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A classification of Palaearctic habitats

Nature and environment, No. 78

A classification of Palaearctic habitats

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species that relate the most to human awareness and subconscious. It is perfectly legitimate that more efforts are expended in favour of the large mammals which populate the tales of childhood or of the birds, butterflies or dragonflies which generate a capital of sympathy and identification than in favour of more obscure invertebrates or bacteria. If specific measures, including complex restoration plans, can be envisioned for the first, the conservation of the latter will more often coalesce with that of the habitats they inhabit.

The will to insure the survival of species, not only in the short term, but on the scale of generations to come, requires that their full capability of adaptation to a necessarily changing environment be preserved and that their populations be maintained in a satisfactory state of conservation with their complete spectrum of genetic characteristics and adaptive potential. It is impossible to predict which genetic material, which populations, will be the material of the future successful evolution of a species and the origin of its branching into new entities or lineages. In this context the preservation of peripheral populations has no more or no less importance than that of central ones. All the regional populations of a sensitive species must be protected.

Finally, the preservation of ecosystem diversity means the conservation of the network of interactions between species that is the basis of the mosaic of large and small scale landscapes to which the continent owes its richness. Beyond the intrinsic aesthetic and exemplary value of these biocoenoses, their preservation in all their complexity is also the only possibility of insuring with some success the conservation of the less obvious and less understood species for which particular efforts are unrealistic. Here again, the first prerequisite is that all distinctive regional manifestations of any sensitive type of habitat be identified and conserved. Like for species, the most fragile habitat classes may require integrated projects, parallel to specific restoration plans. The biogenetic networks of the Council of Europe are an essential first step towards such plans.

The knowledge and understanding of communities needed for such action is unfortunately not as available as that which concerns species or even populations. As a very first step, a catalogue of the recognizable communities formed by the flora and fauna in response to the abiotic environment and to each other's influence is a prerequisite to any attempt at characterizing sites in terms of their importance for nature conservation, of inventorying such sites, of constituting coherent networks of protected sites, or of monitoring the evolution of such networks.

Such a catalog was constructed for the European Community as part of the CORINE Biotope project of the Commission of the European Communities, both as a tool to describe sites and as an instrument of definition of criteria for site inclusion. Extensions to Central and Northern Europe were later sponsored by the Commission as part of the extension of the CORINE Project and are still in progress. The original Community catalog was published in 1991 by the Office for Official Publications of the European Communities as part of the CORINE Biotopes Manual. Its underlying methodology is briefly recalled in the following chapter, as it constitutes the foundation of the present work which extends the framework of the catalog to the area of responsibility of the Council of Europe. Need of future consistency encouraged us to situate it within a wider Palaearctic context and to insure its compatibility with a workable global system outlined below. The work was sponsored in part by the Council of Europe, and a first version of it was published in 1993, as document T-PVS (94) 1. We are grateful to Dr. Jean-Pierre Ribaut and to Dr. Eladio Fernández Galiano for inspiring it, as we are to Dr. Michel Cornaert, DG XI, Commission of the European Communities, for his constant interest in the establishment of an integrated, pragmatic reference tool to habitats.

II. THE PALAEARCTIC HABITATS TYPOLOGY

Definitions and structure

1. Habitat

In the most common usage, a habitat is "the natural home of an animal or plant" (Collins English Dictionary), "the normal abode or locality of an animal or plant" (Chambers Twentieth Century Dictionary), or "the natural abode of a plant or animal" (Webster's New Collegiate Dictionary). Integrating these definitions over all species, for each of which the habitat is the sum of the abiotic environment and of all other species present, a habitat can be defined as "a topographical expanse homogeneous in its physical and biotic components at the scale of the phenomenon studied" (Blondel, 1979, 1995). This is the definition that has been adhered to in the CORINE Habitat typology and the Physis data-base. Thus, a habitat is a three-dimensional spatial entity that comprises at least one interface between air, water and ground spaces, it includes both the physical environment and the communities of plants and animals that occupy it, it is a fractal entity in that its definition depends on the scale at which it is considered. The conditions encountered by a given species are similar on the entire surface of the habitat, but not all characteristics of the habitat are ever assembled at any one point (Blondel, 1979, 1995).

2. Scale

The definition of a habitat depends entirely on the scale at which it is considered (Blondel, 1979, 1995). Thus a steppe can be defined, as in the Physis Database, as a "formation dominated by medium or tall perennial tuft-forming grasses or suffrutescents, with lacunar ground cover, together with its associated therophyte communities". At a higher level of resolution it can be seen as a mosaic of habitats, bunches of tall perennial grasses on the one hand, bare surfaces temporarily supporting communities of therophytes on the other hand. At a lower level of resolution, the grass steppe and the steppe woods that dot it can be regarded as a single habitat, the wooded steppe. The level of resolution that has been used in the CORINE typology is that of the ecological requirements of small vertebrates, large invertebrates and vascular plants. A few units, clearly labelled, have been introduced to permit rendition by the use of single codes or combined codes of the ecological requirements of larger organisms or of the most mobile ones among the smaller ones.

3. Habitat typology unit

A unit in the CORINE habitat typology and the Physis database is a habitat type, thus a characterization of a collection of spatial entities that are considered equivalent as habitats, spatially separated but sufficiently alike in abiotic conditions, physiognomy, composition of plant and animal communities, to play similar roles from the point of view of nature conservation.

4. Limits of units

There is an unavoidable degree of arbitrariness in deciding whether two communities are sufficiently similar to be referred to the same unit, or conversely, sufficiently different to warrant distinctive treatment. In that respect, habitat classification does not differ from any

other taxonomic process. The difficulty is only slightly increased by the fact that intrinsic criteria, such as reproductive isolation, can never be invoked to separate communities. The guideline followed in the CORINE typology was that two habitats should be distinguished if the plant or animal communities they support were sufficiently distinct to confer to them different significances in the preservation of sensitive species. For plant communities, phytosociological criteria, recorded by the Braun-Blanquet approach, or any equivalent one, were used, where usually available, to assess degree of divergence and its relevance to sensitive species. For animal communities, data are often lacking precisely for the groups most in need of habitat conservation rather than species-specific programmes. Physiognomy, plant dominance, ecological conditions and biogeographical parameters, including geographical separation, have been used to assess distinctness.

5. Hierarchical arrangement

All habitat classifications use, alone or in combination, similarities in physiognomy, abiotic conditions, plant community composition, plant dominance, plant community succession and, sometimes, animal community composition to combine elementary units into collective entities of successively higher rank (Dierschke, 1994). Contrary to classical species taxonomy, habitat classification cannot claim to include, among others, a "natural" system of ordering based on the best available perception of phylogenesis, thus on the history of the evolutionary process. Thus, the priority given to the various criteria and the ensuing classifications are necessarily a matter of choice. The guideline of the CORINE habitat classification has been to use, 1, large-feature physiognomy, 2, plant-community composition and 3, biogeographical or ecological factors underpinning animal-community composition, in that order. This principle has, however, been occasionally departed from, when necessary, to ensure maximum compatibility with existing local schemes. Sequence and level within a division carry no intrinsic meaning as to conservation significance or affinities with other units of equal rank. Only the series of nested ensembles of successively higher ranks is an indication of cladistic relationship, the rank of individual units derives from varying needs for finer subdivision, and their sequence from the historical growth of the list.

Rules of evolution

1. Legitimate steady-state evolution

Legitimate steady-state evolution comprises the amendments that will naturally occur in the course of time as understanding of the habitats of the geographical area improves, as new needs of identification arise, as an increasing portion of the total geographical area concerned is examined in detail. These amendments should not, and do not, affect previous applications of the list. They are limited to two operations: subdivision of units, improvement of unit description.

1.1. Subdivision of units

It is the operation by which a formerly undivided unit is partitioned into a number of sub-units the sum of which equals the original unit. It does not affect the content of the unit nor its geographical distribution although it is, of course, possible that some of the sub-units will occur only in part of the area occupied by the undivided unit. Exactly as in the case of the taxonomic splitting of a species, any legal status that was attached to the undivided unit is automatically transferred to all its sub-units.

1.2. Improvement of unit description

It is the operation by which the description of a unit is completed or clarified, with, as appropriate, a more accurate description of its geographical distribution, its ecology, a more complete list of characteristic species, a more adequate title. It does not in any way affect the content of the unit.

2. Early stage acceptable evolution

Early stage acceptable evolution comprised the changes that were made necessary by the expanding area covered until the Palaearctic framework was established. These changes resulted from two processes: insertion of units, expansion of units prior to subdivision. They did not affect previous applications of the list beyond regulated code adaptations spelled out below.

2.1. Addition of units

It is the operation by which units limited to newly covered areas are added at the end of a list of units of equal rank. It does not affect the content or coding of the existing units of that rank, nor the content, within the geographical area previously covered by the list, of the unit of higher rank that includes them.

2.2. Expansion and partition of units

It is the operation by which the content of an existing undivided unit is broadened prior to being partitioned, its original content being then retained by one or several of the new sub-units. This operation has been much used to place a unit that had been defined within a narrow geographical framework into a broader context and introduce alongside it its close relatives in the new geographical areas covered. The operation does not affect the content of the original unit in its original area of occurrence, it does, however, also transfer its precise content to one or several of its new sub-units which, by convention, have always been listed first.

3. Correction of oversights

Unavoidably, especially in the early stages of the development of the typology, habitats were overlooked, misevaluated or misplaced. These errors have given rise to the need for modifications, which should become less and less frequent as the scheme develops. Most of these corrections have not affected the previous application of units. They are reviewed in this paragraph. A few corrections lead to more significant alterations which are discussed under "undesirable changes".

3.1. Fusion of units

It is the process by which the sub-units of a formerly subdivided unit are re-merged into it because subdivision no longer appears supported. This process, which has been very little, if at all, used, does of course not affect the application of the upper unit concerned and does not differ from the routine process that consists, for a user of the list, of not resorting to divisions finer than a chosen level.

3.2. Suppression of units

It is the process by which one or several units are suppressed, either because they are judged identical to a unit included in another hierarchical position or because they are merged with a unit of the same rank within the same hierarchical super-unit. It does not affect the application of units not suppressed provided the numbering within the super-unit concerned is not modified.

3.3. Insertion of units

It is the operation by which units are added at the end of a list of units of equal rank. It differs from the process labelled "addition of units" only in that the new units are not limited to newly covered areas. It reflects an incomplete partition of the unit of higher rank. The correction does not affect the content or coding of the existing units of lower rank, nor the content of the unit of higher rank that includes them, since the new unit was already implicitly included in it.

4. Undesirable changes

Changes that affect the application of existing units are undesirable and have been avoided except in very limited cases when either a grave error could not otherwise be corrected or when a consensus existed to adopt a better arrangement of a limited number of units prior to a major development of the typology. Conceivable changes of this category are of three orders: translocation of units, renumbering of units, rearrangement of hierarchies.

4.1. Translocation of units

It is the operation by which a unit is entirely transferred from one hierarchical position to another. It affects the content of both the super-unit from which it is moved and the super-unit from which it is transferred. It must be limited to rare cases where it is found by further analysis that the definition of the upper unit is absolutely unsuitable to the inclusion of the lower unit or that it would make the definitions of the two higher units concerned not mutually exclusive. Only one instance has affected the 1991 published list, the transfer of units 31.64 to 37.89. It did not affect other units within 31.6 nor the definition of 31.6, which 31.64 was not consistent with, while 37.89 was in any case newt, the 1991 list having only listed 8 subdivisions under 37.8.

4.2. Renumbering of units

It is the operation by which units are reordered and/or renumbered within a higher unit. As the order of units of equal rank within the classification has no significance, there is never a justification for performing this operation and it was never done on the 1991 published version, except to correct typographical errors that led to duplication of code numbers or accidental skipping of numbers. These, of course, implied no reordering.

4.3. Rearrangement of hierarchies

It is the process by which a number of units are rearranged to achieve a more satisfactory hierarchical presentation. Such an operation considerably upsets existing application of the units concerned and must be avoided if only justified by a quest for an intellectually more satisfactory presentation. That it is rarely otherwise indispensable is

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The arrangement as well as the descriptions of the units within the typological lists were largely drawn from the abundant literature emanating from the efforts of numerous European phytosociologists. In particular, the fundamental and elucidating descriptive work of Ellenberg (1963, 1988) provided many definitions, unit names and key species, while the construction of the list closely followed the regional syntheses of Oberdorfer (1990), Horvat *et al.* (1974), Ozenda (1985), Peinado Lorca and Rivas-Martinez (1987) and the European overviews of Ozenda *et al.* (1979) and of Noirfalise (1987). For particular habitats, the Nature and Environment Series of the Council of Europe and the analysis of forest habitats by Noirfalise (1984) provided a framework. The hierarchical vegetation list of Géhu (1984), supported by the wealth of information assembled by the Colloques phytosociologiques that he has guided, was the main leading line of the list.

This phase of development of the habitat classification concerned only with the European Community in its 12-Member State configuration, ended in 1991 with the publication of the first publicly distributed CORINE-BIOTOPES manual (Moss *et al.*, 1991), which included a completed typology with descriptive texts (Devillers *et al.*, 1991). This publication is the version of the decimal classification that has been considered basically unchangeable in further developments, as explained above under rules of evolution

4. Extensions

After the 1991 publication, three lines of development led to the present draft classification. Firstly, the typological list was developed by C. Vander Linden into a database incorporated within the PHYSIS system of the Institut Royal des Sciences Naturelles de Belgique, of which this is the December 1995 version. This version is still a working document, in course of elaboration. Comments, criticisms and suggestions of users are eagerly sought.

Secondly, development of previously poorly covered habitat types has been initiated. The treatment of caves has undergone a first improvement in cooperation with M. Oltean and his team. The marine habitats have received a new framework after consultation of marine experts involved in the BIOMAR project, in particular, K. Hiscock, D. W. Connor, C. O'Criodain, in preparation of the establishment of a compatible typology in the context of that programme (cf. Hiscock and Connor, 1991).

Thirdly, further geographical extension of the typology was undertaken. A level of coverage similar to that of the European Community is progressively being reached for Poland, the Czech Republic, Slovakia, Hungary, Rumania and Bulgaria. This process is nearing completion in this version and has, or is, receiving considerable contribution from the CORINE PHARE teams, in particular from A. Dyduch-Falniovska, R. Kazmierezak, E. Kovacs-Lang, T. Patkai, G. Fekete, M. Ruzicka, P. Elias, N. Donita, G. Coldea, M. Oltean, T. Chifu, G. Spiridonov, T. Meshinev, I. Apostolova, D. Peev, V. Velshev, P. Vassilev, A. Petrova, R. Hardalova, N. Videnova, Söderman, M. Paar, U. Bohn. The hierarchic structure for Iceland, Norway, Sweden and Finland has been essentially finalized after consultation with U.Pinborg and through her with her colleagues of the Nordic Council of Ministers. Full correspondence with the vegetation catalog of the Council, *Vegetationstyper i Norden* (Nordiska ministerradet, 1984; Nordic Council of Ministers, 1985) insures that descriptions of the units can be readily derived from a centralized source. Unit descriptions, prepared by L. Pauhlson, are progressively being entered and will be incorporated in later versions.

Beyond Central and Northern Europe, the hierarchical list has been extended to the Council of Europe 1993 Member States. Detailed subdivisions in that area are provisional and have not yet been validated through consultation. Descriptions for the new units generated are in the course of preparation. To ensure future consistency and harmonious evolution, the typology framework has been widened to the Palaearctic context and its compatibility with a workable global system outlined. Subdivisions in this larger area are under preliminary study and are not included in this version.

III. A GLOBAL SYSTEM OF HABITAT CLASSIFICATION

Method

The CORINE Biotopes habitat list grew progressively as the Community enlarged, then, as extensions of the programme outside the borders of the Community were contemplated. This resulted inevitably in basing its structure along concentric circles from its original area of interest. At the time of making it take a new spatial leap forward, it was deemed necessary both to verify any further possible extensions on the Eurasian continent by immediately expanding the basic framework so as to encompass the entire Palaearctic region and to ensure that it could fit within a global system of habitat classification that will in any case be necessary within the framework of the Biodiversity Convention. Many such global systems are of course possible, and the one outlined here has no pretention to be unique, exclusive or optimal. It is presented only to demonstrate a way in which compatibility between the CORINE regional system and other subglobal schemes developed independently in other parts of the world could be ensured through a flexible integrating system.

The integrating system proposed rests on the matrix-use of two existing sets of upper category describers, the biotic realms of the I.U.C.N. bio-genetic reserve network system (Udvardy, 19), on the one hand (Table 1), and a list of upper units of habitats derived from the two-digit CORINE categories (Wyatt *et al.*, 1982; Devillers *et al.*, 1991) on the other hand (Table 2).

Upper units of habitat within any realm are then designated by combination of a realm digit in the third rank to the left of the decimal point with a biotope class number of two digits in the second and first ranks. Thus, Palaearctic temperate conifer forests are designated by 042 (42), North American ones by 142, South American ones by 742. Lower divisions, characterized by digits to the right of the decimal point, are specific to each realm and not necessarily homologous between units formed with the same second and first rank digits, but different first rank digits. Thus, Palaearctic juniper and cypress woods are coded as 42.A, with 42.A1, for instance, corresponding to northern Hellenic Grecian juniper woods, while in an experimental draft prepared for North America, *Juniperus osteosperma-Juniperus monosperma-Juniperus deppeana-Cupressus arizonica* woodland of central Arizona is coded as B42.517, as part of piñon-juniper woodlands (142.51) in south-western summer drought forests (142). There is, however, no reason not to preserve the lower unit hierarchy as far down as possible for types of habitat with more evident cosmopolitan homologies, such as marine habitats.

Table 1. Biotic realms

0 Palaearctic
1 Nearctic
2 Afrotropical
3 Indomalayan
4 Oceanian
5 Australian
6 Antarctic
7 Neotropical

(from Udvardy, 1975)

Table 2. Biotope classes

1	**Coastal and halophytic communities**
11	Ocean and seas, marine communities
12	Sea inlets and coastal features
13	Estuaries and tidal rivers
14	Mud flats and sand flats
15	Salt marshes, salt steppes, salt scrubs, salt forests
16	Coastal sand dunes and sand beaches
17	Shingle beaches
18	Sea-cliffs and rocky shores
19	Islets, rock stacks, reefs, banks, shoals
1A	Coastal agrosystems
2	**Non-marine waters**
21	Coastal lagoons
22	Standing fresh water
23	Standing brackish and salt water
24	Running water
3	**Scrub and grassland**
31	Temperate heath and scrub
32	Sclerophyllous scrub
33	Phrygana
34	Steppes and dry calcareous grasslands
35	Dry siliceous grasslands
36	Alpine and subalpine grasslands
37	Humid grasslands and tall herb communities
38	Mesophile grasslands
39	Tundra
3A	Tropical grasslands
3B	Tropical shrublands
3C	Tropical alpine communities

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the north-eastern edge of the Australian continental plate. Neither arrangement is entirely satisfactory. In addition, New Guinea, placed in an Oceanian Realm by Udvardy, is climatically, ecologically and, in part, at least, floristically (Van Steenis, 1948; Specht and Womersley, 1979) more closely related to south-east Asia, faunistically, to Australia. We have thus preserved Udvardy's extended understanding of the Indo-Malayan realm by including, together with Sumatra, Java, the Lesser Sunda Islands, Borneo and the Philippines, the Celebes and Timor, but have added to it New Guinea and its satellite islands, east to the Bismarck archipelago and Bougainville (thus respecting the political borders of Papua-New Guinea), subtracted from the Oceanian Realm. The Seychelles, the Amirantes, the Mascarenes, the Laccadives, the Maldives and Chagos, the Cocos-Keeling and Christmas Islands, the Andaman and Nicobar Islands are included.

4. *Oceanian realm*

The Oceanian realm is formed by the tropical and subtropical Pacific islands remote from the Asian, Australian and American continental plates, and west of the the East Pacific Ridge. They include New Caledonia, the New Hebrides, Fiji and Tonga, the Micronesian Islands, the Polynesian Islands, the Hawaii archipelago.

5. *Australian realm*

The Australian realm is constituted by Australia, Tasmania, and their nearshore islands.

6. *Antarctic realm*

The Antarctic realm is composed of the Antarctic continent and the southern oceanic islands, including New Zealand, the Kermadec, Chatham, Aukland, Campbell, Antipodes and Bounty islands, Macquarie Island, the Balleny Islands, Lord Howe and Norfolk islands, Heard Island, the Kerguelen, Crozet, St. Paul and Amsterdam islands, Prince Edward Island, Bouvet Island, Tristan da Cunha and Gough Island, the South Shetland, South Orkney, South Sandwich, South Georgia and Falkland islands.

7. *South American realm*

The South American, or Neotropical, realm is formed by South America and its nearshore islands. Trinidad and Tobago, Margarita, Aruba, Curaçao, Bonaire, Los Roques, Blanquilla and associated islands, the Galapagos Islands, Malpelo Island, the Juan Fernandes Islands, the San Felix archipelago, Fernando de Noronha, South Trinidad and the Martin Vas islands, St. Peter and St. Paul rocks, Easter Island and Sala y Gomez are included.

Definition of higher habitat units

The higher habitat units are directly derived from those proposed by Wyatt *et al.*, 1982 as revised in the course of the CORINE Biotope project (Devillers *et al.*, 1992). Their extension to global applicability has largely drawn upon the ecological analyses of Walter (1979) and Walter and Breckle (1986, 1991a, b, c), upon the characterisation of major plant formations of the world by Riley and Page (1990) and, for marine habitats, upon the synthesis of Barnes and Hughes (1988).

1. *Coastal and halophytic communities*

11. *Ocean and seas, marine communities*

Oceanic and continental shelf waters of the world ocean and its connected seas, their associated open-water and bottom communities, and marine vascular vegetation beds; marine communities of the littoral zone and of coastal lagoons.

12. *Sea inlets and coastal features*

Bays and narrow channels of the oceans and their connected seas, including sea lochs or loughs, fiords or fiards, rias and straits but excluding estuaries and lagoons. Detailed habitats can be coded by combining subdivisions of prefix 11 with the relevant physiographic subdivisions of 12.

13. *Estuaries and tidal rivers*

Broadening of rivers entering the oceans or their connected seas and river channels below the tidal limit. Included are all marine or marine-related pelagic and benthic communities, which can be precised by subdivisions of 11, and all river course and river bed communities, which can be precised by subdivisions of 24. The belts of fringing vegetation are excluded and indicated separately by use of 53 and its subdivisions.

14. *Mud flats and sand flats*

Sands and muds of the coasts of the oceans, their connected seas and associated lagoons, submerged for part of every tide or for part of the annual cycle, devoid of vascular plants, but usually coated by blue algae and diatoms. They are of particular importance as feeding grounds for wildfowl and waders. The diverse intertidal communities of invertebrates and algae that occupy them can be precised by use of the subdivisions of 11.27, eelgrass communities that may be exposed for a few hours in the course of every tide by use of those of 11.3, brackish water vegetation of permanent pools by use of those of 11.4.

15. *Saltmarshes, salt steppes, salt scrubs, salt forests*

Communities of phanerogamic plants, for the most part halophytes, colonizing sites submerged by high tides at some stage of the annual tidal cycle of oceans and their connected seas. Similar halophyte communities colonizing inland permanent or temporary saline, hypersaline or brackish waterbodies and their periphery, including inland closed seas, lakes, pools, sebkhas, rivers, springs, seeps. By extension, azonal, strongly differentiated, communities developing on habitually dry, alkali, chlorid or gypseous soils of steppe or forest zones. Zonal communities of the desert and semi-desert areas, composed, to varying degrees, of halophytes or gypsophytes, are listed under 7. Some saline communities with strong physionognimic similarity to fresh water ones into which they may merge, may be listed in other sections, together with their freshwater counterparts.

16. *Coastal sand dunes and sand beaches*

Sand-covered shorelines of the oceans, their connected seas and associated coastal lagoons, fashioned by the action of wind or waves.

17. *Shingle beaches*

Beaches of the oceans, of their connected seas and of their associated coastal lagoons, covered by pebbles, or sometimes boulders, usually formed by wave action.

18. *Sea-cliffs and rocky shores*

Rock exposures adjacent to the oceans, their connected seas and associated coastal lagoons, or separated from them by a narrow shoreline. The faces, ledges and caves of sea-cliffs and the expanses of rocky shore are important as reproduction, resting and feeding sites for sea-birds, sea-mammals and a few groups of terrestrial birds, composing regionally distinct assemblies listed under 18.1. The presence of major sea-caves can be indicated by addition of codes of 12. Sea-cliffs may also harbour highly distinctive, specialized aerohaline plant communities with associated terrestrial faunas, listed under 18.2. The mediolittoral (intertidal or wave-washed) and supralittoral (spray) zones are inhabited by rich and diverse communities of invertebrates, fish and algae that have been listed under 11.

19. *Islets, rock stacks, reefs, banks, shoals*

Permanently emerging, periodically uncovered, surface-breaking or near-surface raised features of the oceans, their connected seas and coastal waters, with their associated marine and terrestrial communities. The associated marine habitats can be coded by combining subdivisions of prefix 11 with the relevant physiographic subdivisions of 19, the terrestrial habitats by adding codes from 3 and 4.

1A. *Coastal agrosystems*

Complex ecosystems, restricted to coastal areas, and combining natural or seminatural habitats characteristic of 11, 15, 16, 17 or 18 with agropastoral landscapes otherwise listed in 8, as well as more minor elements borrowed from other units.

2. *Non-marine waters*

21. *Coastal lagoons*

Saline or hypersaline waters of the vicinity of the oceans and their connected seas, often formed from sea inlets by silting and cut off from the sea by more or less effective obstacles such as sand or mud banks. The presence of marine invertebrate communities or vegetation can be indicated by combination with the relevant physiographic subdivisions of 21 of codes from 11; the presence of communities of athalassal affinities can similarly be indicated by addition of codes of 23.

22. *Standing fresh water*

Lakes, ponds and pools of natural origin containing fresh (*i.e.* non-saline) water. Semi-natural aquatic communities occupying man-made fresh water bodies, including artificially created lakes, reservoirs and canals.

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84. *Tree lines, hedges, rural mosaics*

Ligneous formations of small size, arranged in a linear, reticulated or insular manner, closely interwoven with grassy or cultivated habitats. Also, combinations of such elements and mixed agricultural formations, containing both ligneous and herbaceous layers. Very artificial, disturbed or heterogeneous systems, containing many planted or exogenous elements can be listed here while more natural ensembles utilising many natural elements and covering substantial surfaces are better classified under section 9.

85. *Urban parks and large gardens*

Usually varied formations, created for recreational use. The vegetation, usually composed mainly of introduced species or cultivars, can nevertheless include many native plants and supports a varied fauna when not intensively managed. The heterogeneity of the habitat engenders a high faunal diversity with, however, a preponderance of common species. The frequent presence of old trees favors the installation of rarer specialists.

86. *Towns, villages, industrial sites*

Areas used for human occupation and industrial activities. A considerable fauna has adapted to buildings. Some bird species nest nearly exclusively in them, using mostly structures with traditional architecture. Other species, of montane rocky habitats, have colonized lowlands in villages and towns. Bats roost in buildings. Rock plants colonize old walls and roofs.

87. *Fallow land, waste places*

Fields abandoned or left to rest, roadsides and other interstitial spaces on disturbed ground. They are colonised by numerous pioneering, introduced or nitrophilous plants. They sometimes provide habitats that can be used by animals of open spaces.

88. *Mines and underground passages*

Artificial underground spaces. They may constitute important substitute habitats for cave-dwelling animals such as bats.

89. *Industrial lagoons and reservoirs, canals*

Very artificial aquatic habitats; semi-natural communities that might colonize them can be indicated by use of codes of 15, 22, 23 or 24.

9. *Wooded grasslands and scrubs*

91. *Parklands*

Extensive surfaces characterized by mixed agro-pastoral formations, combining ligneous and herbaceous elements on the same surfaces.

92. *Bocages*

Reticulated landscapes of small linear, insular and semi-insular wooded habitats, tree-lines, hedgerows, closely interwoven with grassy or cultivated habitats. Also, combinations of such elements and mixed agricultural formations, containing both ligneous and herbaceous layers.

93. *Wooded steppe*

Formations of the transition zones between forests and continental steppes, occurring in mid-latitudes 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 macromosaïc 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. Detailed habitats can be coded by combining subdivisions of prefixes of 4 and 3 with the relevant geographical or physiographic subdivisions of 93.

94. *Wooded tundra*

Formations of the transition zone between taiga and tundra, characterized by a scattering of stunted coniferous trees or deciduous shrubs within a tundra environment, or by a macromosaïc of tundra with scattered islands of forest, or by forest with scattered treeless tundra patches. They occur in a broad belt, up to several hundreds of kilometers wide, across the north of the northern continents and in a narrow ecotone in high-latitude mountains. Detailed habitats can be coded by combining subdivisions of prefixes 39 and 4 with the relevant physiographic subdivisions of 94.

95. *Treeline ecotones*

Formations of the timberline, or combat zone (*Kampfzone, zone de combat*) of mountains, in which subalpine forests give way to alpine or boreal heaths and scrubs, to alpine grasslands, or to tropical alpine communities; they are characterized by a scattering of stunted, gnarled trees punctuating an alpine shrub or grassland environment, by a macromosaïc of alpine shrub and grass formations with scattered islands of forest, or by open or clear forest with an undergrowth composed of alpine elements such as ericaceous shrubs. They occupy a narrow belt, varying in altitudinal location according to latitude, exposure and other climatic or edaphic conditions. Detailed habitats can be coded by combining subdivisions of prefixes 31, 36, 37, 3C, 41, 42, 43 or 49 with the relevant physiographic subdivisions of 95.

96. *Savannas*

Formations transitional between tropical grassland and dry tropical woodland or, sometimes, tropical forests, including both homogeneous surfaces of grassland with a more or less even, more or less dense, scattering of trees or tall shrubs, and macromosaïcs of grasslands and isolated or connected stands of woodland. The grasslands involved may be savanna grasslands, tropical seasonally flooded grasslands, tropical permanently flooded grasslands or tropical steppes, the woodlands are usually dry tropical woodlands (dry forest,

bushland, scrub forest, scrub woodland), sometimes fragments of monsoon forest, rain forest or tropical swamp forest.

97. *Wooded deserts and semideserts*

Formations of the sub-tropical desert zones resulting from the colonisation by dry tropical woodland trees of shrubby or grassy semi-desert or desert communities. Included are desert savannas, pseudo-steppes and sand-dune open woodlands.

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15.A1244 Pannonic few-flowered spikerush saline meadows
15.A125 Pannonic divided sedge saline meadows
15.A126 Dacian saline meadows
15.A1261 Transylvanian arrow-grass sea-aster saline meadows
15.A1262 Transylvanian plantain bent-grass saline meadows
15.A13 Pannonic solonetz hollows
15.A131 Pannonic *Puccinellia limosa* hollows
15.A132 Pannonic *Camphorosma* hollows
15.A133 Pannonic *Bassia sedoides* hollows
15.A134 Pannonic *Pholiurus-Plantago* hollows
15.A135 Pannonic barley hollows
15.A14 Pannonic solonchak hollows
15.A141 Pannonic *Lepidium-Puccinellia limosa* hollows
15.A142 Seewinkel *Puccinellia peisonis* swards
15.A143 Pannonic *Lepidium-Camphorosma* hollows
15.A144 Seewinkel *Lepidium* swards
15.A15 Pelagonian salt steppes
15.A2 Ponto-Sarmatic salt steppes and saltmarshes
15.A21 Western Pontic salt steppes and saltmarshes
15.A211 Western Pontic saline steppes
15.A2111 Western Pontic *Achillea-Festuca* steppes
15.A2112 Western Pontic *Artemisia-Festuca* steppes
15.A2113 Western Pontic *Petrosimonia-Artemisia* salt steppes
15.A2114 Western Pontic *Peucedanum-Festuca* salt steppes
15.A2115 Western Pontic *Limonium-Artemisia* salt steppes
15.A212 Western Pontic saline meadows
15.A2121 Western Pontic *Zingeria* saline meadows
15.A2122 Western Pontic *Beckmannia* saline meadows
15.A2123 Western Pontic spikerush-foxtail saline meadows
15.A2124 Western Pontic saltmarsh rush saline meadows
15.A21241 Western Pontic viper's grass saltmarsh rush saline meadows
15.A21242 Western Pontic dandelion distant sedge saline meadows
15.A21243 Western Pontic rye sedge saline meadows
15.A21244 Western Pontic bent-grass distant sedge saline meadows
15.A2125 Western Pontic divided sedge saline meadows
15.A2126 Western Pontic arrow-grass sea-aster saline meadows
15.A2127 Western Pontic tall grass and rush saline beds
15.A21271 Western Pontic tall rush saline beds
15.A21272 Western Pontic *Rottboellia* saline beds
15.A21273 Western Pontic *Agropyron elongatus* saline beds
15.A21274 Western Pontic tall fescue saline beds
15.A21275 Western Pontic *Cynodon* saline beds
15.A213 Western Pontic solonetz hollows
15.A2131 Western Pontic *Puccinellia* solonetz swards
15.A2132 Western Pontic *Camphorosma annua* hollows
15.A2133 Western Pontic *Bassia sedoides* hollows
15.A2134 Western Pontic *Pholiurus-Plantago* hollows
15.A2135 Western Pontic *Hordeum hystrix* swards
15.A214 Western Pontic solonchak communities
15.A2141 Western Pontic *Lepidium* solonchak hollows
15.A2142 Western Ponto-Caspian saltflats

15.A21421 Western Pontic *Petrosimonia* flats
15.A21422 Western Pontic *Frankenia hirsuta* flats
15.A21423 Western Pontic *Limonium* flats
15.A21424 Western Pontic *Camphorosma monspeliaca* flats
15.A21425 Western Pontic stalked orache flats
15.A2143 Western Ponto-Caspian saltmarsh grass swards
15.A21431 Western Pontic *Aeluropus* swards
15.A21432 Western Pontic *Aeluropus-Puccinellia limosa* swards
15.A21433 Western Pontic *Puccinellia convoluta* swards
15.A215 Western Ponto-Caspian salt scrubs
15.A2151 Western Pontic *Halimione* scrub
15.A2152 Western Pontic *Halocnemum* scrub
15.A2153 Western Pontic *Nitraria schoberi* salt scrub
15.A22 Sarmatic salt steppes and saltmarshes
15.A221 Sarmatic saline steppes
15.A2211 Sarmatic *Artemisia-Festuca* salt steppes
15.A2212 Sarmatic *Petrosimonia* salt steppes
15.A2213 Sarmatic *Limonium-Festuca* salt steppes
15.A2214 Sarmatic *Leymus* saline steppes *
15.A222 Sarmatic saline meadows
15.A2221 Sarmatic *Beckmannia eruciformis* saline meadows
15.A2222 Sarmatic *Leuzea altaica* saline meadows
15.A2223 Sarmatic *Iris halophila* saline meadows
15.A2224 Sarmatic *Juncus gerardii* saline meadows
15.A2225 Sarmatic *Carex distans* saline meadows
15.A223 Sarmatic solonetz hollows
15.A2231 Sarmatic *Puccinellia limosa* hollows
15.A2232 Sarmatic *Puccinellia tenuissima* hollows
15.A224 Sarmatic solonchak hollows
15.A2241 Sarmatic *Lepidium* solonchak hollows
15.A2242 Sarmato-Ponto-Caspian saltflats
15.A23 Eastern Pontic salt steppes and saltmarshes *
15.A24 Euxinian saltmarshes
15.A3 Central Eurasian salt steppes and saltmarshes *
15.A4 East Asian salt steppes and saltmarshes *
15.A5 Irano-Anatolian salt steppes and saltmarshes
15.A51 Western Anatolian salt steppes and saltmarshes
15.A511 Anatolian *Halocnemum* steppes
15.A512 Anatolian *Artemisia-Salsola* steppes
15.A513 Anatolian rosette steppes
15.A5131 Anatolian *Frankenia hirsuta* salt steppes
15.A5132 Anatolian *Petrosimonia* salt steppes
15.A514 Anatolian *Puccinellia-Limonium* salt steppes
15.A515 Western Anatolian *Juncus maritimus* formations
15.A52 Central Irano-Anatolian salt steppes and saltmarshes
15.A53 Irano-Afghan salt steppes and saltmarshes *
15.A54 Northern Mesopotamian salt steppes and saltmarshes
15.A6 North African salt steppes and saltmarshes *
15.A7 Yakutian boreal salt steppes and saltmarshes *

15.B Arctic salt meadows

15.B1 Lower shore arctic salt meadows
15.B11 *Puccinellia phryganodes* swards
15.B12 *Carex subspathacea* swards
15.B13 Arctic *Puccinellia maritima* swards
15.B14 Spitzbergen *Carex ursina* swards
15.B15 Icelandic *Carex salina* swards
15.B2 Upper shore arctic salt meadows
15.B21 *Carex glareosa-Festuca rubra* swards
15.B22 Icelandic *Kobresia* swards
15.B23 *Puccinellia coarctata* swards
15.B24 *Festuca-Mertensia* swards
15.B25 Spitzbergen moss-*Dupontia* communities
15.B26 *Carex rariflora* communities
15.B27 Arctic *Carex mackenziei* swards
15.B3 Sulphurous arctic salt meadows

15.C Saharo-Sindian saltmarshes *

15.D Tropical salt meadows *

16. COASTAL SAND DUNES AND SAND BEACHES

16.1 Sand beaches

16.11 Unvegetated sand beaches
16.12 Sand beach driftline communities
16.121 Boreo-Arctic sand beach annual communities
16.1211 Eurasian Arctic sand beach annual communities
16.1212 Icelandic sand beach annual communities
16.1213 Greenland sand beach annual communities
16.122 Middle European sand beach annual communities
16.1221 Atlantic sand beach annual communities
16.1222 Baltic sand beach annual communities
16.1223 Boreo-Bothnian sand beach annual communities
16.123 Tethyan sand beach driftline communities
16.1231 Mediterraneo-Atlantic sand beach annual communities
16.1232 Pontic sand beach annual communities
16.1233 Pontic sand beach perennial communities
16.12331 Pontic sand beach *Crambe* communities
16.123311 South-western Pontic sand beach *Crambe* communities
16.123312 North-western Pontic sand beach *Crambe* communities
16.12332 Pontic sand beach *Lactuca* communities
16.12333 Pontic sand beach *Argusia* communities
16.12334 Pontic sand beach *Petasites* communities
16.124 Temperate Pacific sand beach annual communities *
16.13 Boreo-Arctic sand beach perennial communities
16.131 North Sea sand beach perennial communities
16.132 Baltic sand beach perennial communities

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22.4315 Amphibious bistort carpets
22.4316 Sacred lotus beds
22.4317 Long-leaved bur-reed carpets
22.432 Shallow-water floating communities
22.4321 Water crowfoot communities
22.4322 Water starwort communities
22.4323 Water violet beds
22.433 Oligotrophic pondweed communities
22.44 Chandalier algae submerged carpets
22.441 *Chara* carpets
22.442 *Nitella* carpets
22.45 Peatmoss-bladderwort bog pools

22.5 Turlough and lake-bottom meadows

22.6 Lacustrine islets

23. STANDING BRACKISH AND SALT WATER

23.1 Athalassic saline lakes

23.11 Salt basins and salt basin pelagic communities
23.111 Boreal-Nemoral and Arctic salt lakes
23.112 Mediterranean salt lakes
23.113 Ponto-Pannonic salt lakes
23.114 Central Eurasian salt lakes *
23.115 East Asian salt lakes *
23.116 Irano-Anatolian salt lakes
23.117 Saharo-Mediterranean and Saharo-Sindian salt lakes *
23.118 Tropical salt lakes *
23.12 Salt basin charophyte carpets
23.13 Salt basin benthic communities
23.14 Salt basin muds or shingles

23.2 Athalassic saline euhydrophyte communities

23.21 Submerged formations
23.211 Athalassic tasselweed communities
23.212 Athalassic seagrass communities *
23.22 Athalassic dwarf spike-rush beds *
23.23 Athalassic brackish water floating communities

23.3 Salt lake islands

23.4 Salt lake beaches *

23.5 Salt lake estuaries *

24. RUNNING WATER

24.1 Rivers and streams

24.11 Crenal streams
24.12 Epirhitral and metarhitral streams
24.13 Hyporhitral streams
24.14 Epipotamal streams
24.15 Metapotamal and hypopotamal streams
24.16 Intermittent streams
24.17 Waterfalls

24.2 River gravel banks

24.21 Unvegetated river gravel banks
24.22 Vegetated river gravel banks
24.221 Boreo-alpine stream gravel communities
24.2211 Alpine willowherb river gravel communities
24.2212 Boreo-arctic alluvial gravel communities
24.22121 Boreo-arctic mountain sorrel river gravels
24.22122 Icelandic willowherb river gravels
24.22123 Boreo-arctic *Rhacomitrium* river gravels
24.2213 Central Eurasian alpine river gravel communities *
24.2214 Far Eastern alpine river gravel communities *
24.222 Montane river gravel communities
24.2221 River gravel chondrilla communities
24.2222 Small-reed river gravel communities
24.22221 Carpatho-Alpine small-reed river gravel communities
24.22222 Pyreneo-Cantabric small-reed river gravel communities
24.2223 Figwort river gravel communities
24.2224 Ponto-Caucasian river gravel communities
24.223 Montane river gravel low brush
24.224 Gravel bank thickets and woods
24.225 Mediterranean river gravel communities
24.226 Northern lowland river gravel communities

24.3 River sand banks

24.31 Unvegetated river sand banks
24.32 Vegetated river sand banks

24.4 Euhydrophytic river vegetation

24.41 Acid oligotrophic river vegetation
24.42 Lime-rich oligotrophic river vegetation
24.43 Mesotrophic river vegetation
24.44 Eutrophic river vegetation

24.5 River mud banks

24.51 Unvegetated river mud banks
24.52 Euro-Siberian annual river mud communities
24.53 Mediterranean river mud communities
24.54 Boreo-Arctic river mud communities

24.6 Riverbed rocks, pavements and blocks

3. SCRUB AND GRASSLAND

31. TEMPERATE HEATH AND SCRUB

31.1 European wet heaths

31.11 Northern wet heaths
31.12 Southern wet heaths
31.13 Purple moorgrass wet heaths

31.2 European dry heaths

31.21 Sub-montane *Vaccinium-Calluna* heaths
31.211 North Atlantic *Vaccinium* heaths
31.2111 Northern Isles crowberry-cowberry heaths
31.2112 Boreo-Atlantic crowberry-northern bilberry heaths
31.2113 Icelandic crowberry-northern bilberry heaths
31.212 Upland British *Vaccinium* heaths
31.2121 British southern bilberry heaths
31.2122 British chionophilous bilberry heaths
31.2123 British species-rich bilberry heaths
31.2124 British matgrass-bilberry heaths
31.2125 British mountain crowberry-bilberry heaths
31.2126 British lichen-bilberry heaths
31.2127 British cowberry heaths
31.2128 British ling-liverwort heaths
31.213 Hercynian *Vaccinium* heaths
31.214 Sub-montane Alpine *Vaccinium* heaths
31.215 Sub-montane Pyreneo-Cantabrian *Vaccinium* heaths
31.216 Collinar-montane Carpathian *Vaccinium* heaths
31.2161 Sub-montane western Carpathian bilberry-cowberry heaths
31.2162 Montane eastern Carpathian bilberry-ling heaths
31.22 Sub-Atlantic *Calluna-Genista* heaths
31.221 Northern *Calluna-Genista-Vaccinium* heaths
31.2211 Northern *Genista-Calluna* heaths
31.2212 Northern *Vaccinium-Calluna* heaths
31.2213 Northern *Arctostaphylos-Calluna* heaths
31.2214 Baltic herb-rich *Calluna* heaths
31.222 Elbe *Calluna-Genista* heaths
31.223 Campino-Flandrian *Calluna-Genista* heaths

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31.7A Hellenic alti-Mediterranean hedgehog-heaths
31.7A1 Alti-Hellenic *Astragalus* hedgehog-heaths
31.7A2 Alti-Hellenic *Minuartia* cushion-heaths
31.7A3 Alti-Hellenic dwarf cushion-heaths
31.7A4 Alti-Hellenic bushy grasslands
31.7B Cretan hedgehog-heaths
31.7B1 Cretan tragacanth hedgehog-heaths
31.7B2 Cretan *Astragalus angustifolius* hedgehog-heaths
31.7B3 Cretan *Chamaecytisus* hedgehog-heaths
31.7B4 Other Cretan hedgehog-heaths
31.7C Aegean summital hedgehog-heaths
31.7C1 Aegean tragacanth hedgehog-heaths
31.7C11 Kerki tragacanth hedgehog-heath
31.7C12 Ambelos tragacanth hedgehog-heath
31.7C13 Chios tragacanth hedgehog-heath
31.7C14 Lesbos tragacanth hedgehog-heath
31.7C15 Samothrace tragacanth hedgehog-heath
31.7C16 Athos tragacanth hedgehog-heath
31.7C17 Euboa tragacanth hedgehog-heath
31.7C2 Aegean *Astragalus angustifolius* hedgehog-heaths
31.7C21 Lesbos Olympus hedgehog-heath
31.7C22 Thasos hedgehog-heath
31.7D Southern Hellenic *Genista acanthoclada* hedgehog-heaths
31.7E *Astragalus sempervirens* hedgehog-heaths
31.7F Canarian cushion-heaths
31.7F1 Tenerife cushion-heaths
31.7F2 La Palma cushion-heaths
31.7G North African hedgehog-heaths *
31.7H Cyprian hedgehog-heaths
31.7I Mediterraneo-Anatolian hedgehog-heaths
31.7I1 Taurus hedgehog-heaths
31.7I2 Aegeo-Anatolian hedgehog-heaths
31.7I3 Amanus hedgehog-heaths
31.7I4 Levantine hedgehog-heaths *
31.7I5 Sinai hedgehog-heaths *
31.7J Western central Eurasian hedgehog-heaths
31.7J1 Northern Thracian tragacanth hedgehog-heath
31.7J2 Central Anatolian hedgehog-heaths
31.7K Irano-Afghan hedgehog-heaths
31.7L Himalayan hedgehog-heaths *

31.8 Western Eurasian thickets

31.81 Medio-European rich-soil thickets
31.811 Blackthorn-bramble scrub
31.8111 Sub-Atlantic blackthorn-bramble scrub
31.8112 Atlantic blackthorn-bramble scrub
31.812 Blackthorn-privet scrub
31.8121 Atlantic and medio-European blackthorn-privet scrub
31.81211 Medio-European blackthorn-privet scrub
31.81212 Atlantic hawthorn-ivy scrub

31.812121 Atlantic calcicline scrub
31.812122 Wayfaring-tree chalk scrub
31.8122 Sub-Mediterranean blackthorn-privet scrub
31.8123 Rock pear scrub
31.8124 Peri-Alpine sea buckthorn-barberry scrub
31.8125 Inner Alpine barberry scrub
31.81251 Inner Alpine marmot plum scrub
31.81252 Inner Alpine rose-barberry scrubs
31.8126 Iberian barberry scrub
31.82 Box thickets
31.83 Atlantic poor soil thickets
31.831 Bramble thickets
31.832 Alder buckthorn, rowan, honeysuckle thickets
31.84 Broom fields
31.841 Medio-European *Cytisus scoparius* fields
31.8411 Lowland and hill broom fields
31.8412 Alpine broom fields
31.8413 Central Massif *Cytisus scoparius* fields
31.8414 Pyrenean *Cytisus scoparius* fields
31.842 *Cytisus purgans* fields
31.8421 Cévennes *Cytisus purgans* fields
31.8422 Pyrenean *Cytisus purgans* fields
31.8423 Galicio-Cantabrian *Cytisus purgans* fields
31.8424 Upper Cordilleran *Cytisus purgans* fields
31.8425 Lower Cordilleran *Cytisus purgans* fields
31.8426 Galicio-Leonese *Cytisus purgans* fields
31.8427 Nevadan *Cytisus purgans* fields
31.8428 North African *Cytisus purgans* fields *
31.843 Piornales
31.8431 White-flowered broom fields
31.8432 North-western Iberian *Genista florida* fields
31.8433 North-western Iberian *Cytisus* fields
31.8434 Central Iberian *Genista florida* fields
31.8435 Upper Cordilleran *Genista cinerea* fields
31.8436 Central Iberian *Cytisus* fields
31.8437 Andalusian broom fields
31.844 Tyrrhenian broom fields
31.8441 Peninsular Italian broom fields
31.8442 Insular Tyrrhenian broom fields
31.845 *Genista aetnensis* stands
31.8451 Etna *Genista aetnensis* stands
31.8452 Sardinian *Genista aetnensis* stands
31.846 Canary Island broom fields
31.847 North African broom fields *
31.848 Moesian broom fields
31.8481 Rumelian broom fields
31.8482 Moesian Lydian broom fields
31.85 Gorse thickets
31.86 Bracken fields
31.861 Sub-Atlantic bracken fields
31.862 Macaronesian bracken fields

31.863 Supra-Mediterranean bracken fields
31.87 Woodland clearings
31.871 Herbaceous clearings
31.8711 Willowherb and foxglove clearings
31.8712 Burdock and deadly nightshade clearings
31.872 Shrubby clearings
31.88 Common juniper scrub
31.881 Juniper downs
31.882 Juniper heaths
31.883 Juniper-wood sorrel woodland
31.884 Sub-Mediterranean common juniper thickets
31.89 South-western sub-Mediterranean deciduous thickets
31.891 Franco-Iberian sub-Mediterranean deciduous thickets
31.892 Western Iberian sub-Mediterranean deciduous thickets
31.893 Central Iberian sub-Mediterranean deciduous thickets
31.894 Oro-Baetic sub-Mediterranean deciduous thickets
31.895 North African sub-Mediterranean deciduous thickets *
31.8A Tyrrhenian sub-Mediterranean deciduous thickets
31.8A1 Cyrno-Sardian sub-Mediterranean deciduous thickets
31.8A2 Italo-Sicilian sub-Mediterranean deciduous thickets
31.8B Subcontinental and continental deciduous thickets
31.8B1 Central European subcontinental thickets
31.8B11 Northern Central European ground cherry scrub
31.8B12 Subcontinental peri-Pannonic scrub
31.8B121 Peri-Pannonic ground cherry scrub
31.8B122 Peri-Pannonic dwarf almond scrub
31.8B123 Peri-Pannonic burnet rose scrub
31.8B124 Peri-Pannonic spiraea scrub
31.8B125 Danubian hawthorn scrub
31.8B13 Peri-Pannonic thickets
31.8B131 Peri-Pannonic hawthorn-blackthorn scrub
31.8B132 Pannonic amelanchier thickets
31.8B133 Pannonic wig tree-manna ash thickets
31.8B14 East Carpathian montane thickets
31.8B141 Dacian service tree thickets
31.8B142 Carpathian elm-leaved spiraea thickets
31.8B2 Illyrian deciduous thickets
31.8B3 Balkano-Hellenic deciduous thickets
31.8B31 Moesian oriental hornbeam thickets
31.8B311 Thracio-Macedonian oriental hornbeam thickets
31.8B312 Central Moesian oriental hornbeam thickets
31.8B313 Peri-Carpathian manna ash oriental hornbeam thickets
31.8B314 Peri-Carpathian wig tree oriental hornbeam thickets
31.8B32 Moesian lilac thickets
31.8B321 Central Moesian lilac thickets
31.8B3211 *Inula* lilac thickets
31.8B3212 *Eryngium* lilac thickets
31.8B322 Danubian lilac thickets
31.8B3221 Lilac oriental hornbeam thickets
31.8B3222 Lilac manna ash thickets
31.8B3223 Lilac wig tree thickets

31.8B3224 Ray broom lilac thickets
31.8B323 Moesio-Hellenic mixed thickets
31.8B3231 Moesio-Hellenic lilac thickets
31.8B3232 Moesio-Hellenic *Rhus* thickets
31.8B3233 Box lilac thickets
31.8B324 Spleenwort lilac chasm thickets
31.8B325 Apuseni *Syringa josikaea* thickets
31.8B33 Moesian Christ's thorn brush
31.8B4 Aegean deciduous thickets
31.8B5 Eastern Mediterranean deciduous thickets
31.8B6 Mediterraneo-Euxinian deciduous thickets *
31.8B7 Ponto-Sarmatic deciduous thickets
31.8B71 Ponto-Sarmatic steppe brush
31.8B711 Ponto-Sarmatic dwarf almond scrub
31.8B712 Ponto-Sarmatic *Caragana* steppe brush
31.8B713 Ponto-Sarmatic *Spiraea* steppe brush
31.8B72 Ponto-Sarmatic presteppe thorn thickets
31.8B721 Ponto-Sarmatic hawthorn-blackthorn scrub
31.8B722 Ponto-Sarmatic sea buckthorn thickets
31.8B73 Ponto-Thracian sub-Mediterranean scrub
31.8B731 Western Pontic jasmine christ's thorn scrub
31.8B732 Thracian christ's thorn scrub
31.8B733 Western Pontic wigtree scrub
31.8B74 Ponto-Sarmatic steppe-ravine scrub *
31.8B75 Ponto-Sarmatic pod thickets *
31.8B8 Irano-Anatolian deciduous thickets
31.8B9 Central Eurasian deciduous thickets
31.8BA Euxino-Hyrcanian deciduous thickets
31.8BB Western Himalayan deciduous thickets *
31.8C Hazel thickets
31.8C1 Atlantic and sub-Atlantic hazel thickets
31.8C2 Boreal hazel thickets
31.8C3 Peri-Alpine hazel thickets
31.8C4 Subcontinental hazel thickets
31.8D Deciduous scrub woodland
31.8E Coppice
31.8F Mixed scrub woodland
31.8G Coniferous scrub woodland

31.9 East Asian thickets and heaths *

32. SCLEROPHYLLOUS SCRUB

32.1 Arborescent matorral

32.11 Evergreen oak matorral
32.111 *Quercus suber* matorral
32.112 Acidiphile *Quercus ilex* and *Q. rotundifolia* matorral
32.113 Calciphile *Quercus ilex, Q. rotundifolia, Q. coccifera* matorral
32.114 Eastern Mediterranean evergreen oak matorral

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32.C Euxinian garrigues

32.C1 Crimean garrigues *
32.C2 South-Euxinian garrigues
32.C3 Thracian garrigues

32.D Mediterraneo-steppic brushes

32.D1 North African Mediterraneo-steppic brushes *
32.D2 Western Asian Mediterraneo-steppic brushes
32.D21 Western Asian semi-steppe bathas
32.D22 East Mediterranean pre-desert scrub

33. PHRYGANA

33.1 West Mediterranean clifftop phryganas

33.11 Calcareous Provence phrygana
33.12 Crystalline Provence phrygana
33.13 Cap Corse phrygana
33.14 Straits of Bonifacio phrygana
33.15 Cabo de Creus phrygana
33.16 Cabo de Sao Vicente phrygana

33.2 Sardinian Centaurea horrida phryganas

33.3 Aegean phryganas

33.31 Aegean *Sarcopoterium* phryganas
33.32 Maritime *Centaurea spinosa* phryganas
33.33 Lesbian *Centaurea spinosa* phryganas
33.331 Lesbian *Centaurea-Sarcopoterium* phryganas
33.332 Lesbian *Sarcopoterium* phryganas
33.333 Lesbian steppe-phrygana
33.34 Cycladian *Centaurea* phryganas
33.35 Aegean heather phryganas
33.36 Aegean thyme phryganas
33.37 Aegean *Genista* phryganas
33.38 Aegean savory phryganas
33.39 Aegean spiny spurge phryganas
33.3A Aegean gromwell phryganas
33.3B Aegean *Anthyllis* phryganas

33.4 Mid-elevation phryganas of Crete

33.5 Dwarf pine scrub

33.6 Italian Sarcopoterium phryganas

33.7 Sardinian Genista acanthoclada phrygana

33.8 Balearic clifftop phryganas

33.9 Cyrno-Sardian Genista phryganas

33.A Pantelleria phrygana

33.B Thracian phryganas

33.B1 Thracian *Sarcopotherium* phryganas
33.B2 Northern Thracian collinar *Astragalus thracicus* phryganas

33.C East Mediterranean bathas

33.C1 Cyprian phryganas
33.C2 *Sarcopoterium* bathas
33.C3 Thyme bathas
33.C4 Sage bathas
33.C5 Gromwell bathas

33.D North African phryganas *

34. STEPPES AND DRY CALCAREOUS GRASSLANDS

34.1 Middle European pioneer swards

34.11 Middle European rock debris swards
34.111 Stonecrop swards
34.112 Houseleek communities
34.1121 *Sempervivum tectorum* communities
34.1122 *Jovibarba sobolifera* communities
34.1123 Amblève houseleek community
34.113 Grassy rock debris communities
34.1131 *Poa badensis* and garlic rock debris swards
34.1132 *Poa compressa* rock debris swards
34.1133 *Melica ciliata* rock debris swards
34.114 Middle European rock debris therophyte communities
34.12 Middle European pioneer calcareous sand swards

34.2 Lowland heavy metal grasslands

34.21 Atlantic heavy metal grasslands
34.211 British heavy metal grasslands
34.212 Irish heavy metal grasslands
34.22 Calaminarian grasslands
34.221 *Viola calaminaria* grasslands
34.222 *Viola guestphalica* grasslands
34.223 Eifel calaminarian thrift grasslands
34.224 Calaminarian pennycress grasslands
34.2241 Osnabrück heavy metal grasslands
34.2242 Sauerland heavy metal grasslands

34.23 Central European heavy metal grasslands
34.231 Saxon *Armeria halleri* grasslands
34.232 *Armeria bottendorfensis* grasslands
34.233 *Armeria hornburgensis* grasslands
34.234 Silesian *Armeria halleri* grasslands
34.24 Calaminarian catchfly grasslands

34.3 Dense perennial grasslands and middle European steppes

34.31 Sub-continental steppic grasslands
34.311 Helleno-Balkanic savory steppes
34.312 Central European steppic grasslands
34.3121 Central European steppes
34.31211 Rheno-Franconian steppes
34.312111 Rheno-Franconian garlic-feathergrass steppes
34.312112 Nahe valley hairy greenweed feathergrass steppes
34.31212 Northern cinquefoil feathergrass steppes
34.31213 Inner Hercynian steppes
34.312131 Inner Hercynian feathergrass steppes
34.312132 Inner Hercynian valesian fescue steppes
34.312133 Inner Hercynian grooved fescue steppes
34.31214 Alpine steppes
34.31215 Northern pre-Sarmatic steppes
34.31216 Central European desert-oat steppes
34.31217 Bohemian crown vetch steppes
34.31218 Bohemian couch-fescue steppes
34.3122 Central European meadow-steppes
34.31221 Central European pheasant'eye meadow-steppes
34.31222 Alpine sub-continental meadow-steppes
34.31223 Central European feathergrass meadow-steppes
34.31224 Northern pre-Sarmatic meadow-steppes
34.313 Eastern inner Alpine arid grasslands
34.314 Western inner Alpine arid grasslands
34.315 Sub-Pannonic steppic grasslands
34.3151 Sub-Pannonic steppes
34.31511 Pre-Noric sub-Pannonic steppes
34.31512 Pre-Bohemian sub-Pannonic steppes
34.31513 Central Hungarian sub-Pannonic steppes
34.31514 Pre-Illyrian sub-Pannonic steppes
34.31515 Andropogonid sub-Pannonic steppes
34.31516 Sub-Pannonic rock steppes
34.3152 Sub-Pannonic meadow-steppes
34.3153 Sub-Pannonic wooded steppe meadows
34.316 Balkano-Carpathian steppic grasslands
34.3161 Moesio-Carpathian steppes
34.31611 Moesio-Carpathian feathergrass-fescue steppes
34.31612 Moesio-Carpathian andropogonid steppes
34.3162 Dacio-Pannonic meadow-steppes
34.3163 Moesio-Carpathian meadow-steppes
34.31631 Dacio-Pontic feathergrass meadow-steppes
34.31632 Moesian chrysopogon meadow-steppes

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36.1123 Boreo-alpine *Deschampsia-Anthoxanthum* communities
36.11231 Highland *Rhytidiadelphus-Deschampsia* communities
36.11232 Scandinavian *Deschampsia-Anthoxanthum* communities
36.1124 Boreo-alpine herb-rich acid snow-patch communities
36.11241 Highland *Silene-Festuca* snow-patch communities
36.11242 Scandio-Caledonian buttercup snow-patch communities
36.11243 Scandinavian starry saxifrage snow-patch communities
36.1125 Boreo-alpine fern snow-patch communities
36.1126 *Carex rufina-C. lachenalii* snow-patch communities
36.1127 Glacier crowfoot snow-patch communities
36.12 Boreo-Alpic calcareous snow-patch communities
36.121 Alpic small herb calcareous snow-patch communities
36.1211 *Arabis-Gnaphalium* snow-patch communities
36.1212 Carpathian saxifrage snow patch communities
36.1213 Dinaro-Pelagonide calciphile herbaceous snow patch communities
36.122 Calcareous espalier willow snow-patch communities
36.1221 Alpic espalier willow communities
36.12211 Alpide *Salix retusa-reticulata* snow patches
36.12212 Carpathian *Salix kitaibeliana* snow patches
36.1222 Scandinavian espalier willow communities
36.123 Oro-boreal calcareous snow-patch communities
36.1231 Polar willow snow-patch communities
36.1232 *Distichium capillaceum* snow-patch communities
36.1233 Snow buttercup snow-patch communities
36.1234 Snow grass snow-patch communities
36.1235 Arctic woodrush snow-patch communities
36.1236 Boreal herb-rich calcicline snow-patch communities
36.13 Ponto-Caucasian snow patch communities
36.14 Altaic snow patch communities *
36.15 Himalayan snow patch communities *
36.16 Sino-Japanese snow patch communities *

36.2 Alpine weathered rock and outcrop communities

36.3 Boreo-Alpic acidophilous alpine grasslands

36.31 Alpic mat-grass swards and related communities
36.311 Pyreneo-Alpine mesophile mat-grass swards
36.312 Pyreneo-Alpine hygrophile mat-grass swards
36.313 Pyreneo-Alpine hygrophile foxtail swards
36.314 Pyrenean closed *Festuca eskia* grasslands
36.315 Pyrenean *Poa violacea* swards
36.316 Hercynian summital mat-grass swards
36.3161 Hautes Chaumes summital mat-grass swards
36.3162 Black Forest summital mat-grass swards
36.3163 Harz summital mat-grass swards
36.3164 Bohemian Forest summital mat-grass swards
36.3165 Sudeten summital mat-grass swards
36.317 Carpathian mat-grass swards
36.3171 Western Carpathian mat-grass swards
36.3172 Eastern Carpathian mat-grass swards

36.318 Oro-Moesian mat-grass swards
36.319 Dinaride mat-grass swards
36.3191 Dinaride arnica mat-grass swards
36.3192 Montenegrine scabious mat-grass swards
36.32 Oro-boreal grasslands
36.321 Oro-Caledonian *Carex bigelowii* communities
36.322 Oro-Caledonian *Rhacomitrium* carpets
36.3221 Species-poor *Rhacomitrium* carpets
36.3222 Grassy *Rhacomitrium* carpets
36.3223 Cushion-herb *Rhacomitrium* carpets
36.323 Oro-Caledonian *Juncus trifidus* formations
36.324 Boreo-alpine mat-grass swards
36.325 Oro-Caledonian fescue grasslands
36.326 Icelandic fescue grasslands
36.327 Icelandic naked-rush grasslands
36.328 Uralian grasslands *
36.329 Oro-Siberian grasslands *
36.33 Thermo-Alpigenous subalpine acidophilous grasslands
36.331 Thermo-Alpigenous *Festuca paniculata* swards
36.3311 Rocky slope thermo-Alpigenous *Festuca paniculata* swards
36.3312 Deep soil thermo-Alpigenous *Festuca paniculata* swards
36.332 Pyrenean *Festuca eskia* garland-grasslands
36.333 Arverno-Alpine varicoloured fescue garland-grasslands
36.34 Alpigenous acidophilous grasslands
36.341 Alpigenous crooked-sedge grasslands
36.3411 Alpine *Carex curvula* grasslands
36.3412 Pyrenean *Carex curvula* grasslands
36.3413 Carpathian *Carex curvula* grasslands
36.342 Alpigenous *Festuca halleri* grasslands
36.343 Alpigenous *Festuca airoides* grasslands
36.3431 Pyrenean *Festuca airoides* grasslands
36.3432 Carpathian *Festuca airoides* grasslands
36.34321 Northern Carpathian *Festuca airoides* grasslands
36.34322 Eastern Carpathian *Festuca airoides* grasslands
36.3433 Hercynian *Festuca airoides* grasslands
36.344 Alpigenous *Festuca borderi* swards
36.345 Alpigenous *Oreochloa disticha* swards
36.3451 Alpine *Oreochloa disticha* swards
36.3452 Carpathian *Oreochloa disticha* grasslands
36.34521 Western Carpathian *Oreochloa disticha* grasslands
36.34522 Eastern Carpathian *Oreochloa disticha* grasslands
36.346 Hercynio-Carpathian *Juncus trifidus* swards
36.3461 Bohemian Forest *Juncus trifidus* swards
36.3462 Sudeten *Juncus trifidus* swards
36.3463 Carpathian *Juncus trifidus* swards
36.34631 Northern Carpathian *Juncus trifidus* swards
36.34632 Eastern Carpathian *Juncus trifidus* swards
36.3464 Alpine *Juncus trifidus* swards
36.347 Cantabrian *Oreochloa blanka* swards
36.348 Alpigenous *Agrostis rupestris* swards
36.35 Oro-Hellenic closed grasslands

36.351 Hellenic mat-grass swards
36.352 Hellenic *Poa violacea* swards
36.353 Hellenic foxtail swards
36.354 Giona *Trisetum-Poa* swards
36.36 Oro-Iberian acidophilous grasslands
36.361 Oro-Iberian acidophilous stripped grasslands
36.3611 Cantabrian acidophilous stripped grasslands
36.3612 Iberian Range acidophilous stripped grasslands
36.3613 Cordilleran *Festuca* stripped grasslands
36.3614 Cordilleran *Agrostis* stripped grasslands
36.3615 Nevadan *Festuca indigesta* stripped grasslands
36.3616 Nevadan *Agrostis* stripped grasslands
36.3617 Nevadan tall fescue stripped grasslands
36.3618 Nevadan *Festuca clementei* stripped grasslands
36.3619 Nevadan *Trisetum* stripped grasslands
36.362 Oro-Iberian mat-grass swards
36.3621 Cantabrio-Cordilleran oro-Mediterranean mat-grass swards
36.3622 Nevadan borreguiles
36.37 Oro-Corsican grasslands
36.371 Corsican oro-Mediterranean stripped grasslands
36.372 Corsican pozzine mat-grasslands
36.373 Corsican alpine adret grasslands
36.374 Corsican alpine ubac grasslands
36.38 Oro-Apennine closed grasslands
36.381 Subalpine southern Italian mat-grass swards
36.382 Central Apennine closed grasslands
36.39 Oro-Moesian acidophilous grasslands
36.391 Oro-Moesian *Festuca paniculata* grasslands
36.392 Oro-Moesian varicoloured fescue grasslands
36.3921 Oro-Moesian *Festuca valida* grasslands
36.3922 Balkan *Festuca balcanica* grasslands
36.3923 Pelagonide *Festuca varia* grasslands
36.393 Oro-Moesian *Poa violacaea* grasslands
36.394 Oro-Moesian aeolian grasslands
36.3941 Oro-Moesian crooked sedge grasslands
36.3942 Oro-Moesian Haller fescue grasslands
36.39421 Rhodopide *Festuca riloensis* grasslands
36.39422 Pelagonide *Festuca scardica* grasslands
36.39423 Montenegrine *Festuca riloensis* grasslands
36.3943 Oro-Moesian *Festuca airoides* grasslands
36.3944 Oro-Moesian *Sesleria comosa* grasslands
36.3945 Oro-Moesian *Agrostis rupestris* grasslands
36.3946 Southern Pelagonide aeolian grasslands
36.3947 Montenegrine aeolian fescue grasslands
36.3A Western Asian acidophilous alpine grasslands
36.3A1 Western Taurus acidophilous grasslands
36.3A2 Central Taurus acidophilous grasslands
36.3A3 Eastern Taurus acidophilous grasslands
36.3A4 Levantine acidophilous alpine grasslands
36.3B Atlas closed grasslands *

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38.2 Lowland and collinar hay meadows

38.21 Atlantic hay meadows
38.22 Sub-Atlantic lowland hay meadows
38.221 Xeromesophile medio-European lowland hay meadows
38.222 Hygromesophile medio-European lowland hay meadows
38.23 Medio-European submontane hay meadows
38.231 Western Hercynian submontane hay meadows
38.232 Eastern Hercynian submontane hay meadows
38.233 Carpathian submontane hay meadows
38.2331 Western Carpathian gladiolus meadows
38.2332 Western Carpathian vetch-clover meadows
38.2333 Eastern Carpathian yellow oatgrass meadows
38.234 Northern Iberian submontane hay meadows
38.235 Alpic submontane hay meadows
38.236 Jurassian submontane hay meadows
38.237 Illyrian submontane hay meadows
38.238 South-western Moesian submontane hay meadows
38.24 Boreal meadows
38.25 Continental meadows
38.251 Ponto-Pannonic mesophile hay meadows
38.252 Moeso-Thracian mesophile hay meadows
38.2521 Moeso-Thracian mesophile floodplain meadows
38.2522 Moeso-Thracian mesophile foothill meadows
38.2523 Moeso-Thracian mesophile cold water meadows
38.253 Sarmatic mesophile hay meadows
38.254 South Siberian mesophile hay meadows *

38.3 Mountain hay meadows

38.31 Alpic mountain hay meadows
38.32 Ponto-Caucasian hay meadows

38.4 Iberian vallicares

38.41 Perennial vallicares
38.42 Annual vallicares
38.43 Andalusian thrift vallicares

38.5 Macaronesian mesophile grasslands

38.6 Steppe meadows *

38.7 Far Eastern meadows *

39. TUNDRA

39.1 Dwarf shrub tundra *

39.11 Western dwarf shrub tundra *

39.12 Central Siberian dwarf shrub tundra *
39.13 Far Eastern dwarf shrub tundra *

39.2 Moss and lichen tundra *

39.21 *Cladonia*-espalier willow tundra *
39.22 Moss tundra *
39.23 Yakutian *Alectoria* tundra *
39.24 *Cetraria-Eriophorum-Ledum* tundra *
39.25 *Cetraria-Dryas* tundra *

39.3 Arctic tundra

39.31 Arctic *Dryas* tundra *
39.32 Oro-arctic *Dryas* tundra *
39.33 Patchy tundra *
39.34 Polygon tundra *
39.35 High arctic tundra

3A. TROPICAL GRASSLANDS *

3B. TROPICAL SHRUBLANDS *

3C. TROPICAL ALPINE COMMUNITIES *

4. FORESTS

41. BROAD-LEAVED DECIDUOUS FORESTS

41.1 Beech forests

41.11 Medio-European acidophilous beech forests
41.111 Medio-European collinar woodrush beech forests
41.1111 Western Hercynian collinar woodrush beech forests
41.1112 Hercyno-Jurassian collinar woodrush beech forests
41.1113 Peri-Alpine collinar woodrush beech forests
41.1114 Western sub-Pannonic collinar woodrush beech forests
41.1115 Pannonic collinar woodrush beech forests
41.112 Medio-European montane woodrush beech forests
41.1121 Hercyno-Alpine montane woodrush beech forests
41.1122 Western medio-European montane woodrush beech forests
41.12 Atlantic acidophilous beech forests
41.121 Germano-Baltic acidophilous beech forests
41.122 Sub-Atlantic acidophilous beech forests
41.123 Armorican acidophilous beech forests
41.124 Pyreneo-Cantabrian acidophilous beech forests

41.125 Western Cantabrian acidophilous beech forests
41.126 Galician acidophilous beech forests
41.127 Humid Iberian acidophilous beech forests
41.128 Hyper-humid Iberian acidophilous beech forests
41.129 Ayllon acidophilous beech forests
41.13 Medio-European neutrophile beech forests
41.131 Medio-European collinar neutrophile beech forests
41.1311 Medio-European wood barley beech forests
41.1312 Medio-European woodruff and hairy sedge beech forests
41.13121 Medio-European wood melick beech forests
41.13122 Medio-European woodruff beech woods
41.13123 Medio-European quaking sedge beech woods
41.13124 Hercyno-Alpine hairy sedge beech forests
41.13125 Western peri-Carpathian hairy sedge beech forests
41.132 Atlantic neutrophile beech forests
41.1321 Calcicline bluebell beech forests
41.1322 Neutrocline bluebell beech forests
41.133 Medio-European montane neutrophile beech forests
41.1331 Jura bittercress beech forests
41.1332 Western Alps bittercress beech forests
41.1333 Austro-Bavarian Alps bittercress beech forests
41.1334 South-eastern Alpine bittercress beech forests
41.1335 Vosges bittercress beech forests
41.1336 Black Forest bittercress beech forests
41.1337 Northern Hercynian bittercress beech forests
41.1338 Bohemian Quadrangle bittercress beech forests
41.1339 Western Carpathian bittercress beech forests
41.134 Bohemian lime-beech forests
41.1341 Bohemian small-leafed lime-beech forests
41.1342 Bohemian large-leafed lime-beech forests
41.135 Pannonic neutrophile beech forests
41.1351 Sub-Pannonic beech forests
41.1352 Pannonic neutrophile collinar beech forests
41.1353 Pannonic neutrophile montane beech forests
41.14 Pyreneo-Cantabrian neutrophile beech forests
41.141 Hygrophile Pyrenean beech forests
41.142 Mesophile Pyrenean beech forests
41.143 Sub-humid oro-Cantabrian beech forests
41.144 Humid Central Massif fir-beech forests
41.15 Medio-European subalpine beech woods
41.16 Medio-European limestone beech forests
41.161 Middle European dry-slope limestone beech forests
41.1611 Medio-European dry slope sedge beech forests
41.1612 Medio-European steep slope yew beech forests
41.1613 Medio-European blue moorgrass beech forests
41.1614 Medio-European naked basiphile beech forests
41.1615 Pannonic limestone beech forests
41.162 North-western Iberian xerophile beech woods
41.17 Southern medio-European beech forests
41.171 Alpino-Apennine acidophilous beech forests
41.172 Pyreneo-Cévennian acidophilous beech forest

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41.7112 Northern *Quercus pubescens* woods
41.712 Sub-Mediterranean *Quercus petraea-Q. robur* woods
41.713 *Quercus palensis* woods
41.714 Eu-Mediterranean white oak woods
41.72 Cyrno-Sardian white oak woods
41.73 Eastern white oak woods
41.731 Northern Italic *Quercus pubescens* woods
41.732 Italo-Sicilian *Quercus pubescens* woods
41.733 Hellenic *Quercus pubescens* woods
41.734 Aegean *Quercus anatolica* woods
41.735 Aegean *Quercus brachyphylla* woods
41.736 Dalmatian *Quercus pubescens* woods
41.737 Eastern sub-Mediterranean white oak woods
41.7371 Thracian white oak-oriental hornbeam woods
41.7372 Moesian white oak woods
41.73721 Moesian white oak-oriental hornbeam woods
41.73722 Lydian greenweed-white oak woods
41.73723 Moesian *Paeonia peregrina*-white oak woods
41.73724 Moesian *Galium dasypodium*-white oak woods
41.73725 Acanthus white oak woods
41.73726 Moesian *Echinops*-white oak woods
41.7373 Intra-Carpathian insular *Quercus virgiliana* woods
41.7374 Pannonian white oak woods
41.73741 Pannonian white oak-manna tree woods
41.73742 Pannonian karst white oak low woods
41.7375 Illyrian white oak woods
41.73751 Illyrian hop-hornbeam white oak woods
41.73752 Illyrian oriental hornbeam white oak woods
41.738 Euxinian white oak woods *
41.7381 Southern Crimean *Quercus anatolica* woods *
41.7382 Western Caucasian *Quercus anatolica* woods *
41.739 Western Asian white oak woods
41.74 Italo-Illyrian hop-hornbeam sub-thermophilous oak woods
41.741 Northern Italian *Quercus cerris* woods
41.742 Dalmatian *Quercus cerris* woods
41.743 Illyrian thermophile turkey oak-sessile oak woods
41.7431 Illyrian hop-hornbeam mixed oak woods
41.7432 Illyrian black pea sessile oak woods
41.75 South-eastern sub-thermophilous oak woods
41.751 Southern Italic sub-thermophilous oak woods
41.7511 Southern Italic *Quercus cerris* woods
41.7512 Southern Italic *Quercus frainetto* woods
41.7513 Southern Italic *Quercus petraea* woods
41.752 Southern Hellenic sub-thermophilous oak woods
41.7521 Southern Hellenic *Quercus cerris* woods
41.7522 Southern Hellenic *Quercus frainetto* woods
41.753 Eastern Mediterranean sub-thermophilous oak woods
41.7531 Taurus sub-Mediterranean *Quercus pseudocerris* woods
41.7532 Sub-Mediterranean *Quercus boissieri* woods
41.76 Balkano-Anatolian thermophilous oak forests
41.761 Helleno-Moesian *Quercus cerris* forests

41.762 Helleno-Moesian *Quercus frainetto* forests
41.763 Helleno-Moesian *Quercus dalechampii* forests.
41.764 Helleno-Moesian montane oak forests
41.7641 Helleno-Moesian *Quercus petraea* forests
41.7642 Rila *Quercus protoroburoides* forests
41.765 Helleno-Moesian *Quercus virgiliana* forests
41.766 Helleno-Moesian *Quercus pedunculiflora* forests
41.767 Helleno-Moesian *Quercus polycarpa* forests
41.768 Moesio-Danubian thermophilous oak forests
41.7681 Moesio-Danubian xerothermal oak forests
41.76811 Moesio-Danubian *Quercus frainetto-Quercus cerris* forests
41.76812 Moesio-Danubian oriental hornbeam *Quercus cerris* forests
41.76813 Moesio-Danubian mixed oak *Quercus frainetto* forests
41.7682 Moesio-Danubian oriental hornbeam-durmast oak forests
41.76821 Central Moesian *Quercus dalechampii*-oriental hornbeam forests
41.76822 Moesio-Danubian bedstraw sessile oak forests
41.7683 Dobrogean oriental hornbeam-lime-oak forests
41.76831 Dobrogean paeonia sessile oak forests
41.76832 Dobrogean sessile oak-lime-oriental hornbeam-ash forests
41.76833 Dobrogean *Quercus pedunculiflora*-lime-oriental hornbeam forests
41.769 Getic sub-continental thermophilous oak woods
41.7691 Getic white cinquefoil *Quercus cerris* forests
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41.7693 Getic crocus *Quercus frainetto-Quercus cerris* forests
41.7694 Getic *Q. frainetto-Q. cerris-Q. petraea* forests
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41.76A Thracian sub-continental thermophilous oak woods
41.76A1 Euxino-Thracian *Quercus frainetto-Quercus cerris* forests
41.76A11 Thracian *Quercus frainetto-Quercus cerris* forests
41.76A12 Sub-Euxinian *Quercus frainetto-Quercus cerris* forests
41.76A2 Thracian *Quercus frainetto-Quercus virgiliana* forests
41.76A3 Thracian *Quercus pedunculiflora* forests
41.76A4 Stranja *Quercus polycarpa* forests
41.76A41 Stranja *Primula rosea-Quercus polycarpa* forests
41.76A42 Stranja *Fagus orientalis-Quercus polycarpa* forests
41.76A5 South-eastern Thracian thermophilous oak forests
41.76B Western Anatolian sub-continental thermophilous oak woods
41.76B1 Western Anatolian turkey oak woods
41.76B2 Western Anatolian Hungarian oak woods
41.76B3 Western Anatolian turkey oak-white oak woods
41.77 Afro-Iberian thermophilous oak forests
41.771 Spanish *Quercus faginea* forests
41.7711 Western Spanish *Quercus faginea* forests
41.7712 Central Spanish *Quercus faginea* forests
41.7713 Eastern Spanish *Quercus faginea* forests
41.7714 Baetic *Quercus faginea* forests
41.7715 Valencian *Quercus faginea* forests
41.772 Portuguese *Quercus faginea* forests
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41.9 Chestnut woods

41.A Hornbeam forests

41.A1 Western hornbeam woods
41.A2 Eastern hornbeam forests
41.A21 Illyrian hornbeam forests
41.A22 Dacio-Moesian hornbeam forests
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41.B Birch woods

41.B1 Atlantic lowland and collinar birch woods
41.B11 Humid birch woods
41.B111 Northern humid birch woods
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41.B12 Medio-European dry acidophilous birch woods
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41.B15 Heavy-metal birch woods
41.B16 Dune birch woods
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41.B2 British sub-boreal birch woods
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41.B32 Birch block forests
41.B33 Pyrenean birch woods
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41.B4 Corsican birch woods
41.B5 Montane *Betula celtiberica* woodlands
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41.B6 Mount Etna birch stands
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41.B711 Icelandic crowberry birch woods
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41.B714 Icelandic geranium birch woods
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42.164 Pelagonide silver fir forests
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42.1723 Western sub-Pontic beech-Bornmueller's fir forests
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42.173 Nordmann's fir forests
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42.1733 Hyper-humid Caucasian fir forests *
42.1734 Neutrophilous Caucasian fir forests *
42.1735 Acidophilous Caucasian fir forests *
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42.191 Ronda pinsapo fir forests
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42.195 Cilician fir forests
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42.21621 Carpathian subalpine rhododenron spruce forests
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This classification of Palaearctic habitats is intended to increase knowledge of the variability of habitats in Europe, so that representative parts of natural and semi-natural habitats may be preserved. First published as a working document in 1993, the list is largely based on the CORINE Biotopes *Habitats of the European Communities* and its various extensions to northern and central Europe. The version presented here was revised in February 1996.

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