

# THE HABITATS OF THE EUROPEAN UNION HABITATS DIRECTIVE

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## ABSTRACT

The habitats listed in Annex I of the 1992 European Union Directive on the conservation of natural habitats and of wild fauna and flora cover a wide range of both terrestrial and marine habitats, including a large number that are semi natural rather than natural. Implementing the directive has revealed many problems, particularly with identifying the habitats in the field and the absence of information on habitat distribution. As a result the Directive has been responsible for much survey work and has increased our knowledge of many habitats and species across the European Union. As data are reported to the European Commission in agreed standard formats, a database of information about habitats now exists that can be used for other projects. Monitoring obligations will give another unified source of information at a European Union scale.

## INTRODUCTION

The 1992 European Union Directive on the conservation of natural habitats and of wild fauna and flora (Commission of the European Communities 2003b) requires member states of the European Union to establish a network of Special Areas for Conservation to protect species and habitats considered to be of 'Community Interest' and listed in annexes to the directive.

The directive defines habitats of Community Interest as those that (i) are in danger of disappearance in their natural range; or (ii) have a small natural range following their regression or by reason of their intrinsically restricted area; or (iii) present outstanding examples of typical characteristics of one or more of the seven following biogeographical regions: Alpine, Atlantic, Boreal, Continental, Macaronesian, Mediterranean and Pannonian (Article 1c, as modified in 1995 and 2004).

Pierre Devillers (Institut Royal des Sciences Naturelles de Belgique) was asked by DG Environment to produce a list of rare or endangered habitats based on the CORINE biotopes project (Commission of the European Communities 1991) and later A. Noirfalise produced a draft of Annex I. These formed the basis of discussion by an ad hoc committee of national experts, leading to the Annex I attached to the 1992 directive (Carlos Romão, pers. comm.; Commission of the European Communities 2003a).

The annex simply lists habitat names, mostly using names from the CORINE biotopes classification (Commission of the European Communities 1991), although habitat types added in 2004 mostly follow the more recent Palearctic

classification (Devillers and Devillers-Terschuren 1996).

To aid identification of the habitats and site selection, an 'Interpretation Manual of European Union Habitats' was produced by the European Commission with the assistance of the Scientific Working Group set up by the Habitats Committee (a committee established by the directive), and a first edition was published in 1995. This has since been revised twice to incorporate changes required by enlargement of the European Union in 1995 and 2004 (CEC 2003). The Interpretation Manual gives equivalent habitat units in other national or regional classifications but this seems to have been done more thoroughly for some countries (e.g. Germany, Nordic countries, United Kingdom) than for the rest, presumably due to the input of national experts from those countries during the drafting of the text. Many problems remain in interpreting the habitat types (see below), but in many cases pragmatic solutions have been agreed as a result of discussions at the Scientific Working Group or during the biogeographical seminars held to assess the national site proposals (Boillot *et al.* 1997); however, little has been documented or made available to a wider public.

At each enlargement of the European Union since the Habitats Directive was adopted, the future members have been asked to propose additional habitats to ensure the annex remains relevant for the whole of the European Union. These proposals have been discussed by the Scientific Working Group, before approval by the Habitats Committee and adoption by the Council of Ministers, and appear in the treaties of accession. The process is described in more detail in Evans (2004).

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The 218 habitat types currently listed in Annex I cover a range of marine and terrestrial habitats, both natural and semi-natural with both biotic and abiotic features. Although usually referred to as 'habitats' or 'habitat types' they are more correctly biotopes or biotope complexes. The majority of the habitat types are defined by vegetation communities, typically at the level of a phytosociological alliance, but some are landscape units (e.g. estuaries and machair). They are divided into nine groups and most are further subdivided. Table 1 lists the divisions and shows how many habitat types there are in each group, together with the area currently classified or proposed for inclusion in the Natura 2000 network. The proportion of Annex I habitat types in each habitat group is shown in Fig. 1.

Some 70 habitats have been given 'priority' status and these are indicated with an asterisk (\*) next to the habitat's numerical code (e.g. 9180\* *Tilio-Acerion* forests of slopes, screes and ravines); such habitats have a higher degree of protection than 'non-priority' habitats.

The largest group of habitats is the Forests, with 71 types, or close to a third of the annex. They also represent some 32% of the area designated/proposed for habitat types. The smallest group is the Temperate Heaths and Scrub with only ten habitat types.

Although the majority of habitat types are defined by vegetation, some are abiotic features that may be vegetated (e.g. '8240\* Limestone pavements') or in some cases unvegetated (e.g. '8340 Permanent glaciers'). This is particularly the case with the relatively few marine habitat types listed, which include seacliffs, bays, sand and mudbanks and estuaries. Reefs may be abiotic or biotic.

The habitat types can occur at a variety of scales, from habitats such as '7220\* Petrifying springs with tufa formation (*Cratoneurion*)', which typically occur in stands of a few square metres or less, to features such as '1130 Estuaries' or '1160 Large shallow inlets and bays', which may cover many square kilometres. Even some habitat types defined by their vegetation may cover large areas, as with '9010\* Western Taiga'.

The habitats also differ greatly in their inherent variability; some are closely defined, perhaps as a single plant association (e.g. '9590 *Cedrus brevifolia* forests (*Cedrosetum brevifoliae*)'), while others are based on an order or class (e.g. '9410 Acidophilous *Picea* forests of the montane to alpine levels (*Vaccinio-Piceetea*)'), although often with a qualifying clause (referring to a region, altitudinal zone or species). In many cases a list of subtypes is given in the Interpretation Manual although this is only indicative of the variation.

## PROBLEMS ENCOUNTERED WHEN IMPLEMENTING THE DIRECTIVE

Although the Interpretation Manual gives more detail than the list of habitat names in the annex itself, there are still many problems when trying to identify habitat types in the field, and in both selecting sites and assessing the national lists of proposed sites. Some of these problems arise from poorly defined, sometimes overlapping, habitat types, whereas others arise from errors within the Palaearctic classification or its associated PHYSIS database. The following is a review of some of the problems that the European Topic Centre on Biological Diversity has encountered during the biogeographical seminars or when assessing proposals from candidate countries to add habitat types to Annex I.

### IS A HABITAT TYPE RESTRICTED TO A NAMED REGION?

Many habitat types make reference to one of the seven biogeographical regions in their name, such as '3170\* Mediterranean temporary ponds'. In such cases the centre of the habitat distribution will be in that region, but often similar vegetation can be found elsewhere. Where this is close to the border between two zones, this is clearly the same habitat and possibly a result of the process used to produce the map of biogeographical region (see Roekaerts 2002 for details). When similar vegetation (often with many of the same species) is found far from the named region, as for '3170\* Mediterranean ponds' in southern England, the solution is not so clear but interpretations have tended to be broad rather than strict.

In some cases, such as the occurrence of *Salix* scrub in the Alps and Pyrenees it was decided during the biogeographical seminars that sites proposed by France could not be the habitat type '4080 Sub-Arctic *Salix* spp scrub' as the French mountains are alpine, not arctic and they were formed by different *Salix* spp. The proposal from Poland to add Sub-Alpine *Salix* scrub in the Tatras as a new habitat type (which although not sub-arctic does have many of the same species as stands in Scandinavia and Scotland) led to a revised definition that now clearly includes the French and Polish stands.

In some cases, such as the *Salix* scrub mentioned above, a change of name (in this example perhaps to 'Sub alpine and sub arctic *Salix* scrub') would have been a better solution. However, changing names requires a decision by the Council of Ministers, whereas a change of the interpretation manual can be agreed by the Habitats Committee.

**Table 1—habitat groups of Annex I.**

<i>Group/subgroup</i>	<i>Number of habitats</i>	<i>Area (km<sup>2</sup>)</i>
1. COASTAL AND HALOPHYTIC HABITATS	28	54,957
11. Open sea and tidal areas	8	46,574
12. Sea cliffs and shingle or stony beaches	5	1,381
13. Atlantic and continental salt marshes and salt meadows	4	2,054
14. Mediterranean and thermo-Atlantic salt marshes and salt meadows	3	1,759
15. Salt and gypsum inland steppes	3	2,716
16. Boreal Baltic archipelago, coastal and land upheaval areas	5	471
2. COASTAL SAND DUNES AND INLAND DUNES	23	5,230
21. Sea dunes of the Atlantic, North Sea and Baltic coasts	10	3,264
22. Sea dunes of the Mediterranean coast	7	1,484
23. Inland dunes, old and decalcified	4	479
3. FRESHWATER HABITATS	18	22,674
31. Standing water	10	17,552
32. Running water – sections of water courses with natural or semi-natural dynamics (minor, average and major beds) where the water quality shows no significant deterioration	9	5,121
4. TEMPERATE HEATH AND SCRUB	10	41,954
5. SCLEROPHYLLOUS SCRUB (MATORRAL)	15	14,693
51. Sub-Mediterranean and temperate scrub	4	3,331
52. Mediterranean arborescent matorral	3	3,772
53. Thermo-Mediterranean and pre-steppe brush	3	4,857
54. Phrygana	3	2,732
6. NATURAL AND SEMI-NATURAL GRASSLAND FORMATIONS	29	42,422
61. Natural grasslands	9	10,379
62. Semi-natural dry grasslands and scrubland facies	10	16,101
63. Sclerophyllous grazed forests (dehesas)	1	6,514
64. Semi-natural tall-herb humid meadows	6	5,026
65. Mesophile grasslands	3	4,399
7. RAISED BOGS AND MIRES AND FENS	12	28,630
71. Sphagnum acid bogs	6	13,403
72. Calcareous fens	4	2,533
73. Boreal mires	2	15,226
8. ROCKY HABITATS AND CAVES	14	15,016
81. Scree	6	4,643
82. Rocky slopes with chasmophytic vegetation	4	8,486
83. Other rocky habitats	4	1,886
9. FORESTS	71	107,558
90. Forests of Boreal Europe	8	32,432
91. Forests of Temperate Europe	29	36,917
92. Mediterranean deciduous forests	13	13,082
93. Mediterranean sclerophyllous forests	10	12,574
94. Temperate mountainous coniferous forests	3	3,923
95. Mediterranean and Macaronesian mountainous coniferous forests	9	8,628

Source: Based on Annex I of the Habitats Directive (European Commission 1992/95/2003).

Numbering: The numbering is hierarchical, e.g. 11 is a subset of 1.

Area: Area is that proposed or designated for the relevant habitat group or subgroup according to information sent by the 25 Member States to the European Commission by June 2005.

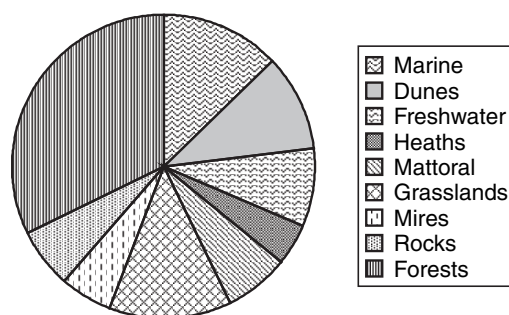


Fig. 1— The proportion of Annex I habitat types in each habitat group for the 25 EU countries.

#### OVERLAPPING HABITATS

In several habitat types a more endangered and/or rarer form is listed as a priority habitat with stronger protection. For example '4040\* Dry Atlantic coastal heaths with *Erica vagans*' is a rare subtype of the more widely distributed '4030 European dry heaths' and '3170\* Mediterranean temporary ponds' is a priority subtype of '3120 Oligotrophic waters containing very few minerals generally on sandy soils of the West Mediterranean, with *Isoetes* spp'.

The 'Standing waters' group of habitat types is particularly complex, with both priority subtypes of wider habitats and similar vegetation in two or more habitat types but separated by substrate and/or water quality. Fig. 2 tries to show this complexity, which has caused many problems for authorities trying to select sites.

Habitat type '3130 Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea*' includes two phytosociological classes. However, some communities within the class *Littorelletea uniflorae* can also be habitat types: '3110 Oligotrophic waters containing very few minerals of sandy plains (*Littorelletea uniflorae*)' or '3160 Natural dystrophic lakes and ponds' (order *Utricularietalia*) depending on the water quality. The class *Isoëto-Nanojuncetea* also includes '3120 Oligotrophic waters containing very few minerals generally on sandy soils of the West Mediterranean, with *Isoetes* spp' and its priority subtype '3170\* Mediterranean temporary ponds'.

There is also a problem in this group of habitats with '3150 Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* – type vegetation' as in many cases it is not always clear if a water body is eutrophic naturally or due to anthropogenic influences.

The pragmatic solution adopted to the problem of overlapping habitats is to assign the stand in question to the most restrictive definition.

#### HABITATS USUALLY FOUND AS MOSAICS OF SEVERAL TYPES

Some of the habitat types listed on Annex I usually occur as a group of several related types and rarely, if ever, occur as isolated stands. For instance the various dune habitat types in the Atlantic region (codes starting with 21) are usually found in a dynamic mosaic of two or more types. This causes problems when member states have to complete the standard data forms as the area of each habitat type found on a given site will change frequently and there are also likely to be difficulties with monitoring and reporting.

A related situation arises with '7110 Raised bogs', '7120 Degraded raised bogs still capable of natural regeneration' and '7130 Blanket bogs (\* if active bog)' which often include other habitats (such as '3160 Natural dystrophic lakes and ponds', '7150 Depressions on peat substrates of the *Rhynchosporion*' and/or '91D0\* Bog woodland') as components of the biotope complex.

#### OVER-COMPLICATION?

Some habitats have been divided into several Annex I habitat types, for example the various dunes habitat types mentioned above. Similarly the beechwoods (which for the Council of Europe 'EMERALD' network are treated as a single habitat type) are covered by 10 habitat types in Annex I. The phytosociological treatment of beechwoods by the European Vegetation Survey (Rodwell *et al.* 2002) lists sixteen alliances of which six are not, at least partly, covered by Annex I. Five of these alliances are included in habitat types proposed by Bulgaria and Romania which will be added to Annex I when these countries join the European Union. There is only one alliance present in the European Union and not, at least partially, covered by Annex I: the *Galio rotundifolii-Fagion* (acidic beechwoods in Corsica). This alliance is considered as a sub alliance within the *Luzulo luzuloidis-Fagion sylvaticae* in Bardat *et al.* (2004) but is not considered to be '9110 *Luzulo-Fagetum* beech forests' as that is defined as being Atlantic and

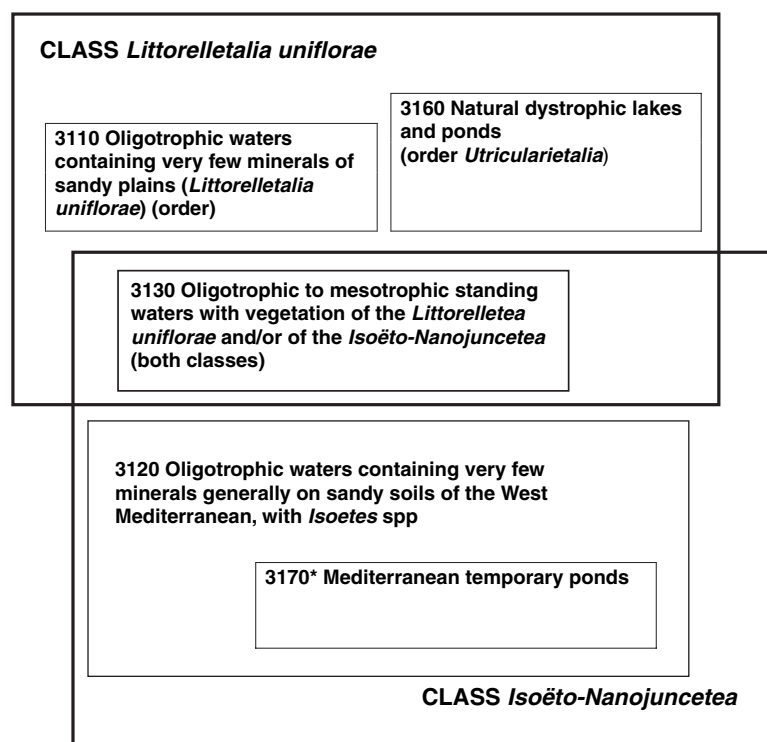


Fig. 2— The relationship among the standing water habitat types 3110, 3120, 3130, 3160 and 3170.

Continental. The communities are similar to '9210\* Apeninne beech forests with *Taxus* and *Ilex*' but that is defined as being endemic to the Apennines (F. Bensettiti, pers. comm.).

#### BEYOND THE LIMITS?

During the Biogeographical seminars it has been evident that some member states have identified plant communities of nature conservation interest and proposed them as the nearest Annex I habitat type even though they do not fully fit the definition. Thus, Greece proposed sites for '9120 Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrublayer (*Quercion robori-petraeae* or *Ilici-Fagenion*)', which on examination had little in common with that habitat type. Bulgaria has proposed several new forest habitats including some beechwoods and it is possible that the Greek stands proposed as 9120 will be covered by one of these new habitat types when Bulgaria joins the European Union.

Similarly Cyprus has proposed sites for habitat type '91E0\* Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)' for riparian forests of *Alnus orientalis*. It may be that these stands more closely fit another, more typically Mediterranean, habitat type and this is being investigated. Possibly a small

revision of a description in the Interpretation Manual will be required.

Several member states in southern Europe have proposed sites for '7110\* Active raised bogs', '7120 Degraded raised bogs still capable of natural regeneration' or '7130 Blanket bogs (\* if active bog)' which, although having some of the characteristic species of these habitats, do not have the peat structures associated with these habitats and should probably be classified as one of the wet heath communities or '7140 Transition mires and quaking bogs'.

#### DO WE HAVE THE RIGHT HABITATS?

The list of marine habitat types was agreed when it was thought that the Directive only applied to coastal waters (to 12 nautical miles) and the recent agreement that it applies to a much larger zone (to 200 nautical miles in the Atlantic) may require additional habitat types in the future.

Although there are some national red lists of rare and/or endangered habitats, such as published by Germany (Rennwald 2000) and Hungary (Borhidi and Sántha 1999) or in preparation in Austria (Essl *et al.* 2002) and the United Kingdom (J.S. Rodwell, pers. comm.), there is no European list with which to compare Annex I. For natural habitats it is possible to use maps of potential

natural vegetation, such as the map published by the Bundesamt für Naturschutz (Bohn *et al.* 2000–2003) to find the natural vegetation types that are the rarest in Europe. Evans (2005) examined Mediterranean sclerophyllous forests and scrub, and found that nine of the ten rarest mapping units could be assigned to an Annex I habitat type.

There are some habitats which do not appear in Annex I but which probably fall within the definition of ‘habitats of community interest’. Some of these were proposed in 2000–2002 as potential new habitat types by the then-candidate countries but rejected as they also occur widely in the EU15. Among such habitats are:

- poor Fens: only rich fens are listed as 7230 Alkaline fens;
- swamp woods: habitat ‘9080 Fennoscandian deciduous swamp woods’ only occurs in the Boreal region, while the related 91E0 is restricted to alluvial soils;
- springs: only petrifying springs and Fennoscandian mineral rich springs are listed;
- sub-alpine *Alnus viridis* scrub: only associated *Salix* scrub and tall herb communities are listed;
- pinewoods of the *Dicrano-Pinion*: partly covered by e.g. 9010, 91C0, 91T0 but all these have a restricted distribution.

This list is almost certainly incomplete but the European Commission has indicated that there will be no revision until after the 2000–2006 reporting has been assessed.

### CONCLUSION—WHAT HAVE WE GAINED?

As of June 2005, there are some 20,000 sites across the EU25 classified or proposed as SAC covering more than 500,000 km<sup>2</sup>. This includes 333,000 km<sup>2</sup> identified as being classified/proposed for Annex I habitats; and as the member states complete their site proposals these figures will increase. These sites should benefit from appropriate management where necessary; this is particularly important for the semi-natural habitat types (e.g. meadows and lowland heaths) dependent on extensive agriculture, which according to Ostermann (1998) form approximately a third of the habitat types of Annex I.

Once countries started to consider how to select possible sites for Natura 2000, it became apparent that in many countries there was a lack of information on habitat distribution and many countries have made considerable efforts to produce inventories and/or atlases for the Annex I habitats. In some instances this work was partly funded by the European Union via its LIFE fund as

in Cyprus and Spain. As a result of this work many countries have published atlases or handbooks such as the *Cahiers d’habitat* series in France (Bensettiti 2001–2005) and Poland (Herbich 2004) or the handbooks of Austria (Ellmauer and Traxler 2000) and Slovakia (Viceníková and Polák 2003). Often this information is available on the internet as in France (<http://natura2000.environnement.gouv.fr/>) and the United Kingdom ([http://www.jncc.gov.uk/ProtectedSites/SACselection/SAC\\_habitats.asp](http://www.jncc.gov.uk/ProtectedSites/SACselection/SAC_habitats.asp)).

Many projects funded by LIFE have included a research or survey element as well as practical conservation measures, and these have increased our understanding of many habitat types. In the United Kingdom alone projects have covered rivers, wet woods, oakwoods, Caledonian forests and grasslands. Further information on LIFE can be found at <http://europa.eu.int/comm/environment/life/home.htm> including a database of all projects that have been funded.

There have also been many research projects funded by the European Union to help with the implementation of the Habitats Directive and many of these concern the habitat types of Annex I. They include projects such as Biopress ([www.crea.uab.es/biopress/](http://www.crea.uab.es/biopress/)) looking at habitat and land use change, or projects such as SPIN ([www.spin-project.org](http://www.spin-project.org)) and EON2000+ ([www.eon2000plus.org](http://www.eon2000plus.org)), which are developing remote sensing tools for monitoring.

At national level the need to propose sites, to manage sites and to monitor and report on the conservation status of the habitat types has led to much work on habitat related issues, such as habitat mapping or research into the ecology of the habitat to allow effective management.

The Natura 2000 database has been used for several projects that are developing indicators for biodiversity-related issues across the European Union, such as the European Environment Agencies ‘core set of indicators’ (<http://themes.eea.eu.int/IMS/CSI>) and the IRENA indicators reporting on the integration of environmental concerns into agricultural policy (see <http://web.pubs.eea.eu.int/content/irena/index.htm>) being developed for the European Commission. The Natura 2000 database, together with information from the 2000–06 reporting cycle, may be a possible input to the SEBI2010 indicators to measure progress towards stopping loss of biodiversity in Europe by 2010.

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