

## 2 Overview

### 2.1 Name

INSPIRE data specification for the theme Bio-geographical Regions.

### 2.2 Informal description

#### **Definition:**

Areas of relatively homogeneous ecological conditions with common characteristics.  
[Directive 2007/2/EC]

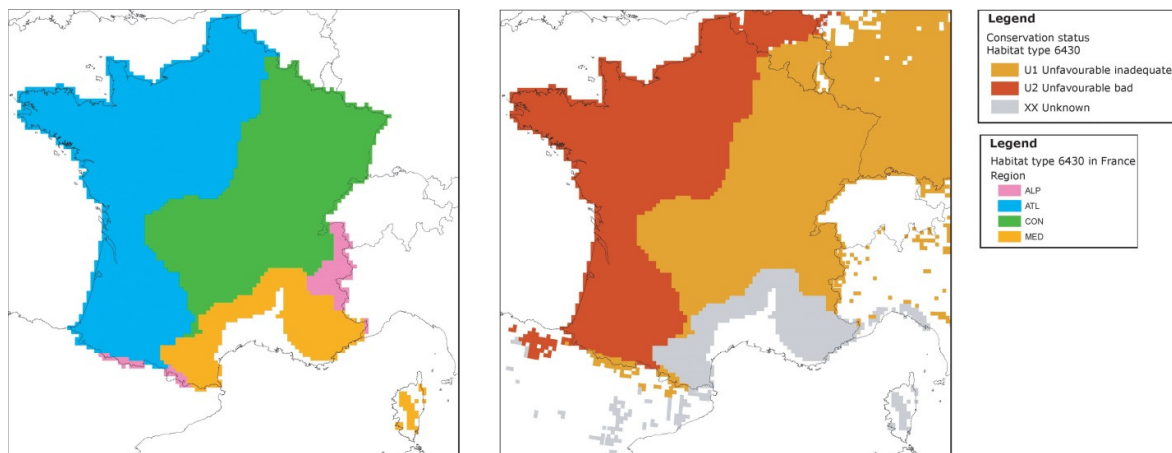
#### **Description:**

Data content:

The scope of the theme '*Bio-geographical regions*' falls under the more general scope of 'biodiversity' which covers three of the themes listed under Annex III of the INSPIRE Directive: *Bio-geographical regions*, *Habitat and biotopes*, and *Species distribution*, all of which have a link to the Annex I theme on *Protected sites*. More specifically this theme deals with areas of "*relatively homogeneous ecological conditions with common characteristics*".

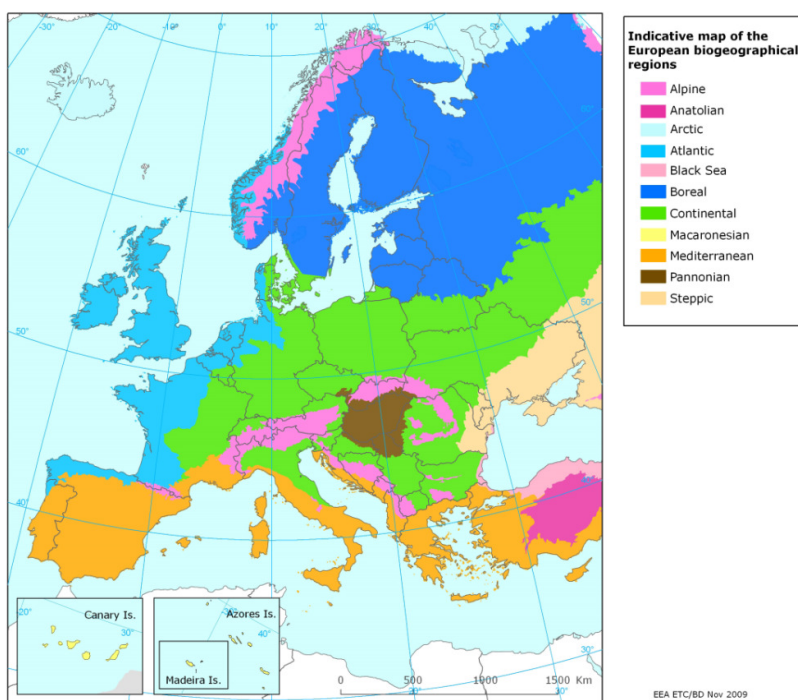
The concept of "bio-geographical regions" has been discussed in scientific literature going back over 150 years growing out of the work by Humboldt and others on the science of biogeography. Depending on the underlining concepts involved, these regions have been defined based on a variety of related factors such as geology, soils, climate, geomorphology, and vegetation. The aim of these "bio-geographical regions" has been to identify regions of similar environmental and ecological characteristics.

In regards to this theme the most important guiding document is the Habitats Directive (EEC/92/43), which contains a list of 'bio-geographical regions' (Article 1.iii). These bio-geographical regions are the basis of a series of seminars (series of bilateral or multi lateral meetings with Member States) which evaluate the Natura 2000 network and which are used for reporting every 6 years on the "conservation status" of the habitat types and species protected by the Directive (see Figure 1). In this regard these bio-geographical regions are also covered under the concept of "reporting units", which are further described in another Annex III theme "*Area management/restriction/regulation zones and reporting units*".



**Figure 1 – The map on the left shows the distribution of a habitat type in France colour coded by the bio-geographical region it occurs in; the map on the right shows the “conservation status” of the same habitat by bio-geographical region.**

The Habitats Directive was the first piece of EU legislation to introduce the concept of bio-geographical regions. There are currently 9 regions, covering the 27 Member States of the EU. The bio-geographical regions are based on maps of potential natural vegetation (Bohn et al, 2000), but adjusted to fit political and administrative boundaries (Roekaerts, 2002, ETC/BD 2006). For the Bern Convention, via the Emerald Network, the map of these bio-geographical regions has been extended to cover the Pan-European geographical area and includes an additional 2 regions, making 11 bio-geographical regions in all (Figure 2). More recently 5 marine regions have also been used for reporting, based on the European marine conventions, though these have no legal basis. Although the regions have been modified to make them easier to use administratively, they still form ecologically coherent units of similar environmental conditions as can be seen by comparing these pan European bio-geographical regions with other environmental classifications of Europe.



**Figure 2 – The pan European bio-geographical regions map.**

While these legally mandated bio-geographical regions fulfil administrative needs, there is further need amongst users for other kinds of ecological regions for various analyses at a European scale or for use at a regional, national or sub national level. The needs of these users for a more detailed or conceptually different set of ecological regions are covered under the use of code lists such as the ‘Environmental Stratification’ Classification values. Another, often used example is the “European Map of Natural Vegetation” which uses a specific vegetation type classification. For the use at national and sub national level Member States often have their own more detailed versions of the bio-geographical regions outlined in the Habitats Directive (see use case 4).

It should be stressed that while these Data Specifications focus on the European dimension the same concepts and guidelines are equally valid for bio-geographical regions at the level of the Member State. Member States are able to upload their own code lists for their own bio-geographical regions via a ‘code-list register’. Furthermore these Data Specifications do not imply that the European bio-geographical regions are a replacement for any more detailed bio-geographical regions that Member States may have.

Use cases:

Four of the basic use cases that help define the scope of this theme and the attributes of the schema are detailed in Annex B.

1. The first use case describes the assessment of the Conservation Status of the habitat types and species listed on the Annex's of the Habitat Directives. This is one of the key tools in assessing the efficiency of the Habitats Directive (and by default the efficiency of the EU and Member States) in its stated aim of protecting biodiversity in the European Union. These assessments are done at the bio-geographical level.
2. The second use case describes the evaluation of the Natura 2000 network by bio-geographical region. This is a critical step in the protection of biodiversity in Europe as it is during this process that the quality of protection is assessed.
3. The third case covers the situation relating to local (national level) ecological regions highlighting the case of the use of these regions in Germany.
4. Finally the fourth use case describes the use of the detailed set of ecological regions which were described in the previous paragraph; the use case highlights the use of Environmental stratification classification values in reporting under the European Biodiversity Observation Network (EBONE).

**Definition:**

Areas of relatively homogeneous ecological conditions with common characteristics.

[Directive 2007/2/EC]

**Description:**

*Bio-geographical Regions* describe areas of relatively homogeneous ecological conditions with common characteristics. The INSPIRE theme Bio-geographical Regions has a strong linkage to other "biodiversity themes".

The Habitats Directive (EEC/92/43) is the most important guiding document regarding to *Bio-geographical Regions*, which contains a list of 'bio-geographical regions' (Article 1.iii). These bio-geographical regions are the basis of a series of seminars evaluating the Natura 2000 network and for reporting on the conservation status of the habitats and species protected by the Directive.

However, the theme was specified in a more generic way to allow for other concepts of BR (e.g. European map of natural vegetation, environmental stratification) to be shared via INSPIRE.

Entry in the INSPIRE registry: <http://inspire.ec.europa.eu/theme/br/>

## References

Bohn, U., Gollub, G., and Hettwer, C. (2000) Karte der natürlichen Vegetation Europas. Maßstab 1:2.500.000 Karten und Legende. Bundesamt für Naturschutz, Bonn.

Burrichter, E. (1973) Die potentielle natürliche Vegetation in der Westfälischen Bucht. – Siedlung und Landschaft in Westfalen, 8. Geogr.Komm.f.Westf., Münster.

Council directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. *Official Journal of the European Communities*, 206 (22), 7.

ETC/BD (2006) "*The indicative Map of European Biogeographical Regions: methodology and development*". [http://www.eea.europa.eu/data-and-maps/data/biogeographical-regions-europe-2005/methodology-description-pdf-format/methodology-description-pdf-format/at\\_download/file](http://www.eea.europa.eu/data-and-maps/data/biogeographical-regions-europe-2005/methodology-description-pdf-format/methodology-description-pdf-format/at_download/file)

Metzger M.J., Bunce, R.G.H., Jongman R.H.G., Múcher, C.A., and Watkins J.W. (2005) A climatic stratification of the environment of Europe *Global Ecology and Biogeography* 14 (6), 549–563

Noirfalise, A. (1987) Map of the Natural Vegetation of the member countries of the European Community and of the Council of Europe. Office for Official Publications of the European Communities, Luxembourg

Roekaerts, M. (2002) The Biogeographical Regions Map of Europe - Basic principles of its creation and overview of its development. [http://www.eea.europa.eu/data-and-maps/data/biogeographical-regions-europe-2001/methodology-basic-principles-of-the-biogeographical-regions-map-creation-and-overview-of-its-development/methodology-basic-principles-of-the-biogeographical-regions-map-creation-and-overview-of-its-development/at\\_download/file](http://www.eea.europa.eu/data-and-maps/data/biogeographical-regions-europe-2001/methodology-basic-principles-of-the-biogeographical-regions-map-creation-and-overview-of-its-development/methodology-basic-principles-of-the-biogeographical-regions-map-creation-and-overview-of-its-development/at_download/file)

## 2.3 Normative References

[Directive 2007/2/EC] Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Union (INSPIRE)

[Directive 2008/56/EC] Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy

[ISO 19105] EN ISO 19105:2000, Geographic information -- Conformance and testing

[ISO 19107] EN ISO 19107:2005, Geographic Information – Spatial Schema

[ISO 19111] EN ISO 19111:2007 Geographic information - Spatial referencing by coordinates (ISO 19111:2007)

[ISO 19115] EN ISO 19115:2005, Geographic information – Metadata (ISO 19115:2003)

[ISO 19118] EN ISO 19118:2006, Geographic information – Encoding (ISO 19118:2005)

[ISO 19125-1] EN ISO 19125-1:2004, Geographic Information – Simple feature access – Part 1: Common architecture

[ISO 19135] EN ISO 19135:2007 Geographic information – Procedures for item registration (ISO 19135:2005)

[ISO 19139] ISO/TS 19139:2007, Geographic information – Metadata – XML schema implementation

[ISO 19157] ISO/DIS 19157, Geographic information – Data quality

[OGC 06-103r4] Implementation Specification for Geographic Information - Simple feature access – Part 1: Common Architecture v1.2.1

NOTE This is an updated version of "EN ISO 19125-1:2004, Geographic information – Simple feature access – Part 1: Common architecture".

[Regulation 1205/2008/EC] Regulation 1205/2008/EC implementing Directive 2007/2/EC of the European Parliament and of the Council as regards metadata

[Regulation 976/2009/EC] Commission Regulation (EC) No 976/2009 of 19 October 2009 implementing Directive 2007/2/EC of the European Parliament and of the Council as regards the Network Services

[Regulation 1089/2010/EC] Commission Regulation (EU) No 1089/2010 of 23 November 2010 implementing Directive 2007/2/EC of the European Parliament and of the Council as regards interoperability of spatial data sets and services

## 2.4 Terms and definitions

General terms and definitions helpful for understanding the INSPIRE data specification documents are defined in the INSPIRE Glossary<sup>13</sup>.

Specifically, for the theme Bio-geographical Regions, the following terms are defined:

### (1) Article 17

Article 17 of the Habitats Directive requires that every 6 years Member States prepare reports to be sent to the European Commission on the implementation of the Directive. Article 11 of the Habitats Directive requires Member States to monitor the habitats and species listed in the annexes and Article 17 requires a report to be sent to the European Commission every 6 years following an agreed format – hence the term ‘Article 17 Reporting’. The report includes assessments on the conservation status of the habitat types and species of Community interest at the bio-geographical level.

### (2) Bio-geographical regions

An area in which there are relatively homogeneous ecological conditions with common characteristics. These areas with “homogeneous ecological conditions” could be based on physio-geomorphological traits, on vegetation cover, on climate regions, etc...

NOTE Article 1.iii of the Habitats Directive identifies 9 bio-geographical regions in the EU. These bio-geographical regions are, according to Article 4.2 of the Habitats Directive, the geographical framework for the establishment of a draft list of sites of Community Importance drawn from the Member States’ lists with a view of setting up the Natura 2000 ecological network (Special Areas of Conservation – SACs). In parallel, Bern Convention Resolution No. 16 (1989) foresees that Contracting Parties take steps to designate Areas of Special Conservation Interest (ASCIs). As a consequence there was a need to extend the Map of Bio-geographical regions to the Pan-European geographical area.

### (3) Environmental stratification

The “Environmental stratification” (Metzger et al. 2005) was designed to produce a statistical stratification of the European environment, suitable for stratified random sampling of ecological resources, the selection of sites for representative studies across the continent, and to provide strata for modelling exercises and reporting. In this the strata are more refined regions than the broader bio-geographical regions used in the Habitat Directive.

### (4) Marine regions

Marine regions and their subregions are sea regions designated under international, Union, national or sub-national legislation for the purpose of assessment, management and regulation.

NOTE The marine regions are used in the context of Natura2000 due to practical/technical reasons only; they do not have any legal status as opposed to the “terrestrial” bio-geographical regions of the Habitats Directive which do.

### (5) MSFD Marine regions

Marine regions as defined under Article 4 of the Marine Strategy Framework Directive.

### (6) Natura 2000

Natura 2000 is a European Union-wide network of nature protection areas established under the 1992 Habitats Directive. The aim of the network is to assure the long-term survival of Europe's most valuable and threatened species and habitats. It is comprised of Special Areas of Conservation (SAC) designated by Member States under the Habitats Directive, and also incorporates Special Protection Areas (SPAs) designated under the 1979 Birds Directive. The establishment of this network of protected areas also fulfils a Community obligation under the UN Convention on Biological Diversity.

### (7) Natural Vegetation

<sup>13</sup> The INSPIRE Glossary is available from <http://inspire-registry.jrc.ec.europa.eu/registers/GLOSSARY>

The map of Natural Vegetation of Europe was compiled and produced by an international team of geobotanists. It was first published in 1979 with a second version being published in 1987 by the Council of Europe.

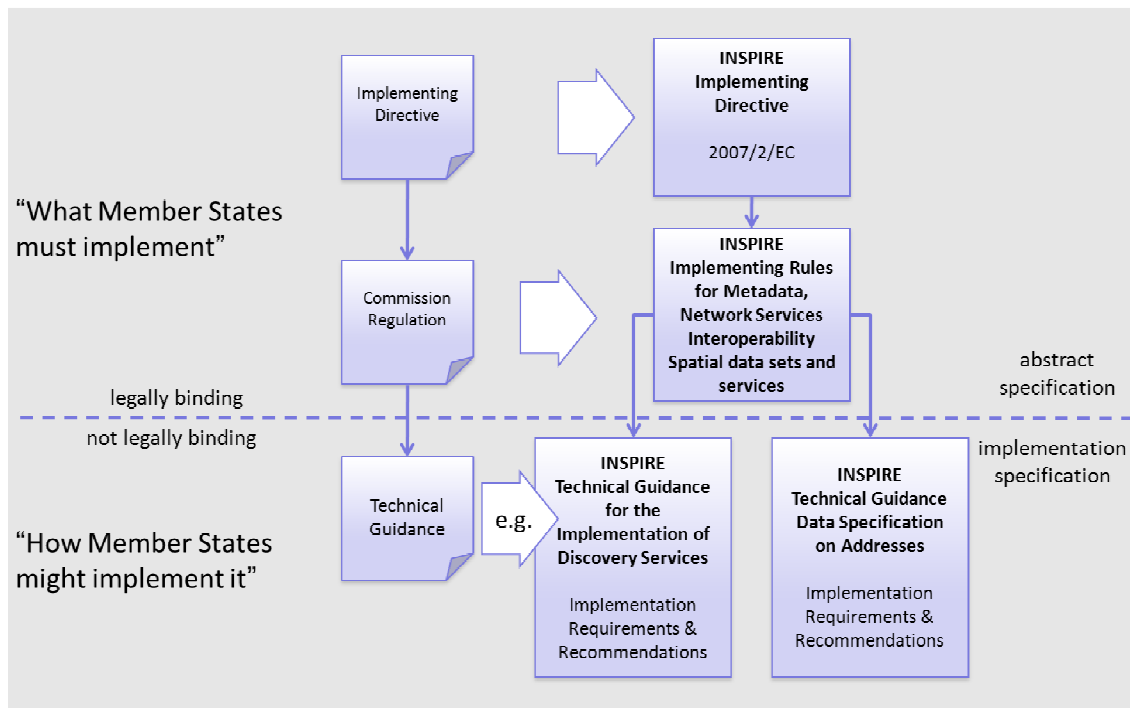
## 2.5 Symbols and abbreviations

Article 17	Article 17 of the 1992 Habitats Directive
ATS	Abstract Test Suite
EBONE	European Biodiversity Observation Network
EC	European Commission
EEA	European Environment Agency
ETC/BD	European Topic Centre on Biological Diversity
ETRS89	European Terrestrial Reference System 1989
ETRS89-LAEA	Lambert Azimuthal Equal Area
EU	European Union
EU27	27 Member States of the European Union
EVRS	European Vertical Reference System
GCM	General Conceptual Model
GML	Geography Markup Language
INSPIRE	Infrastructure for Spatial Information in Europe
IR	Implementing Rules
ISDSS	Interoperability of Spatial Data Sets and Services
ISO	International Organization for Standardization
ITRS	International Terrestrial Reference System
LAT	Lowest Astronomical Tide
LMO	Legally Mandated Organisation
Natura 2000	European Union-wide network of nature protection areas established under the 1992 Habitats Directive and Directive.
SAC	Special Areas of Conservation
SDF	Standard Data Form used to collect data on Natura 2000 sites
SDIC	Spatial Data Interest Community
TG	Technical Guidelines
UML	Unified Modeling Language
UTC	Coordinated Universal Time
XML	EXtensible Markup Language

## 2.6 XML Extensible Markup Language How the Technical Guidelines map to the Implementing Rules

The schematic diagram in Figure 3 gives an overview of the relationships between the INSPIRE legal acts (the INSPIRE Directive and Implementing Rules) and the INSPIRE Technical Guidelines. The INSPIRE Directive and Implementing Rules include legally binding requirements that describe, usually on an abstract level, *what* Member States must implement.

In contrast, the Technical Guidelines define *how* Member States might implement the requirements included in the INSPIRE Implementing Rules. As such, they may include non-binding technical requirements that must be satisfied if a Member State data provider chooses to conform to the Technical Guidelines. Implementing these Technical Guidelines will maximise the interoperability of INSPIRE spatial data sets.



**Figure 3 - Relationship between INSPIRE Implementing Rules and Technical Guidelines**

## 2.6.1 Requirements

The purpose of these Technical Guidelines (Data specifications on *Bio-geographical Regions*) is to provide practical guidance for implementation that is guided by, and satisfies, the (legally binding) requirements included for the spatial data theme Bio-geographical Regions in the Regulation (Implementing Rules) on interoperability of spatial data sets and services. These requirements are highlighted in this document as follows:

<p style="text-align: center;"><b>IR Requirement</b> Article / Annex / Section no. <b>Title / Heading</b></p> <p>This style is used for requirements contained in the Implementing Rules on interoperability of spatial data sets and services (Commission Regulation (EU) No 1089/2010).</p>
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For each of these IR requirements, these Technical Guidelines contain additional explanations and examples.

**NOTE** The Abstract Test Suite (ATS) in Annex A contains conformance tests that directly check conformance with these IR requirements.

Furthermore, these Technical Guidelines may propose a specific technical implementation for satisfying an IR requirement. In such cases, these Technical Guidelines may contain additional technical requirements that need to be met in order to be conformant with the corresponding IR requirement *when using this proposed implementation*. These technical requirements are highlighted as follows:

<p><b>TG Requirement X</b> This style is used for requirements for a specific technical solution proposed in these Technical Guidelines for an IR requirement.</p>
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NOTE 1 Conformance of a data set with the TG requirement(s) included in the ATS implies conformance with the corresponding IR requirement(s).

NOTE 2 In addition to the requirements included in the Implementing Rules on interoperability of spatial data sets and services, the INSPIRE Directive includes further legally binding obligations that put additional requirements on data providers. For example, Art. 10(2) requires that Member States shall, where appropriate, decide by mutual consent on the depiction and position of geographical features whose location spans the frontier between two or more Member States. General guidance for how to meet these obligations is provided in the INSPIRE framework documents.

## 2.6.2 Recommendations

In addition to IR and TG requirements, these Technical Guidelines may also include a number of recommendations for facilitating implementation or for further and coherent development of an interoperable infrastructure.

**Recommendation X** Recommendations are shown using this style.

NOTE The implementation of recommendations is not mandatory. Compliance with these Technical Guidelines or the legal obligation does not depend on the fulfilment of the recommendations.

## 2.6.3 Conformance

Annex A includes the abstract test suite for checking conformance with the requirements included in these Technical Guidelines and the corresponding parts of the Implementing Rules (Commission Regulation (EU) No 1089/2010).