The Biogeographical Regions Map of Europe

Basic principles of its creation and overview of its development

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Introduction

This document describes how the map of Biogeographical Regions of Europe was developed to serve both the Habitats Directive of the European Community and the Emerald network under the Bern Convention.

The map was first developed for the member countries of the European Union with the aim of applying the criteria of annex III of the Habitats Directive, second phase : " …, to assess the community importance and to select from the national lists the sites which will become Special Areas for Conservation". Specifically, this means that proposed sites are evaluated within each of the Biogeographical Regions, according to the criteria laid down in annex III.

It was thereafter expanded to cover also the rest of Europe, as the Standing Committee of the Bern Convention decided to develop the Emerald network in complete compatibility with the Natura 2000 network.

Background

Article 1 c (iii) of *Council Directive 92/43/EEC* on the conservation of natural habitats and of wild fauna and flora (21 May 1992) identifies the five Biogeographical Regions to be considered in the framework of the 'Habitats' Directive: Alpine, Atlantic, Continental, Macaronesian and Mediterranean.

Article 4.2 of this directive also refers to the Biogeographical Regions as the geographical framework for the establishment of a draft list of sites of Community importance drawn from the Member States' lists.

In 1995, when Austria Finland and Sweden joined the European Union, the Council decided to add the Boreal region to this list (OJ L1, 1/1/95, p. 135)

On the other hand, the *Bern Convention Resolution No 16 (1989)* recommends the Contracting Parties to take steps to designate Areas of Special Conservation Interest (ASCI's). In resolution No 3 (1996) the standing committee desirous to pursue the implementation of this recommendation by setting up the Emerald network.

Resolution No 5 (1998) concerning the rules for the Emerald network, clearly stipulates that for contracting parties which are Member States of the European Union the Emerald sites are those of the Natura 2000 network, and that the Standard Data Form of the Emerald sites is fully compatible with the SDF of Natura 2000.

As a consequence there was a need to extend the Map of Biogeographical Regions to the Pan-European geographical area.

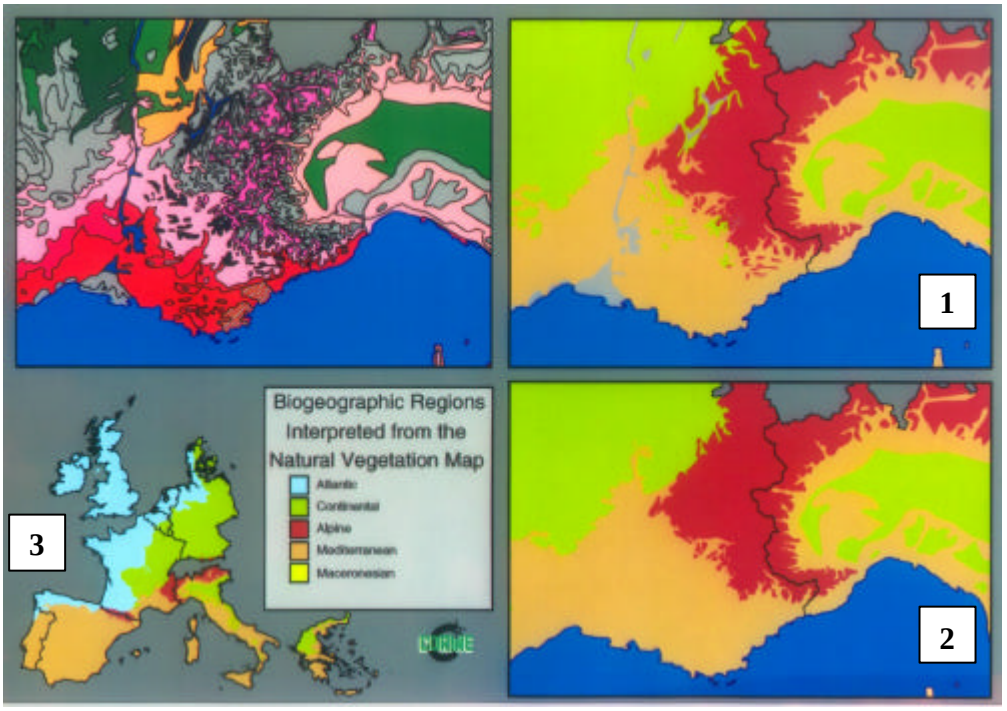
The technical and scientific principles behind the various steps in the creation and development of the Biogeographical Regions Map are fully explained below.

Main principles for the creation of the map

In the absence of a clear definition of the Biogeographical Regions mentioned in the text of the Habitats Directive, the Scientific Working Group (SWG) of the directive agreed upon the following principles for the creation of the Biogeographical Regions Map:

⇒ Only regions related to the terms mentioned in art. 1 c (iii) are to be mapped ; as a consequence no 'sub-classes' are considered such as 'sub-continental, sub-alpine, hemi-boreal, etc … .
⇒ The mapping procedure is based on an interpretation of the digital version of the 'Map of Natural Vegetation of the member countries of the European Community and of the Council of Europe' (Noirfalise A., 1987).
⇒ The final map is only to be used at a small scale (± 1/10.000.000 or smaller)
⇒ As a consequence the basic background natural vegetation map (scale 1/3.000.000) needs to be generalised
⇒ Generalisation is performed by removing smaller 'islands' of different regions within a major region and by attributing the 'azonal units' of the map to the neighbouring Biogeographical Region

Figure 1 illustrates the different steps, discussed during several meetings of the Scientific Working Group of the directive and leading to its adoption by the Habitats Committee. (part of Southern France and northern Italy)



Step 1: Original Natural Vegetation Map units (top left, original scale = 1:3.000.000) allocated to one of the Biogeographical Regions (top right); azonal units are shown in grey.
Table 1 illustrates this interpretation of the map legend of the natural vegetation map towards the Biogeographical Regions.

Step 2: azonal units in grey are attributed to the neighbouring Biogeographical Region and the smaller islands, scattered within a major Biogeographical Region are allocated to the adjacent region.

Step 3: final generalisation and modification of the borders according to specific comments of some member states, resulting in the map of Biogeographical Regions for the 12 member states at the moment of adoption of the habitats directive (1992)

Table 1: extract of the look-up table for the initial interpretation of the legend units of the natural vegetation map (Noirfalise, 1987) towards Biogeographical Regions.

Legend unit	Title	Biogeographical unit
1	Coastal and Halophytic vegetation	AZ
2	Coastal dunes	AZ
5	Fluvial plains	AZ
◆ ◆ ◆		
C1	Boreo-Atlantic oak-pine woods	AT
C10	Aquitanian oak woods and heath lands	AT
C11	Pre – Pyrenean oak woods with *Quercus pyrenaica*	AT
C12a	Ibero-Atlantic oak woods	AT
◆ ◆ ◆		
C2	Sub-Continental oak-pine woods	CO
C6	Xerophilous oak woods of the Rhine valley	CO
C9	Submontane oak woods of the Massif Central	CO
◆ ◆ ◆		
G5	Beech-fir forest of the outer Alps	AL
P1 ◆ ◆ ◆	Montane forests of *Pinus sylvestris*	AL
M1	Sclerophyllous cork oak woods	ME
M9	Oak woods of Crete with *Quercus ilex*	ME
◆ ◆ ◆		

(AZ = Azonal, AT = Atlantic, CO = Continental, AL = Alpine, ME = Mediterranean)

Note : the Natural Vegetation Map does not cover the Atlantic islands of Portugal and Spain. This does not create any difficulty for the development of the map as they belong all to the Macaronesian Biogeographical Region.

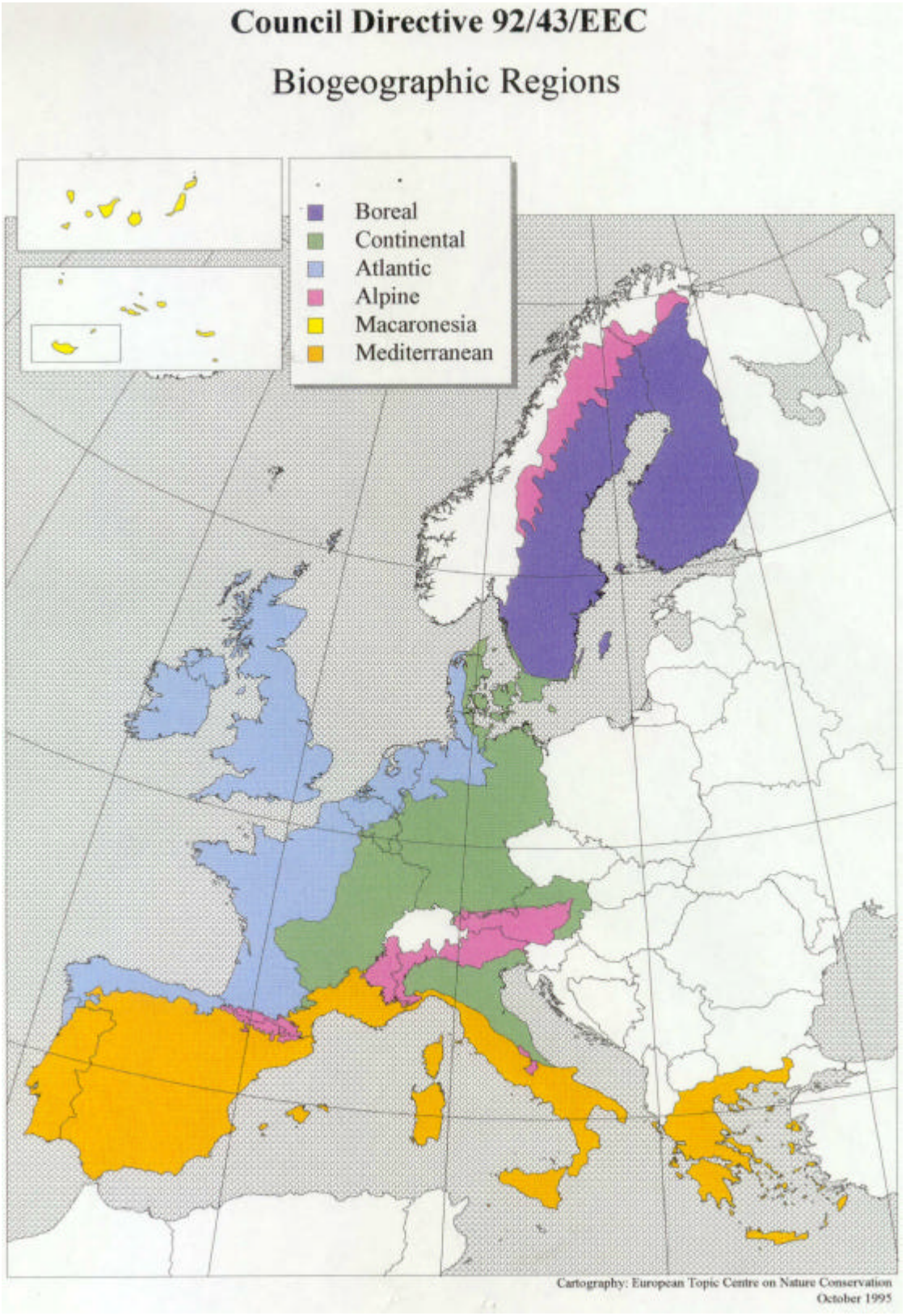
Modifying the map for Austria, Finland and Sweden : adding the Boreal Region to the map

On 1 January 1995, Austria, Finland and Sweden joined the European Union. As a consequence the Council decided to add the 'Boreal' Biogeographical Region in art. 1 c (iii) of Council Directive 92/43/EEC (OJ L1, 1/1/95, p. 135)

Subsequently, the Habitats Committee extended the existing map to cover the 3 new Member States, using the same mapping principles as explained above.

Figure 2 illustrates the final result as adopted by the Habitats Committee meeting of 13-14/7/1995

Figure 2: Biogeographical Regions map, adopted by the Habitats Committee meeting of 13-14/7/95


Council Directive 92/43/EEC
Biogeographic Regions
Boreal
Continental
Atlantic
Alpine
Macaronesia
Mediterranean
Cartography: European Topic Centre on Nature Conservation
October 1995

Extending the map to 'Pan-Europe' in the framework of the Emerald network under the Bern Convention

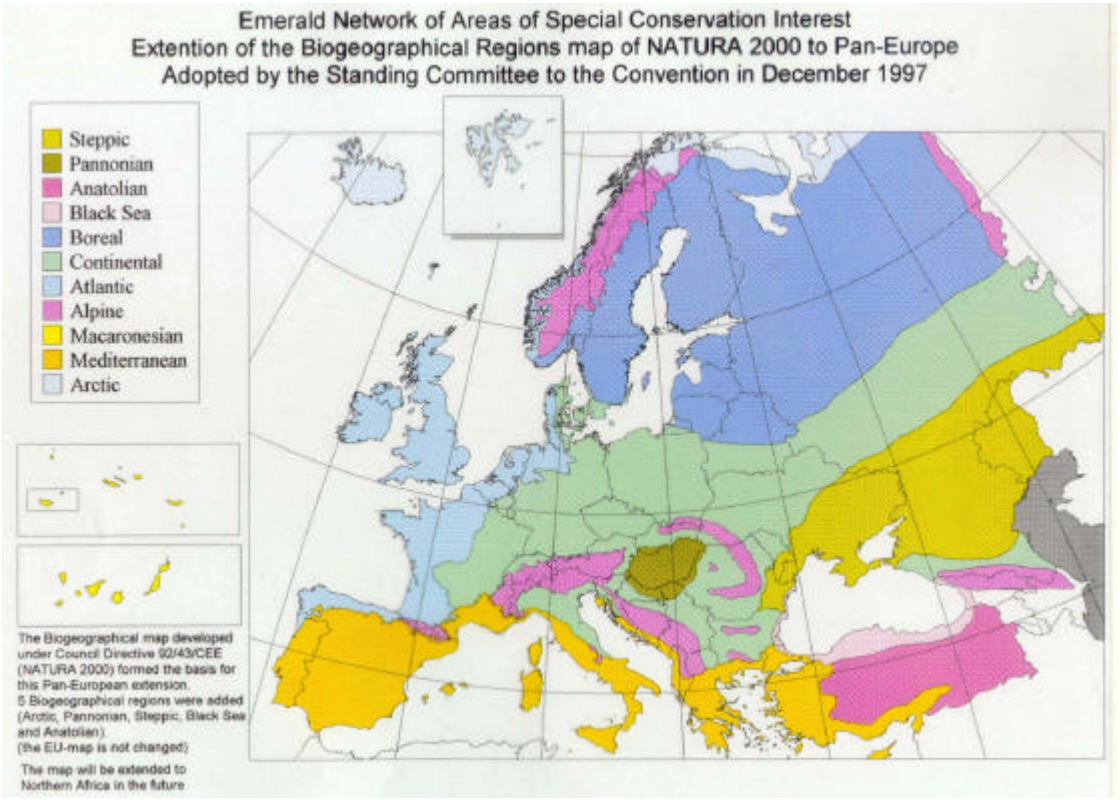
As already indicated in the introduction, the Emerald network is being developed as a geographical complement of the Natura 2000 network. On the other hand the Natura 2000 network is considered as the contribution of the European Union to the Emerald network as a contracting party of the Bern Convention.

Already in 1997, the Emerald expert group had discussed the possible extension of the Biogeographical Regions map to the Pan-European area. Unfortunately, no Pan-European natural vegetation map existed in digital format at that moment. Only the paper edition of the generalised version of 'the Map of Natural Vegetation of Europe' at a scale of 1/10.000.000 was available (Bohn, 1993). This map was interpreted using the methodology described above, but boundaries of mapping units were transferred by hand. Thus, some of the boundaries are rather indicative.

To cover the whole area, 5 Biogeographical Regions were added: Anatolian, Arctic, Black Sea, Pannonian and Steppic.

The Pan-European Natural Vegetation Map does not include the territory of Turkey. As a consequence, the boundaries for the Biogeographical Regions were drawn using the paper version of the Map of Natural Vegetation of the member countries of the European Community and of the Council of Europe (Noirfalise A., 1987).

The existing EUR 15 map was unchanged and was fully integrated into the Emerald map. (Figure 3)


Emerald Network of Areas of Special Conservation Interest
Extention of the Biogeographical Regions map of NATURA 2000 to Pan-Europe
Adopted by the Standing Committee to the Convention in December 1997
Steppic
Pannonian
Anatolian
Black Sea
Boreal
Continental
Atlantic
Alpine
Macaronesian
Mediterranean
Arctic
The Biogeographical map developed under Council Directive 92/43/CEE (NATURA 2000) formed the basis for this Pan-European extension.
5 Biogeographical regions were added (Arctic, Pannonian, Steppic, Black Sea and Anatolian).
(the EU-map is not changed)
The map will be extended to Northern Africa in the future

During 1998, a digital version of a more detailed Natural Vegetation Map of Europe became available at a scale of 1:2 500 000. A paper edition of this map was published later (Bohn, Gollub & Hettwer, 2000).

This allowed the technical cartographic procedure, followed for the EUR 12 and EUR 15 map (see figure 1), to be used also for the expanded map and it proved to be necessary to revise the 1997 version from a cartographic point of view as well as from an administrative point of view for a few countries.

Figure 4 illustrates the cartographic shifts of the boundaries of the 1997 map according to the digital version of the Natural Vegetation Map of Europe.
The legend units of the Natural Vegetation Map were interpreted according to the 11 Biogeographical Regions (Table 2) and a similar cartographic process was performed using GIS techniques. The colored background represents the interpretation of the Natural Vegetation Map. The black lines are the boundaries between Biogeographical Regions according to the 1997 map.

Table 2: Extract from the look-up table with the interpretation of the legend units of the Natural Vegetation Map (Bohn & all., 2000) according to the 11 Biogeographical Regions

Legend unit	Title	Biogeographical region
G5	Pre-Carpathian mixed Tatarian maple-sessile oak forests	PA
G6	Pannonian mixed Tatarian maple-pedunculate oak forests	PA
G7	Pannonian mixed sand steppe-oak forests	PA
H1	Lowland and submontane mixed oak forests	CO
H2	Hercynian submontane oak forests	CO
N5a	Great Caucasian thorn-cushion communities	ST
P7b1	West Pontic halophytic vegetation	BS

PA = Pannonian, CO = Continental, ST = Steppic, BS = Black Sea

The revisions were discussed and agreements were made during the Emerald pilot project workshops in each country. A new version was presented at the September 2000 Emerald expert meeting (Figure 5)

For Turkey, the revision was made using the digital version of the Map of Natural Vegetation of the member countries of the European Community and of the Council of Europe (Noirfalise A., 1987). This revision was included in the October 2001 version produced for the Emerald expert group meeting in Istanbul (Figure 7)

Finally, the Standing Committee of the Bern Convention, at its 21th meeting in Strasbourg (21-30 November 2001), approved this map as the final version of the Biogeographical Regions map for the Pan-European area. (Figure 8)

Figure 4: Illustration of the cartographic errors in the hand drawn 1997 Emerald map

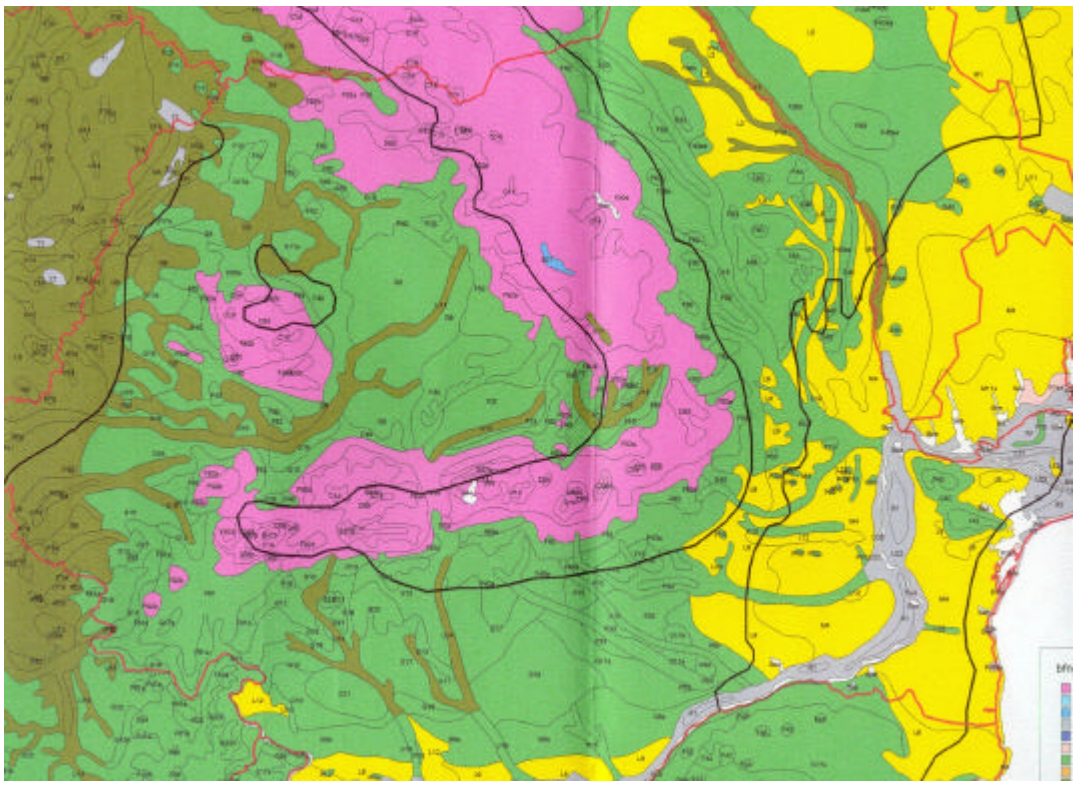
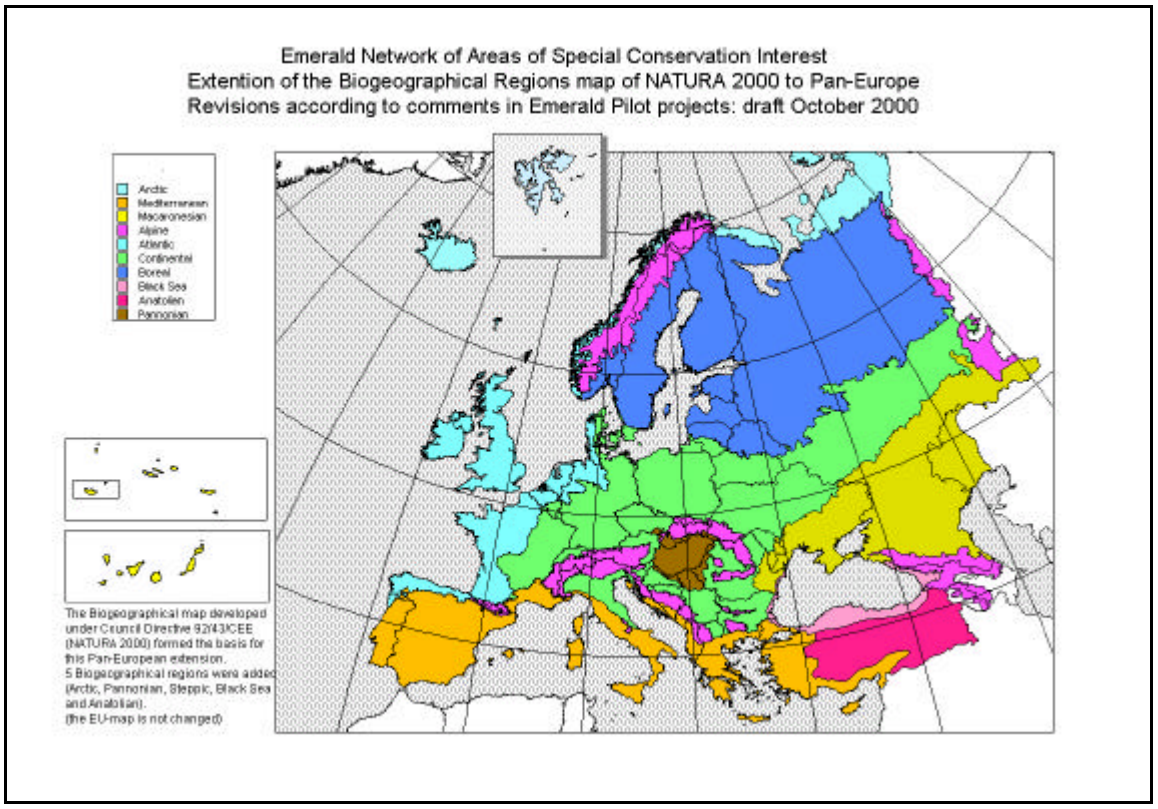


Figure 5: Map presented to the September 2000 Emerald expert group meeting



Expanded EUR 15 Map for accession countries and small amendments for Germany and Austria

The 1997 Emerald map was used to create an extract for the Accession Countries which are preparing for Natura 2000. First a map was produced for the 11 AC's at that time. When Malta became an Accession Country a new map was produced, without changing the substance of the map.

At the same time, Germany was requesting a few amendments to the existing EUR 15 map in their country. The Habitats Committee accepted changes to the borders between Atlantic and Continental, and between Alpine and Continental.

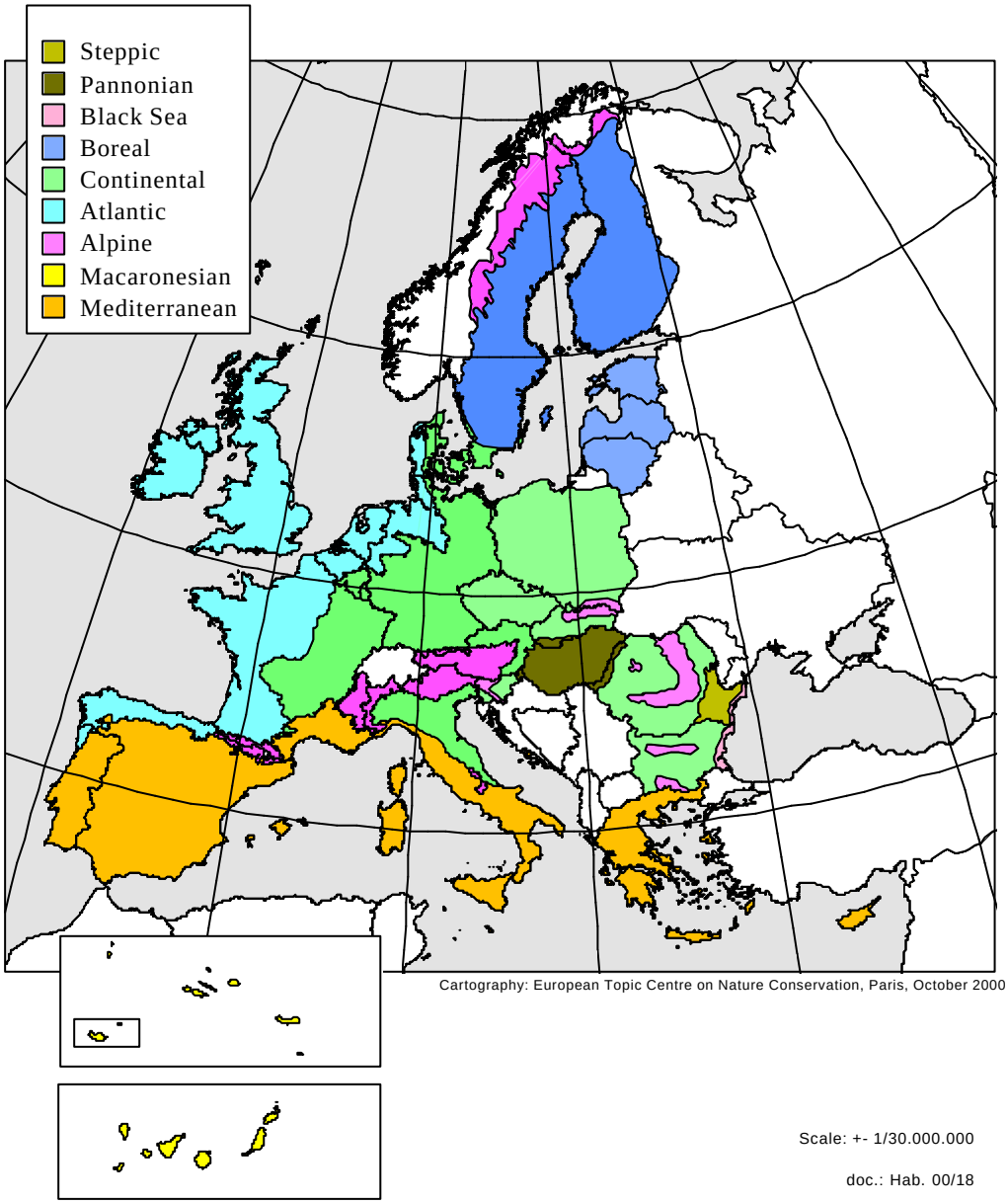
At the request of Austria, it was also agreed that the relatively small area in Voralberg previously considered as 'Continental' should be included within the 'Alpine' region.

The EUR 15 + 12 map, including the small changes for Germany and Austria was adopted during the Habitats Committee meeting of 4/10/2000 (Figure 6)

Figure 6: the EUR 15 + 12

Indicative Map of Biogeographical Regions
Carte indicative des Régions Biogéographiques

adopted by the Habitat Committee
adoptée par le Comité Habitats, 23.10.2000
EUR 15 + 12



Cartography: European Topic Centre on Nature Conservation, Paris, October 2000

Scale: +- 1/30.000.000

doc.: Hab. 00/18

Figure 7: October 2001 version for the Emerald expert group meeting in Istanbul.

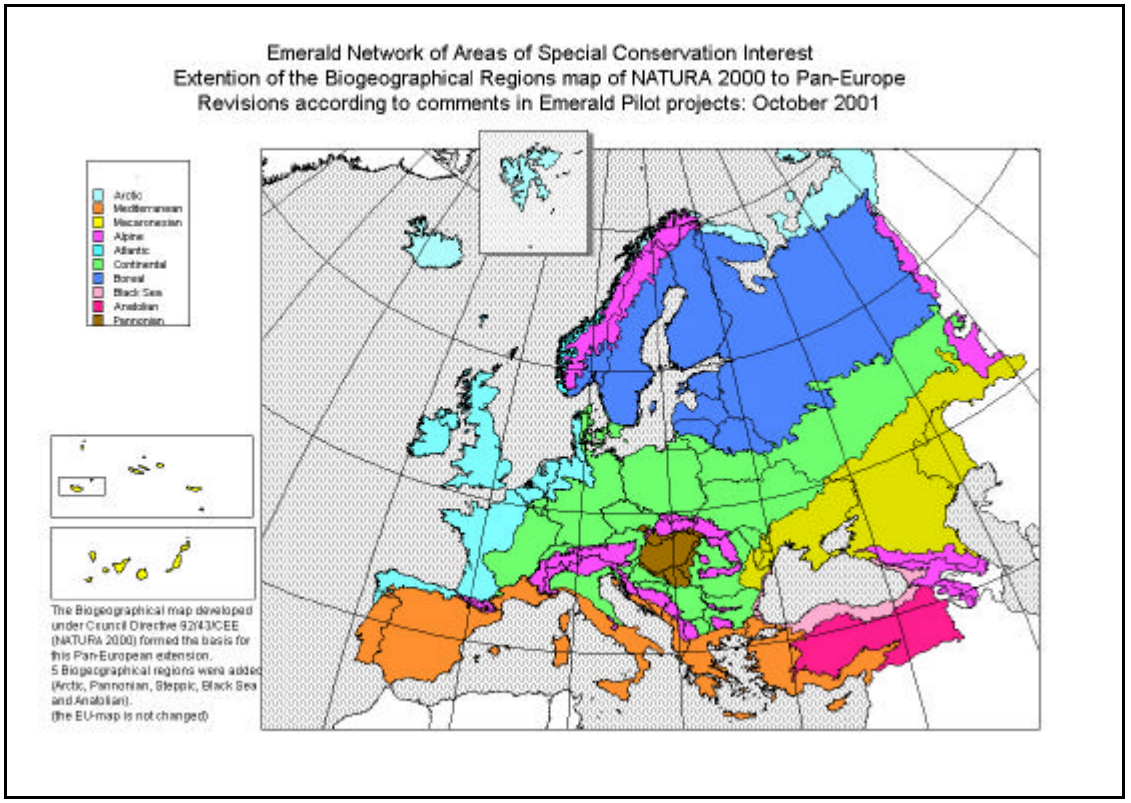
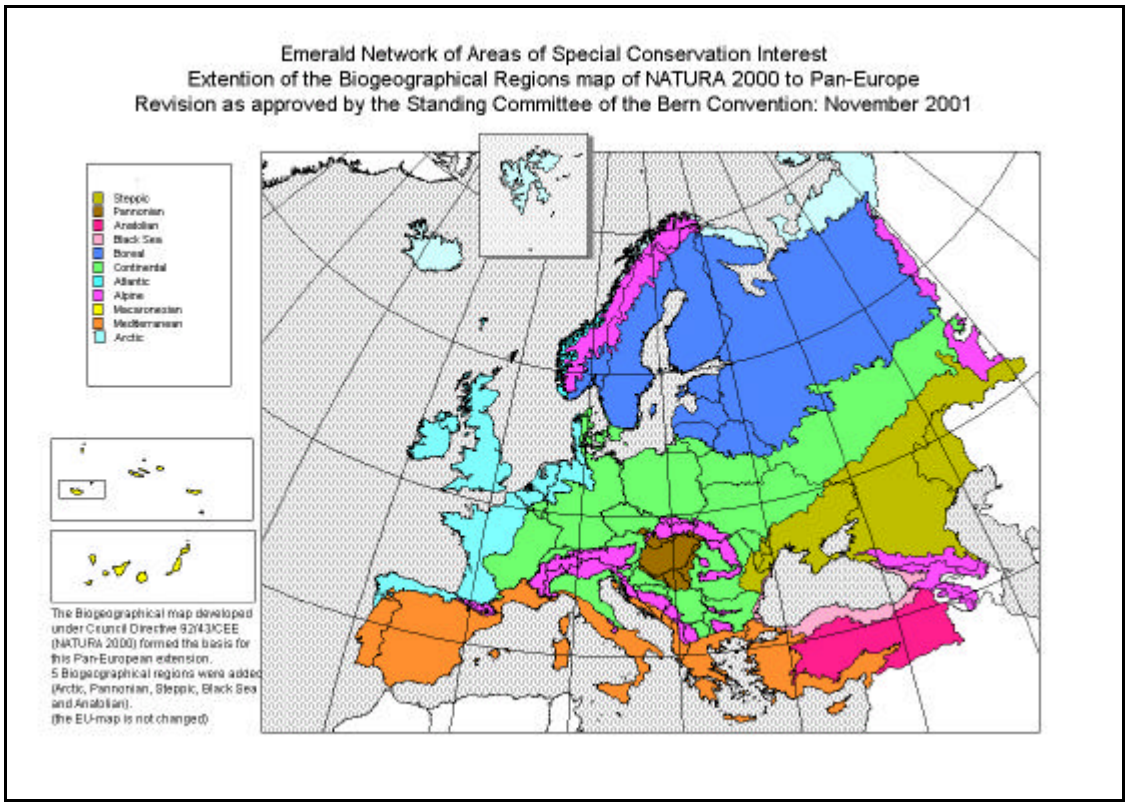


Figure 8: December 2001 version as approved by the Standing Committee of the Bern Convention


Emerald Network of Areas of Special Conservation Interest
Extention of the Biogeographical Regions map of NATURA 2000 to Pan-Europe
Revision as approved by the Standing Committee of the Bern Convention: November 2001
Steppic
Pannonian
Anatolian
Black Sea
Boreal
Continental
Atlantic
Alpine
Macaronesian
Mediterranean
Arctic
The Biogeographical map developed under Council Directive 92/43/CEE (NATURA 2000) formed the basis for this Pan-European extension.
5 Biogeographical regions were added (Arctic, Pannonian, Steppic, Black Sea and Anatolian).
(the EU-map is not changed)

Summary of important milestones during the development of the Biogeographical Regions Map

21/5/1992:	adoption of Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora, defining 5 Beogeographical Regions in art. 1 c (iii).
3-4/2/1994:	adoption of the EUR 12 version (see Figure 1) by the Habitats Committee
13-14/7/1995:	adoption of the EUR 15 version (see Figure 2) by the Habitats Committee
12/1997:	adoption of the Pan-European version of the Biogeographical Regions Map under the Emerald network.
27-28/9/1999:	principle agreement on revising the 1997 Emerald map based on the digital version of the European Natural Vegetation Map.
4/10/1999:	adoption of the EUR 15 + 11 version as an extract of the 1997 Emerald version to include 11 accession countries by the Habitats Committee
18-19/9/2000:	the Emerald expert group takes note of the amended version according to the discussions and decisions in the Emerald pilot projects workshops in each of the countries (Figure 5)
23/10/2000:	adoption of the EUR 15 + 12 version as an extract of the 1997 Emerald version to include 12 accession countries (including Malta) by the Habitats Committee and to modify the existing Atlantic – Continental and Continental – Alpine border lines in Germany and changes in the Voralberg region in Austria (Figure 6)
4-5/10/2001:	the Emerald expert group (Istanbul) takes note of the final version according to the discussions and decisions in the Emerald pilot projects workshops in each of the countries (Figure 7)
26-30/11/2001:	the Standing Committee of the Bern Convention takes note of the final version as it was shown at the Emerald expert group. (Figure 8)
14/3/2002:	The ETC/NPB presents the new biogeographic map and its scientific reasoning to the Habitats Committee. The Committee is asked for its opinion of the new indicative Map of Biogeographical Regions EU15 + 12. (The biogeographic boundaries for the EUR 15 Member States are the same as those approved by the Habitats Committee on 23 October 2000)

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