths**

### **Description**

Stable dunes with leached soils and vegetation dominated by ericaceous shrubs including *Calluna vulgaris*, *Empetrum nigrum* and *Erica* spp.

### **Plant communities**

*Ulicion minoris*, *Ericion cinereae*, *Genisto-Vaccinion*, *Geniston pilosae*, *Empetrion nigri*, *Ericion umbellatae*

### **Species**

*Calluna vulgaris*, *Empetrum nigrum*, *Erica* sp.

### **EU Habitats Directive Annex I**

Includes:

2140: Decalcified fixed dunes with *Empetrum nigrum*

2150: Atlantic decalcified fixed dunes (*Calluno-Ulicetea*)

### **Associated Habitat types**

Often found as a complex with other dune habitats such as B1.3 to B1.8 (all included in Resolution 4).

**References**

Gorissen, I. 2004. *Dwarf shrub heaths of Europe - from Atlantic to Caucasus and Ural*. Verlag Ingmar Gorissen, Siegburg.

**! B1.6 Coastal dune scrub****Description**

Stable dunes with scrub, e.g. *Hippophae rhamnoides*, *Salix repens* in the north, or *Juniperus* spp. or sclerophyllous shrubs in the south.

**Plant communities**

*Pruno-Rubion radulae*, *Pruno-Rubion ulmifolii*, *Berberidion vulgaris*, *Oleo-Ceratonion siliquae*, *Juniperion turbinatae*, *Salicion arenariae*, *Ligustro-Hippophaeion*, *Cisto-Lavanduletea*, *Rosmarinetea officinalis*, *Quercetea ilicis*, *Pyro cordatae-Ulicion europaei*

**Species**

*Astragalus maritimus*, *Centaurea attica* ssp. *Megarensis*, *Cytisus aeolicus*, *Daphne rodriguezii*, *Dracocephalum austriacum*, *Gypsophila papillosa*, *Hippophae rhamnoides*, *Juniperus* sp., *Ophrys argolica*, *Phoenix theophrasti*, *Ruscus aculeatus*, *Salix repens*

**EU Habitats Directive Annex I**

Includes:

2160 Dunes with *Hippophaë rhamnoides*

2170 Dunes with *Salix repens* ssp. *argentea* (*Salicion arenariae*)

2250 Coastal dunes with *Juniperus* spp

2260 *Cisto-Lavenduletalia* dune sclerophyllous scrubs

**Associated Habitat types**

Often found as a complex with other dune habitats such as B1.3 to B1.8 (all included in Resolution 4).

**! B1.7 Coastal dune woods****Description**

Coastal dunes colonised by woodland which are directly influenced by proximity to the sea.

**Plant communities**

*Quercu-Fagetea*, *Quercetea ilicis*, *Dicrano-Pinion*

**Species**

*Betula* sp, *Pinus* sp, *Quercus* sp, *Fagus sylvatica*, *Leucobryum glaucum*, *Ruscus aculeatus*

**EU Habitats Directive Annex I**

Includes:

2180 Wooded dunes of the Atlantic, Continental and Boreal region

2270 Wooded dunes with *Pinus pinea* and/or *Pinus pinaster*

### **Associated Habitat types**

Often found as a complex with other dune habitats such as B1.3 to B1.8 (all included in Resolution 4).

## **! B1.8 Moist and wet dune slacks**

### **Description**

Moist or wet depressions in coastal dune systems, sometimes with permanent water but more often only seasonally moist or flooded by fresh water. Dune-slacks are extremely rich and specialised habitats, very threatened by the lowering of water tables.

### **Plant communities**

*Hyperico elodis-Sparganion*, *Preslion cervinae*, *Caricion davallianae*, *Caricion canescenti-fuscae*, *Potentillion anserinae*

### **Species**

*Apium repens*, *Armeria helodes*, *Caropsis verticillatinundata*, *Colchicum corsicum*, *Coleanthus subtilis*, *Eryngium viviparum*, *Hamatocaulis vernicosus*, *Kosteletzkya pentacarpos*, *Ligularia sibirica*, *Lindernia procumbens*, *Liparis loeselii*, *Luronium natans*, *Marsilea quadrifolia*, *Petalophyllum ralfsii*, *Sisymbrium supinum*, *Spiranthes aestivalis*, *Thesium ebracteatum*

### **EU Habitats Directive Annex I**

2190 Humid dune slacks

### **Associated Habitat types**

Often found as a complex with other dune habitats such as B1.3 to B1.7 (all included in Resolution 4).

## **! B1.9 Machair**

### **Description**

Short-turf grasslands formed on dry and seasonally waterlogged, relatively flat and low-lying sand plains, where windblown calcareous sand overlies peat or impermeable bedrock. Machair grasslands are machair in the strict sense, and form part of the machair complex (X27), characteristic of the Outer Hebrides and western Ireland, with dunes (B1.3, B1.4), shallow lochs (C1) and land cultivated on a strip rotation (I1). They support a flower-rich, and correspondingly insect-rich, dune grassland studded with shallow lochs and cultivated on a strip rotation. The grassland is dominated by *Poa pratensis* and *Festuca rubra*, accompanied by *Thalictrum minus* ssp. *arenarium*, *Thymus praecox* ssp. *arcticus* (*Thymus drucei*), *Bellis perennis*, *Prunella vulgaris*, *Erodium cicutarium*, *Trifolium* spp., *Euphrasia* spp. and many orchids, among which *Dactylorhiza fuchsii* ssp. *hebridensis*, *Dactylorhiza purpurella*, *Gymnadenia conopsea*, *Coeloglossum viride*, *Platanthera chlorantha* and *Orchis mascula* are the most prominent. This grassland harbours a plant community of very restricted distribution comprising vulnerable species; *Cochlearia scotica*, *Euphrasia marshallii* and *Dactylorhiza fuchsii* ssp. *hebridensis* are endemic. As a whole, machair is an essential habitat for breeding waders such as *Haematopus ostralegus*,

*Vanellus vanellus* , *Charadrius hiaticula* , *Calidris alpina* , *Tringa totanus* and *Gallinago gallinago* ; it supports the healthiest western European population of the threatened corncrake *Crex crex* .

**Plant communities**

*Plantagini-Festucion ovinae*

**EU Habitats Directive Annex I**

21A0 Machairs (\* in Ireland)

**References**

Angus, I.S. & Dargie, T.C.D. 2002. The UK Machair Habitat Action Plan: progress and problems. *Botanical Journal of Scotland* 54: 63–74.

Gaynor, K.. 2006. The Vegetation of Irish Machair. *Biology & Environment: Proceedings of the Royal Irish Academy* 106 (3): 311-321.

## B2 Coastal shingle

### ! B2.3 Upper shingle beaches with open vegetation

**Description**

The upper beach of large shingle bars, with open pioneer communities or perennial vegetation mostly formed by *Crambe maritima* , *Honkenya peploides* , *Lathyrus japonicus* and other specialised species. Mainly in northwest Europe, from the Atlantic to the Baltic.

**Plant communities**

*Honkenyo-Crambion maritimae*

**Species**

*Crambe maritima*, *Honkenya peploides*, *Lathyrus japonicus*

**EU Habitats Directive Annex I**

1220 Perennial vegetation of stony banks

## C Inland surface waters

### C1 Surface standing waters

#### ! C1.1 Permanent oligotrophic lakes, ponds and pools

##### Description

Waterbodies with a low nutrient (nitrogen and phosphorus) content, mostly acid (pH 4-6). Includes oligotrophic waters of medium or high pH, e.g. calcareous and basic unpolluted nutrient-poor lakes and pools, which are rare in much of Europe and noted as a habitat of charophytes (C1.14). Excludes peaty, dystrophic waters (C1.4). Because of the low nutrient status, beds of vascular plants are often sparse and open.

##### Plant communities

*Charion fragilis*, *Nitellion flexilis*, *Nelumboion nuciferae*, *Scorpidio-Utricularion minoris*, *Oenanthion aquaticae*, *Zannichellion pedicellatae*, *Parvopotamion*, *Potamion graminei*, *Nitellion syncarpae-tenuissimae*, *Sphagno-Utricularion*, *Ranunculion aquatilis*, *Hyperico elodis-Sparganion*, *Charion vulgaris*, *Potamion*,

##### Species

*Callitriche* sp. *Chara* sp, *Isoetes* sp, *Nitella* sp, *Potamogeton* sp, *Sparganium* sp, *Eleocharis quinqueflora*, *Eleocharis ovata*

##### EU Habitats Directive Annex I

Includes:

2190 Humid dune slacks

3110 Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*)

3120 Oligotrophic waters containing very few minerals generally on sandy soils of the West Mediterranean, with *Isoetes* spp

3140 Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp

#### C1.2 Permanent mesotrophic lakes, ponds and pools

##### C1.22 Free-floating vegetation of mesotrophic waterbodies

#### ! C1.222 Floating *Hydrocharis morsus-ranae* rafts

##### Description

Free-floating surface communities of Palaearctic waters rich in *Hydrocharis morsus-ranae* .

##### Plant communities

*Hydrocharition: Hydrocharitetum morsus-ranae*

**Species***Hydrocharis morsus-ranae***EU Habitats Directive Annex I**

included in 3150 Natural eutrophic lakes with Magnopotamion or Hydrocharition -type vegetation

**!** C1.223 Floating *Stratiotes aloides* rafts**Description**Free-floating communities of Palaeartic waters dominated by *Stratiotes aloides* .**Plant communities***Hydrocharition: Stratiotetum aloidis***Species***Stratiotes aloides***EU Habitats Directive Annex I**

included in 3150 Natural eutrophic lakes with Magnopotamion or Hydrocharition -type vegetation

**!** C1.224 Floating *Utricularia australis* and *Utricularia vulgaris* colonies**Description**Free-floating communities of more or less nutrient-rich Palaeartic waters dominated by bladderworts (*Utricularia australis*, *Utricularia vulgaris*).**Plant communities***Hydrocharition: Lemno-Utricularietum vulgaris*, *Utricularietum australis* (*Utricularietum neglectae*)**Species***Utricularia australis*, *Utricularia vulgaris***EU Habitats Directive Annex I**included in 3150: Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* -type vegetation**!** C1.225 Floating *Salvinia natans* mats**Description**Free-floating communities of Central and Eastern Europe dominated by the free-floating non-indigenous fern *Salvinia natans*, often forming dense and extensive mats.**Plant communities***Hydrocharition: Spirodelo-Salviniatum natantis*

**Species**

*Salvinia natans*

**EU Habitats Directive Annex I**

included in 3150 Natural eutrophic lakes with Magnopotamion or Hydrocharition -type vegetation

**!** C1.226 Floating *Aldrovanda vesiculosa* communities

**Description**

Rare aquatic formations of Central and Eastern Europe, dispersed from southern Brandenburg and Lake Constance east to the Ukraine, with a former outpost in eastern Lithuania, harbouring the carnivorous, free-floating Droseraceae *Aldrovanda vesiculosa* (listed on Resolution 6).

**Plant communities**

*Aldrovandetum vesiculosae*, *Spirodelo-Aldrovandetum i.a.*

**Species**

*Aldrovanda vesiculosa*

**EU Habitats Directive Annex I**

included in 3150 Natural eutrophic lakes with Magnopotamion or Hydrocharition -type vegetation

**C1.24 Rooted floating vegetation of mesotrophic waterbodies**

C1.241 Floating broad-leaved carpets

**!** C1.2416 *Nelumbo nucifera* beds

**Description**

Formations of *Nelumbo nucifera*, occurring in the Volga delta and from the south Caspian lowlands to the Far East, with a naturalised population in Romania.

**Plant communities**

*Nelumboion nuciferae*

**Species**

*Nelumbo nucifera*

**!** C1.25 Charophyte submerged carpets in mesotrophic waterbodies

**Description**

Algal carpets dominated by Charophytes of the bottom of unpolluted, mesotrophic lakes and pools of the Palaearctic region.

**Plant communities**

*Charetalia hispidae*, *Nitelletalia flexilis*

**Species**

*Chara* sp., *Nitella* sp, *Tolypella* sp.

**EU Habitats Directive Annex I**

3140 Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp.

**Associated Habitat types**

This is similar to subtype C1.14 of !C1.1 Permanent oligotrophic lakes, ponds and pools and C1.44 Charophyte submerged carpets in dystrophic waterbodies but differing in the trophic status of the water body.

**C1.3 Permanent eutrophic lakes, ponds and pools**

***C1.34 Rooted floating vegetation of eutrophic waterbodies***

C1.341 Shallow-water floating communities

**! *C1.3411 Ranunculus communities in shallow water***

**Description**

Communities dominated by water crowfoots (aquatic species of *Ranunculus*) with both submerged and floating leaves, characteristic mostly of shallow Palaearctic waters with fluctuating water levels and susceptible to occasional drying.

**Plant communities**

*Ranunculion aquatilis* (*Nymphaeion albae* p., *Ranunculion fluitantis* p.); *Hydrocotylo-Baldellion*

**Species**

*Ranunculus peltatus*, *Ranunculus aquatilis*, *Ranunculus baudotii*, *Ranunculus hederaceus*, *Ranunculus rionii*, *Ranunculus ololeucos*

**! *C1.3413 Hottonia palustris beds in shallow water***

**Description**

Communities of shallow Palaearctic waters dominated by *Hottonia palustris* .

**Plant communities**

*Hottonion palustris*, *Ranunculion aquatilis* p

**Species**

*Hottonia palustris*



## **C1.4 Permanent dystrophic lakes, ponds and pools**

### **! C1.44 Charophyte submerged carpets in dystrophic waterbodies**

#### **Description**

Algal carpets dominated by Charophytes of the bottom of unpolluted, dystrophic lakes and pools of the Palearctic region.

#### **Plant communities**

*Charion fragilis*

#### **Species**

*Chara* sp, *Nitella* sp, *Tolypella* sp

#### **EU Habitats Directive Annex I**

3140 Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp.

#### **Associated Habitat types**

This is similar to subtype C1.14 of !C1.1 Permanent oligotrophic lakes, ponds and pools and !C1.25 Charophyte submerged carpets in mesotrophic waterbodies but differing in the trophic status of the water body.

## **! C1.5 Permanent inland saline and brackish lakes, ponds and pools**

#### **Description**

Non-coastal brackish, saline or hypersaline lakes, ponds or pools and their pelagic vertebrates and plankton.

#### **Plant communities**

*Charion canescentis*, *Zannichellion pedicellatae*, *Ranunculion aquatilis*, *Ruppion maritimae*

#### **Species**

*Lemna* sp, *Wolffia* sp, *Callitriche* sp and *Ranunculus* sect. *Batrachium* sp., *Najas marina*, *Najas minor*, *Potamogeton pectinatus*

#### **EU Habitats Directive Annex I**

Includes 1150: Coastal lagoons

## **C1.6 Temporary lakes, ponds and pools**

### **! C1.66 Temporary inland saline and brackish waters**

#### **Description**

Shallow temporary saline and brackish waters, in which communities may develop which often form two layers. The main species are *Ranunculus trichophyllus*, *Najas minor*, *Najas marina* and *Ceratophyllum demersum*.

#### **Plant communities**

*Charion fragilis*, *Nelumboion nuciferae*, *Potentillion anserinae*, *Zannichellion pedicellatae*, *Parvopotamion*, *Littorellion uniflorae*, *Potamion graminei*, *Isoëtion lacustris*, *Nymphaeion albae*, *Ranunculion aquatilis*, *Hyperico elodis-Sparganion*, *Ranunculion fluitantis*

#### **Species**

*Ceratophyllum demersum*, *Najas marina*, *Najas minor*, *Ranunculus trichophyllus*

### **! C1.67 Turlough and lake-bottom meadows**

#### **Description**

Terrestrial communities colonizing the bottom of waterbodies that are completely and recurrently emptied of water for part of the time, such as Irish turloughs. Habitats characteristic of each stage of the cycle may be units of C1, C3.41-C3.43, C3.51-C3.52, C3.64-C3.65 and, if appropriate, those of units D2-D5 or E2-E3.

#### **Plant communities**

#### **Species**

Plants: *Cinclidotus fontinaloides*, *Fontinalis antipyretica* (Bryophyta).

Animals: *Tanymastix stagnalis* (wet phase) and the beetles *Agonum lugens*, *A. livens*, *Badister meridionalis*, *Blethisa multipunctata* and *Pelophila borealis* (dry phase).

#### **Corresponding class in other classifications**

#### **EU Habitats Directive Annex I**

3180 Turloughs

#### **References**

Proctor, M. 2010. Environmental and vegetational relationships of lakes, fens and turloughs in the Burren. *Biology & Environment: Proceedings of the Royal Irish Academy* 110 (1): 17-34.

## **C2 Surface running waters**

### **C2.1 Springs, spring brooks and geysers**

#### **! C2.12 Hard water springs**

#### **Description**

Springs rich in calcium, typically due to calcareous tufa formation. Species-rich habitats with high moss cover, a high dominance of the moss *Cratoneuron commutatum* is typical.

### **Plant communities**

*Cratoneurion commutati*, *Lycopodo-Cratoneurion commutati*

### **Species**

*Arabis soyeri*, *Cochlearia pyrenaica* (in sites with heavy metals), *Pinguicula vulgaris*, *Saxifraga aizoides*. Mosses: *Catoscopium nigratum*, *Cratoneuron commutatum*, *C. commutatum* var. *falcatum*, *C. filicinum*, *Eucladium verticillatum*, *Gymnostomum recurvirostrum*. In the Boreal region also *Carex appropinquata*, *Epilobium davuricum*, *Juncus triglumis*, *Drepanocladus vernicosus*, *Philonotis calcarea*, *Scorpidium revolvens*, *S.cossoni*, *Cratoneuron decipiens*, *Bryum pseudotriquetum*

### **Corresponding class in other classifications**

Milieux naturels de Suisse 2008 1.3.2 Végétation des sources alcalines

### **EU Habitats Directive Annex I**

Subtype C2.121 Petrifying springs with tufa or travertine formations is 7220: Petrifying springs with tufa formation (*Cratoneurion*).

## **C3 Littoral zone of inland surface waterbodies**

### **C3.4 Species-poor beds of low-growing water-fringing or amphibious vegetation**

#### **! C3.41 Euro-Siberian perennial amphibious communities**

#### **Description**

Carpets of perennial vegetation submerged for a considerable part of the year in oligotrophic or mesotrophic lakes, ponds and pools of the boreal and nemoral zones of the Palaeartic and of mountains of the southern Palaeartic.

#### **Plant communities**

*Littorelletalia* including the alliances *Deschampsion littoralis* *Eleocharition acicularis*, *Isoetion lacustris*, *Littorellion uniflorae*, *Lobelion dortmannae*, *Hyperico elodis-Sparganion*

#### **Species**

*Sparganium gramineum*, *Sparganium minimum*, *Sparganium natans*, *Sparganium glomeratum*, *Eleocharis quinqueflora*, *Eleocharis ovata*, *Glyceria lithuanica* **C3.411**: *Littorella uniflora*, *Lobelia dortmanna*, *Sparganium angustifolium*, *Isoetës lacustris*, *I. echinospora*. **C3.413**: *Eleocharis multicaulis*, *Glyceria fluitans*, *Juncus bulbosus*, *Hypericum elodes*, *Pilularia globulifera*, *Deschampsia setacea*, *Ranunculus reptans*, *Littorella uniflora*, *Samolus valerandi*

#### **Corresponding class in other classifications**

Milieux naturels de Suisse 2008 2.1.3 Végétation temporaire des grèves

#### **EU Habitats Directive Annex I**

included in:

3110 Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)

3130 Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoeto-Nanojuncetea

### **C3.42    *Mediterraneo-Atlantic amphibious communities***

#### **!    C3.421    Short Mediterranean amphibious communities**

##### **Description**

Formations of Mediterranean, thermo-Atlantic and Macaronesian regions entirely or partially summer such as dry ponds, pools and ditches.

##### **Plant communities**

*Isoetalia velatae*

##### **Species**

*Isoetes* spp., *Marsilea quadrifolia*, *Marsilea strigosa*, *Pilularia globulifera*, *Pilularia minuta*, *Mentha pulegium*, *Lythrum hyssopifolia* s.l., *Trifolium filiforme*, *Peplis erecta*, *Teucrium cravense*, *Serapias lingua*, *Juncus bufonius*, *Juncus capitatus*, *Juncus pygmaeus*, *Juncus fasciculatus*, *Scirpus savii*, *Spiranthes aestivalis*, *Anagallis tenella*, *Cyperus flavescens*, *C. fuscus*, *C. michelianus*, *Fimbristylis bisumbellata*, *Chaetopogon fasciculatus*

##### **EU Habitats Directive Annex I**

included in 3170: Mediterranean temporary ponds

##### **References**

Bagella, S., MC Caria & V. Zuccarello. 2010. Patterns of emblematic habitat types in Mediterranean temporary wetlands. *Comptes Rendus Biologies* 333 (9): 694-700

#### **!    C3.422    Tall Mediterranean amphibious communities**

##### **Description**

Mediterranean and thermo-Atlantic formations of entirely or partially summer-dry ponds, pools, ditches and springs, developed on terrain covered by deep waters during long periods, composed of a mixture of small annuals and of tall perennials or annuals, in particular, of the genera *Mentha* and *Eryngium*.

##### **Plant communities**

*Preslion cervinae*

##### **Species**

*Eryngium corniculatum*, *Mentha cervina*, *Mentha longifolia*

##### **EU Habitats Directive Annex I**

included in 3170: Mediterranean temporary ponds

## References

Bagella, S., MC Caria & V. Zuccarello. 2010. Patterns of emblematic habitat types in Mediterranean temporary wetlands. *Comptes Rendus Biologies* 333 (9): 694-700

### **C3.43 Central Eurasian amphibious communities**

#### **! C3.431 Ponto-Pannonic riverbank dwarf sedge communities**

##### **Description**

Communities of nitrogen-rich muds and inundation zones of watercourses and lakes of the western central Eurasian steppe and pre-steppe zones, in particular of the Pannonic and sub-Pannonic plains and hills, dominated by sedges and rushes.

##### **Plant communities**

*Elatino-Eleocharition ovatae* p.: *Dichostylidi-Gnaphalietum uliginosi*, *Cypero-Juncetum bufonii*

##### **Species**

*Cyperus fuscus*, *Cyperus flavescens*, *Cyperus michelianus* (*Dichostylis michelianus*), *Juncus bufonius*, *Echinochloa crus-galli*, *Filaginella uliginosa* (*Gnaphalium uliginosum*), *Elatine hungarica*, *Ammannia verticillata*

### **C3.5 Periodically inundated shores with pioneer and ephemeral vegetation**

#### **C3.51 Euro-Siberian dwarf annual amphibious swards**

#### **! C3.511 Freshwater dwarf *Eleocharis* communities**

##### **Description**

Rare communities colonising the fluid muds of drying ponds of nemoral, boreonemoral, boreal, and, locally, steppic regions of Europe, characterised by annual *Eleocharis* spp and other amphibious plants.

##### **Plant communities**

*Elatino-Eleocharitenion ovatae*

##### **Species**

*Eleocharis ovata*, *Eleocharis carniolica*, *Carex bohémica*, *Lindernia procumbens*, *Scirpus supinus*, *Limosella aquatica*, *Cyperus fuscus*, *Peplis portula*, *Juncus tenageia*, *Elatine hexandra*, *Elatine hydropiper*

##### **EU Habitats Directive Annex I**

Included in 3130 Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoeto-Nanojuncetea*

! C3.512 Dune-slack *Centaurium* swards

**Description**

Pioneer formations of humid calcareous sands of Atlantic and sub-Atlantic Europe, recorded from the coasts around the North Sea and from the Baltic coast of Germany, with *Centaurium* spp and other plants, characteristic of humid dune slacks and dune pool fringes, on soils with low salinity.

**Plant communities**

*Nanocyperion*

**Species**

*Samolus valerandi*, *Centaurium littorale*, *Centaurium erythraea*, *Centaurium pulchellum*, *Gentianella amarella*, *Blackstonia perfoliata*, *Juncus bufonius*

**EU Habitats Directive Annex I**

Included in 2190 Humid dune slacks

! C3.5132 Swards of small *Cyperus* species

**Description**

Medio-European communities dominated by *Cyperus flavescens*, *Cyperus fuscus* and *Cyperus michelianus*.

**Plant communities**

*Nanocyperion* i.a.

**Species**

*Cyperus flavescens*, *Cyperus fuscus* and *Cyperus michelianus*

**EU Habitats Directive Annex I**

Included in 3130 Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoeto-Nanojuncetea*

! C3.5133 Wet ground dwarf herb communities

**Description**

Varied communities, some very rare and threatened, of small annuals of wet ground of nemoral and boreo-nemoral regions of Palaeartic Eurasia.

**Plant communities**

*Juncenion bufonii*: *Glycerio-Limoselletum*, *Centunculo-Anthocerotetum*, *Stellario uliginosae-Scirpetum setaceae*, *Erythraeo-Blackstonietum*, *Radiolenion linoidis*: *Ranunculo-Radioletum linoidis*, *Cicendietum filiformis*, *Hyperico-Spergularietum rubrae*, *Spergulario-Illecebretum verticillati*, *Junco-Radioletum linoidis* i.a.

### Species

*Juncus bufonius*, *Scirpus setaceus*, *Centunculus minimus*, *Spergularia segetalis*, *Blackstonia perfoliata*, *Cicendia filiformis*, *Radiola linoides* and *Illecebrum verticillatum*

### EU Habitats Directive Annex I

Included in 3130 Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoeto-Nanojuncetea*

## ! C3.55 *Sparsely vegetated river gravel banks*

### Description

Vascular plant communities occupying gravel deposits of rivers, including pioneer vegetation and subsequent stages in the colonization sequence. Early-stage communities of Alpine, boreal and Mediterranean watercourses are specialised, those of nemoral lowlands and hills are related to other formations, in particular those of unit E3.

### Plant communities

*Epilobietalia fleischeri*, *Glaucion flavi*

### Species

*Myricaria germanica*, *Glaucium flavum*, *Oenothera biennis*, *Salix elaeagnos*, *Elymus fibrosus*, *Elymus transbaicalensis*, *Elymus kronokensis ssp. subalpinus*, *Cotoneaster cinnabarinus*, *Papaver lapponicum*

### Corresponding class in other classifications

Milieux naturels de Suisse 20083.2.1.1 Alluvions avec végétation pionnière herbacée

### EU Habitats Directive Annex I

Partially covered by

3220 Alpine rivers and the herbaceous vegetation along their banks

3230 Alpine rivers and their ligneous vegetation with *Myricaria germanica*

3240 Alpine rivers and their ligneous vegetation with *Salix elaeagnos*

3250 Constantly flowing Mediterranean rivers with *Glaucium flavum*

### Associated Habitat types

Can occur in a mosaic with !C3.62 Unvegetated river gravel banks

## C3.6 Unvegetated or sparsely vegetated shores with soft or mobile sediments

## ! C3.62 *Unvegetated river gravel banks*

### Description

Unvegetated deposit beds of streams formed of pebbles, gravels, boulders or a mixture of gravels and finer sediments, occupying the edges of the stream, forming islands in the channel or

supporting the arms and rivulets constituting the stream, together with their associated animal communities. Corresponding habitats with pioneer or ephemeral vascular vegetation are included in unit C3.55 and their succession leads to willow woodland (G1.11).

**Associated Habitat types**

Can occur in a mosaic with !C3.55 Sparsely vegetated river gravel banks



## D Mires, bogs and fens

### D1 Raised and blanket bogs

#### ! D1.2 Blanket bogs

##### Description

The mire surface and underlying peat of ombrotrophic peatlands, formed on flat or gently sloping ground with poor surface drainage, in oceanic climates with high rainfall. The mire surface may on flatter ground be very similar to that of a raised bog, with a complex of small pools and terrestrial hummocks. In the strictest sense, blanket bogs are a habitat endemic to northwestern Europe, characteristic of the western and northern British Isles, the Faeroe Islands and the western seaboard of Scandinavia. They often cover extensive areas with local topographic features supporting distinct communities but *Sphagnum* mosses play an important role in all of them, accompanied by *Narthecium ossifragum*, *Molinia caerulea*, *Scirpus cespitosus*, *Schoenus nigricans*, *Eriophorum angustifolium*, *Eriophorum vaginatum* and *Calluna vulgaris*. Blanket bog complexes (X28) include dystrophic pools (C1.4) and acidic flushes (D2.2) as well as the mire surface (D1.2).

##### Plant communities

*Ericion tetralicis*, *Oxycocco-Ericion tetralicis*

##### Species

*Sphagnum papillosum*, *S. tenellum*, *S. compactum*, *S. magellanicum*, *S. rubellum*, *S. fuscum*, *Narthecium ossifragum*, *Molinia caerulea*, *Scirpus cespitosus*, *Schoenus nigricans*, *Eriophorum angustifolium*, *Eriophorum vaginatum*, *Calluna vulgaris*

##### EU Habitats Directive Annex I

7130 Blanket bogs (\* if active bog)

### D2 Valley mires, poor fens and transition mires

#### D2.2 Poor fens and soft-water spring mires

##### D2.22 *Carex nigra*, *Carex canescens*, *Carex echinata* fens

#### ! D2.226 Peri-Danubian black-white-star sedge fens

##### Description

Acidic fens, with an herbaceous sward formed by *Carex* spp and sometimes *Juncus effusus*, *Juncus acutiflorus* or *Nardus stricta* of the mountains and hills forming the basin of the middle and lower Danube basin, and of adjacent regions, in particular of the Carpathians, the Dinarides, the mountains of the southeastern Balkan peninsula and the Moravian hills.

**Plant communities**

*Carici dacicae-Plantaginetum gentianoidis*, *Carici nigrae-Sphagnetum balkanicum*, *Carici echinatae-Sphagnetum*, *Junco-Caricetum fuscae*, *Sphagno-Caricetum rostratae*, *Carici-Sphagnetum droseretosum*

**Species**

*Carex echinata*, *Carex canescens*, *Carex dacica* (*Carex nigra* ssp. *dacica*), *Carex rostrata*, *Juncus effusus*, *Juncus acutiflorus*, *Nardus stricta*, **D2.2262:** *Carex nigra*, *Carex echinata*, *Eriophorum angustifolium*, *Agrostis canina*, *Molinia caerulea*, *Nardus stricta*, *Drosera rotundifolia*. **D2.2263:** *Carex nigra*, *C. echinata*, *Eriophorum latifolium*, *E. angustifolium*, *E. vaginatum*, *Carex panicea*, *C. pallescens*, *Dactylorhiza cordigera*, *Pinguicula vulgaris*, *Primula farinosa* ssp. *exigua*, *Alchemilla bulgarica*, *Cirsium heterotrichum*, *Soldanella hungarica*, *Gymnadenia frivaldii*, *Juncus* spp., *Sphagnum* spp. **D2.2265:** *Carex nigra*, *Carex stellulata*, *Deschampsia cespitosa*, *Pinguicula vulgaris*, *Drosera rotundifolia*, *Sphagnum rubellum*, *Soldanella alpina*, *Dactylorhiza cordigera*, *Leucorchis albida*

**! D2.3 Transition mires and quaking bogs**

includes the following subtype separately listed in the 1998 edition of Resolution 4:  
D2.3H Wet, open, acid peat and sand, with *Rhynchospora alba* and *Drosera*

**Description**

Incompletely terrestrialized wetlands occupied by peat-forming vegetation with acid groundwater or (for vegetation rafts) acid underlying pool or lake water. Included in this habitat type are rafts of *Sphagnum* and *Eriophorum* sp (D2.38) and quaking rafts of *Molinia caerulea* (D2.3D). Excluded are stands of vegetation fringing water bodies (C3.2) unless the vegetation raft is sufficiently extensive to count as a habitat in its own right.

**Plant communities**

*Caricion canescenti-fuscae*, *Sphagno-Caricion canescentis*, *Caricion lasiocarpae*, *Rhynchosporion albae*

**Species**

*Eriophorum gracile*, *Carex chordorrhiza*, *C. lasiocarpa*, *C. diandra*, *C. rostrata*, *C. limosa*, *Scheuchzeria palustris*, *Hammarbya paludosa*, *Liparis loeselii*, *Rhynchospora alba*, *R. fusca*, *Menyanthes trifoliata*, *Epilobium palustre*, *Pedicularis palustris*, *Sphagnum* sp. (*S. papillosum*, *S. angustifolium*, *S. subsecundum*, *S. fimbriatum*, *S. riparium*, *S. cuspidatum*), *Calliergon giganteum*, *Drepanocladus revolvens*, *Scorpidium scorpioides*, *Campylium stellatum*, *Aneura pinguis*, *Dactylorhiza curvifolia*, *Ophrys insectifera*, *Orchis palustris*, *Cladium mariscus*

**Corresponding class in other classifications**

Milieux naturels de Suisse 2008 2.2.4 Cariçaie de transition

**EU Habitats Directive Annex I**

Includes:

7140 Transition mires and quaking bogs

7150 Depressions on peat substrates of the *Rhynchosporion*

## D3 Aapa, palsa and polygon mires

### ! D3.1 Palsa mires

#### Description

Mires of the subarctic and northern boreal regions formed by elevated frozen mounds or ridges (palsas), 0.5 to 8 m high and up to 50 m in diameter, interspersed wet hollows of similar area. Palsa mires are distributed in the discontinuous permafrost zone of Iceland, northern Fennoscandia and arctic Russia, in areas experiencing subzero temperatures for at least 200 days per year.

#### Plant communities

*Oxycocco microcarpi-Empetrion hermaphroditi*

#### Species

*Eriophorum russeolum*, *Carex rotundata*, *C. saxatilis*, *Empetrum nigrum* ssp. *hermaphroditum*, *Ledum palustre*, *Betula nana*, *Vaccinium microcarpum*; Mosses- *Dicranum elongatum*; Lichens: *Ochrolechia* spp., *Cladonia* spp., *Cladina* spp.

#### EU Habitats Directive Annex I

7320 Palsa mires

### ! D3.2 Aapa mires

#### Description

Mire complexes of the central and northern boreal zones, often extensive, with a concave or flat, gently to very slightly sloping surface patterned by an alternation of slightly to substantially raised ridges and hummocks (strings), with minerotrophic or ombrotrophic characteristics, and of minerotrophic pools and hollows (flarks), arranged perpendicularly to the slope direction. In Europe, the main area of distribution is subatlantic and subcontinental Fennoscandia and subarctic and arctic Russia.

#### Plant communities

*Oxycocco microcarpi-Empetrion hermaphroditi*, *Sphagnion medii*

#### Species

Plants: *Chamaedaphne calyculata*, *Empetrum nigrum* (s.lato), *Betula nana*, *Thricophorum cespitosum*, *Eriophorum vaginatum*, *E. russeolum*, *Carex rostrata*, *C. lasiocarpa*, *C. rotundata*, *C. chordorrhiza*, *C. livida*, *Scheuchzeria palustris*, *Molinia caerulea*, *Rubus chamaemorus*, *Saxifraga hirculus*, *Dactylorhiza incarnata*; Mosses- *Sphagnum papillosum*, *S. jensenii*, *S. lindbergii*, *S. majus*, *S. aongstroemii*, *S. subsecundum*, *S. subfulvum*, *S. pulchrum*, *Warnstorfia exannulata* (*Drepanocladus exannulatus*), *Limprichtia revolvens* (*Drepanocladus revolvens*), *Drepanocladus* (s.lato) spp., *Scorpidium scorpioides*.

Animals: Butterflies - *Pyrgus centaureae*, *Erebia disa*; Moths: *Syngrapha diasema*, *Apamea maillardi*, *Nola karelica*, *Hypoxyxtis pluviana*.

**EU Habitats Directive Annex I**

7310 Aapa mires

**! D3.3 Polygon mires****Description**

Complex mires of the arctic and subarctic patterned by surface microrelief of large, 10 to 30 m in diameter, low-centre or high-centre polygons formed by the juxtaposition of dry, 0.3 to 0.5 m high, ridges covered by shrubs, hypnoid mosses and sphagna, and of wet hollows occupied by grasses, sedges, mosses and sphagna. Polygon mires occur mainly outside Europe, in tundra where the mean annual temperature is below -1°C.

**Plant communities**

*Oxycocco microcarpi-Empetrion hermaphroditi*

**Species**

*Salix pulchra*, *S. reptans*, *Betula nana*, *Ledum decumbens*, *Vaccinium vitis-idaea*, *Rubus chamaemorus*, *Dryas punctata*, *Carex chordorrhiza*, *C. rariflora*, *C. rotundata*, *C. stans*, *Arctagrostis latifolia*, *Arctophila fulva*, *Dupontia fischeri*, *Aulacomnium palustre*, *A. turgidum*, *Homalothecium nitens*, *Polytrichum strictum*, *Hylocomium splendens*, *Sphagnum fimbriatum*, *S. girgensohnii*, *S. lenense*, *S. nemoreum*, *S. balticum*, *S. majus*

**EU Habitats Directive Annex I**

Not present in EU28

**D4 Base-rich fens and calcareous spring mires****! D4.1 Rich fens, including eutrophic tall-herb fens and calcareous flushes and soaks****Description**

Wetlands and spring-mires, seasonally or permanently waterlogged, with a soligenous or topogenous base-rich, often calcareous water supply. Peat formation, when it occurs, depends on a permanently high watertable. Rich fens may be dominated by small or larger graminoids or tall herbs (e.g. ). Where the water is base-rich but nutrient-poor, small sedges usually dominate the mire vegetation, together with a "brown moss" carpet. Hard-water spring mires (D4.1N) often contain tufa cones and other tufa deposits. Excluded is the water body of hard-water springs (C2.1); calcareous flushes of the alpine zone are a separate category (D4.2). Rich fens are exceptionally endowed with spectacular, specialised, strictly restricted species. They are among the habitats that have undergone the most serious decline. They are essentially extinct in several regions and gravely endangered in much of central and western Europe.

**Plant communities**

*Caricion davallianae*

### Species

*Campylium stellatum*, *Drepanocladus intermedius*, *D. revolvens*, *Cratoneuron commutatum*, *Acrocladium cuspidatum*, *Ctenidium molluscum*, *Fissidens adianthoides*, *Bryum pseudotriquetrum*, *Schoenus nigricans*, *S. ferrugineus*, *Eriophorum latifolium*, *Carex davalliana*, *C. flava*, *C. lepidocarpa*, *C. hostiana*, *C. panicea*, *Juncus subnodulosus*, *Scirpus cespitosus*, *Eleocharis quinqueflora*, very rich herbaceous flora including *Tofieldia calyculata*, *Dactylorhiza incarnata*, *D. traunsteineri*, *D. traunsteinerioides*, *D. russowii*, *D. majalis* ssp. *brevifolia*, *D. cruenta*, *Eupatorium cannabinum*, *Liparis loeselii*, *Herminium monorchis*, *Epipactis palustris*, *Pinguicula vulgaris*, *Pedicularis sceptrum-carolinum*, *Primula farinosa*, *Swertia perennis*

### Corresponding class in other classifications

Milieux naturels de Suisse 2008 2.2.3 Parvocariçaie neutro-basophile

### EU Habitats Directive Annex I

7230: Alkaline fens

## ! D4.2 Basic mountain flushes and streamsides, with a rich arctic-montane flora

### Description

Rare Alpine, peri-Alpine, northern British and periarctic pioneer communities colonizing gravelly, sandy, stony, sometimes somewhat argilous or peaty, calcareous sedimentary substrates soaked by cold water, in moraines and on the edge of springs, rivulets, glacial torrents of the alpine or subalpine levels, or on alluvial sands of pure, cold, slow-flowing rivers and calm backwaters. They host many species with a boreoarctic or glacial relict distribution, many of which are redlisted several countries.

### Plant communities

*Caricion bicoloris-atrofuscae*

### Species

*Carex bicolor*, *C. microglochin*, *C. maritima*, *C. atrofusca*, *C. vaginata*, *Kobresia simpliciuscula*, *Scirpus pumilus*, *Juncus arcticus*, *J. alpinoarticulatus*, *J. castaneus*, *J. triglumis*, *Typha minima*, *T. lugdunensis*, *T. shuttleworthii*, *Tofieldia pusilla*, often accompanied by *Carex davalliana*, *C. dioica*, *C. capillaris*, *C. panicea*, *C. nigra*, *Blysmus compressus*, *Eleocharis quinqueflora*, *Scirpus cespitosus*, *Primula farinosa*, *Equisetum variegatum*, *Drepanocladus intermedius*, *Campylium stellatum*

### Corresponding class in other classifications

Milieux naturels de Suisse 2008 2.2.5 Groupement pionnier des bords de torrents alpins

### EU Habitats Directive Annex I

7240: Alpine pioneer formations of the *Caricion bicoloris-atrofuscae*

## D5 Sedge and reedbeds, normally without free-standing water

### ! D5.2 Beds of large sedges normally without free-standing water

#### Description

Terrestrialized stands of tall species of *Carex*, *Cladium* and *Cyperus*, stands are usually species-poor and often dominated by one species, growing on waterlogged ground. These species also grow as emergents and fringing vegetation beside water bodies (C3.2).

#### Plant communities

*Magno-Caricion elatae*, *Magno-Caricion gracilis*, *Carici-Rumicion hydrolapathi*, *Scrophulario umbrosae-Caricion paniculatae*, *Caricion broterianae*, *Caricion microcarpae*, *Deschampsion argenteae*

#### Species

*Angelica palustris*, *Carex acuta*, *Carex acutiformis*, *Carex appropinquata*, *Carex elata*, *Carex lasiocarpa*, *Carex paniculata*, *Cladium mariscus*, *Cyperus papyrus*, *Schoenus nigricans*, *Kosteletzka pentacarpos*

#### Corresponding class in other classifications

Milieux naturels de Suisse 2008 2.2.1.1 Magnocariçaie

2.2.1.2 Formation à marisque

#### EU Habitats Directive Annex I

7210: Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*

## D6 Inland saline and brackish marshes and reedbeds

### ! D6.1 Inland saltmarshes

includes the following subtypes separately listed in or split units from the 1998 version:

D6.15 Interior Iberian *Microcnemum* and *Salicornia* swards

D6.16 Interior central European and Anatolian *Salicornia*, *Microcnemum*, *Suaeda* and *Salsola* swards

#### Description

Salt meadows and swards of *Salicornia* and other *Chenopodiaceae* of inland salt basins of the nemoral zone. Inland saltmarshes of middle Europe are remarkable, extremely threatened communities occurring in a few isolated stations of Saxony and Lower Saxony, Schleswig-Holstein, Thuringia, Hesse, Lorraine, Auvergne, the Midlands and southeastern Poland (lower Nida valley).

**Plant communities**

*Scorzonero-Juncion gerardii*, *Armerion maritimae*, *Potentillion anserinae*, *Puccinellio-Spergularion salinae*, *Puccinellion limosae*, *Puccinellion maritimae*, *Halo-Trichophorion pumili*, *Salicornion patulae*, *Thero-Salicornion*

**Species**

*Apium repens*, *Kosteletzkyia pentacarpos*, *Primula nutans*, *Salicornia sp*, *Sisymbrium supinum*

**EU Habitats Directive Annex I**

1340 Inland salt meadows

## E Grasslands and lands dominated by forbs, mosses or lichens

### E1 Dry grasslands

#### E1.1 Inland sand and rock with open vegetation

##### *E1.11 Euro-Siberian rock debris swards*

##### ! E1.112 *Sempervivum* or *Jovibarba* communities on rock debris

##### **Description**

Open lowland and hill rock debris swards of suboceanic climates of Western Europe and western and northern Central Europe harbouring often rare and local lowland forms of *Sempervivum* spp. or *Jovibarba* spp.

##### **Plant communities**

*Alyso alyssoidis-Sedion albi*: *Sempervivetum soboliferi*, *Sedo sexangularis-Sempervivetum tectorum*, *i.a.*

##### **Species**

*Sempervivum tectorum*, *S. funckii* var. *aqualiense*, *Jovibarba sobolifera*

##### **Corresponding class in other classifications**

Milieux naturels de Suisse 2008 included in 4.1.1 Végétation des dalles calcaires de basse altitude

##### **EU Habitats Directive Annex I**

included in 6110: Rupicolous calcareous or basophilic grasslands of the *Alyso-Sedion albi*

##### ! E1.2 Perennial calcareous grassland and basic steppes

##### **Description**

Perennial grasslands, often nutrient-poor and species-rich, on calcareous and other basic soils of the nemoral and steppe zones and of adjacent parts of the subboreal and submediterranean zones. Includes the calcareous grasslands of central and western Europe, alvar grasslands of the Baltic region, and basic grasslands of the steppe zone.

##### **Plant communities**

*Brachypodietalia phoenicoidis*, *Brometalia erecti*, *Festucetalia vaginatae*, *Festucetalia valesiaca*, *Helictotricho-Stipetalia*, *Koelerio-Phleetalia phleoidis*, *Scorzonero-Chrysopogonetalia*, *Seslerietalia rigidae*, *Stipo pulcherrimae-Festucetalia pallentis*

##### **Species**



*Artemisia laciniata, Artemisia oelandica, Artemisia pancicii, Astragalus centralpinus, Biscutella neustriaca, Cypripedium calceolus, Dianthus arenarius ssp. arenarius, Dracocephalum austriacum, Euphrasia marchesettii, Gentianella anglica, Jurinea cyanoides, Lilium pomponium, Pulsatilla patens, Pulsatilla vulgaris ssp. gotlandica, Senecio jacobaea ssp. gotlandicus, Stipa bavarica, Stipa styriaca, Thesium ebracteatum, Allium savranicum, Colchicum laetum, Silene cretacea, Bellevalia sarmatica, Elytrigia stipifolium, Iris rectulata, Iris notha, Stipa dasyphylla, Crocus speciosus, Koeleria sclerophylla, Stipa pulcherrima, Stipa zalesskii, Fritillaria rithenica, Adonis wolgensis, Astragalus cretophilus, Bulbocodium versicolor, Crambe grandiflora, Diplotaxis cretacea, Paeonia tenuifolia, Tulipa schrenkii, Cotoneastrum alaunicus, Papaver bracteatum, Potentilla eversmanniana, Rosa donetzica*

### **Corresponding class in other classifications**

Milieux naturels de Suisse 2008 4.2 Pelouses sèches thermophiles

### **EU Habitats Directive Annex I**

6190 Rupicolous pannonic grasslands (*Stipo-Festucetalia pallentis*)

6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (\* important orchid sites)

6240 Sub-Pannonic steppic grasslands

6250 Pannonic loess steppic grasslands

6260 Pannonic sand steppes

6280 Nordic alvar and precambrian calcareous flatrocks

62C0 Ponto-Sarmatic steppes

## **! E1.3 Mediterranean xeric grassland**

### **Description**

Meso- and thermo-Mediterranean xerophile, mostly open, short-grass perennial grasslands rich in therophytes; therophyte communities of oligotrophic soils on base-rich, often calcareous substrates e.g. vegetation of the class Thero-Brachypodieta.

### **Plant communities**

*Diantho humilis-Velezion rigidae, Cymbopogoni-Brachypodion ramosi, Plantagini-Catapodion marini, Moricandio-Lygeion sparti, Dauco-Catananchion luteae, Sedo-Ctenopsion gypsophylae, Trachynion distachyae, Thero-Brachypodion, Armerion girardii, Omphalodion commutatae, Stipion retortae*

### **Species**

*Brachypodium distachyum, B. retusum, B. fasciculatus, B. madritensis, B. rubens, B. alopecuros, Aegilops neglecta, A. geniculata, A. triuncialis, Avena sterilis, A. barbata, Lagurus ovatus, Cynosurus echinatus, Stipa capensis, Hyparrhenia hirta, Andropogon distachyos, Cynodon dactylon, Dactylis hispanica, Urginea maritima, Asphodelus microcarpus, Lloydia graeca, Anacamptis pyramidalis*

### **EU Habitats Directive Annex I**

6220 Pseudo-steppe with grasses and annuals of the Thero-Brachypodieta

## E1.7 Closed non-Mediterranean dry acid and neutral grassland

### ! E1.71 *Nardus stricta* swards

#### Description

Mesophile and xerophile *Nardus stricta* dominated or -rich grasslands of Atlantic or sub-Atlantic lowland, collinar and montane regions of northern Europe, middle Europe and western Iberia. Other important species: *Festuca rubra*, *Agrostis capillaris*, *Agrostis pyrenaica*, *Avenula versicolor*, *Campanula alpina* and *Avenella flexuosa*.

Does not include subalpine and alpine *Nardus stricta* communities (*Nardion strictae*) which are included in E4.3 Acid alpine and subalpine grassland.

#### Plant communities

*Violion caninae*

#### Species

*Nardus stricta*, *Festuca rubra*, *Agrostis capillaris*, *Avenella flexuosa*, *Avenula versicolor*, *Polygala vulgaris*, **E1.711** *Galium saxatile*, *Potentilla erecta* **E1.712** *Arnica montana*, *Campanula rotundifolia*, *Carex panicea*, *Thymus pulegioides*, **E1.713** *Danthonia decumbens*, *Calluna vulgaris*, *Sieglingia decumbens*, **E1.714** *Carex pallescens*, *Gymnadenia conopsea*, *Orchis mascula*, *Dactylorhiza majalis*, *Platanthera bifolia*, *Phyteuma nigrum*, *Lychnis flos-cuculi*, *Anemone nemorosa*

#### Corresponding class in other classifications

Nordic Vegetation Classification 1994 5.1.3.3 Mat grass heath type

Milieux naturels de Suisse 2008 5.4.1 Lande subatlantique acidophile

#### EU Habitats Directive Annex I

6230 \*Species-rich *Nardus* grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)

## E1.8 Closed Mediterranean dry acid and neutral grassland

### ! E1.83 *Mediterraneo-montane Nardus stricta* swards

#### Description

Perennial grasslands on acid soils of the supra-Mediterranean zone, dominated by grasses such as *Festuca elegans* or *Nardus stricta*. Mediterranean annual-rich siliceous grassland of siliceous gravelly, sandy or silty, usually shallow, soils that remain cohesive during the dry season.

#### Plant communities

*Helianthemion guttati*, *Vulpio-Lotion*, *Potentillo ternatae-Nardion*, *Corynephor-Malcolmion patulae*, *Festucion elegantis*, *Campanulo herminii-Nardion strictae*, *Potentillion calabri*

### Species

*Arnica montana, Colchicum corsicum, Festuca elegans, Gentiana lutea, Nardus stricta*

## ! E1.B Heavy-metal grassland

### Description

Dry, short grasslands, often rich in lichens and mosses, colonizing western and central European soils with a high content in heavy metals such as zinc and lead, and comprising uniquely adapted species, ecotypes or populations mostly related to, or derived from, otherwise montane, boreomontane or steppic species; heavy metal grasslands of distinctly alpine affinities, though spanning an altitudinal range that extends from the montane level and lowland dealpine stations to the subalpine and alpine levels, are included. Vegetation of the order *Violetalia calaminariae*.

### Plant communities

*Armerion halleri, Plantagini-Festucion ovinae, Thlaspion calaminariae, Thlaspion rotundifolii*

### Species

*Armeria arenaria, Armeria bottendorfensis, Armeria halleri, Armeria maritima, Dianthus sylvestris, Festuca ophioliticola ssp. calaminaria, Festuca valesiaca, Galium anisophyllum, Minuartia verna var. hercynica, Poa alpina, Silene vulgaris ssp. humilis, Thlaspi alpestre ssp. calaminare, Thlaspi caerulescens, Viola calaminaria, Viola dubyana*

### EU Habitats Directive Annex I

6130 Calaminarian grasslands of the *Violetalia calaminariae*

## E2 Mesic grasslands

### E2.2 Low and medium altitude hay meadows

## ! E2.25 Continental meadows

### Description

Lowland and collinar mesophile grasslands of the Pannonic basin, the Transylvanian basin, the lower Danubian plain, the Thracian plain and their fringing foothills, Eastern Europe and of southern Siberia.

### Plant communities

*Alopecurion pratensis, Arrhenatherion, Glycyrrhizion echinatae Glycyrrhizion glabrae*

### Species

*Agrostis capillaris, Arrhenatherum elatius, Alopecurus pratensis, Alopecurus rendlei, Festuca pratensis, Poa pratensis, Merendera sobolifera, Galium rubioides*

### EU Habitats Directive Annex I

included in 6510 Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*)

## E3 Seasonally wet and wet grasslands

### ! E3.1 Mediterranean tall humid grassland

includes the following subtypes separately listed in or split units from the 1998 version:

E3.111 Serapias grassland

#### Description

Mediterranean humid grasslands of tall grasses and rushes widespread throughout the Mediterranean basin, extending, along the coasts of the Black Sea, in particular in dune systems, north to the Dobrogea and the Danube Delta, and, in valleys of the Balkan peninsula, north to the Banat.

#### Plant communities

*Molinio-Holoschoenion*, *Sieglingion decumbentis*

#### Species

*Scirpus holoschoenus* (*Holoschoenus vulgaris*), *Agrostis stolonifera*, *A. reuteri*, *Galium debile*, *Molinia caerulea*, *Briza minor*, *Melica cupanii*, *Cyperus longus*, *Linum tenue*, *Trifolium resupinatum*, *Schoenus nigricans*, *Peucedanum hispanicum*, *Carex mairii*, *Juncus maritimus*, *J. acutus*, *Asteriscus aquaticus*, *Hypericum tomentosum*, *H. tetrapterum*, *Inula viscosa*, *Oenanthe pimpinelloides*, *O. lachenalii*, *Eupatorium cannabinum*, *Prunella vulgaris*, *Pulicaria dysenterica*, *Tetragonolobus maritimus*, *Orchis laxiflora*, *Dactylorhiza elata*, *Succisa pratensis*, *Sonchus maritimus* ssp. *aquatilis*, *Silaum silaus*, *Sanguisorba officinalis*, *Serratula tinctoria*, *Genista tinctoria*, *Cirsium monspessulanum*, *C. pyrenaicum*, *Senecio doria*, *Dorycnium rectum*, *Erica terminalis*, *Euphorbia pubescens*, *Lysimachia ephemerum*

#### EU Habitats Directive Annex I

6420: Mediterranean tall humid grasslands of the *Molinio-Holoschoenion*

### ! E3.4 Moist or wet eutrophic and mesotrophic grassland

#### Description

Wet eutrophic and mesotrophic grasslands and flood meadows of the boreal and nemoral zones, dominated by grasses, rushes or *Scirpus sylvaticus*.

#### Plant communities

*Glycyrrhizion glabrae*, *Calthion palustris*, *Deschampsion cespitosae*, *Juncion acutiflori*, *Cnidion venosi*; *Agropyro-Rumicion*, *Molinion caeruleae*, *Arrhenatherion*, *Alopecurion pratensis*, *Filipendulion*.

#### Species

**E3.41:** *Caltha palustris*, *Cirsium palustre*, *C. rivulare*, *C. oleraceum*, *Carduus personata*, *Telekia speciosa*, *Epilobium parviflorum*, *Mentha aquatica*, *Scirpus sylvaticus*, *Stachys palustris*, *Bromus racemosus*, *Crepis paludosa*, *Fritillaria meleagris*, *Geum rivale*, *Polygonum bistorta*, *Senecio aquaticus*, *Trollius europaeus*, *Lotus uliginosus*, *Trifolium dubium*, *Equisetum palustre*, *E. telmateia*, *Myosotis palustris*, *Oenanthe silaifolia*, *Gratiola officinalis*, *Inula salicina*, *Succisella inflexa*, *Dactylorhiza majalis*, *Alopecurus pratensis*, *Festuca gigantea*, *Juncus effusus*, *Juncus filiformis*. **E3.42:** *Juncus acutiflorus*. **E3.43:** *Deschampsia cespitosa*; *Cnidium dubium*, *Viola persicifolia*, *Allium angulosum*, *Iris sibirica*, *Oenanthe lachenalii*, *Oenanthe silaifolia*, *Gratiola officinalis*, *Juncus atratus*, *Leucojum aestivum*, *Carex praecox* var. *suzae*, *Lythrum virgatum*. **E3.44:** *Juncus effusus*, *J. conglomeratus*, *J. inflexus*, *J. compressus*, *J. tenuis*, *Carex hirta*, *Festuca arundinacea*, *Alopecurus geniculatus*, *Rumex crispus*, *Mentha longifolia*, *M. pulegium*, *Potentilla anserina*, *P. reptans*, *Ranunculus repens*. **E3.46:** *Cirsium canum*, *Alopecurus pratensis*, *Festuca pratensis*, *Deschampsia cespitosa*, *Polygonum bistorta*, *Angelica sylvestris*, *Scirpus sylvaticus*, *Caltha palustris*, *Valeriana simplicifolia*, *Pedicularis limnogenae*, *Ligularia sibirica*, *Telekia speciosa*

### EU Habitats Directive Annex I

subtype E3.43 = 6440: Alluvial meadows of river valleys of the *Cnidion dubii*

## ! E3.5 Moist or wet oligotrophic grassland

### Description

Grasslands on wet, nutrient-poor, often peaty soils, of the boreal, nemoral and steppe zones. Includes coarse acid grassland dominated by *Molinia caerulea* and shorter wet heathy grasslands with *Juncus squarrosus*, *Nardus stricta* and *Scirpus cespitosus*.

### Plant communities

*Molinion caeruleae*, *Juncion squarrosi*, *Junco-Molinion*, *Juncion acutiflori*

### Species

*Artemisia laciniata*, *Carex acuta*, *Juncus squarrosus*, *Ligularia sibirica*, *Molinia caerulea*, *Nardus stricta*, *Scirpus cespitosus*, *Thesium ebracteatum*

**E3.51:** *Succisa pratensis*, *Allium angulosum*, *A. suaveolens*, *Betonica officinalis*, *Cirsium dissectum*, *C. tuberosum*, *Dianthus superbus*, *Trollius europaeus*, *Galium boreale*, *Gentiana asclepiadea*, *G. pneumonanthe*, *Gladiolus palustris*, *Silaum silaus*, *Selinum carvifolia*, *Inula salicina*, *Iris sibirica*, *Laserpitium prutenicum*, *Lathyrus pannonicus*, *Tetragonolobus maritimus*, *Serratula tinctoria*, *Dactylorhiza maculata*. **E3.52:** *Festuca ovina*, *Gentiana pneumonanthe*, *Pedicularis sylvatica*, and sometimes *Sphagnum* spp.

### Corresponding class in other classifications

Milieux naturels de Suisse 2008 2.3.1 prairie à molinie

### EU Habitats Directive Annex I

subtype E3.51 = 6410: *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)

## E5 Woodland fringes and clearings and tall forb stands

### E5.4 Moist or wet tall-herb and fern fringes and meadows

#### *E5.41 Screens or veils of perennial tall herbs lining watercourses*

##### E5.411 Watercourse veils (other than of *Filipendula* )

##### ! *E5.4111 Angelica archangelica fluvial communities*

#### **Description**

Communities of *Angelica archangelica*. ssp. *litoralis* of large northern rivers, presently rare and threatened.

#### **Plant communities**

*Soncho-Angelicetum litoralis*

#### **Species**

*Angelica archangelica* ssp. *litoralis*

#### **EU Habitats Directive Annex I**

Included in 6430 Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels

##### ! *E5.4112 Angelica heterocarpa fluvial communities*

#### **Description**

*Angelica heterocarpa* formations of tidal estuaries of the Loire, the Charente and the Gironde; the species is a rare and very narrow endemic of southwestern France.

#### **Species**

*Angelica heterocarpa*

#### **EU Habitats Directive Annex I**

Included in 6430 Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels

#### **References**

Bensettiti, F., Gaudillat, V., Malengrau, D. & Quéré, E. 2002. Cahiers d'habitats Natura 2000. Connaissance et gestion des habitats et des espèces d'intérêt communautaire. Tome 6. Espèces végétales. La Documentation française. 271 pp. <http://inpn.mnhn.fr/docs/cahab/fiches/1607.pdf>

##### ! *E5.4113 Althaea officinalis screens*

#### **Description**

*Althaea officinalis* formations of river banks and marsh edges, particularly on somewhat saline soils.

**Species**

*Althaea officinalis*

**EU Habitats Directive Annex I**

Included in 6430 Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels

**!** E5.414 Continental river bank tall-herb communities dominated by *Filipendula*

**Description**

River bank and freshwater humid depression tall herb communities dominated by *Filipendula ulmaria* of the continental steppe zones.

**Species**

*Filipendula ulmaria*

**EU Habitats Directive Annex I**

6430 Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels

**!** E5.415 Eastern nemoral riverbanks with tall herb communities

**Description**

Tall herb communities of river banks in the eastern nemoral region of Europe (Note – this habitat type has not yet been formally incorporated into the EUNIS classification)

**Plant communities**

*Calamagrostetea langsdorffii* p.

**EU Habitats Directive Annex I**

6430 Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels

**Associated Habitat types**

Similar vegetation may also occur in E5.424 Eastern nemoral Tall-herb communities of humid meadows.

**E5.42 Tall-herb communities of humid meadows**

**!** E5.423 Continental tall-herb communities of humid meadows

**Description**

River bank and freshwater humid depression tall herb communities of the continental steppe zones.

**Plant communities**

*Lythro-Euphorbion, Veronico longifoliae-Lysimachion vulgaris*

**Species**

*Filipendula ulmaria, Lythrum salicaria*

**EU Habitats Directive Annex I**

Included in 6430 Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels

## ! E5.424 Eastern nemoral Tall-herb communities of humid meadows

**Description**

Tall herb communities of humid meadows in the eastern nemoral region of Europe (Note – this habitat type has not yet been formally incorporated into the EUNIS classification)

**EU Habitats Directive Annex I**

6430 Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels

**Associated Habitat types**

Similar vegetation may also occur in E5.415 Eastern nemoral riverbanks with tall herb communities

## E6 Inland salt steppes

### ! E6.1 Mediterranean inland salt steppes

**Description**

Vegetated saline land of Mediterranean coastal regions and of the fringes of semiarid salt basins that lack drainage to the sea; often dominated by perennial, rosette-forming *Limonium* spp. or esparto grass, *Lygeum spartum*. The soils are temporarily permeated (though not inundated) by saline water and subject to extreme summer drying, with formation of salt efflorescences.

**Plant communities**

*Limonion gmelinii, Frankenion pulverulenta, Hordeion marini, Puccinellio-Spergularion salinae, Lygeo-Lepidion cardaminis, Romulion, Lygeo sparti-Limonion furfuracei, Thero-Salicornion,*

**Species**

*Halopeplis amplexicaulis, Hymenolobus procumbens, Limonium* spp., *Lygeum spartum, Microcnemion coralloides, Salicornia patula, Senecio auricula, Sphenopus divaricatus.*

**EU Habitats Directive Annex I**

1510 Mediterranean salt steppes (*Limonietalia*)



## ! E6.2 Continental inland salt steppes

includes the following subtype separately listed in or split unit from the 1998 version:

E6.23 Central Eurasian solonchak grassland with *Crypsis*

### Description

Salt steppes and their associated salt-tolerant herbaceous communities outside the Mediterranean basin. In Europe they are found in the substeppe and steppe zones eastwards from the Hungarian Plain.

### Plant communities

*Scorzonero-Juncion gerardii*, *Armerion maritimae*, *Festuco-Limonion gmelinii*, *Glycyrrhizion echinatae*, *Potentillion anserinae*, *Beckmannion eruciformis*, *Peucedano officinalis-Asterion sedifolii*, *Limonion gmelinii*, *Juncion maritimi*, *Cypero-Spergularion salinae*, *Puccinellion peisonis*, *Festucion pseudovinae*, *Puccinellio-Spergularion salinae*, *Salicornion herbaceae*, *Puccinellion limosae*, *Thero-Salicornion*, *Malvion neglectae*, *Scorzonero-Juncetalia gerardii*, *Glycyrrhizetalia glabrae*, *Festuco-Limoniotalia*, *Puccinellietalia*, *Lepidietalia latifolii*, *Crypsidetalia aculeatae*, *Agropyro-Artemision coerulescentis*

### Species

*Festuca pseudovina*, *Achillea collina*, *A. setacea*, *Trifolium strictum*, *T. retusum*, *Camphorosma annua*. **E6.21:** *Achillea asplenifolia*, *Trifolium subterraneum*, *T. pallidum*, *Lotus tenuis*, *Centaurea pannonica*, *Scilla autumnalis*, *Artemisia santonicum*, *A. maritima*, *Limonium gmelinii*, *Sedum caespitosum*, *Taraxacum bessarabicum* *Puccinellia distans*, *Aster tripolium* ssp. *pannonicus*, and the endemic *Plantago schwarzenbergiana*. **E6.22:** *Camphorosma monspeliaca*, *Goniolimon tataricum*, *Petrosimonia triandra*, *Zingeria pisidica* *Trifolium resupinatum*, *Trifolium michelianum*, *Medicago arabica*, *Halimione pedunculata*, *Iris halophila*. **E6.231:** *Cyperus pannonicus* (*Acorellus pannonicus*). **E6.232:** (*Frankenia pulverulenta*, *Suaeda confusa*, *Salsola acutifolia*, *Parapholis incurva*, *Hordeum marinum*, *Cressa cretica*).

### EU Habitats Directive Annex I

E6.21 = 1530 Pannonic salt steppes and salt marshes

## E7 Sparsely wooded grasslands

### ! E7.3 Dehesa

#### Description

A characteristic landscape of the southwest Iberian peninsula in which crops, pasture land or Mediterranean scrub, in juxtaposition or rotation, are shaded by a fairly closed to very open canopy of native oaks, *Quercus suber*, *Quercus rotundifolia*, *Quercus pyrenaica*, *Quercus faginea*. It is an important habitat of raptors, including the threatened Iberian endemic eagle *Aquila adalberti*, of the crane *Grus grus*, of large insects and their predators and of the endangered Iberian lynx *Lynx pardinus*.

#### Species

Plants: *Quercus suber*, *Q. rotundifolia*, *Q. pyrenaica*, *Q. faginea*

Animals: *Aquila adalberti*, *Grus grus*, *Lynx pardinus*

**EU Habitats Directive Annex I**

6310: Dehesas with evergreen *Quercus* spp

## F Heathland, scrub and tundra

### F2 Arctic, alpine and subalpine scrub

#### F2.2 Evergreen alpine and subalpine heath and scrub

##### F2.22 *Alpide acidocline Rhododendron heaths*

##### ! F2.224 Carpathian *Rhododendron kotschyi* heaths

###### Description

Heaths of the subalpine and lower alpine levels (1700-2000 m) of the eastern and southern Carpathian Mountains, common and widespread, but occupying small areas, dominated by *Rhododendron myrtifolium* (syn *R kotschyi*), *Vaccinium gaultherioides* and *Vaccinium vitis-idaea*.

###### Plant communities

*Rhododendro myrtifolii-Vaccinietum*

###### Species

*Rhododendron myrtifolium* (*R. kotschyi*) - dominate, *Vaccinium gaultherioides*, *V. vitis-idaea*, *Soldanella hungarica* ssp. *major*, *Potentilla aurea* ssp. *chrysocraspeda*, *Melampyrum saxosum*, *Campanula abietina*, *Campanula serrata*

###### EU Habitats Directive Annex I

included in 4060 Alpine and Boreal heaths

##### ! F2.225 Balkan *Rhododendron kotschyi* heaths

###### Description

*Rhododendron myrtifolium* (syn *R kotschyi*) dominated heaths of the subalpine belt of the Balkan Range and the Rila mountains.

###### Plant communities

*Rhododendro-Vaccinion p*

###### Species

*Rhododendron myrtifolium*

###### EU Habitats Directive Annex I

included in 4060 Alpine and Boreal heaths

## ! F2.26 *Bruckenthalia heaths*

### Description

Formations of *Bruckenthalia spiculifolia*, often accompanied by *Juniperus nana*, *Vaccinium myrtillus* and herbaceous alpine grassland species, occupying damp, non-calcareous substrates of high mountains of the Balkan peninsula and northern Anatolia.

### Plant communities

*Bruckenthalion spiculifoliae*

### Species

*Bruckenthalia spiculifolia*, *Juniperus nana*, *Vaccinium myrtillus*

### EU Habitats Directive Annex I

included in 4060 Alpine and Boreal heaths

## F3 Temperate and mediterranean-montane scrub

### F3.2 Submediterranean deciduous thickets and brushes

#### F3.24 *Subcontinental and continental deciduous thickets*

## ! F3.241 Central European subcontinental thickets

### Description

Deciduous thickets of the Pannonic basin and neighbouring regions, with northwestern irradiations in Central Europe, within and around the range of occurrence of white cinquefoil oak woods (G1.7A11), of western tartar maple steppe oak woods (G1.7A12) and of Pannonian white oak woods (unit G1.7374).

### Plant communities

*Prunion fruticosae*, *Orno-Cotinion p.*

### Species

*Prunus fruticosa*. **F3.2412:** *Amygdalus nana*, *Spiraea media*, *Prunus spinosa*, *Rhamnus catharticus*, *Rosa gallica*, *R. pimpinellifolia*, *R. spinosissima*, *Peucedanum alsaticum*, *Asparagus officinalis*, *Agropyron intermedium*, *Vinca herbacea*. **F3.2413:** *Cotinus coggygria*, *Amelanchier ovalis*, *Cotoneaster tomentosus*, *C. matrensis*, *Pyrus nivalis*, *Prunus mahaleb*, *Spiraea media*, *Sorbus graeca*, *Fraxinus ornus*.

### EU Habitats Directive Annex I

40A0 \*Subcontinental peri-Pannonic scrub

## F4 Temperate shrub heathland

### ! F4.1 Wet heaths

#### Description

Wet or humid ericoid-shrub dominated heaths of the Atlantic and sub-Atlantic zones, developed on peaty or semipeaty soils, waterlogged for at least part of the year, sometimes temporarily inundated, and usually moist even in summer.

#### Plant communities

*Daboecion cantabrigae*, *Ericion cinereae*, *Ericion umbellatae*, *Stauracanthion boivinii*, *Ulicion minoris*, *Genisto pilosae-Vaccinion*, *Ericion arboreae*

#### Species

*Calluna vulgaris*, *Erica tetralix*, *Erica ciliaris*, *Erica scoparia*, *Genista anglica*, *Molinia caerulea*, *Scirpus cespitosus*, *Sphagnum compactum*, *Sphagnum molle*, *Sphagnum tenellum*, *Ulex gallii*, *Ulex minor*

#### EU Habitats Directive Annex I

4010 Northern Atlantic wet heaths with *Erica tetralix*

4020 \*Temperate Atlantic wet heaths with *Erica ciliaris* and *Erica tetralix* [a priority subtype of 4010]

#### References

Gorissen, I. 2004. *Dwarf shrub heaths of Europe - from Atlantic to Caucasus and Ural*. Verlag Ingmar Gorissen, Siegburg.

### ! F4.2 Dry heaths

#### Description

Heaths on siliceous, podsolic, rarely- or never-waterlogged soils in moist Atlantic and sub-Atlantic climates of the plains and low mountains of Western and Central Europe.

#### Plant communities

*Calluno-Festucion tenuifoliae*, *Daboecion cantabrigae*, *Dactylido maritimae-Ulicion maritimi*, *Ericion cinereae*, *Ericion umbellatae*, *Genistion micrantho-anglicae*, *Genistion pilosae*, *Genisto-Vaccinion*, *Koelerio-Phleion phleoidis*, *Loiseleurio-Vaccinion*, *Loiseleurio-Diapension*, *Ulicion minoris*, *Ulici-Ericion ciliaris*

#### Species

*Vaccinium* spp., *Calluna vulgaris*; *Arctostaphylos uva-ursi*, *Bruckenthalia speculifolia*, *Cistus salvifolius*, *C. incanus*, *Empetrum nigrum*, *E. hermaphroditum*, *Erica cinerea*, *E. mackaiana*, *E. vagans*, *E. aragonensis*, *E. andevalensis*, *E. umbellata*, *Genista anglica*, *G. germanica*, *G. pilosa*, *G. tinctoria*, *Genistella sagittalis*, *Ulex maritimus*, *U. gallii*, *Pleurozium schreberi*, *Hylocomium splendens*.

**Corresponding class in other classifications**

Milieux naturels de Suisse 2008 included in 5.4.1 Lande subatlantique acidophile

**EU Habitats Directive Annex I**

4030 European dry heaths

**References**

Gorissen, I. 2004. *Dwarf shrub heaths of Europe - from Atlantic to Caucasus and Ural*. Verlag Ingmar Gorissen, Siegburg.

## ! F4.3 Macaronesian heaths

**Description**

Heaths of the Canary Islands, Azores and Madeira.

**Plant communities**

*Myrica fayae*-*Ericion arboreae*, *Daboecion azoricae*

**Species**

*Adenocarpus foliolosus*, *Calluna vulgaris*, *Chamaecytisus proliferus* ssp. *proliferus*, *Cistus chinamadensis*, *Cletura arborea*, *Daboecia azorica*, *Erica arborea*, *E. maderensis*, *E. platycodon*, *E. scoparia* ssp. *azorica*, *Ilex canariensis*, *Juniperus brevifolia*, *Laurus azorica*, *Luzula purpureo-splendens*, *Lysimachia azorica*, *Myrica faya*, *Pteridium aquilinum*, *Teline canariensis*, *T. splendens*, *T. stenopetala*, *Thymus caespititius*, *Vaccinium cylindraceum*

**EU Habitats Directive Annex I**

4050 Endemic macaronesian heaths

## F5 Maquis, arborescent matorral and thermo-Mediterranean brushes

### F5.5 Thermo-Mediterranean scrub

#### ! F5.52 *Euphorbia dendroides* formations

**Description**

Stands of *Euphorbia dendroides*, a tertiary relict of Macaronesian origin; they occur as a facies of the thermo-Mediterranean scrub of the Balearics, Corsica, Sardinia, Sicily, Islas Eolie, Egadi, Pelagi, Pantelleria, Crete, and, very locally, of those of the coasts of northern Catalonia, southeastern France, peninsular Italy and its islands, central Greece, notably on slopes facing the gulf of Corinth, the Peloponnese, the Aegean archipelagoes, Albania and enclaves of the Mediterranean periphery of Anatolia and the Levant. Particularly extensive and robust stands occur in Sicily, Sardinia and Crete where they may extend to relatively high altitudes. Very local

formations in Mediterranean North Africa occupy the steep rocky slopes of some coastal capes and isolated inland sites, in Cyrenaica, northern Tunisia (Ichkeul), and in a narrow coastal strip in northern Algeria.

**Plant communities**

*Oleo-Ceratonion siliquae* p

**Species**

*Euphorbia dendroides*

**Corresponding class in other classifications**

**EU Habitats Directive Annex I**

included in 5330 Thermo-Mediterranean and pre-desert scrub

**!** F5.54 *Chamaerops humilis* brush

**Description**

*Chamaerops humilis* dominated scrub in coastal regions of the Mediterranean.

**Plant communities**

*Pistacio lentisci-Rhamnetalia alaterni* p

**Species**

*Chamaerops humilis*

**EU Habitats Directive Annex I**

included in 5330 Thermo-Mediterranean and pre-desert scrub

**!** F5.55 Mediterranean pre-desert scrub

**Description**

Shrub formations constituting, with the halo-nitrophilous scrubs (unit F6.824) and the localized gypsum scrubs (unit F6.73), much of the natural and semi-natural vegetation of the arid zone of southeastern Spain (Almeria, Murcia, Alicante), a highly distinctive region of unique climatological, biological and landscape character within Europe, extremely rich in African and endemic species. Several of the most remarkable formations remain in only a few undisturbed localities and are gravely at risk. Similar formations occur in the upper arid (Mediterranean arid) zone of North Africa. Outposts of these communities also exist in Sicily, the Egadi islands, the Pelagie islands, the Maltese Islands and Pantelleria.

**Plant communities**

*Anthyllido terniflorae-Salsolion papillosae, Thymo moroderi-Sideritidion leucanthae*

**Species**

*Ziziphus lotus*, *Maytenus senegalensis* var. *europaeus*, *Periploca laevigata* ssp. *angustifolia*, *Salsola webbii*, *Sideretis foetens*, *Ulex argentatus* ssp. *erinaceus*, *Genista umbellata*

### **EU Habitats Directive Annex I**

included in 5330 Thermo-Mediterranean and pre-desert scrub

## **! F5.56 Thermo-Mediterranean broom fields (retamares)**

### **Description**

Mediterranean formations dominated by retamas (*Lygos* spp.) or by large, non-spiny thermo-mediterranean brooms of the genera *Cytisus* and *Genista*, limited to the Iberian peninsula, the Balearics, mediterranean North Africa, the Cilento coast of Campania and Sicily and its associated islands.

### **Plant communities**

*Adenocarpion decorticantis*, *Genistion floridae*, *Genistion polygaliphyllae*, *Pruno-Rubion radulae*, *Retamion sphaerocarpace*, *Ulici europaei-Cytision striate*

### **Species**

*Lygos sphaerocarpa*, *L. monosperma*, *L. raetam* ssp. *gussonei*, *Genista cinerea* ssp. *speciosa*, *G. valentina*, *G. spartioides* ssp. *retamoides*, *G. s.* ssp. *pseudoretamoides*, *G. haenseleri*, *G. ramosissima*, *G. ephedroides*, *G. dorycnifolia*, *Cytisus aeolicus*

### **EU Habitats Directive Annex I**

included in 5330 Thermo-Mediterranean and pre-desert scrub

## **! F5.5B Cabo de Sao Vicente brushes**

### **Description**

Low brush and garrigue formations of the dolomitic tableland, karsts, sands and terra-rosas of the vicinity of Cape San Vicente (Portugal), with dwarf *Juniperus phoenicea* ssp. *lycia*, *Cistus palhinhae*, *Ulex argenteus* ssp. *erinaceus*, rich in endemic species.

### **Plant communities**

*Junipero-Cistetum palhinhae*, *Asparago-Rhamnetum oleoidis juniperetosum lyciae i.a.*

### **Species**

*Biscutela vicentina*, *Cistus palhinhae*, *Genista hirsuta* ssp. *algarbiensis*, *G. triacanthus*, *Juniperus turbinata*, *Juniperus phoenicea* ssp. *lycia*, *Serratula monardii* var. *algarbiensis*, *Sideritis arborescens* ssp. *lusitanica*, *Teucrium vinctinum*, *Ulex erinaceus* (*Ulex argenteus* ssp. *erinaceus*)

### **EU Habitats Directive Annex I**

5140 *Cistus palhinhae* formations on maritime wet heaths



## F6 Garrigue

### ! F6.7 Mediterranean gypsum scrubs

#### Description

Garrigues occupying gypsum-rich soils of the Iberian peninsula, usually very open and floristically characterised by the presence of numerous gypsophilous species, among which *Gypsophila struthium*, *Gypsophila hispanica*, *Centaurea hyssopifolia*, *Teucrium libanitis*, *Ononis tridentata*, *Lepidium subulatum*, *Herniaria fruticosa*, *Reseda stricta*, *Helianthemum squamatum*. They are often rich in thymes (*Thymus*), germanders (*Teucrium*), rockroses (*Helianthemum*), composites (*Centaurea*, *Jurinea*, *Santolina*), *Frankenia*.

#### Plant communities

*Thymo-Teucrienion verticillati*, *Lepidion subulati*, *Thymo-Teucrienion verticillati*

#### Species

*Centaurea hyssopifolia*, *Centaurea sp.*, *Frankenia sp.*, *Gypsophila hispanica*, *Gypsophila struthium*, *Helianthemum sp.*, *Helianthemum squamatum*, *Herniaria fruticosa*, *Jurinea sp.*, *Lepidium subulatum*, *Ononis tridentata*, *Reseda stricta*, *Santolina sp.*, *Teucrium libanitis*, *Teucrium sp.*, *Teucrium turretanum*, *Thymus sp.*

#### EU Habitats Directive Annex I

1520 Iberian gypsum vegetation (*Gypsophiletalia*)

### ! F6.8 Xero-halophile scrubs

#### Description

Salt-tolerant shrub formations of dry ground in areas of low-precipitation in the mediterranean region, in particular, the Iberian peninsula and Sicily, and of the Macaronesian Islands.

#### Plant communities

*Chenoleion tomentosae*, *Oleo cerasiformis-Rhamnetea crenulatae*, *Oleo-Rhamnetalia crenulatae*, *Forsskaoleo angustifoliae-Rumicetalia lunariae*, *Helichryso stoechadis-Santolinetalia squarrosae*, *Polycarpaeo niveae-Traganetea moquini*, *Salsolo vermiculatae-Peganetalia harmalae*, *Cisto monspeliensis-Micromerietalia hyssopifoliae*

#### Species

**F6.81:** *Chenoleoides tomentosa* **F6.82:** *Peganum harmala*, *Artemisia herba-alba*, *Lycium intricatum*, *Capparis ovata*, *Salsola vermiculata*, *Salsola genistoides*, *Salsola verticillata*, *Suaeda pruinosa*, *Atriplex halimus*, *Atriplex glauca*, *Camphorosma monspeliaca*, *Anabasis articulata*, *Haloxylon articulatum* **F6.83:** *Arthrocnemum glaucum*, *Arthrocnemum perenne*, *Suaeda pruinosa*, *Suaeda fruticosa* var. *brevifolia*,

#### EU Habitats Directive Annex I

includes 1430 Halo-nitrophilous scrubs (*Pegano-Salsoletea*)

## ! F7 Spiny Mediterranean heaths (phrygana, hedgehog-heaths and related coastal cliff vegetation)

### Description

Shrublands with dominant low spiny shrubs, widespread in Mediterranean and Anatolian regions with a summer-dry climate, occurring from sea level to high altitudes on dry mountains.

### Plant communities

Anthyllion hermanniae, Crithmo-Staticion, Dorycnio-Coridothymion capitati, Hypericion balearici, Launaemon cervicornis, Micromerion julianae, Rosmarinon officinalis Verbascion spinosi

### Species

*Anthyllis hermanniae*, *Armeria soleirolii*, *Astragalus massiliensis*, *Centaurea balearica*, *Centaurea horrida*, *Limonium insulare*, *Limonium lanceolatum*, *Limonium multiflorum*, *Limonium pseudolaetum*, *Limonium strictissimum*, *Sarcopoterium spinosum*, *Silene holzmannii*, *Silene velutina*, *Iris timofeevi*, *Corydalis tarkiensis*, *Himantoglossum formosum*

### EU Habitats Directive Annex I

Includes

5410 West Mediterranean clifftop phryganas (Astragalo-Plantaginetum subulatae)

5420 *Sarcopoterium spinosum* phryganas

5430 Endemic phryganas of the Euphorbio-Verbascion

## F9 Riverine and fen scrubs

### ! F9.1 Riverine scrub

#### Description

Scrub of broad-leaved willows, e.g. *Salix pentandra*, beside rivers. Also scrub of *Alnus* spp. and narrow-leaved willows, e.g. *Salix elaeagnos*, where these are less than 5 m tall. Riverside scrub of *Hippophae rhamnoides* and *Myricaria germanica*. Excludes riversides dominated by taller narrow-leaved willows *Salix alba*, *Salix purpurea*, *Salix viminalis* which are considered as a forest habitat (G1.1).

#### Plant communities

*Salicion incanae*, *Salicion albae*, *Salicion triandrae*, *Tamaricion parviflorae*, *Salicion triandroneotrichae*, *Salicion eleagno-daphnoidis*, *Salicion salviifoliae*, *Salicetalia purpureae*

#### Species

*Salix pentandra*, *Salix elaeagnos*, *Frangula alnus*, *Hippophae rhamnoides*, *Myricaria germanica*

#### Corresponding class in other classifications

Nordic Vegetation Classification 1994 2.2.5.1 Willow thicket of wet herb type

Milieux Naturels de Suisse 2008 5.3.6 Saulaie buissonnante alluviale

## EU Habitats Directive Annex I

Includes

3230 Alpine rivers and their ligneous vegetation with *Myricaria germanica*

3240 Alpine rivers and their ligneous vegetation with *Salix elaeagnos* p

## ! F9.3 Southern riparian galleries and thickets (Excluding F9.35: Riparian stands of invasive shrubs)

### Description

Tamarisk, oleander, chaste tree galleries and thickets and similar low woody vegetation of permanent or temporary streams and wetlands of the thermo-Mediterranean zone and southwestern Iberia.

Stands dominated by invasive species (e.g. *Reynoutria japonica*) are not included in this habitat type.

### Plant communities

*Arbuto unedonis-Laurion nobilis*, *Nerion oleandri*, *Salicion cinereae*, *Securinegion buxifoliae*, *Tamaricion africanae*, *Tamaricion boveano-canariensis*

### Species

**F9.311:** *Nerium oleander*, *Vitex agnus-castus*, *Tamarix spp.*, *Dittrichia viscosa*, *Saccharum ravennae*, *Arundo donax*, *Rubus ulmifolius*. **F9.3133:** *Tamarix parviflora*, *T. tetrandra*, *T. dalmatica*, *T. smyrnensis*, *T.hampeana*, *T. hohenackeri* **F9.32:** *Securinega tinctoria*, *Bryonia cretica*, *Tamus communis*, *Clematis campaniflora*, **F9.33:** *Prunus lusitanica*, *Viburnum tinus*. **F9.34:** *Salix atrocinerea*, *Salix salvifolia*, *Myrica gale*

## EU Habitats Directive Annex I

subtypes F9.31 to F9.34 = 92D0 Southern riparian galleries and thickets (*Nerio-Tamaricetea* and *Securinegion tinctoriae*)

## G Woodland, forest and other wooded land

### G1 Broadleaved deciduous woodland

#### G1.1 Riparian and gallery woodland, with dominant *Alnus*, *Betula*, *Populus* or *Salix*

##### ! G1.11 Riverine *Salix* woodland

##### Description

Bush or arborescent formations dominated by willow (*Salix* spp), lining flowing water and submitted to periodic flooding, developed on recently deposited alluvion. Willow brushes are particularly characteristic of rivers originating in major mountain ranges. Shrubby willow formations also constitute an element of lowland and hill riverine successions in all major biomes, often making the belt closest to the water course. Taller arborescent willow formations often constitute the next belt landwards in riverine successions of lowland western nemoral, eastern nemoral and warm-temperate humid forest regions, and a large part of the less diverse riverine systems of the steppic, mediterranean and cold desert zones. May be affected by the invasive alien species such as *Solidago canadensi*, *Aster novi-belgi*, *Aster novi-angli* and *Impatiens glandulifera*

##### Plant communities

*Salicetea purpureae*, *Salicion albae*, *Salicion canariensis*

##### Species

*Aster novi-belgii*, *Impatiens glandulifera*, *Lycopus europaeus*, *Lysimachia vulgaris*, *Phalaroides arundinacea*, *Populus alba*, *Populus canescens*, *Populus nigra*, *Salix* sp., *Urtica dioica*

##### Corresponding class in other classifications

Milieux Naturels de Suisse 2008 6.1.2 Saulaie blanche

##### EU Habitats Directive Annex I

3240 Alpine rivers and their ligneous vegetation with *Salix elaeagnos* (tree dominated stands)

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

92A0 *Salix alba* and *Populus alba* galleries

##### Associated Habitat types

European forest types 6.12.1 Riparian forest

##### ! G1.12 Boreo-alpine riparian galleries

##### Description

Riverside, lakeside and seaside alder, birch or pine galleries and cordons of the boreal, boreonemoral and boreosteppic zones, of the high mountains of the nemoral zone and of their piedmont influence region, dominated by *Alnus incana* along the montane and submontane rivers of the Alps, the Carpathians, the northern Apennines, the Dinarides, the Balkan Range, the Rhodopides and neighbouring regions, by *Alnus incana* or *Alnus glutinosa* in boreal Fennoscandia and northeastern Europe, by *Betula pendula* or *Pinus sylvestris* in western Siberia. Nitrophilous and hygrophilous species dominate the herb layer.

### Plant communities

*Alnion incanae*, *Roso majalis-Betulion pendulae*,

### Species

*Alnus incana*, *Aegopodium podagraria*, *Chaerophyllum hirsutum*, *Petasites hybridus*, *Crepis paludosa*, *Caltha palustris* ssp. *laeta* **G1.123:** *Betula pubescens*, *Prunus padus*, *Valeriana sambucifolia*, *Anemone nemorosa*, *Geranium sylvaticum*, *Geum rivale*, *Matteuccia struthiopteris*, *Paris quadrifolia*, *Silene dioica* (*Melandrium rubrum*), *Equisetum pratense*. **G1.124:** *Lycopus europaeus*, *Filipendula ulmaria*, *Lysimachia vulgaris*, *Equisetum arvense*. **G1.127:** *Alnus subcordata*, *Alnus barbata*,

### Corresponding class in other classifications

European forest types 6.12.1 Riparian forest

Milieux naturels de Suisse 2008 6.1.3 Aulnaie alluviale

### EU Habitats Directive Annex I

included in 9030 Natural forests of primary succession stages of land upheaval coast

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

### Associated Habitat types

Can occur as a band between larger rivers and floodplain forests such as G1.221, G1.223, G1.223 and G1.224

## ! G1.13 Southern *Alnus* and *Betula* galleries

### Description

Riparian formations of *Alnus glutinosa*, locally of *Alnus cordata* or *Betula* spp. of the Mediterranean basin and of western Iberia, often with *Fraxinus angustifolia* and *Osmunda regalis*.

### Plant communities

*Osmundo-Alnion*, *Populetalia albae*

### Species

*Alnus cordata*, *Alnus glutinosa*, *Betula* spp, *Frangula alnus*, *Quercus canariensis*, *Myrica gale*, *Salix atrocinerea*, *Scilla ramburei*, *Salix pedicellata*, *Rhododendron ponticum* ssp. *baeticum*, *Diplazium caudatum*, *Galium broterianum*, *Osmunda regalis*

### Corresponding class in other classifications

European forest types 6.12.3 Mediterranean and Macaronesian riparian forest

**EU Habitats Directive Annex I**

subtypes G1.132 and G1.134 = 92B0 Riparian formations on intermittent Mediterranean water courses with *Rhododendron ponticum*, *Salix* and others

**G1.2 Mixed riparian floodplain and gallery woodland****! G1.21 Riverine Fraxinus - Alnus woodland, wet at high but not at low water****Description**

Riparian forests of *Fraxinus excelsior* and *Alnus glutinosa*, sometimes *Alnus incana*, of middle European and northern Iberian lowland or hill watercourses, on soils periodically inundated by the annual rise of the river level, but otherwise well-drained and aerated during low-water; they differ from riparian alder woods within units G1.41 and G1.52 by the strong representation in the dominated layers of forest species not able to grow in permanently waterlogged soils.

**Plant communities**

*Alnion incanae*, *Carpinion betuli*, *Fraxinion excelsioris*

**Species**

*Fraxinus excelsior*, *Alnus glutinosa*, *A. incana*. **G1.211:** *Carex remota*, *Carex pendula*, *Carex strigosa*, *Equisetum telmateia*, *Rumex sanguineus*, *Lysimachia nemorum*, *Cardamine amara*, *Chrysosplenium oppositifolium*, *Chrysosplenium alternifolium*, *Impatiens noli-tangere*, *Ribes rubrum*. **G1.212:** *Ribes rubrum*, *R. uva-crispa*, *Stellaria nemorum*, *Impatiens noli-tangere*, *Aconitum vulparia*, *Allium ursinum*, *Geum rivale*, *Athyrium filix-femina*, *Dryopteris carthusiana*, *Matteuccia struthiopteris*, *Ranunculus platanifolius*, *Urtica dioica*, *Ranunculus ficaria*, *Primula elatior*, *Lamium galeobdolon*, *Filipendula ulmaria*, *Luzula sylvatica*, *Chaerophyllum hirsutum*, *Crepis paludosa*, *Aegopodium podagraria*, *Astrantia major*, *Aruncus sylvestris*, *Carex remota*, *C. brizoides*, *Equisetum maximum*

**Corresponding class in other classifications**

European forest types 6.12.2 Fluvial forest

Milieux naturels de Suisse 2008 6.1.4 Frêneie humide

**EU Habitats Directive Annex I**

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

**Associated Habitat types**

Can occur as a band between larger rivers and floodplain forests such as G1.221, G1.223, G1.223 and G1.224

## G1.22 *Mixed Quercus - Ulmus - Fraxinus woodland of great rivers*

### ! G1.221 Great medio-European fluvial forests

#### Description

Fully developed, very tall, multi-layered, highly diverse riparian forests of oaks, ashes, elms, limes, maples, alders, poplars, cherries, apple, willows of the middle and lower courses of large central European river systems, in particular, the Rhine, the Danube, the Emst, the Elbe, the Saale, the Weser, the Oder, the Loire, the Rhone-Saone systems. Their highly complex structure is formed of eight strata with some 50 species of trees and shrubs. The upper arborescent stratum includes *Quercus robur*, *Fraxinus excelsior*, *Ulmus minor*, *Ulmus laevis*, *Ulmus glabra*, *Populus alba*, *Populus tremula*, *Populus canescens*, *Populus nigra*, *Acer pseudoplatanus*, *Acer platanoides*, *Salix alba*, *Alnus glutinosa* and *Prunus avium*, the lower arborescent stratum *Malus sylvestris*, *Tilia cordata*, with *Alnus incana*, *Prunus padus* and *Crataegus monogyna* forming the sub-arborescent shrub layer. There are very varied high and low shrub layers and numerous lianas including *Clematis vitalba*, *Tamus communis*, *Humulus lupulus*, *Hedera helix* and *Vitis vinifera* ssp. *sylvestris*. These forests are the most diverse, structurally, floristically and faunistically, of all European ecosystems, and closest in that respect to tropical communities and to the warm temperate forests of the Pleistocene, the great fluvial forests of Europe are reduced to a few highly vulnerable examples, located mainly within the Rhine, Danube and Elbe systems.

#### Plant communities

*Ulmenion minoris*

#### Species

The upper arborescent stratum includes *Quercus robur*, *Fraxinus excelsior*, *Ulmus minor*, *Ulmus laevis*, *Ulmus glabra*, *Populus alba*, *Populus tremula*, *Populus canescens*, *Populus nigra*, *Acer pseudoplatanus*, *Acer platanoides*, *Salix alba*, *Alnus glutinosa*, *Prunus avium*, the lower arborescent stratum *Malus sylvestris*, *Tilia cordata*, the sub-arborescent shrub layer *Alnus incana*, *Prunus padus* and *Crataegus monogyna*, *Clematis vitalba*, *Tamus communis*, *Humulus lupulus*, *Hedera helix*, *Vitis vinifera* ssp. *sylvestris*

#### Corresponding class in other classifications

European forest types 6.12.2 Fluvial forest

#### EU Habitats Directive Annex I

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

#### References

Schnitzler A. (2007) *Les forêts alluviales d'Europe. Biodiversité. Ecologie, biogéographie et valeur intrinsèque*. Tec et Doc Lavoisier, Paris

### ! G1.223 Southeast European *Fraxinus - Quercus - Alnus* forests

#### Description

Mixed riverine forests of Ponto-Pannonic and sub-Mediterranean regions of southeastern Europe, usually dominated by *Quercus robur* and/or *Fraxinus angustifolia*, accompanied by a wide range of other tree species.

### Plant communities

*Alno-Quercion roboris*

### Species

*Ulmus minor*, *Ulmus laevis*, *Carpinus betulus*, *Acer campestre*, *Alnus glutinosa*, *Fraxinus excelsior*, *Salix alba*, *Populus alba*. **G1.2233:** *Quercus robur*, *Fraxinus angustifolia* ssp. *pannonica*, *Acer tataricum*, *Cornus sanguinea*, *Crataegus monogyna*, *Corylus avellana*, *Carex acutiformis*, *C. elata*, *C. riparia*, *Urtica dioica*, *U. kioviensis*, *Veratrum album*, *Polygonatum latifolium*, *Symphytum officinale*. **G1.2234:** *Cornus sanguinea*, *Viburnum opulus*, *Frangula alnus*, *Crataegus monogyna*, *Rubus caesius*, *Lysimachia nummularia*, *Glechoma hederacea*, *Convallaria majalis*.

### Corresponding class in other classifications

European forest types 6.12.2 Fluvial forest

### EU Habitats Directive Annex I

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

### References

Schnitzler A. (2007) *Les forêts alluviales d'Europe. Biodiversité. Ecologie, biogéographie et valeur intrinsèque*. Tec et Doc Lavoisier, Paris

## ! G1.224 Po *Quercus* - *Fraxinus* - *Alnus* forests

### Description

Relict forests of the alluvial plain of the Po and its main tributaries, remnants of the greatest fluvial system of Europe. They are formed by meso-hygrophile, mesotrophic, multi-layered, oak-ash-hornbeam-dominated communities, with ashes, willows and, mostly, alders, in the wettest areas, lianas are abundant and the herb layer is very diverse.

### Plant communities

*Polygonato multiflorae-Quercetum roboris* i.a.

### Species

**Canopy** - *Quercus robur*, *Q. cerris*, *Fraxinus excelsior*, *F. ornus*, *Carpinus betulus*, *Ulmus minor*, *Populus alba*, *P. nigra*, *Acer campestre*, *A. pseudoplatanus*, *Prunus padus*, *P. avium*, *Alnus glutinosa*, *Salix alba*, *Corylus avellana*, *Sorbus torminalis*, *S. domestica*, **Shrub layer** - *Ruscus aculeatus*, *Cornus mas*, *C. sanguinea*, *Pyracantha coccinea*, *Rubus fruticosus*, *R. ulmifolius*, *R. caesius*, *Ribes uva-crispa*, *Sambucus nigra*, *Daphne mezereum*, *Viburnum lantana*, *Mespilus germanica*, *Lonicera xylosteum*, *Ligustrum vulgare*, *Prunus spinosa*, *Rosa canina*, *Euonymus europaeus*, *Rhamnus catharticus* **Lianes-**, *Hedera helix*, *Tamus communis*, *Rubia peregrina*, *Bryonia cretica*; **Herb layer** - *Equisetum hyemale*, *Symphytum officinale*, *Polygonatum*



*multiflorum*, *Pulmonaria officinalis*, *Lathyrus vernus*, *Mercurialis perennis*, *Mespilus germanica*, *Primula acaulis*, *Euphorbia dulcis*, *Melittis melissophyllum*, *Erythronium dens-canis*, *Leucojum vernum*, *Brachypodium sylvaticum*.

### Corresponding class in other classifications

European forest types 6.12.2 Fluvial forest

### EU Habitats Directive Annex I

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

### References

Schnitzler A. (2007) *Les forêts alluviales d'Europe. Biodiversité. Ecologie, biogéographie et valeur intrinsèque*. Tec et Doc Lavoisier, Paris

## G1.3 Mediterranean riparian woodland

### ! G1.36 Ponto-Sarmatic mixed *Populus* riverine forests

#### Description

Mixed riverine forests of the floodplains of rivers of the Pontic and Sarmatic steppes, wooded steppes and southern nemoral forests of southern Eastern Europe, in particular, of the lower Danube, the lower Prut, the lower Dniestr, the lower Dniepr basin, the lower and middle Don and Donetz system, the lower Volga basin, the Kouma and Terek basins, dominated by or rich in *Populus alba*, *P nigra* and *P canescens*. They extend west to the sub-Carpathian Getic region; poplar galleries described from the Pannonic margin of Moravia and the Bohemian basin occupy a similar ecological position and are included here.

#### Plant communities

*Salici-Populetum*, *Populetum nigro-albae*, *Fraxino pallisae-angustifoliae-Quercetum roboris*, *Ulmeto-Fraxinetum pallisae p.*, *Fraxino-Populetum*

#### Species

**G1.361:** *Populus alba*, *Populus nigra*, *Populus canescens*. **G1.362:** *Quercus robur*, *Quercus pedunculiflora*, *Fraxinus angustifolia*, *Fraxinus pallisiae*, *Populus alba*, *Populus tremula* and *Populus canescens*

### Corresponding class in other classifications

European forest types 6.12.3 Mediterranean and Macaronesian riparian forest

### EU Habitats Directive Annex I

included in 92A0 *Salix alba* and *Populus alba* galleries

### ! **G1.37 Irano-Anatolian mixed riverine forests**

#### **Description**

Riverine forests of the Irano-Anatolian plateau of Turkey, Iran and Afghanistan, of the Koura basin of Transcaucasia and of the Hyrcanian lowlands, of the Hindu-Kuch and western Himalayas, with species of *Populus* together with *Juglans regia* and *Platanus orientalis*.

#### **Species**

*Populus nigra*, *Populus caspica*, *Populus alba*, *Populus euphratica*, *Populus pruinosa*, *Populus transcaucasica*, *Juglans regia*, *Platanus orientalis*

#### **EU Habitats Directive Annex I**

Not present in the European Union

### ! **G1.38 Platanus orientalis woods**

#### **Description**

Forests, usually riparian, of *Platanus orientalis* in southeast Europe.

#### **Plant communities**

*Platanion orientalis*

#### **Species**

*Salix alba*, *S. elaeagnos*, *S. purpurea*, *Alnus glutinosa*, *Cercis siliquastrum*, *Celtis australis*, *Populus alba*, *P. nigra*, *Juglans regia*, *Fraxinus ornus*, *Alnus glutinosa*, *Ruscus aculeatus*, *Vitex agnus-castus*, *Nerium oleander*, *Rubus* spp., *Rosa sempervirens*, *Hedera helix*, *Clematis vitalba*, *Vitis vinifera* ssp. *sylvestris*, *Anemone blanda*, *Aristolochia rotunda*, *Symphytum bulbosum*, *Hypericum hircinum*, *Calamintha grandiflora*, *Melissa officinalis*, *Helleborus cyclophyllus*, *Cyclamen hederifolium*, *C. repandum*, *C. creticum*, *Galanthus nivalis* ssp. *reginae-olgae*, *Dracunculus vulgaris*, *Arum italicum*, *Biarum tenuifolium*, *Pteridium aquilinum*

#### **Corresponding class in other classifications**

European forest types 6.12.3 Mediterranean and Macaronesian riparian forest

#### **EU Habitats Directive Annex I**

Included in 92C0 *Platanus orientalis* and *Liquidambar orientalis* woods (*Platanion orientalis*)

### ! **G1.39 Liquidambar orientalis woods**

#### **Description**

Riverine forests dominated by the Tertiary relict *Liquidambar orientalis*, with a very limited range in southern Asia Minor and Rhodes.

#### **Plant communities**

*Platanion orientalis*

**Species**

*Liquidambar orientalis*, *Adiantum capillus-veneris*

**Corresponding class in other classifications**

European forest types 6.12.3 Mediterranean and Macaronesian riparian forest

**EU Habitats Directive Annex I**

Included in 92C0 *Platanus orientalis* and *Liquidambar orientalis* woods (*Platanion orientalis*)

**G1.4 Broadleaved swamp woodland not on acid peat**

**G1.41 *Alnus* swamp woods not on acid peat**

G1.411 Meso-eutrophic swamp alder woods

! G1.4115 *Eastern Carpathian Alnus glutinosa* swamp woods

**Description**

Meso-eutrophic *Alnus glutinosa* swamp woods of marshy intramontane depressions and floodplains, at the 500-800 m level of foothills of the eastern Carpathian system, in particular, the Harghita and Baraolt mountains.

**Plant communities**

*Carici elongatae-Alnetum glutinosae* p.

**Species**

*Alnus glutinosa*, *Calla palustris*, *Calamagrostis canescens*, *Carex caespitosa*, *C. elongata*, *Dryopteris carthusiana*, *Ligularia sibirica*, *Thelypteris palustris*

**Corresponding class in other classifications**

European forest types 6.11.2 Alder swamp forest

Habitatele din Romania R4403 Păduri danubian- panonice de anin negru (*Alnus glutinosa*) cu *Iris pseudacorus*

! G1.414 Steppe swamp *Alnus glutinosa* woods

**Description**

*Alnus glutinosa* mire woods of the steppic regions of Eurasia, west to the Pannonic basin.

**Plant communities**

*Alnion glutinosae: Thelypteridi-Alnetum, Dryopteridi-Alnetum, Fraxino pannonicae-Alnetum*

**Species**

*Alnus glutinosa*, *Fraxinus pannonicus*

**Corresponding class in other classifications**

European forest types 6.11.2 Alder swamp forest

**! G1.44 Wet-ground woodland of the Black and Caspian Seas****Description**

The most hygrophilous communities of the mixed mesic Euxino-Hyrcanian forests (units G1.A71, G1.A74). They may include, *Fraxinus angustifolia* galleries, as well as dense *Alnus barbata* forest stands occupying areas of black damp or swampy soils on coastal alluvial plains, with *Fraxinus angustifolia* and an understorey of *Rubus hirtus*, *Smilax excelsa* and other climbers and shrubs, notably of the Rosaceae.

**Plant communities**

*Alnetea hyrcanica* p., *Alnetea glutinosae euxina* p.

**Species**

*Alnus barbata*, *Fraxinus angustifolia*, *Smilax excelsa*, *Rubus hirtus*

**Corresponding class in other classifications**

European forest types 6.11.2 Alder swamp forest

**G1.5 Broadleaved swamp woodland on acid peat****! G1.51 Sphagnum Betula woods****Description**

Forests of *Betula pubescens* or *Betula carpatica* on peaty, humid and very acid soils, colonizing bogs of reduced peat building activity and acid fens of the boreal, sub-boreal and nemoral zones, very locally of the wooded steppe and steppe zones, with *Molinia caerulea*, *Vaccinium* spp., *Empetrum nigrum*, *Trientalis europaea*, *Eriophorum vaginatum* and many sphagna and other bryophytes. In European Russia these forests may also host *Salix lapponicum*, *Salix myrtilloides* and *Scheuchzeria palustris*

**Plant communities**

*Betulion pubescentis*

**Species**

*Betula carpatica*, *Betula pubescens*, *Empetrum nigrum*, *Eriophorum vaginatum*, *Molinia caerulea*, *Sphagnum fallax*, *Sphagnum magellanicum*, *Trientalis europaea*, *Vaccinium* sp. *Salix lapponicum*, *Salix myrtilloides*, *Scheuchzeria palustris*

**Corresponding class in other classifications**

European forest types 6.11.3 Birch swamp forest

Milieux naturels de Suisse 2008 6.5.1 Betulion

**EU Habitats Directive Annex I**

9080 Fennoscandian deciduous swamp woods  
91D0 Bog woodland

## ! G1.6 Fagus woodland

### Description

Forests dominated by beech *Fagus sylvatica* in western and central Europe, and *Fagus orientalis* and other *Fagus* species in southeastern Europe and the Pontic region. Many montane and oro-Mediterranean formations are mixed beech-fir or beech-fir-spruce forests, which are listed under G4.6 in EUNIS but included here.

### Plant communities

*Scillo lilio-hyacinthi-Fagion*, *Galio rotundifolii-Fagion*, *Geranio nodosi-Fagion*, *Geranio striati-Fagion*, *Doronic orientalis-Fagion moesiaca*, *Symphyto cordati-Fagion*, *Dentario quinquefoliae-Fagion*, *Fagion sylvaticae*, *Sorbo-Fagion*, *Lonicero alpigenae-Fagion*, *Aremonio-Fagion*, *Endymio non-scripti-Fagion*, *Rhododendro pontici-Fagion orientalis*, *Vaccinio-Fagion orientalis*, *Carpino-Fagion orientalis*, *Violo odoratae-Fagion orientalis*, *Luzulo-Fagion sylvaticae*, *Ilici-Fagion sylvaticae*

### Species

*Fagus sylvatica*, *Abies alba*. **G1.61:** *Luzula luzuloides*, *Polytrichum formosum*, *Deschampsia flexuosa*, *Calamagrostis villosa*, *Vaccinium myrtillus*, *Pteridium aquilinum*. **G1.62:** *Ilex aquifolium*. **G1.63:** *Anemone nemorosa*, *Carex pilosa*, *Galium odoratum*, *Lamium galeobdolon*, *Melica uniflora*, *Picea abies*. **G1.64:** *Scilla lilio-hyacinthus*, *Lathraea clandestina*, *Athyrium filix-femina*, *Gymnocarpium dryopteris*, *Asplenium scolopendrium*, *Dryopteris* spp., *Polystichum* spp., *Melica uniflora*, *Galium odoratum*, *Helleborus viridis* ssp. *occidentalis*, *Lathyrus occidentalis*, *Paris quadrifolia*, *Euphorbia hyberna*. **G1.65:** *Acer pseudoplatanus* **G1.66:** *Cephalanthera* spp., *Carex digitata*, *C. flacca*, *C. montana*, *C. alba*, *Sesleria albicans*, *Brachypodium pinnatum*, *Neottia nidus-avis*, *Epipactis leptochila*, *E. microphylla*) and thermophile species, transgressive of the *Quercetalia pubescenti-petraeae*. The bush-layer includes several calcicolous species (*Ligustrum vulgare*, *Berberis vulgaris*) and *Buxus sempervirens*. **G1.69:** *Fagus moesiaca*. **G1.6D:** *Symphytum cordatum*, *Cardamine glanduligera* (*Dentaria glandulosa*), *Hepatica transsilvanica*, *Pulmonaria rubra*, *Leucanthemum waldsteinii*, *Silene heuffelii*, *Ranunculus carpaticus*, *Euphorbia carniolica*, *Aconitum moldavicum*, *Saxifraga rotundifolia* ssp. *heuffelii*, *Primula elatior* ssp. *leucophylla*, *Hieracium rotundatum*, *Galium kitaibelianum*, *Moehringia pendula*, *Festuca drymeja*. **G1.6F:** *Fagus taurica* var. *dobrogica*, *Tilia tomentosa*, *T. cordata*, *Fraxinus ornus*, *F. angustifolia*, *F. pallisiae*, *Carpinus betulus*, *Populus tremula*, *Ulmus glabra*, *Potentilla micrantha*, *Scutellaria altissima*, **Caucasus:** *Rhododendron ponticum*, *Vaccinium arctostaphylos*, *Acer laetum*, *Ruscus colchicus*, *Galanthus bortkewitschianus*, *Cephalanthera damasonium*, *Colchicum umbrosum*, *Taxus baccata*

### Corresponding class in other classifications

European forest types 6.6 Beech forest (all subtypes)  
Milieux Naturels de Suisse 2008 6.2 Hêtraies

### EU Habitats Directive Annex I

Includes:

G1.61 = 9110 *Luzulo-Fagetum* beech forests

G1.62 = 9120 Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrublayer (*Quercion robori-petraeae* or *Ilici-Fagenion*)

G1.63 = 9130 *Asperulo-Fagetum* beech forests

G1.65 = 9140 Medio-European subalpine beech woods with *Acer* and *Rumex arifolius*

G1.66 = 9150 Medio-European limestone beech forests of the *Cephalanthero-Fagion*

G1.681, G1.685 and G1.686 = 9210 Apennine beech forests with *Taxus* and *Ilex*

G1.186 and G1.687 = 9220 Apennine beech forests with *Abies alba* and beech forests with *Abies nebrodensis*

## References

Dzwonko, Z. & Loster, S. (2000). Syntaxonomy and phyto-geographical differentiation of the *Fagus* woods in the Southwest Balkan Peninsula. *J. Veg. Sci.* 11: 667–678.

Tzonev, R., Dimitrov, M., Chytrý, M., Roussakova, V., Di-mova, D., Gussev, C., Pavlov, D., Vulchev, V., Vitkova, A., Gogoushev, G., Nikolov, I., Borisova, D. & Ganeva, A. (2006). Beech forest communities in Bulgaria. *Phytocoenologia* 36: 247–279.

Willner, W. (2002). Syntaxonomische Revision der südmittel-europäischen Buchenwälder. *Phytocoenologia* 32: 337–453.

## ! G1.7 Thermophilous deciduous woodland (excluding G1.7D *Castanea sativa* woodland)

includes the following subtypes separately listed in or split units from the 1998 version:

G1.7B *Quercus pyrenaica* woodland

G1.7C Mixed thermophilous woodland

## Description

Forests or woods of submediterranean climate regions and supramediterranean altitudinal levels, and of western Eurasian steppe and substeppe zones, dominated by deciduous or semideciduous thermophilous *Quercus* species or by other southern trees such as *Carpinus orientalis* and *Ostrya carpinifolia*. Thermophilous deciduous trees may, under local microclimatic or edaphic conditions, replace the evergreen oak forests in mesomediterranean or thermomediterranean areas, and occur locally to the north in central and western Europe.

## Plant communities

*Aceri granatensis-Quercion fagineae*, *Aceri tatarici-Quercion*, *Genisto germanicae-Quercion*, *Junipero excelsae-Quercion pubescentis*, *Quercion broteroi*, *Quercion ilicis*, *Quercion pyrenaicae*, *Quercion pubescenti-sessiliflorae*, *Quercus rotundifoliae-Oleion sylvestris*

## Species

**G1.73:** *Ostrya carpinifolia*, *Carpinus orientalis*, *C. betulus*, *Fraxinus ornus*, *Quercus pubescens*, *Quercus virgiliana*. **G1.74:** *Quercus cerris*, *Q. petraea*, *Ostrya carpinifolia*, *Carpinus orientalis*, *C. betulus*, *Fraxinus ornus*. **G1.7C2:** *Carpinus orientalis*, *Fraxinus ornus*, *Cotinus coggygria*, *Oryzopsis holciformis*, *Oxytropis virescens*, *Stachys leucoglossa*, *Paeonia peregrina*, *Salvia ringens*, *Cornus mas*, *Quercus pubescens*. **G1.7C3:** *Acer granatense*, *Acer monspessulanum*, *Quercus faginea*, *Quercus pyrenaica*, *Sorbus aria*, *Sorbus torminalis*, *Taxus baccata*, *Daphne laureola*, *Paeonia officinalis* ssp. *humilis*. **G1.7C4:** *Tilia tomentosa*, *T. platyphyllos*, *Fraxinus excelsior*, *Brachypodium pinnatum*, *Galium erectum*, *Cruciata glabra*, *Digitalis grandiflora*, *Erysimum odoratum*, *Sisymbrium strictissimum*, *Aconitum anthora*, *Hesperis vrabelyiana*, *Carduus*

*collinus*, *Waldsteinia geoides*, *Melica altissima*, *Carex brevicollis*. **G1.7C6:** *Fraxinus angustifolia*, *F. ornus*, *Cornus sanguinea*, *Tilia platyphyllos*, *T. tomentosa*, *Ulmus minor*, *Carpinus orientalis*. **G1.7C7:** *Juniperus communis*, *Ligustrum vulgare*, *Rhamnus catharticus*, *Crataegus monogyna*, *Prunus spinosa*, *Prunus mahaleb*, *Rubus caesius*, *Euonymus verrucosus*, *Berberis vulgaris*. **G1.7C8:** *Tilia* spp., *Fraxinus* spp., *Quercus* spp., *Carpinus* spp., *Ostrya carpinifolia*, *Acer* spp., *Sorbus* spp., *Populus* spp., *Celtis australis* **Caucasus:** *Pterocarpa pterocarpa*, *Lilium caucasicum*, *Ruscus colchicus*

### Corresponding class in other classifications

European forest types 6.8 Thermophilous deciduous forest (except 6.8.7 Chestnut forest)

Milieux Naturels de Suisse 2008 6.3.4 Chênaie buissonnante

6.3.5 Ostryaie buissonnante du sud des Alpes

### EU Habitats Directive Annex I

Includes:

91AA Eastern white oak woods

91B0 Thermophilous *Fraxinus angustifolia* woods

91H0 Pannonian woods with *Quercus pubescens*

91I0 Euro-Siberian steppic woods with *Quercus* spp

91M0 Pannonian-Balkan turkey oak –sessile oak forests

91N0 Pannonic inland sand dune thicket (*Junipero-Populetum albae*)

91Z0 Moesian silver lime woods

9230 Galicio-Portuguese oak woods with *Quercus robur* and *Quercus pyrenaica*

9240 *Quercus faginea* and *Quercus canariensis* Iberian woods

9250 *Quercus trojana* woods

9310 Aegean *Quercus brachyphylla* woods

9350 *Quercus macrolepis* forests

## ! G1.8 Acidophilous *Quercus*-dominated woodland

### Description

Forests of *Quercus robur* or *Quercus petraea* on acid soils.

### Plant communities

*Genisto germanicae-Quercion*, *Quercion petraeae*, *Quercion roboris*, *Quercion pyrenaicae*

### Species

*Quercus robur*, *Quercus petraea*, *Deschampsia flexuosa*, *Vaccinium myrtillus*, *Pteridium aquilinum*, *Lonicera periclymenum*, *Holcus mollis*, *Maianthemum bifolium*, *Convallaria majalis*, *Hieracium sabaudum*, *Hypericum pulchrum*, *Luzula pilosa*, *Polytrichum formosum*, *Leucobryum glaucum*

### Corresponding class in other classifications

European forest types 6.4 Acidophilous oak and oak-birch forest

Milieux Naturels de Suisse 2008 6.3.6 Chênaie acidophile

### EU Habitats Directive Annex I

Subtypes:

G1.81 & G1.84 = 9190 Old acidophilous oak woods with *Quercus robur* on sandy plains  
 G1.83 = 91A0 Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles

## **G1.A Meso- and eutrophic *Quercus* , *Carpinus* , *Fraxinus* , *Acer* , *Tilia* , *Ulmus* and related woodland**

### **! G1.A1 *Quercus* - *Fraxinus* - *Carpinus betulus* woodland on eutrophic and mesotrophic soils**

#### **Description**

Atlantic, medio-European and eastern European forests dominated by *Quercus robur* or *Quercus petraea*, on eutrophic or mesotrophic soils, with usually ample and species-rich herb and bush layers. *Carpinus betulus* is generally present. They occur under climates too dry or on soils too wet or too dry for beech or as a result of forest management favouring oaks.

#### **Plant communities**

*Carpinion betuli*

#### **Species**

*Carpinus betulus*, *Quercus robur*, *Q. petraea*, *Chamaecytisus wulffi*, *Juniperus foetidissima*, *Juniperus excelsa*, *Cotinus coggygria*. **G1.A16:** *Quercus cerris*, *Sorbus torminalis*, *S. domestica*, *Acer campestre*, *Ligustrum vulgare*, *Cornus mas*, *Ulmus minor*, *Rhamnus catharticus*, *Viola mirabilis*, *V. alba*, *V. suavis*, *Primula veris*, *Polygonatum latifolium*, *P. multiflorum*, *P. odoratum*, *Pulmonaria mollis* ssp. *mollis*, *P. murinii*, *Chamaecytisus supinus*, *Convallaria majalis*, *Carex montana*, *C. umbrosa*, *C. curvata*, *C. michelii*, *Festuca heterophylla*, *Melica uniflora*, *Poa nemoralis*. **G1.A1A:** *Acer tataricum*, *Cyclamen purpurascens*, *Epimedium alpinum*, *Erythronium dens-canis*, *Helleborus dumetorum* ssp. *atrorubens*, *Knautia drymeia*. **G1.A1B:** *Carex brizoides*, *Anemone nemorosa*, *Corydalis solida*, *Galanthus nivalis*, *Gagea spathacea*, *G. lutea*, *Gladiolus imbricatus*, *Cyclamen purpurascens*, *Crocus neapolitanus*, *Erythronium dens-canis*, *Helleborus dumetorum*, *Adoxa moschatellina*, *Anemone ranunculoides*, *Ranunculus ficaria*, *Scilla vindobonensis*, *Leucojum vernum*. **G1.A1C:** *Tilia tomentosa*, *Pyrus eleagrifolia*, *P. malus*, *Acer stevenii*, *Lonicera caprifolium*, *Cotinus coggygria*, *Stellaria holostea*, *Carex pilosa*, *Galium schultesii*, *Festuca heterophylla*, *Ranunculus auricomus*, *Lathyrus hallersteinii*, *Melampyrum bihariense*, *Aposeris foetida*, *Helleborus odoratus*

#### **Corresponding class in other classifications**

European forest types 6.5 Mesophytic deciduous forest (except 6.5.8 Ravine and slope forest).  
 Milieux naturels de Suisse 2008 6.3.3 Carpinion

#### **EU Habitats Directive Annex I**

Subtypes:

G1.A14 = 9160 Sub-Atlantic and medio-European oak or oak-hornbeam forests of the *Carpinion betuli*

G1.A161 = 9170 *Galio-Carpinetum* oak-hornbeam forests

G1.A1B, G1.A166, G1.A167 = 91G0 Pannonic woods with *Quercus petraea* and *Carpinus betulus*

G1.A1C = 91Y0 Dacian oak & hornbeam forests



## ! **G1.A4 Ravine and slope woodland**

### **Description**

Cool, moist forests with a varied tree layer, especially species of *Acer*, *Tilia* and *Fraxinus* of variable dominance, most often on steep slopes. They are of considerable biohistorical and biogeographical importance, as examples of the mixed forests of the Atlantic period, preserved in stations inaccessible to beech domination.

### **Plant communities**

*Tilio platyphylli-Acerion pseudoplatani*

### **Species**

*Acer pseudoplatanus*, *Actaea spicata*, *Fraxinus excelsior*, *Helleborus viridis*, *Lunaria rediviva*, *Taxus baccata*, *Ulmus glabra*, *Carpinus betulus*, *Corylus avellana*, *Quercus* sp., *Sesleria varia*, *Tilia cordata*, *T. platyphyllos*. **G1.A41:** *Acer platanoides*, *Fagus sylvatica*, *Quercus robur*. *Actaea spicata*, *Galeobdolon montanum*. **G1.A42:** *Polygonatum verticillatum*, *Galium odoratum*, *Ranunculus platanifolius*, *Centaurea montana*, *Poa chaixii*, *Pulmonaria montana*, *Circaea alpina*, *Sambucus racemosa*, *Mercurialis perennis*, *Dryopteris filix-mas*. **G1.A43:** *Aegopodium podagraria*, *Cirsium oleraceum*, *Filipendula ulmaria*, *Carex pendula*, *C. sylvatica*, *Equisetum telmateia*, *Matteuccia struthiopteris*, *Cardamine trifolia*, *Paris quadrifolia*, *Stachys sylvatica*. **G1.A45:** *Tilia cordata*, *T. platyphyllos*, *Acer platanoides*, *Fraxinus excelsior*, *Ulmus glabra*, *Fagus sylvatica*, *Euonymus latifolius*, *Asperula taurina*, *Cyclamen purpurascens*.

### **Corresponding class in other classifications**

European forest types 6.5.8 Ravine and slope forest

Milieux Naturels de Suisse 2008 6.3.1 Erablaie de ravin méso-hygrophile

6.3.2 Tiliaie thermophile sur éboulis ou lapiez

### **EU Habitats Directive Annex I**

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

## ! **G1.A7 Mixed deciduous woodland of the Black and Caspian Seas**

### **Description**

Mixed summer-green broad-leaved forests limited mainly to the mountains bordering the Black Sea and the Caspian Sea.

### **Plant communities**

*Astrantio-Carpinion caucasicae*, *Carpinion orientalis*, *Crataego-Carpinion caucasicae*, *Junipero excelsae-Quercion pubescentis*, *Quercetalia pubescenti-petraeae*

### **Species**

*Carpinus betulus*, *C. orientalis*, *Quercus dshorochensis*, *Q. sypsiensis*, *Q. anatolica*, *Q. iberica*, *Q. macranthera*, *Acer cappadocicum*, *Fagus orientalis*, *Abies bornmuelleriana*, *Prunus avium*, *Pyrus caucasica*, *Corylus avellana*, *Euonymus europaeus*, *Euonymus verrucosus*

## **! G2 Broadleaved evergreen woodland** (excluding G2.8 Highly artificial broadleaved evergreen forestry plantations and G2.9 Evergreen orchards and groves)

### **Description**

Temperate forests dominated by broad-leaved sclerophyllous or lauriphyllous evergreen trees, or by palms. They are characteristic of the Mediterranean and warm-temperate humid zones. EUNIS includes plantations and orchards under G2 but they are not included in this habitat type for Emerald. Woodlands dominated by exotic lauriphyllous trees and shrubs as in Ticino, Switzerland<sup>1</sup> are also excluded.

### **Plant communities**

*Cistion laurifolii*, *Quercion pubescenti-sessiliflorae*, *Aceri granatensis-Quercion fagineae*, *Oleo-Ceratonion siliquae*, *Quercion ilicis*, *Querco rotundifoliae-Oleion sylvestris*, *Arbuto andrachnae-Quercion cocciferae*, *Quercion broteroi*, *Lathyrion veneti*, *Quercion pyrenaicae*, *Paenion broteroi-Abietion pinsapo*, *Quercetalia ilicis*

### **Species**

*Pistacia terebinthus*, *Ilex aquifolium*, *Fraxinus ornus*, *Coronilla emerus*, *Ostrya carpinifolia*, *Carpinus orientalis*, *Laurus nobilis*, *Viburnum tinus*, *Rhamnus alaternus*, *Rosa sempervirens*, *Lonicera etrusca*, *Clematis flammula*, *Rubia peregrina*, *Smilax aspera*, *Vitis vinifera ssp. sylvestris*, *Cyclamen purpurascens*, *Prunus mahaleb*, *Myrtus communis*, *Juniperus phoenicea*, *Quercus pubescens*, *Acer monspessulanum*, *Frangula rupestris*, *Hedera helix*

### **Corresponding class in other classifications**

European forest types 6.9 Broadleaved evergreen forest (all subtypes)

### **EU Habitats Directive Annex I**

Subtypes:

G2.1 includes 9330 *Quercus suber* forests

9340 *Quercus ilex* and *Quercus rotundifolia* forests

9390 Scrub and low forest vegetation with *Quercus alnifolia*

93A0 Woodlands with *Quercus infectoria* (*Anagyro foetidae-Quercetum infectoriae*)

G2.3 = 9360 Macaronesian laurel forests (*Laurus*, *Ocotea*)

G2.4 = 9320 *Olea* and *Ceratonia* forests

G2.5 = 9370 Palm groves of Phoenix

G2.6 = 9380: Forests of *Ilex aquifolium*

## **G3 Coniferous woodland**

---

<sup>1</sup> See e.g. Walther, G. R. (2002). Weakening of climatic constraints with global warming and its consequences for evergreen broad-leaved species. *Folia Geobotanica*, 37(1), 129-139.

## **G3.1     *Abies* and *Picea* woodland**

### **!    G3.15    Southern Apennine *Abies alba* forests**

#### **Description**

Relict *Abies alba* woods associated with the beech forests of the *Geranio versicolori*-*Fagion* of the Lucano-Calabrian Apennines (Pollino, Sila, Aspromonte).

#### **Plant communities**

*Cardamino kitaibelii*-*Fagenion sylvaticae*.

#### **Species**

*Abies alba*, *Abies alba* subsp. *apennina*, *Juniperus hemisphaerica*, *Monotropa hypopitys*, *Orthilia secunda*, *Cirsium erisithales*, *Oxalis acetosella*, *Veronica urticifolia*, *Daphne mezereum*.

#### **Corresponding class in other classifications**

European forest types 6.10.6 Mediterranean and Anatolian fir forest

#### **EU Habitats Directive Annex I**

9510 Southern Apennine *Abies alba* forests

#### **Associated Habitat types**

Stands where *Fagus sylvatica* is also present are treated under 61.6 *Fagus* woodland

#### **References**

Spampinato G & E Biondi (not dated) 9510\*: Foreste sud-appenniniche di *Abies alba* in Habitat Italia <http://vnr.unipg.it/habitat/cerca.do?formato=stampa&idSegnalazione=85#>

### **!    G3.16    Moesian *Abies alba* forests**

#### **Description**

Forests of *Abies alba* or of *Abies alba* mixed with *Fagus sylvatica*, *Picea abies*, *Pinus sylvestris* or *Pinus nigra* of the Rhodopides, the Balkan Range, the Moeso-Macedonian mountains and the Pelagonids, within the geographical range of the alliance *Fagion moesiacum*.

#### **Plant communities**

*Fagion sylvaticae*, *Fagion moesiacum p.*

#### **Species**

*Abies alba*, *Picea abies*, *Pinus sylvestris*, *P. nigra*.

#### **Corresponding class in other classifications**

European forest types 6.10.6 Mediterranean and Anatolian fir forest

#### **EU Habitats Directive Annex I**

91BA Moesian silver fir forests

**Associated Habitat types**

Stands where *Fagus sylvatica* is co-dominant are treated under 61.6 *Fagus* woodland

### ! G3.17 *Balkano-Pontic Abies forests*

**Description**

Forests of *Abies nordmanniana*, *Abies borisii-regi*, *Abies bornmuelleriana* of the southern Balkans peninsula, the Pontic range and the Caucasus, often mixed with beech, or adjacent to beech forests.

**Plant communities**

*Fagion sylvaticae*, *Rhododendro pontici-Fagion orientalis*, *Abieti nordmannianae-Fagenion orientalis*

**Species**

*Abies nordmanniana*, *Abies borisii-regis*, *Buxus sempervirens*, *Vaccinium arctostaphylos*, *Rhododendron ponticum*, *Actaea spicata*, *Ruscus colchicus*, *Acer laetum*

**Corresponding class in other classifications**

European forest types 6.10.6 Mediterranean and Anatolian fir forest

**EU Habitats Directive Annex I**

9270 Hellenic beech forests with *Abies borisii-regis*

### ! G3.19 *Abies pinsapo forests*

**Description**

Fir or fir-cedar forests dominated by relict species of *Abies*, including forests of *Abies pinsapo*, *Abies marocana*, *Abies numidica*, *Abies cilicica* or *Abies nebrodensis*, distributed along the coasts of the Mediterranean basin, well outside the range of beech.

**Plant communities**

*Paeonio coriaceae-Abietetum pinsapi*, *Bunio macucae-Abietetum pinsapi*

**Species**

*Abies pinsapo*, *A. marocana*, *A. numidica*, *A. cilicica*, *A. nebrodensis*

**Corresponding class in other classifications**

European forest types 6.10.6 Mediterranean and Anatolian fir forest

**EU Habitats Directive Annex I**

9520: *Abies pinsapo* forests

### ! G3.1B *Alpine and Carpathian subalpine Picea forests*

**Description**

Spruce (*Picea abies*) forests of the lower subalpine level, and of anomalous stations in the montane level, of the outer, intermediate and inner Alps; in the latter, they are often adjacent to montane spruce forests of unit G3.1C. Also Spruce forests of the lower subalpine level of the Carpathians. The spruces, often stunted or columnar, are accompanied by an undergrowth of decidedly subalpine affinities.

**Plant communities**

*Piceion excelsae*

**Species**

*Picea abies*, *Vaccinium* spp. **G3.1B1:** *Oxalis acetosella*, *Vaccinium vitis-idaea*, *Vaccinium myrtillus*, *Calamagrostis villosa* and the moss *Hylocomium splendens*. **G3.1B2:** *Adenostyles* spp., *Chaerophyllum hirsutum*, *Peucedanum ostruthium*, *Ranunculus aconitifolius*, *Aconitum vulparia*, *Aconitum paniculatum*, *Stellaria nemorum*, *Geranium sylvaticum*, *Cicerbita alpina*. **G3.1B3:** *Listera cordata*, *Sphagnum acutifolium*, *S. quinquefarium*, *S. girgensohnii*. **G3.1B6:** *Pinus mugo*, *Pinus cembra*, *Rhododendron myrtifolium*, *Vaccinium myrtillus*, *Vaccinium vitis-idaea*, *Homogyne alpina*, *Soldanella hungarica* ssp. *major*, *Calamagrostis villosa*. East Carpathians: *Bruckenthalia spiculifolia*, *Campanula abietina*, *Campanula serrata*, *Hieracium rotundatum*, *Sphagnum palustre*, *S. wulfianum*, *S. squarrosus*, *Bazzania trilobata*, *Leucanthemum waldsteinii*.

**Corresponding class in other classifications**

European forest types 6.3.2 Subalpine and montane spruce and montane mixed spruce-silver fir forest

Milieux naturels de Suisse 2008 included in 6.6.2 Pessièrè

**EU Habitats Directive Annex I**

included in 9410 Acidophilous *Picea* forests of the montane to alpine levels (*Vaccinio-Piceetea*)

## ! G3.1C Inner range montane *Picea* forests

**Description**

*Picea abies* forests of the montane level of the inner Alps, characteristic of regions climatically unfavourable to both beech and fir. Also analogous *Picea abies* forests of the montane and collinar levels of the inner basin of the Slovakian Carpathians subjected to a climate of high continentality.

**Plant communities**

*Piceion excelsae*

**Species**

*Picea abies*. **G3.1C2:** *Calamagrostis varia*, *Carex flacca*, *Sesleria caerulea*, *Hieracium trifidum*, *Aster bellidiastrum*. **G3.1C3:** *Oxalis acetosella*, *Galium rotundifolium*, *Galium odoratum*, *Anemone nemorosa*, *Doronicum austriacum*, *Petasites albus*, *Primula elatior*, *Fragaria vesca*, *Cardamine trifolia*, *Carex montana* and *Melica nutans*. **G3.1C5:** *Sphagnum* spp., *Equisetum sylvaticum*, *Listera cordata*, *Dryopteris dilatata*

**Corresponding class in other classifications**

European forest types 6.3.2 Subalpine and montane spruce and montane mixed spruce-silver fir forest

Milieux naturels de Suisse 2008 included in 6.6.2 Pessièrè

### **EU Habitats Directive Annex I**

included in 9410 Acidophilous *Picea* forests of the montane to alpine levels (*Vaccinio-Piceetea*)

## **! G3.1D *Hercynian subalpine Picea forests***

### **Description**

Subalpine Spruce (*Picea abies*) forests of high ranges of the central and eastern sections of the Hercynian arc, from the Harz to the Bohemian Quadrangle.

### **Plant communities**

*Soldanello montanae-Piceetum*, *Calamagrostio villosae-Piceetum*, *Plagiothecio-Piceetum hercynicum*

### **Species**

*Picea abies*, *Abies alba*, *Sorbus aucuparia*, *Vaccinium myrtillus*, *Homogyne alpina*, *Soldanella montana*, *Calamagrostis villosa*

### **Corresponding class in other classifications**

European forest types 6.3.2 Subalpine and montane spruce and montane mixed spruce-silver fir forest

### **EU Habitats Directive Annex I**

included in 9410 Acidophilous *Picea* forests of the montane to alpine levels (*Vaccinio-Piceetea*)

## **G3.1E *Southern European Picea abies forests***

### **! G3.1E1 *Southeastern Moesian Picea abies forests***

### **Description**

Spruce (*Picea abies*) forests of the Rhodopide Vitosha, Rila, Pirin and Rhodope ranges and of the Moeso-Macedonian mountains.

### **Plant communities**

"*Abieti-Piceetum scardicum*", "*Piceetum subalpinum scardicum*", *i.a.*

### **Species**

*Picea abies*

### **Corresponding class in other classifications**

European forest types 6.3.2 Subalpine and montane spruce and montane mixed spruce-silver fir forest

! G3.1E3 Montenegrine *Picea abies* forests

**Description**

Isolated subalpine and high montane *Picea abies* forests of the Ljubisnja range of Montenegro, developed on both siliceous and calcareous substrates, at altitudes comprised between 1150 and 1850 m on adrets and between 1100 and 1900 m on ubacs. They are species-rich on limestones with a cortège of medio-European affinities, except for the presence of *Laserpitium marginatum*.

**Plant communities**

*Piceion excelsae*

**Species**

*Picea abies*

**Corresponding class in other classifications**

European forest types 6.3.2 Subalpine and montane spruce and montane mixed spruce-silver fir forest

**EU Habitats Directive Annex I**

Not present in the European Union

! G3.1E4 Pelagonide *Picea abies* forests

**Description**

Very local subalpine *Picea abies* forests of the Pelagonides, particularly of the southern Sar Planina of the F.Y.R. of Macedonia, with smaller stands farther south in the F.Y.R. of Macedonia, and in Albania.

**Plant communities**

*Piceion excelsae*

**Species**

*Picea abies*

**Corresponding class in other classifications**

European forest types 6.3.2 Subalpine and montane spruce and montane mixed spruce-silver fir forest

**EU Habitats Directive Annex I**

Not present in the European Union

! G3.1E5 Balkan Range *Picea abies* forests

**Description**

Rare and local *Picea abies* forests of the western and central Balkan Range.

**Plant communities***Piceion excelsae***Species***Picea abies***Corresponding class in other classifications**

European forest types 6.3.2 Subalpine and montane spruce and montane mixed spruce-silver fir forest

**EU Habitats Directive Annex I**

included in 9410 Acidophilous *Picea* forests of the montane to alpine levels (*Vaccinio-Piceetea*)

### ! G3.1G *Picea omorika* forests

**Description**

*Picea omorika* -dominated forests of the Drina basin of central Serbia, also in Bosnia and Hercegovina. *Picea abies* and *Abies alba* are usually also present while the herb layer is relatively species-poor while bryophytes can be widespread.

**Plant communities***Piceion excelsae***Species**

*Picea omorika*, *Salix caprea*, *Pinus nigra*, *Rosa pendulina*, *Valeriana montana*, *Vaccinium myrtillus*, *Luzula sylvatica*, *Hieracium transsilvanicum*, *Gentiana asclepiadea*, *Erica carnea*, *Calamagrostis varia*, *Veronica chamaedrys*, *Lathyrus vernus*, *Euphorbia amygdaloides*  
 Bryophytes - *Dicranum scoparium*, *Ctenidium molluscum*, *Eurhynchium striatum*, *Hylocomium splendens*, *Rhytidiadelphus triquetrus*

**Corresponding class in other classifications**

European forest types 6.3.2 Subalpine and montane spruce and montane mixed spruce-silver fir forest

**EU Habitats Directive Annex I**

Not present in the European Union

### ! G3.1H *Picea orientalis* forests

**Description**

*Picea orientalis* -dominated forests of the Caucasus and of the eastern Pontic Range.

**Plant communities***Geranio iberici-Pinion orientalis*



**Species**

*Picea orientalis*

**Corresponding class in other classifications**

European forest types 6.3.2 Subalpine and montane spruce and montane mixed spruce-silver fir forest

**EU Habitats Directive Annex I**

Not present in the European Union

**References**

Ketenoglu, O et al (2010) Synopsis of syntaxonomy of Turkish forests. *Journal of Environmental Biology* 31 (1) 71-80.

## **G3.2 Alpine *Larix - Pinus cembra* woodland**

### **! G3.21 Eastern Alpine siliceous *Larix* and *Pinus cembra* forests**

**Description**

Subalpine forests of *Larix decidua* and/or *Pinus cembra* of the eastern and central Alps, mostly of the inner ranges, usually on siliceous substrates, with an often species-poor undergrowth.

**Plant communities**

*Piceion excelsae*, *Rhododendro-Vaccinion*

**Species**

*Larix decidua*, *Pinus cembra*, *Rhododendron ferrugineum*, *Vaccinium myrtillus*, *Calamagrostis villosa*, *Luzula albida*

**Corresponding class in other classifications**

European forest types 6.3.1 Subalpine larch-arolla pine and dwarf pine forest  
Milieux Naturels de Suisse 2008 6.6.3 Forêt de mélèzes et d'aroles

**EU Habitats Directive Annex I**

Included in 9420 Alpine *Larix decidua* and/or *Pinus cembra* forests

### **! G3.22 Eastern Alpine calcicolous *Larix* and *Pinus cembra* forests**

**Description**

Subalpine and montane forests of *Larix decidua*, *Picea abies* and *Pinus cembra* of the eastern and central Alps on calcareous substrates. The undergrowth is usually species-rich.

**Plant communities**

*Piceion excelsae*, *Rhododendro-Vaccinion*

**Species**

*Larix decidua*, *Picea abies*, *Pinus cembra*, *Pinus mugo*, *Erica herbacea*, *Rhododendron hirsutum*, *Polygala chamaebuxus*

### **Corresponding class in other classifications**

European forest types 6.3.1 Subalpine larch-arolla pine and dwarf pine forest  
Milieux Naturels de Suisse 2008 6.6.3 Forêt de mélèzes et d'aroles

### **EU Habitats Directive Annex I**

Included in 9420 Alpine *Larix decidua* and/or *Pinus cembra* forests

## **! G3.25 Carpathian *Larix* and *Pinus cembra* forests**

### **Description**

Uncommon *Larix decidua* or *Pinus cembra* formations of the Carpathians, occurring as a single dominant, together as codominants, or mixed with spruce (*Picea abies*).

### **Plant communities**

*Pino cembrae-Piceetum*, *Erico-Pinion sylvestris*

### **Species**

*Larix decidua*, *Pinus cembra*, *Picea abies*, *Rhododendron myrtifolium*, *Bruckenthalia spiculifolia*, *Melampyrum saxosum*, *Soldanella hungarica* ssp. *major*, *Campanula abietina*

### **Corresponding class in other classifications**

European forest types 6.3.1 Subalpine larch-arolla pine and dwarf pine forest  
Habitat din România

R4201 Rarişti sud-est carpatice de molid (*Picea abies*) și zâmbru (*Pinus cembra*) cu *Bruckenthalia spiculifolia*

R4202 Rarişti sud-est carpatice de molid (*Picea abies*) și zâmbru (*Pinus cembra*) cu *Rhododendron myrtifolium*

R4204 Păduri și rarişti de larice (*Larix decidua*) cu *Saxifraga cuneifolia*

### **EU Habitats Directive Annex I**

Included in 9420 Alpine *Larix decidua* and/or *Pinus cembra* forests

## **! G3.26 *Larix polonica* forests**

### **Description**

*Larix decidua* ssp. *polonica* -dominated facies of the white cinquefoil oak woods (units G1.7A111 & G1.7A114) of Poland and the western Ukraine.

### **Plant communities**

*Piceion excelsae*.

### **Species**

*Larix decidua* ssp. *polonica*

### **Corresponding class in other classifications**

European forest types 6.3.1 Subalpine larch-arolla pine and dwarf pine forest

### **Associated Habitat types**

G1.7A111, G1.7A114

## **G3.3 *Pinus uncinata* woodland**

### **! G3.31 *Pinus uncinata* forests with *Rhododendron ferrugineum***

#### **Description**

*Pinus uncinata* forests of the western outer Alps, the Jura and north facing slopes ('ubac') of the Pyrenees developed on siliceous or decalcified soils of the subalpine level with a predominately ericaceous undergrowth usually dominated by *Rhododendron ferrugineum*.

#### **Plant communities**

*Rhododendro-Vaccinion* p.

#### **Species**

*Pinus uncinata*, *Rhododendron ferrugineum*, *Vaccinium myrtillus*, *V. uliginosum*, *Calluna vulgaris*, *Homogyne alpina*, *Deschampsia flexuosa*, *Lycopodium annotinum*

#### **Corresponding class in other classifications**

European forest types 6.3.1 Subalpine larch-arolla pine and dwarf pine forest

#### **EU Habitats Directive Annex I**

included in 9430 Subalpine and montane *Pinus uncinata* forests (\* if on gypsum or limestone)

### **! G3.32 *Xerocline Pinus uncinata* forests**

#### **Description**

*Pinus uncinata* forests of the inner Alps, of the western outer Alps and the Jura, and of south facing slopes ('adret') of the Pyrenees, accompanied by shrubby undergrowth in which *Rhododendron ferrugineum* is absent or rare.

#### **Plant communities**

*Seslerio caeruleae-Pinion uncinatae*

#### **Species**

*Pinus uncinata*, *Juniperus nana*, *J. hemisphaerica*, *Arctostaphylos uva-ursi*, *A. alpinus*, *Erica herbacea*, *Rhododendron hirsutum*, *Cotoneaster integerrimus*, *Daphne striata*, *Dryas octopetala*, *Polygala chamaebuxus*

#### **Corresponding class in other classifications**

European forest types 6.3.1 Subalpine larch-arolla pine and dwarf pine forest

Milieux naturels de Suisse 2008 6.6.5 Pinède de montagne

### EU Habitats Directive Annex I

included in 9430 Subalpine and montane *Pinus uncinata* forests (\* if on gypsum or limestone)

## G3.4 *Pinus sylvestris* woodland south of the taiga

### ! G3.41 *Caledonian forest*

#### Description

Relict, indigenous Scots pine forests of endemic *Pinus sylvestris* var. *scotica*, limited to the central and northeastern Grampians of Scotland. They are mostly open and have a ground layer usually rich in ericaceous species and mosses, in particular, *Hylocomium splendens*.

#### Plant communities

*Dicrano-Pinion*

#### Species

*Pinus sylvestris*, *Sorbus aucuparia*, *Betula pubescens*, *B. pendula*, *Juniperus communis*, *Ilex aquifolium*, *Populus tremula*, *Calluna vulgaris*, *Corallorhiza trifida*, *Deschampsia flexuosa*, *Goodyera repens*, *Linnaea borealis*, *Listera cordata*, *Moneses uniflora*, *Orthilia secunda*, *Pyrola minor*, *Trientalis europaea*. Bryophytes - *Hylocomium splendens*, *Pleurozium schreberi*.

#### Corresponding class in other classifications

European forest types 6.2.2 Nemoral scots pine forest

National Vegetation Classification (UK) W18 *Pinus sylvestris* - *Hylocomium splendens* woodland

### EU Habitats Directive Annex I

91C0 Caledonian forest

#### References

Rodwell, J.S. & Cooper, E.A. 1995. Scottish pinewoods in a European context. pp. 4-21 in J.R. Aldhous (ed.) *Our Pinewood Heritage*. Forestry Commission, Royal Society for the Protection of Birds & Scottish Natural Heritage, Inverness.

### G3.42 *Middle European Pinus sylvestris forests*

G3.423 Western Eurasian steppe pine forests

### ! G3.4232 *Sarmatic steppe Pinus sylvestris forests*

#### Description

Xerophilous *Pinus sylvestris* woods of the wooded steppe belt of the Sarmatic region of western Eurasia and of areas with extreme continental local climates of northeastern Central Europe and Eastern Europe, extending from northeastern and eastern Brandenburg and Mecklenburg-Vorpommern, north-central and eastern Poland in the west, through Podolia and the southern Russian plateaux, to Bashkiria.

**Plant communities**

*Cytiso ruthenici-Pinion sylvestris*

**Species**

*Pinus sylvestris*, *Vaccinium myrtillus*, *Pyrola minor*, *Orthilia minor*, *Chimaphilla umbellata*, *Ophrys insectifera*, *Coronilla vaginalis*, *Globularia punctata*, *Brachypodium pinnatum*, *Astragalus zingeri*, *Potentilla vulgarica*, *Sempervivum ruthenicum*, *Chamaecytisus wulfii*

**Corresponding class in other classifications**

Biotopes of the Czech Republic 2001 L8.2 Lesostepní bory  
European forest types 6.2.2 Nemoral scots pine forest

**EU Habitats Directive Annex I**

91U0 Sarmatic steppe pine forest (*Cytiso-Pinetalia*)

**! G3.4233 Carpathian steppe *Pinus sylvestris* woods**

**Description**

Local xerophile *Pinus sylvestris* steppe woods of sub-Pannonic low Carpathian spurs of southwestern and southeastern Slovakia and of the Slovakian inner Carpathian basins.

**Plant communities**

*Cytiso ruthenici-Pinion* p.

**Species**

*Cornus mas*, *Brachypodium pinnatum*, *Melica nutans*, *Luzula luzuloides*, *Hypochoeris maculata*, *Buglossoides purpureocaerulea*, *Lathyrus niger*, *Vicia dumetorum*, *Melittis melissophyllum*, *Digitalis grandiflora*, *Viola collina*, *Achillea distans*, *Euphorbia epithymoides*, *Orchis purpurea*

**Corresponding class in other classifications**

Biotopes of Slovakia 2114300 Dubové subxerothermofilné a borovicové xerofilné lesy  
European forest types 6.2.2 Nemoral scots pine forest

**! G3.4234 Pannonic steppe *Pinus sylvestris* woods**

**Description**

*Pinus sylvestris* sand steppe woods of the western Pannonic plain and its satellite basins, in particular, the Zahorie (Marchfeld) and the little Alföld.

**Plant communities**

*Festuco vaginatae-Pinion*

**Species**

*Pinus sylvestris*, *Festuca vaginata*

**Corresponding class in other classifications**

European forest types 6.2.2 Nemoral scots pine forest

**G3.44 Spring heath *Pinus sylvestris* forests****! G3.442 Carpathian relict calcicolous *Pinus sylvestris* forests****Description**

Isolated, calcicolous *Pinus sylvestris* forests of the western Carpathians, related to the spring heath Scots pine forests of the Alpine area, limited to a few small enclaves in the Strazov mountains, the Velka Fatra, the Pienini ( *Pinus sylvestris* - *Calamagrostis varia* community, *Pinus sylvestris* - *Carex alba* community), the Slovakian inner-Carpathian basins and the Slovakian Erzgebirge. *Erica herbacea* and *Polygala chamaebuxus* are absent; the undergrowth includes a number of species of continental distribution and xerothermic affinities, including some western Carpathian endemics.

**Plant communities***Pulsatillo slavicae*-Pinion: *Carici humilis*-Pinetum**Species**

*Pinus sylvestris*, *Linum flavum*, *Carex humilis*, *Carex alba*, *Calamagrostis varia*, *Pulsatilla slavica*, *Thymus carpathicus*, *Primula auricula* ssp. *hungarica*, *Globularia aphyllanthes*, *Campanula carpatica*, *Festuca tatrae*

**Corresponding class in other classifications**

European forest types 6.3.3 Alpine scots pine and black pine forest

**EU Habitats Directive Annex I**91Q0 Western Carpathian calcicolous *Pinus sylvestris* forests**! G3.4C Southeastern European *Pinus sylvestris* forests****Description**

*Pinus sylvestris* forests of the eastern Carpathians and of the mountains of the Balkan peninsula, south to northern Greece, formed by the largely isolated, disjunct, southeastern forms of *Pinus sylvestris* (*Pinus sylvestris* var. *rhodopaea* , *Pinus sylvestris* var. *illyrica* , *Pinus sylvestris* var. *romanica* ), and often limited to azonal edaphic enclaves.

**Plant communities***Fraxino orni*-Ericion, *Fraxino orni*-Pinion *nigrae***Species**

*Pinus sylvestris* var. *rhodopaea*, *Pinus sylvestris* var. *illyrica*, *Pinus sylvestris* var. *romanica*. **G3.4C5:** *Erica herbacea* (*Erica carnea*), *Galium lucidum*, *Aquilegia vulgaris*. **G3.4C6:** *Abies alba*, *Fagus sylvatica*, *Picea abies*, *Populus tremula*, *Betula pendula*, *Juniperus communis*, *Cotoneaster nebrodensis*, *Vaccinium myrtillus*, *Arctostaphylos uva-ursi*, *Galium lucidum*, *Luzula sylvatica*,

*Brachypodium pinnatum*. **G3.4C7:** *Picea abies*, *Abies alba*, *Betula pendula*, undergrowth dominated by *Leucobryum glaucum*. **G3.4C8:** *Sesleria rigida*, *Helianthemum nummularium* ssp. *obscurum*, *Thymus comosus*, *Asperula capitata*, *Dianthus spiculifolius*, *Arctostaphylos uva-ursi*, *Sorbus aria*, *Cotoneaster integerrimus*. **G3.4C9:** *Vaccinium myrtillus*, *Vaccinium vitis-idaea*, *Luzula luzuloides*, *Oxalis acetosella*, *Deschampsia flexuosa* and *Dicranum scoparium*. **G3.4CA:** *Daphne blagayana*, *Iris ruthenica*, *Bruckenthalia spiculifolia*, *Anthemis carpatica*

**Corresponding class in other classifications**

European forest types 6.3.3 Alpine scots pine and black pine forest

**EU Habitats Directive Annex I**

91Q0 Western Carpathian calcicolous *Pinus sylvestris* forests

**! G3.4E Ponto-Caucasian *Pinus sylvestris* forests**

**Description**

Pine forests dominated by the *Pinus sylvestris* group, mostly included in *Pinus sylvestris* ssp. *hamata* or its intermediates with *Pinus sylvestris* ssp. *sylvestris*, also forests with *Pinus kochiana*, *Pinus hamata* or *Pinus armena*, of the Pontic Range, its satellites and inner Anatolian outposts, of the mountains of the Crimea and of the Caucasus.

**Plant communities**

*Pinion kochianae*

**Species**

*Pinus sylvestris* ssp. *hamata*, *P. kochiana*, *P. hamata*, *P. armena*

**EU Habitats Directive Annex I**

Not present in the European Union

**G3.5 *Pinus nigra* woodland**

**! G3.51 Alpino-Apennine *Pinus nigra* forests**

**Description**

*Pinus nigra* sensu stricta forests of the eastern Italian, Austrian and Slovenian Alps, the Apennines and the Adriatic coasts of northern Italy occurring on steep, dry, sunny rocky slopes.

**Plant communities**

*Fraxino orni-Pinion nigrae*, *Erico-Pinion sylvestris*

**Species**

*Pinus nigra*. **G3.511:** *Cyclamen purpurascens*, *Aquilegia einseleana*. **G3.513:** *Amelanchier ovalis*, *Cotoneaster* spp., *Berberis vulgaris*, *Erica herbacea*, *Daphne cneorum*, *Polygala chamaebuxus*, *Melampyrum angustissimum*, *Epipactis atrorubens*, *Cyclamen purpurascens*, *Carex humilis*, *Euphorbia saxatilis*, *Sesleria albicans*, *Calamagrostis varia*

**Corresponding class in other classifications**

European forest types 6.10.2 Mediterranean and Anatolian black pine forest

**EU Habitats Directive Annex I**

included in 9530 (Sub-) Mediterranean pine forests with endemic black pines

**! G3.52 Western Balkanic *Pinus nigra* forests**

**Description**

Light, open forests of *Pinus nigra* ssp. *nigra* or *Pinus dalmatica* of the Dinarides, the Pelagonides and the Dalmatian coastal areas. The tree and shrub layer are not dense, therefore the herb layer is quite rich, dominated by *Potentilla opaca*, *Euphorbia glabriflora*, *Erica carnea* and *Sesleria rigida*, forming compact “meadows” in the forest.

**Plant communities**

*Fraxino orni-Pinion nigrae*

**Species**

**G3.521:** *Pinus nigra* ssp. *nigra*. **G3.5212:** *Daphne blagayana*, *Rosa pendulina*, *Erica herbacea*, *Galium lucidum*, *Laserpitium krapfii*, *Vicia villosa*, *Symphytum tuberosum*, *Erythronium dens-canis*, *Pteridium aquilinum*, *Asplenium cuneifolium* ssp. *serpentina*, *Campanula servicaria*, *Crocus veluchensis*, *Stachys scardica*, *Helleborus multifidus* ssp. *serbicus*. **G3.5214:** *Erica herbacea*, *Galium lucidum*, *Genista januensis*, *Aquilegia vulgaris*, *Bupthalmum salicifolium*, *Teucrium chamaedrys*, *Carex humilis*, *Anthericum ramosum*, *Cyclamen purpurascens*, *Polygala chamaebuxus*, *Hepatica nobilis*, *Geranium sanguineum*, *Helleborus niger* ssp. *macranthus*, *Epipactis atrorubens*, *Carex alba*

**Corresponding class in other classifications**

European forest types 6.10.2 Mediterranean and Anatolian black pine forest

**EU Habitats Directive Annex I**

included in 9530 (Sub-) Mediterranean pine forests with endemic black pines

**! G3.53 *Pinus salzmannii* forests**

**Description**

*Pinus salzmannii* (*Pinus nigra* ssp. *salzmannii*, *Pinus nigra* ssp. *clusiana*, *Pinus nigra* ssp. *mauretanica*) forests of Spain, southern France and North Africa.

**Plant communities**

*Juniperion thuriferae*

**Species**

*Pinus salzmannii* (*Pinus nigra* ssp. *salzmannii*, *Pinus nigra* ssp. *clusiana*, *Pinus nigra* ssp. *mauretanica*)



**Corresponding class in other classifications**

European forest types 6.10.2 Mediterranean and Anatolian black pine forest

**EU Habitats Directive Annex I**

included in 9530 (Sub-) Mediterranean pine forests with endemic black pines

**! G3.54 Corsican *Pinus laricio* forests**

**Description**

*Pinus laricio* forests of the mountains of Corsica. The Corsican nuthatch (*Sitta whiteheadi*) is endemic to these forests.

**Plant communities**

*Galio-Pinetum luzuletosum*, *Galio-Pinetum anthyllidetosum*, *Galio-Pinetum ericetosum*

**Species**

*Pinus laricio*, *Ilex aquifolium*, *Daphne laureola*, *Erica arborea*, *E. scoparia* *Pteridium aquilinum*, *Allium pendulinum*, *Helleborus lividus* ssp. *corsicus*, *Galium odoratum*, Epiphytic lichens - *Cetraria glauca*, *Hypogymnia bitteriana*, Birds - *Sitta whiteheadi*

**Corresponding class in other classifications**

European forest types 6.10.2 Mediterranean and Anatolian black pine forest

**EU Habitats Directive Annex I**

included in 9530 (Sub-) Mediterranean pine forests with endemic black pines

**! G3.55 Calabrian *Pinus laricio* forests**

**Description**

*Pinus laricio* var. *calabrica* forests of the Sila, the Aspromonte and Etna in southern Italy.

**Plant communities**

*Hypochoerido-Pinetum calabricae*

**Species**

*Pinus laricio*

**Corresponding class in other classifications**

European forest types 6.10.2 Mediterranean and Anatolian black pine forest

**EU Habitats Directive Annex I**

included in 9530 (Sub-) Mediterranean pine forests with endemic black pines

**Associated Habitat types**

**References**

Spampinato G (not dated) 9530\* Pinete (sub)mediterranee di pini neri endemici in Habitat Italia  
<http://vnr.unipg.it/habitat/cerca.do?formato=stampa&idSegnalazione=86>

### ! G3.56 *Pinus pallasiana* and *Pinus banatica* forests

#### Description

Montane forests of *Pinus pallasiana*, or *Pinus banatica* (*Pinus nigra* var. *banatica*) of the southern Carpathians, the Balkan peninsula, Cyprus, Anatolia and Crimea.

#### Plant communities

*Abietion cephalonicae*

#### Species

*Pinus pallasiana*, *Pinus banatica*. **G3.5618:** *Quercus dalechampii*, *Ostrya carpinifolia* (southern Rhodopes), *Abies alba*, *Pinus sylvestris*. **G3.562:** *Genista radiata*, *Fraxinus ornus*, *Cotinus coggygria*, *Biscutella laevigata*, *Ceterach officinarum*, *Festuca xanthina*, *Seseli rigidum*, *Campanula kladniana*, *Centaurea rhenana* and *Campanula divergens*. **North-Western Caucasus:** *Brachypodium pinnatum*, *Campanula komarovii*, *Paeonia caucasica*, *Staphylea pinnata*, *Cephalanthera rubra*, *C. longifolia*, *C. damasonium*, *Orchis punctulata*.

#### Corresponding class in other classifications

European forest types 6.10.2 Mediterranean and Anatolian black pine forest

#### EU Habitats Directive Annex I

included in 9530 (Sub-) Mediterranean pine forests with endemic black pines

#### References

Papastergiadou, E. *et al.* (1997). Syntaxonomic Typology of Greek Habitats. *Folia Geobotanica & Phytotaxonomica* 32 (3): 335-341..

### ! G3.6 Subalpine mediterranean *Pinus* woodland

#### Description

Balkan endemic forests of *Pinus heldreichii* or *Pinus peuce*, restricted to the southern Balkans, Northern Greece and Southern Italy. Accompanying species are *Picea abies*, *Pinus sylvestris*, *Pinus mugo* with understory including *Juniperus sibirica*, *Vaccinium myrtillus*, *Calamagrostis arundinacea*, *Brachypodium pinnatum*, *Luzula luzuloides*, *Luzula sylvatica*, *Geranium macrorrhizum*

#### Plant communities

*Pinion peucis*, *Pinion heldreichii*

#### Species

**G3.61:** *Pinus heldreichii*, *Pinus leucodermis*, *Brachypodium pinnatum*, *Festuca penzesii*, *Calamagrostis arundinacea*, *Orthilia secunda*. **G3.62:** *Pinus peuce*, *Vaccinium myrtillus*, *Luzula sylvatica*, *Calamagrostis arundinacea*, *Pinus mugo*

**Corresponding class in other classifications**

European forest types 6.10.5 Alti-Mediterranean pine forest

**EU Habitats Directive Annex I**

95A0 High oro-Mediterranean pine forests

### **G3.7 Lowland to montane mediterranean *Pinus* woodland (excluding *Pinus nigra*)**

#### **G3.71 Maritime *Pinus pinaster* ssp. *atlantica* forests**

**!** G3.711 Charente *Pinus pinaster* ssp. *atlantica* - *Quercus ilex* forests

**Description**

*Pinus pinaster* ssp. *atlantica* forests with a subcanopy of *Quercus ilex*, *Arbutus unedo* and sometimes *Quercus pubescens* or *Quercus robur* and an undergrowth of *Rubia peregrina*, *Cistus salvifolius*, *Daphne gnidium*. The more acid stands have *Ulex europaeus*, *Cytisus scoparius* and *Erica scoparia* while calcareous stands have *Hedera helix* and *Ruscus aculeatus*. These forests occur on the mostly calcareous inner dunes of the coasts of Vendé, Charente-maritime and northern Gironde, including the islands of Noirmoutier, Yeu, Ré, and Oléron, in western France.

**Plant communities**

*Junipero intermediae-Pinion catalaunicae, Pino pinastri-Quercetum ilicis*

**Species**

*Pinus pinaster* ssp. *atlantica*, *Arbutus unedo*, *Quercus ilex*, *Q. pubescens*, *Q. robur*, *Rubia peregrina*, *Cistus salvifolius*, *Daphne gnidium*. Acidic stands- *Ulex europaeus*, *Cytisus scoparius*, *Erica scoparia*. Calcareous stands- *Hedera helix*, *Ruscus aculeatus*

**Corresponding class in other classifications**

European forest types 6.10.1 Thermophilous pine forest

**EU Habitats Directive Annex I**

included in 9540 Mediterranean pine forests with endemic Mesogean pines

**!** G3.712 Aquitanian *Pinus pinaster* ssp. *atlantica* - *Quercus suber* forests

**Description**

*Pinus pinaster* ssp. *atlantica* forests with a subcanopy of *Quercus suber*, *Arbutus unedo* and sometimes *Quercus robur* developed on acidocline inner dunes of the warmer, more humid coasts of the Marenin, between the Eyre and the Adour river mouths in southwest France.

**Plant communities**

*Pino pinastri-Quercetum suberis*

**Species**

*Pinus pinaster* ssp. *Atlantica*, *Erica cinerea*, *Pteridium aquilinum*, *Frangula alnus*, *Rubia peregrina*. In the more open stands- *Cistus salvifolius*, *Cytisus scoparius*, *Erica scoparia*, *Calluna vulgaris*. In more closed stands- *Hedera helix*, *Ruscus aculeatus*, *Ilex aquifolium*

**Corresponding class in other classifications**

European forest types 6.10.1 Thermophilous pine forest

**EU Habitats Directive Annex I**

included in 9540 Mediterranean pine forests with endemic Mesogean pines

! G3.714 Iberian *Pinus pinaster* ssp. *atlantica* forests

**Description**

*Pinus pinaster* ssp. *atlantica* forests of Galicia, Portugal and neighbouring areas.

**Species**

*Pinus pinaster* ssp. *atlantica*

**Corresponding class in other classifications**

European forest types 6.10.1 Thermophilous pine forest

**EU Habitats Directive Annex I**

included in 9540 Mediterranean pine forests with endemic Mesogean pines

! G3.72 *Pinus pinaster* ssp. *pinaster* ( *Pinus mesogeensis* ) forests

**Description**

Forests of *Pinus pinaster* ssp. *pinaster* (syn. *Pinus mesogeensis* ) of the western Mediterranean, mostly in siliceous meso-Mediterranean, upper meso-Mediterranean and supra-Mediterranean regions of Spain, Portugal, Corsica, southeastern France, northwestern Italy, Sardinia and Pantelleria not on coastal dunes.

**Plant communities**

*Junipero intermediae*-*Pinion catalaunicae*

**Species**

*Pinus pinaster*. **G3.725:** *Arbutus unedo*, *Quercus ilex*, *Rosmarinus officinalis*, *Erica arborea*, *Genista corsica*, *Lavandula stoechas*, *Rubia peregrina*, *Calicotome spinosa*, *Pistacia lentiscus*, *Teucrium marum*

**Corresponding class in other classifications**

European forest types 6.10.1 Thermophilous pine forest

**EU Habitats Directive Annex I**

included in 9540 Mediterranean pine forests with endemic Mesogean pines

### **Associated Habitat types**

Similar forests on coastal dunes are habitat type B1.71

## **!** G3.73 *Pinus pinea* forests

### **Description**

Mediterranean forests and old naturalised plantations of *Pinus pinea* not on coastal dunes. Ancient introductions in many areas often makes the distinction between spontaneous forests and long-established formations of anthropogenic origin difficult. These are thus included, while stands resulting from recent plantations are not.

### **Plant communities**

*Cisto-Lavanduletea*, *Quercion ilicis*

### **Species**

*Pinus pinea*

### **Corresponding class in other classifications**

European forest types 6.10.1 Thermophilous pine forest

### **EU Habitats Directive Annex I**

included into 9540: Mediterranean pine forests with endemic Mesogean pines

### **Associated Habitat types**

*Pinus pinea* on coastal dunes are included in habitat type B1.71

## G3.74 *Pinus halepensis* forests

## **!** G3.741 Iberian *Pinus halepensis* forests

### **Description**

*Pinus halepensis* forests of Spain, considered native for at least two-thirds of their considerable expanse; they are mostly restricted to eastern regions on the Mediterranean slope of the Catalanian mountains, the Maestrazgo, the pre-Baetic ranges of the upper Guadalquivir basin, the southern Andalusian mountains; they penetrate farther inland in the Ebro basin and around the headwaters of the Tagus and Guadalquivir systems. They appear to extend north along the coast of the French Golfe du Lion to the region of Agde.

### **Species**

*Pinus halepensis*

### **Corresponding class in other classifications**

European forest types 6.10.1 Thermophilous pine forest

### **EU Habitats Directive Annex I**

included in 9540 Mediterranean pine forests with endemic Mesogean pines

! G3.742 Balearic *Pinus halepensis* forests

**Description**

*Pinus halepensis* formations of the Balearic islands, present and probably native on all the major islands.

**Species**

*Pinus halepensis*

**Corresponding class in other classifications**

European forest types 6.10.1 Thermophilous pine forest

**EU Habitats Directive Annex I**

included in 9540 Mediterranean pine forests with endemic Mesogean pines

! G3.743 Provenço-Ligurian *Pinus halepensis* forests

**Description**

Mostly lower meso-Mediterranean *Pinus halepensis* forests of Provence and of the lower slopes and coastlines of the Maritime and Ligurian Alps, extensive and undoubtedly native.

**Species**

*Pinus halepensis*

**Corresponding class in other classifications**

European forest types 6.10.1 Thermophilous pine forest

**EU Habitats Directive Annex I**

included in 9540 Mediterranean pine forests with endemic Mesogean pines

! G3.744 Corsican *Pinus halepensis* woods

**Description**

Rare and local *Pinus halepensis* woods of the Corsican coasts, some, at least, possibly natural.

**Plant communities**

*Pistacio-Juniperetum macrocarpae*

**Species**

*Pinus halepensis*

**Corresponding class in other classifications**

European forest types 6.10.1 Thermophilous pine forest

**EU Habitats Directive Annex I**

included in 9540 Mediterranean pine forests with endemic Mesogean pines

**References**

Gamisans, J (1991) La Végétation de la Corse. Edisud Aix en Provence.

**!** G3.745 Sardinian *Pinus halepensis* woods

**Description**

*Pinus halepensis* formations of Sardinia, where certainly native woods occur on Isola di San Pietro and the Sulcis coast of Iglesias.

**Species**

*Pinus halepensis*

**Corresponding class in other classifications**

European forest types 6.10.1 Thermophilous pine forest

**EU Habitats Directive Annex I**

included in 9540 Mediterranean pine forests with endemic Mesogean pines

**!** G3.746 Sicilian *Pinus halepensis* woods

**Description**

*Pinus halepensis* formations of Sicily and peripheral islands.

**Species**

*Pinus halepensis*

**Corresponding class in other classifications**

European forest types 6.10.1 Thermophilous pine forest

**EU Habitats Directive Annex I**

included in 9540 Mediterranean pine forests with endemic Mesogean pines

G3.747 Italic *Pinus halepensis* forests

**!** G3.7471 Gargano *Pinus halepensis* forests

**Description**

*Pinus halepensis* forests of monte Gargano and the Tremiti islands (south-east Italy).

**Species**

*Pinus halepensis*

**Corresponding class in other classifications**

European forest types 6.10.1 Thermophilous pine forest

**EU Habitats Directive Annex I**

included in 9540 Mediterranean pine forests with endemic Mesogean pines

**!** G3.7472 *Metapontine Pinus halepensis forests***Description**

*Pinus halepensis* forests of the Gulf of Taranto area, in particular of the Metapontine littoral (Southern Italy).

**Species**

*Pinus halepensis*

**Corresponding class in other classifications**

European forest types 6.10.1 Thermophilous pine forest

**EU Habitats Directive Annex I**

included in 9540 Mediterranean pine forests with endemic Mesogean pines

**!** G3.7473 *Umbrian Pinus halepensis forests***Description**

*Pinus halepensis* forests of southern Umbria, in the Narni and Spoleto-Terni areas.

**Species**

*Pinus halepensis*

**Corresponding class in other classifications**

European forest types 6.10.1 Thermophilous pine forest

**EU Habitats Directive Annex I**

included in 9540 Mediterranean pine forests with endemic Mesogean pines

**!** G3.748 *Hellenic Pinus halepensis forests***Description**

*Pinus halepensis* formations of Greece, where the species is relatively widespread, particularly in Attica, Thessaly, the coasts of the Peloponnese and of central continental Greece, the Ionian islands, Chalcidici, the northern Sporades, Euboea and Skiros.

**Species**

*Pinus halepensis*



**Corresponding class in other classifications**

European forest types 6.10.1 Thermophilous pine forest

**EU Habitats Directive Annex I**

included in 9540 Mediterranean pine forests with endemic Mesogean pines

**!** G3.749 Illyrian *Pinus halepensis* forests

**Description**

*Pinus halepensis* forests and woods of the southern and central part of the meso-Mediterranean Orno-Quercetum illicis zone of the Balkan peninsula, extending in a narrow coastal and archipelagic band from the Gulf of Sarandë to northern Dalmatia.

**Species**

*Pinus halepensis*

**Corresponding class in other classifications**

European forest types 6.10.1 Thermophilous pine forest

**EU Habitats Directive Annex I**

included in 9540 Mediterranean pine forests with endemic Mesogean pines

**!** G3.74A East Mediterranean *Pinus halepensis* forests

**Description**

Forests of *Pinus halepensis* of the Mediterranean coastal regions of the Middle East. Extensive and varied in the southern part of the region, they are represented further north by isolated outposts in the coastal region of Syria and in south central Anatolia, where *Pinus halepensis* occurs in the thermo-Mediterranean zone of the Cilician plain, apparently mixed with *Pinus brutia*.

**Species**

*Pinus halepensis*

**Corresponding class in other classifications**

European forest types 6.10.1 Thermophilous pine forest

**EU Habitats Directive Annex I**

included in 9540 Mediterranean pine forests with endemic Mesogean pines

**!** G3.75 *Pinus brutia* forests

**Description**

*Pinus brutia* forests of Crete, the eastern Aegean islands, extreme southeastern continental Europe, Anatolia, Cyprus and the eastern Mediterranean coastal regions not on coastal dunes. Eastern vicariants of Aleppo pine forests (unit G3.74), they comprise, however, taller, more luxuriant, and often extensive, formations. Disjunct formations of this pine or of related species, described from Crimea and the Caucasian region (*Pinus pityusa* , *Pinus stankewiczii* , *Pinus eldarica* ) are also included here.

### Species

*Pinus brutia*

### Corresponding class in other classifications

European forest types 6.10.1 Thermophilous pine forest

### EU Habitats Directive Annex I

included in 9540 Mediterranean pine forests with endemic Mesogean pines

### Associated Habitat types

*Pinus brutia* on coastal dunes are included in habitat type B1.71

## ! G3.8 Canary Island *Pinus canariensis* woodland

### Description

Forests of endemic *Pinus canariensis* , of the dry montane level at around 800 to 2000 m (locally down to 500 and up to 2500 m) in Tenerife, La Palma, Gran Canaria and Hierro. These forests, of which well-preserved examples have become rare, are the only habitat of Blue Chaffinch (*Fringilla teydea*), Tenerife Great Spotted Woodpecker (*Dendrocopos major canariensis*) and Gran Canaria Great Spotted Woodpecker (*Dendrocopos major thanneri*).

### Plant communities

*Cisto-Pinion canariensis*

### Species

*Pinus canariensis*, *Chamaecytisus proliferus*, *Adenocarpus foliolosus*, *Cistus symphytifolius*, *Lotus campylocladus*, *L. hillebrandii*, *L. spartioides*, *Daphne gnidium*, *Juniperus cedrus*, *Micromeria* spp.

### Corresponding class in other classifications

European forest types 6.10.3 Canarian pine forest

### EU Habitats Directive Annex I

9550: Canary Island endemic pine forests

## ! G3.9 Coniferous woodland dominated by Cupressaceae or Taxaceae

includes the following subtypes separately listed in or split unit from the 1998 version:  
G3.9C Cedrus woodland

### **Description**

Woods dominated by *Cupressus sempervirens*, *Juniperus* spp. or *Taxus baccata* of the nemoral and Mediterranean mountains and hills.

### **Plant communities**

*Juniperion brevifoliae*, *Acero sempervirenti-Cupression sempervirentis*, *Oleo-Ceratonion siliquae*, *Quercion ilicis*, *Mayteno-Juniperion canariensis*, *Juniperion thuriferae*, *Periplocion angustifoliae*, *Juniperion excelsae*, *Fagion sylvaticae*, *Junipero excelsae-Quercion pubescentis*, *Quercetea pubescentis*

### **Species**

*Abies nebrodensis*, *Anagyris latifolia*, *Arceuthobium azoricum*, *Argyranthemum lidii*, *Argyranthemum winteri*, *Astragalus maritimus*, *Bupleurum handiense*, *Centaurea attica* ssp. *megarensis*, *Cephalanthera cucullata*, *Cheirolophus duranii*, *Cheirolophus junonianus*, *Convolvulus lopez-socasi*, *Cupressus sempervirens*, *Cupressus* sp., *Cypripedium calceolus*, *Cytisus aeolicus*, *Dendriopoterium pulidoi*, *Dorycnium spectabile*, *Dracaena draco*, *Erica scoparia* ssp. *azorica*, *Euphorbia lambii*, *Euphorbia stygiana*, *Frangula azorica*, *Fritillaria conica*, *Fritillaria obliqua*, *Galanthus nivalis*, *Jankaea heldreichii*, *Juniperus* sp., *Limonium arborescens*, *Limonium dendroides*, *Limonium sventenii*, *Ophrys argolica*, *Phoenix theophrasti*, *Picconia azorica*, *Prunus lusitanica* ssp. *azorica*, *Rumex azoricus*, *Ruscus aculeatus*, *Sideritis cystosiphon*, *Sideritis infernalis*, *Sideritis marmoreal*, *Sideroxylon marmulano*, *Solanum lidii*, *Taxus baccata*, *Teline salsoloides*, *Tetraclinis articulate*, *Zelkova abelicea*

### **Corresponding class in other classifications**

Includes European forest types

- 6.10.7 Juniper forest
- 6.10.8 Cypress forest
- 6.10.9 Cedar forest
- 6.10.10 *Tetraclinis articulata* stands
- 6.10.11 Mediterranean yew stands

### **EU Habitats Directive Annex I**

Includes

- 91J0 *Taxus baccata* woods of the British Isles
- 9290 *Cupressus* forests (*Acero-Cupression*)
- 9560 Endemic forests with *Juniperus* spp
- 9570 *Tetraclinis articulata* forests
- 9580 Mediterranean *Taxus baccata* woods
- 9590 *Cedrus brevifolia* forests (*Cedrosetum brevifoliae*)

## **! G3.D Boreal bog conifer woodland**

### **Description**

Woods of *Pinus* spp. or *Picea* spp., sometimes mixed with *Betula pubescens*, colonizing bogs and fens in the boreal and boreonemoral zones of northern Europe.

**Species**

*Betula pubescens*, *Picea* sp., *Pinus* sp. *Sphagnum* spp

**Corresponding class in other classifications**

European forest types 6.11.1 Conifer dominated or mixed mire forests

**EU Habitats Directive Annex I**

91D0: Bog woodland

**! G3.E Nemoral bog conifer woodland****Description**

Woods of *Pinus* spp. or *Picea* spp., sometimes mixed with *Betula pubescens*, colonizing bogs and fens in the nemoral zone. Conifer-dominated bog woodland occurs mainly in the boreal and boreonemoral zones, but extends into the nemoral, wooded steppe and steppe zones.

**Plant communities**

*Sphagnion medii*, *Salicion cinereae*, *Piceion excelsae*, *Dicrano-Pinion*, *Sphagno-Betuletalia*, *Betulion pubescentis*

**Species**

*Eriophorum vaginatum*, *Vaccinium oxycoccos*, *Vaccinium uliginosum*

**Corresponding class in other classifications**

European forest types 6.11.1 Conifer dominated or mixed mire forests

Milieux naturels de Suisse 2008 6.5.2 Pinède sur tourbe

6.5.3 Pessièrre sur tourbe

**EU Habitats Directive Annex I**

91D0 Bog woodland

# H Inland unvegetated or sparsely vegetated habitats

## ! H1 Terrestrial underground caves, cave systems, passages and waterbodies

### Description

Natural caves, cave systems, underground waters and subterranean interstitial spaces. Caves and their associated waters harbour varied, but species poor, communities of animals, fungi and algae that are restricted to them (trogllobiont organisms), or are physiologically and ecologically capable of conducting their entire life cycle within them (troglophile organisms), or are dependent on them for part of the life cycle (subtroglophile organisms). Underground waters not associated with caves (stygon) and interstitial spaces harbour distinctive faunas.

### Plant communities

### Species

Plants: bryophytes only (e.g. *Schistostega pennata*) and algal carpets at the entry of caves.

Animals: Very specialised and highly endemic cavernicolous fauna. It includes underground relic forms of a fauna which has been diversified outside. This fauna is mainly composed of invertebrates which exclusively live in caves and underground waters. The cavernicolous terrestrial invertebrates are mainly coleoptera, belonging to the *Bathysciinae* and *Trechinae* families in particular, which are carnivorous and have a very limited distribution. Cavernicolous aquatic invertebrates constitute a highly endemic fauna, dominated by crustaceans (*Isopoda*, *Amphipoda*, *Syncarida*, *Copepoda*) and include many living fossils. Aquatic molluscs, belonging to the *Hydrobiidae* family are also found. With regard to vertebrates, caves constitute hibernation sites for most European bat species, among which many are threatened and listed on Resolution 6. Caves also shelter some very rare amphibious species like *Proteus anguinus* and several species of the *Speleomantes* genus

### EU Habitats Directive Annex I

8310 Caves not open to the public

H1.4 Lava tubes is included in 8320 Fields of lava and natural excavations

## H2 Screes

### H2.6 Calcareous and ultra-basic screes of warm exposures

#### H2.61 Peri-Alpine thermophilous screes

#### ! H2.613 Paris Basin screes

### Description

Calcareous screes of the Paris basin and its periphery, with many rare or endemic plants including *Viola hispida* (listed on Resolution 6).

**Plant communities**

*Leontodontion hyoseroidis*

**Species**

*Leontodon hyoseroides*, *Sisymbrium supinum*, *Linaria supina*, *Galeopsis angustifolia*, *Viola hispida*, *Galium timeroyi ssp. fleurotii*, *Iberis violetii*, *Iberis durandii*, *Biscutella neustriaca*

**EU Habitats Directive Annex I**

Included in 8160 Medio-European calcareous scree of hill and montane levels

**Associated Habitat types****References**

Anon 2004. Éboulis médio-européens calcaires des étages collinéen à montagnard. 155-158 in Bensettiti F., Logereau K., Van Es J. & Balmain C. (coord.), 2004. *Cahiers d'habitats Natura 2000. Connaissance et gestion des habitats et des espèces d'intérêt communautaire. Tome 5 – Habitats rocheux*. La Documentation française, Paris.

## X Habitat complexes

### ! X01 Estuaries

#### Description

Downstream part of a river valley, subject to the tide and extending from the limit of brackish waters. River estuaries are coastal inlets where there is generally a substantial freshwater influence. The mixing of freshwater and sea water and the reduced current flows in the shelter of the estuary lead to deposition of fine sediments, often forming extensive intertidal sand and mud flats. In addition to herbs, they can also be colonised by shrubs creating thickets (e.g. *Tamarix* spp.). Where the tidal currents are faster than flood tides, most sediments deposit to form a delta at the mouth of the estuary. Baltic river mouths, considered here to be an estuary subtype, have brackish water and no tide, with helophytic wetland vegetation and luxurious aquatic vegetation in shallow water areas. Littoral and sublittoral habitat types typical of estuaries are included in A2 and A5, although many other habitat types including tidal rivers may occur in estuaries. Includes Transitional waters as defined by the European Union's Water Framework Directive.

#### Species

Plants: Benthic algal communities, *Zostera* beds e.g. *Zostera noltii* (*Zosteretea*) or vegetation of brackish water: *Ruppia maritima* (= *R. rostellata* (*Ruppieteae*)); *Spartina maritima* (*Spartinetea*); *Sarcocornia perennis* (*Arthrocnemetea*). Both species of fresh water and brackish water can be found in Baltic river mouths (*Carex* spp., *Myriophyllum* spp., *Phragmites australis*, *Potamogeton* spp., *Scirpus* spp.).

Animals: Invertebrate benthic communities; important feeding areas for many birds.

#### EU Habitats Directive Annex I

1130 Estuaries

#### References

McLusky, D. S. & Elliott, M. (2004). *The estuarine ecosystem: ecology, threats, and management*. Oxford University Press, Oxford.

### ! X02 Saline coastal lagoons

#### Description

Lagoons are expanses of shallow coastal salt water, of varying salinity and water volume, wholly or partially separated from the sea by sand banks or shingle, or, less frequently, by rocks. Salinity may vary from brackish water to hypersalinity depending on rainfall, evaporation and through the addition of fresh seawater from storms, temporary flooding of the sea in winter or tidal exchange. With or without vegetation of seagrasses or charophytes. Habitat types typical of lagoons are included in A5, although many other habitat types may also occur in lagoons.

#### EU Habitats Directive Annex I

1150 Coastal lagoons

## ! X03 Brackish coastal lagoons

### Description

Lagoons are expanses of shallow coastal salt water, of varying salinity and water volume, wholly or partially separated from the sea by sand banks or shingle, or, less frequently, by rocks. Fully saline coastal lagoons are classified as X02.

Flads and gloes, considered a Baltic variety of lagoons, are small, usually shallow, more or less delimited water bodies still connected to the sea or cut off from the sea very recently by land upheaval. Characterised by well-developed reedbeds and luxuriant submerged vegetation and having several morphological and botanical development stages in the process whereby sea becomes land.

Mediterranean lagoons may host the Ruppium community with halophytic vegetation, while at sites with a fresh water supply, plant communities of Juncetum and Phragmitetum can develop. *Sarcocornia perennis* and *Arthrocnemum macrostachyum* may occur here.

### EU Habitats Directive Annex I

1150 Coastal lagoons

## ! X04 Raised bog complexes

### Description

Raised bogs are highly oligotrophic, strongly acidic, domed peatlands, whose peat is composed mainly of sphagnum remains and whose surface derives moisture and nutrients only from rainfall.

### Plant communities

*Erico-Sphagnetalia magellanici*, *Scheuchzerietalia palustris* p., *Utricularietalia intermedio-minoris* p., *Caricetalia fuscae* p

### Species

Plants: *Erico-Sphagnetalia magellanici*- *Andromeda polifolia*, *Carex pauciflora*, *Cladonia* spp., *Drosera rotundifolia*, *Eriophorum vaginatum*, *Odontoschisma sphagni*, *Sphagnum magellanicum*, *S. imbricatum*, *S. fuscum*, *Vaccinium oxycoccus*; in the Boreal region also *Betula nana*, *Chamaedaphne calyculata*, *Calluna vulgaris*, *Ledum palustre* and *Sphagnum angustifolium*. *Scheuchzerietalia palustris* p., *Utricularietalia intermedio-minoris* p., *Caricetalia fuscae* p.- *Carex fusca*, *C. limosa*, *Drosera anglica*, *D. intermedia*, *Eriophorum gracile*, *Rhynchospora alba*, *R. fusca*, *Scheuchzeria palustris*, *Utricularia intermedia*, *U. minor*, *U. ochroleuca*; in the Boreal region also *Sphagnum balticum* and *S. majus*.

Animals: Dragonflies- *Leucorrhinia dubia*, *Aeshna subartica*, *A. caerulea*, *A. juncea*, *Somatochlora arctica*, *S. alpestris*; Butterflies- *Colias palaeno*, *Boloria aquilonaris*, *Coenonympha tullia*, *Vacciniina optilete*, *Hypenodes turfosalis*, *Eugraphe subrosea*; Spiders- *Pardosa sphagnicola*, *Glyphesis cottonae*; Ants- *Formica transkaucaasia*; Cricket/Grasshopper- *Metrioptera brachyptera*, *Stethophyma grossum*.



**Corresponding class in other classifications**

Milieux naturels de Suisse 2008 2.4.1 Tourbière à sphaignes

**EU Habitats Directive Annex I**

7110 \*Active raised bogs

7120 Degraded raised bogs still capable of natural regeneration

**Associated Habitat types**

Raised bog complexes may include elements of the main mire surface (D1.1) comprising a complex of low hummocks, small pools and their associated vegetation, together with larger pools (C1.46), a marginal lagg (C1.47), pre-woods (G5.64) and other associated habitat types.

## ! X18 Wooded steppe

**Description**

The transition zone between forests and the middle Eurasian, Irano-Anatolian or Saharo-Mediterranean steppes, occurring in a vast swath extending from Pannonia to the Far East, south of and inland from the boreal and nemoral forest belts, in regions of reduced summer humidity, as well as in areas adjacent to, or under the influence of the Mediterranean and warm-temperate humid zones, represented by a macromosaic of steppe and connected, contiguous, disjunct or widely spaced woodland stands, the latter usually with a very developed grassy understorey, or by a scattering of trees within a steppe environment. The forest elements are often located on porous or slightly raised ground, valley sides or slopes, the grasslands occupying less well drained soils and lower places. Component habitat types include those of E1.2 in combination with G1.7.

**Species**

*Fritillaria ruthenica*, *Bulbocodium versicolor*, *Delphinium puniceum*, *Pulsatilla pratensis*, *Stipa zalesski*, *Stipa pulcherrima*, *Adonis wolgensis*

## ! X29 Salt lake islands

**Description**

Permanently or usually emergent features of inland saline lakes and of permanent or temporary saline lakes or ponds.

**Species**

*Saussurea salsa*, *Ruppia drepanensis*, *Marsilea strigosa*, *Ceratophyllum tanaiticum*

**EU Habitats Directive Annex I**

Not present in the European Union

## ! X35 Inland Sand Dunes

**Description**

Sand bodies of eolian origin, possessing constructional relief and separated from the coast and its dune cordons by nondunal habitats, developed within the boreal, nemoral, steppic, warm-temperate humid, mediterranean or subdesert steppe zones. The vegetation is a mosaic of grasslands, heaths and open areas which differs markedly from coastal sand dune communities. Desert sands are excluded. (Habitat type not yet incorporated into the EUNIS habitats classification)

**Species**

*Pulsatilla patens*, *Dianthus arenarius ssp. arenarius*, *Ligularia sibirica*, *Serratula lycopifolia*, *Chamaedaphne calyculata*, *Cinna latifolia*, *Inula helenium*, *Helichrysum arenarium*, *Serratula coronata*, *Adenophora lilifolia*, *Hypericum hirsutum*, *Dracocephalum ruyschiana*, *Origanum vulgare*, *Lilium martagon*, *Gladiolus tenuis*, *Hierochloë odorata*, *Polemonium caeruleum*, *Chimaphila umbellata*

**EU Habitats Directive Annex I**

Includes

2310 Dry sand heaths with *Calluna* and *Genista*

2320 Dry sand heaths with *Calluna* and *Empetrum nigrum*

2330 Inland dunes with open *Corynephorus* and *Agrostis grasslands*

2340\*Pannonic inland dunes