



INSPIRE Infrastructure for Spatial Information in Europe

D2.8.III.18 Data Specification on Habitats and Biotopes – Draft Guidelines

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INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page II

Foreword

How to read the document?

This document describes the “*INSPIRE data specification on Habitats and Biotopes - Guidelines*” version 2.0 as developed by the Thematic Working Group (TWG) *Bio-geographical Regions / Habitats and Biotopes / Species Distribution* using both natural and a conceptual schema language. This version is now available for the public consultation. Based on the results of the consultation (received comments and the testing reports), the final version 3.0 will be prepared by the TWGs.

The data specification is based on a common template used for all data specifications and has been harmonised using the experience from the development of the Annex I data specifications.

This document provides guidelines for the implementation of the provisions laid down in the draft Implementing Rule for spatial data sets and services of the INSPIRE Directive.

This document includes two executive summaries that provide a quick overview of the INSPIRE data specification process in general, and the content of the data specification on *Habitats and Biotopes* in particular. We highly recommend that managers, decision makers, and all those new to the INSPIRE process and/or information modelling should read these executive summaries first.

The UML diagrams (in Chapter 5) offer a rapid way to see the main elements of the specifications and their relationships. The definition of the spatial object types, attributes, and relationships are included in the Feature Catalogue (also in Chapter 5). People having thematic expertise but not familiar with UML can fully understand the content of the data model focusing on the Feature Catalogue. Users might also find the Feature Catalogue especially useful to check if it contains the data necessary for the applications that they run. The technical details are expected to be of prime interest to those organisations that are/will be responsible for implementing INSPIRE within the field of *Habitats and Biotopes*.

The technical provisions and the underlying concepts are often illustrated by examples. Smaller examples are within the text of the specification, while longer explanatory examples and descriptions of selected use cases are attached in the annexes.

In order to distinguish the INSPIRE spatial data themes from the spatial object types, the INSPIRE spatial data themes are written in *italics*.

The document will be publicly available as a ‘non-paper’. It does not represent an official position of the European Commission, and as such cannot be invoked in the context of legal procedures.

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INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page III

Interoperability of Spatial Data Sets and Services – General Executive Summary

The challenges regarding the lack of availability, quality, organisation, accessibility, and sharing of spatial information are common to a large number of policies and activities and are experienced across the various levels of public authority in Europe. In order to solve these problems it is necessary to take measures of coordination between the users and providers of spatial information. The Directive 2007/2/EC of the European Parliament and of the Council adopted on 14 March 2007 aims at establishing an Infrastructure for Spatial Information in the European Community (INSPIRE) for environmental policies, or policies and activities that have an impact on the environment.

INSPIRE will be based on the infrastructures for spatial information that are created and maintained by the Member States. To support the establishment of a European infrastructure, Implementing Rules addressing the following components of the infrastructure are being specified: metadata, interoperability of spatial data themes (as described in Annexes I, II, III of the Directive) and spatial data services, network services and technologies, data and service sharing, and monitoring and reporting procedures.

INSPIRE does not require collection of new data. However, after the period specified in the Directive¹ Member States have to make their data available according to the Implementing Rules.

Interoperability in INSPIRE means the possibility to combine spatial data and services from different sources across the European Community in a consistent way without involving specific efforts of humans or machines. It is important to note that “interoperability” is understood as providing access to spatial data sets through network services, typically via Internet. Interoperability may be achieved by either changing (harmonising) and storing existing data sets or transforming them via services for publication in the INSPIRE infrastructure. It is expected that users will spend less time and efforts on understanding and integrating data when they build their applications based on data delivered within INSPIRE.

In order to benefit from the endeavours of international standardisation bodies and organisations established under international law their standards and technical means have been utilised and referenced, whenever possible.

To facilitate the implementation of INSPIRE, it is important that all stakeholders have the opportunity to participate in specification and development. For this reason, the Commission has put in place a consensus building process involving data users, and providers together with representatives of industry, research and government. These stakeholders, organised through Spatial Data Interest Communities (SDIC) and Legally Mandated Organisations (LMO)², have provided reference materials, participated in the user requirement and technical³ surveys, proposed experts for the Data Specification Drafting Team⁴ and Thematic Working Groups⁵.

¹ For all 34 Annex I,II and III data themes: within two years of the adoption of the corresponding Implementing Rules for newly collected and extensively restructured data and within 5 years for other data in electronic format still in use

² Number of SDICs and LMOs on 8/6/2011 was 461 and 249 respectively

³ Surveys on unique identifiers and usage of the elements of the spatial and temporal schema,

⁴ The Data Specification Drafting Team has been composed of experts from Austria, Belgium, Czech Republic, France, Germany, Greece, Italy, Netherlands, Norway, Poland, Switzerland, UK, and the European Environmental Agency

⁵ The Thematic Working Groups of Annex II and III themes have been composed of experts from Austria, Belgium, Bulgaria, Czech Republic, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, Latvia, Netherlands, Norway, Poland, Romania, Slovakia, Spain, Sweden, Switzerland, Turkey, UK, the European Commission, and the European Environmental Agency

INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page IV

This open and participatory approach was successfully used during the development of the data specification on Annex I data themes as well as during the preparation of the Implementing Rule on Interoperability of Spatial Data Sets and Services⁶ for Annex I spatial data themes.,

The development framework elaborated by the Data Specification Drafting Team aims at keeping the data specifications of the different themes coherent. It summarises the methodology to be used for the data specifications and provides a coherent set of requirements and recommendations to achieve interoperability. The pillars of the framework are four technical documents:

- The Definition of Annex Themes and Scope⁷ describes in greater detail the spatial data themes defined in the Directive, and thus provides a sound starting point for the thematic aspects of the data specification development.
- The Generic Conceptual Model⁸ defines the elements necessary for interoperability and data harmonisation including cross-theme issues. It specifies requirements and recommendations with regard to data specification elements of common use, like the spatial and temporal schema, unique identifier management, object referencing, a generic network model, some common code lists, etc. Those requirements of the Generic Conceptual Model that are directly implementable will be included in the Implementing Rule on Interoperability of Spatial Data Sets and Services.
- The Methodology for the Development of Data Specifications⁹ defines a repeatable methodology. It describes how to arrive from user requirements to a data specification through a number of steps including use-case development, initial specification development and analysis of analogies and gaps for further specification refinement.
- The “Guidelines for the Encoding of Spatial Data”¹⁰ defines how geographic information can be encoded to enable transfer processes between the systems of the data providers in the Member States. Even though it does not specify a mandatory encoding rule it sets GML (ISO 19136) as the default encoding for INSPIRE.

Based on these framework documents and following the successful development of the Annex I Data specifications (Technical Guidelines) and the Implementing Rules, the new Thematic Working Groups have created the INSPIRE data specification for each Annex II and III theme. These documents – at the version 2.0 – are now publicly available for INSPIRE stakeholders for consultation. The consultation phase covers expert review as well as feasibility and fitness-for-purpose testing of the data specifications.

The structure of the data specifications is based on the “ISO 19131 Geographic information - Data product specifications” standard. They include the technical documentation of the application schema, the spatial object types with their properties, and other specifics of the spatial data themes using natural language as well as a formal conceptual schema language¹¹.

A consolidated model repository, feature concept dictionary, and glossary are being maintained to support the consistent specification development and potential further reuse of specification elements. The consolidated model consists of the harmonised models of the relevant standards from the ISO 19100 series, the INSPIRE Generic Conceptual Model, and the application schemas¹² developed for

⁶ Commission Regulation (EU) No 1089/2010 *implementing Directive 2007/2/EC of the European Parliament and of the Council as regards interoperability of spatial data sets and services*, published in the Official Journal of the European Union on 8th of December 2010.

⁷ http://inspire.jrc.ec.europa.eu/reports/ImplementingRules/DataSpecifications/D2.3_Definition_of_Annex_Themes_and_scope_v3.0.pdf

⁸ http://inspire.jrc.ec.europa.eu/reports/ImplementingRules/DataSpecifications/D2.5_v3.3.pdf

⁹ http://inspire.jrc.ec.europa.eu/reports/ImplementingRules/DataSpecifications/D2.6_v3.0.pdf

¹⁰ http://inspire.jrc.ec.europa.eu/reports/ImplementingRules/DataSpecifications/D2.7_v3.2.pdf

¹¹ UML – Unified Modelling Language

¹² Conceptual models related to specific areas (e.g. INSPIRE themes)

INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page V

each spatial data theme. The multilingual INSPIRE Feature Concept Dictionary contains the definition and description of the INSPIRE themes together with the definition of the spatial object types present in the specification. The INSPIRE Glossary defines all the terms (beyond the spatial object types) necessary for understanding the INSPIRE documentation including the terminology of other components (metadata, network services, data sharing, and monitoring).

By listing a number of requirements and making the necessary recommendations, the data specifications enable full system interoperability across the Member States, within the scope of the application areas targeted by the Directive. They will be published (version 3.0) as technical guidelines and will provide the basis for the content of the Amendment of the Implementing Rule on Interoperability of Spatial Data Sets and Services for data themes included in Annex II and III of the Directive. The Implementing Rule Amendment will be extracted from the data specifications keeping in mind short and medium term feasibility as well as cost-benefit considerations. The Implementing Rule will be legally binding for the Member States.

In addition to providing a basis for the interoperability of spatial data in INSPIRE, the data specification development framework and the thematic data specifications can be reused in other environments at local, regional, national and global level contributing to improvements in the coherence and interoperability of data in spatial data infrastructures.

INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page VI

Habitats and Biotopes – Executive Summary

The Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 (INSPIRE) sets generic rules for establishing an Infrastructure for Spatial Information in the European Community. As a building block of the infrastructure, provisions on the interoperability of spatial datasets and services are foreseen as being required. The thematic areas affected by the Directive are listed in the Annexes of the Directive.

Habitats and Biotopes are linked and/or point to other information that belongs to other thematic fields. There are strong interdependencies between this and some themes listed in Annex III that are under development like *Area Management/Restriction/Regulation Zones and Reporting Units*, *Bio-geographical Regions*, *Environmental facilities* and *Species Distribution*. *Habitats and Biotopes* had to pick up candidate feature types from the theme *Protected Sites* from Annex I.

The INSPIRE data specification on *Habitats and Biotopes* has been prepared following the participative principle of a consensus building process. The stakeholders, based on their registration as a Spatial Data Interest Community (SDIC) or a Legally Mandated Organisation (LMO) had the opportunity to bring forward user requirements and reference materials, propose experts for the specification development, and to participate in the review of the data specifications. The Thematic Working Group responsible for the specification development was composed of experts coming from Austria, Belgium, Denmark, Germany, Latvia, Netherlands, Norway, Romania, Slovakia, United Kingdom and the European Topic Center for Biodiversity. The specification process took place according to the methodology elaborated for INSPIRE respecting the requirements and the recommendation of the INSPIRE Generic Conceptual Model, which is one of the elements that ensures a coherent approach and cross theme consistency with other themes in the Directive.

The INSPIRE Directive defines *Habitats and Biotopes* as geographical areas characterised by specific ecological conditions, processes, structure, and (life support) functions that physically support the organisms that live there. Includes terrestrial and aquatic areas distinguished by geographical, abiotic and biotic features, whether entirely natural or semi-natural. [Directive 2007/2/EC]

Theme *Habitats and Biotopes* is included in Annex III. The "*Habitats and biotopes*" category of spatial data defined in the INSPIRE Directive is one of several themes in a wider grouping of biological organisms and biological communities - biodiversity. It includes *habitats and biotopes* as areas and their distinct boundaries. Common to all spatial data that fall under this category is a characterisation of the distribution of geographical areas being functional areas for living organisms: biotopes being the spatial environment of a biotic community (biocoenosis); habitats being the spatial environment of specific species. Although aware of the conceptual difference, for practical reasons, biotopes and habitats are dealt with similarly. Even if "*habitats*" will be used most frequently in wording (compare "Habitat Directive" and the EUNIS habitat classification"), it always includes "*biotopes*".

From use cases and reference material it has become clear, that biotopes as features may be understood as "complex biotopes", that is, as areas comprising more than one habitat type (e.g. a lowland pasture and the neighbouring lowland river and the riverbank between), while with other use cases you have only one habitat type in one area/feature (e.g. habitat types within a Natura2000 site). Therefore, it will be allowed to attribute one to many habitat types for one feature (object).

Use cases describing reporting obligations on the Habitats Directive ask for grid distribution data on habitats (see use case on "*Bio-geographic Regions*"), rather than area-class maps like in those classic biotope mapping programs. Therefore the provision of both, distribution data (coverages) and area-class feature (mapping) was modelled.

Habitat feature descriptions usually carry lots of information: structural traits, lists of species, management proposals, to name just a few. However, annex III themes should restrict metadata information to necessary information only. For that reason, this data specification restricts attributes to those items already known from "*Protected Sites*" specification, namely a list of the occurring habitat types, a list of occurring vegetation types and a list of relevant species using the habitat. Finally, it should also be emphasized that a strong link exists between the *habitats and biotopes* and Annex I

INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page VII

theme *Protected Sites*. Habitats may in total or partly be overlapping with *Protected Sites* (e.g. for nature conservation purposes), however, they need to have a geometry of their own, because both Protected Sites and habitats/biotopes features may change over time, without any obligation for change of the other feature type.

Different countries or communities have different habitat classification systems. There may be difficulties in mapping accurately certain habitat classes between national nomenclatures and also between national and European nomenclatures. Harmonisation was achieved by using one classification system, which serves as "*primus inter pares*" to which all other classification systems can be mapped. In general, the EUNIS habitat classification system already serves this purpose. However, those "habitat types" from the Annex I of the Habitats Directive have gained an overall importance in Europe due to reporting obligations and the level of detail of these habitat types is in parts finer than those covered by the EUNIS habitats classification. Therefore, this specification proposes to use "habitat types" from the Habitats Directive as the major encoding where appropriate and to take EUNIS habitat classification for other habitat types. As a result all habitat features will have one or two habitat type encodings, an obligatory one from either the "European Union habitats" list or the "EUNIS habitat classification" list and an optional second one from a registered local/national coding list.

Habitats and biotopes do only include areas represented by natural boundaries and classified according to their ecological or geo-physical conditions. They have boundaries of their own rather than being defined relative to some other spatial object type. *Habitats and biotopes* are mapped based on remote sensing image interpretation (e.g. aerial photography interpretation) and/or fieldwork, and sometimes even by modelling.

In some cases reference data (e.g. a geographic grid system) are used to collect, store and present information on habitats, for example the habitat distribution maps that are required for the reporting under article 17 of the Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora. In this case there is no information on the distinct boundaries of the habitats.

In INSPIRE users of "*Habitats and Biotopes*" are all persons or organisations providing public services, related to the environment (INSPIRE 2007, Art. 3 (9)). In conclusion, a wide range of stakeholders exists, who produce, hold and use spatial data relevant to nature conservation, mirroring people and organisations working in different nature conservation application domains and operate at different scales – from the local to the EU-wide level. The focus here is on public authorities, but other stakeholders are not excluded.

Data are needed on the distribution, the extent and the "quality" of habitats on different scale levels (European – local scale). The "quality" of habitats is often expressed in terms of (typical) flora and fauna species and vegetation structure and floristic composition. These data are required for many different purposes including the assignment and management of protected sites, law enforcement (environmental impact assessments) and reporting of EU member states to the EC on the "conservation status" of habitats. This last purpose leads to the important use case of the reporting under Article 17 of the Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora. However there are other national and regional use cases as well.

The intention of this data specification is to create a generic application schema for *Habitats and Biotopes* that can be broadly used to enable maximum data distribution between various data sources. Nevertheless, due to the heterogeneity and complexity of *habitats and biotopes* concepts i.e. different approaches, definitions and terms and resulting data sources, it can be expected that not all habitat datasets can be mapped against the proposed application schema.

The application schema "HabitatsAndBiotopes" has been developed according the Rules for application schemas defined in ISO 19109. It can be considered as an instrument for generating pan-European representations of *habitats and biotopes*. In order to meet the variety of habitat data sources an abstract feature type Habitat has been conceived that supports the representation of *habitats and biotopes* through both features and coverages. At the same time greater interoperability can be provided with regard to the classification of habitats by implementing the use of widely known reference lists next to the use of a scientific local name coming from the national nomenclature.

INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page VIII

Data that are representing a geographical distribution of biotopes are modelled in this application schema as coverages, realizing the ISO 19123 standard that defines the coverage representation from a conceptual point of view. The coverage representation should be applied in order to present habitat distribution data aggregated over grid cells or other analytical units.

Detailed information on the properties of the mapping or distribution of habitats can be provided through the feature types `HabitatMapping` and `HabitatDistributionCoverage` (where each spatial object in a coverage represents feature type `HabitatDistribution`). Both feature types cover information on the classification and covered area within the feature. `HabitatMapping` represents each habitat and its delineation as single objects. `HabitatDistributionCoverage` represents habitat information by some tessellation of space (typically a grid). Further metadata information on object level on the habitat mapping or distribution can be provided through the feature type `SourceInformation`.

For `HabitatMapping` features it can also be of importance to know which species and vegetation types constitute a given habitat/biotope. For the purpose of harmonization widely accepted code lists for habitat types and species names are mandatory and not avoidable. They will be registered and maintained in the INSPIRE context and are not extendible by the member states. Names for habitat types or species names, that are used on a local level, may be added separately. It is recommended to register these names schemes with the national focal point of INSPIRE of a Member State.

INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page IX

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Table of contents

1	Scope	1
2	Overview	1
2.1	Name.....	1
2.2	Informal description.....	1
2.3	Normative References	3
2.4	Terms and definitions.....	4
2.5	Symbols and abbreviations.....	4
2.6	Notation of requirements and recommendations.....	4
2.7	Conformance.....	5
3	Specification scopes	5
4	Identification information.....	5
5	Data content and structure	5
5.1	Basic notions.....	6
5.1.1	Stereotypes.....	6
5.1.2	Placeholder and candidate types.....	6
5.1.3	Voidable characteristics.....	7
5.1.4	Code lists and Enumerations.....	8
5.2	Application schema HabitatsAndBiotopes	8
5.2.1	Description.....	8
5.2.2	Feature catalogue.....	16
6	Reference systems	30
6.1	Coordinate reference systems	30
6.1.1	Datum	30
6.1.2	Coordinate reference systems.....	30
6.1.3	Display	31
6.1.4	Identifiers for coordinate reference systems.....	31
6.2	Temporal reference system	31
6.3	Theme-specific requirements and recommendations on reference systems	32
7	Data quality.....	32
7.1	Data quality elements and measures.....	32
7.2	Minimum data quality requirements and recommendations	32
8	Dataset-level metadata.....	33
8.1	Common metadata elements.....	33
8.1.1	Coordinate Reference System.....	35
8.1.2	Temporal Reference System	35
8.1.3	Encoding.....	36
8.1.4	Character Encoding.....	37
8.1.5	Data Quality – Logical Consistency – Topological Consistency.....	37
8.2	Metadata elements for reporting data quality	38
8.3	Theme-specific metadata elements	39
8.3.1	Maintenance information	40
8.3.2	Purpose.....	41
8.4	Guidelines on using metadata elements defined in Regulation 1205/2008/EC	42
8.4.1	Conformity.....	42
8.4.2	Lineage	42
8.4.3	Temporal reference	43
9	Delivery.....	43

INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page XI

9.1	Delivery medium	43
9.2	Encodings	44
9.2.1	Default Encoding(s)	44
9.2.2	Alternative Encoding(s).....	46
10	Data Capture.....	47
11	Portrayal	47
11.1	Layers to be provided by INSPIRE view services	48
11.1.1	Layers organisation.....	48
11.2	Styles to be supported by INSPIRE view services.....	48
11.2.1	Styles for the layer HB.HabitatDistributionFeature	48
11.3	Other recommended styles	51
11.3.1	Styles for the layer HB.HabitatDistributionCoverage	51
	Bibliography.....	54
	Annex A (normative) Abstract Test Suite	56
	Annex B (informative) Use Cases	57
	Annex C (informative) Examples	70
C.1	Examples on using metadata elements defined in Regulation 1205/2008/EC.....	70
C.1.1	Conformity.....	70
C.1.2	Lineage	71

INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page 1

1 Scope

This document specifies a harmonised data specification for the spatial data theme *Habitats and Biotopes* as defined in Annex III of the INSPIRE Directive.

This data specification provides the basis for the drafting of Implementing Rules according to Article 7 (1) of the INSPIRE Directive [Directive 2007/2/EC]. The entire data specification will be published as implementation guidelines accompanying these Implementing Rules.

2 Overview

2.1 Name

INSPIRE data specification for the theme Habitats and Biotopes.

2.2 Informal description

Definition:

Geographical areas characterised by specific ecological conditions, processes, structure, and (life support) functions that physically support the organisms that live there. Includes terrestrial and aquatic areas distinguished by geographical, abiotic and biotic features, whether entirely natural or semi-natural.

[Directive 2007/2/EC]

Description:

Data content

The "Habitats and biotopes" category of spatial data defined in the INSPIRE Directive is one of several themes in a wider grouping of biological organisms and biological communities - biodiversity. It includes habitats and biotopes as areas and their distinct boundaries. Common to all spatial data that fall under this category is a characterisation of the distribution of geographical areas being functional areas for living organisms: biotopes being the spatial environment of a biotic community (biocoenosis), while habitats being the spatial environment of specific species. Although aware of the conceptual difference, for practical reasons, biotopes and habitats will be dealt with similarly. Even if "*habitats*" will be used most frequently in wording (compare "Habitat Directive" and the EUNIS "habitat classification"), it always includes "*biotopes*".

From some use cases and reference material it has become clear that biotopes as features may be understood as "complex biotopes", that is, as areas comprising more than one habitat type (e.g. a lowland pasture and the neighbouring lowland river and the riverbank between). Other use cases utilise only one habitat type in one area/feature (e.g. habitat types within a Natura2000 site). Therefore, it will be allowed to attribute one to many habitat types for one feature (object).

A third group of use cases, including use cases describing reporting obligations on the Habitats Directive (see use case on "Bio-geographic Regions"), require grid distribution data for habitats rather than the area-class maps described above which are the mainstay of classic biotope mapping programs. Therefore the provision of both grid distribution data (hereafter referred to as a coverage) and area-class data (hereafter referred to as a feature collection) was modelled.

INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page 2

Habitat features are often connected with protected sites (designated for purposes of conservation of biodiversity). If a legal document on protected sites comprises lists of habitat types or species, it is possible to attribute these in the “full profile” of the Protected Sites (PS) data specification. More often though, one will find the detailed information on biodiversity traits of a protected site within a habitat area description (habitat feature). For extensive protected sites you may even find several biotope/habitat descriptions.

Habitat feature descriptions usually carry lots of information: structural traits, lists of species, management proposals, to name just a few. However, annex III themes should restrict metadata information to necessary information only. For that reason, this data specification restricts attributes to those items already known from the Protected Sites’ specification, namely a list of the occurring habitat types, a list of occurring vegetation types and a list of relevant species using the habitat.

Different countries or communities have different habitat classification systems. There may be difficulties in mapping accurately certain habitat classes between national nomenclatures and also between national and European nomenclatures. Harmonization needs to take into account both national and international classification systems. Harmonisation can be achieved, if there is one classification system, which serves as “*primus inter pares*” to which all other classification systems can be mapped. In general, the EUNIS habitat classification system already serves this purpose. However, those “habitat types” from the Annex I of the Habitats Directive have gained an overall importance in Europe due to reporting obligations and the level of detail of these habitat types is in parts finer than those covered by the EUNIS habitats classification. Therefore, this specification proposes to use “habitat types” from the Habitats Directive as the major encoding where appropriate and to take EUNIS habitat classification for all other habitat types. As a result all habitat features will have one or two habitat type encodings, an obligatory one from either the “European Union habitats” list or the “EUNIS habitat classification” list and optional a second one from a registered local/national coding list.

Data sources and data production process

Habitats and biotopes have natural boundaries and are classified according to their ecological or geo-physical conditions. They have boundaries of their own rather than being defined relative to some other spatial object type. Habitats and biotopes are usually mapped based on remote sensing image interpretation (e.g. aerial photography interpretation) and/or fieldwork, and sometimes also modelling.

In some cases reference data (e.g. a geographic grid system) are used to collect, store and present information on habitats, for example the habitat distribution maps that are required for the reporting under article 17 of the Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora. In this case there is usually no information on the distinct boundaries of the habitats (although it should be noted that this is dependent on the size of the grid cell).

Scope (purpose of habitat data collection)

The general scope for the collection of data on habitats is nature conservation. Different policy instruments are being applied for nature conservation, namely legal instruments (e.g. EU directives and international conventions), financial instruments (e.g. LIFE plus), spatial planning and education. Based on international and national legislation (including spatial planning acts) protected sites are assigned and managed in order to preserve endangered species and habitats. They usually have linkages to habitat or species data collections.

Users

In INSPIRE users are primarily defined as providers and users of spatial data in public authorities across various levels, different countries and different sectors. However, the notion of “public authority” in INSPIRE includes not only the public administration *per se*, but also all persons or organisations providing public services, related to the environment (INSPIRE 2007, Art. 3 (9)). In conclusion, a wide range of stakeholders exists, who produce, hold and use spatial data relevant to nature conservation. These people and organisations work in different nature conservation application domains and operate at different scales – from the local to the EU-wide level. The focus here is on public authorities, but other stakeholders are not excluded.

Use cases

INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page 3

Data are needed on the distribution, the extent and the “quality” of habitats (both status and trends) on different scale levels (European – local scale). The “quality” of habitats is often expressed in terms of typical flora and fauna species and vegetation structure and floristic composition. These data are required for many different purposes including the assignment and management of protected sites, law enforcement (environmental impact assessments), questions of climate impacts and climate change and reporting of EU member states to the EC on the “conservation status” of habitats.

An important use case is the reporting under Article 17 of the Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora, but there are other national and regional use cases as well. Four use cases, including reporting under Article 17, are presented in Annex B.

References

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http://ec.europa.eu/environment/nature/legislation/habitatsdirective/docs/standarddataforms/form_en.pdf

European Commission, 2006. Assessment, monitoring and reporting under Article 17 of the habitats Directive: explanatory notes & guidelines. Final draft 5, October 2006. European Commission, Brussels.

EUNIS Database: <http://eunis.eea.europa.eu/>

EUNIS Habitat types : <http://eunis.eea.europa.eu/habitats.jsp>

Habitats Committee. (2007). *Interpretation manual of European union habitats version EUR 27* European Commission, DG XI Brussels.

Peterseil, J., Blankman, D., Gaigalas, G., Magagna, B., Schentz, H., Vanacker, S., Vanhercke, L., van der Werf, B. 2010. EBONE D7.1: Technical Specification. Deliverable report.

Synbiosys <http://www.synbiosys.alterra.nl/synbiosyseu/>

Wawer, R. and Tirry, D. (2010) NatureSDIplus D3.4 Data Exchange Models. Pilot application schemas for INSPIRE biodiversity themes. Deliverable report.

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 Community (INSPIRE)

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

[ISO 19108] EN ISO 19108:2005, Geographic Information – Temporal Schema

[ISO 19108-c] ISO 19108:2002/Cor 1:2006, Geographic Information – Temporal Schema, Technical Corrigendum 1

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

[ISO 19113] EN ISO 19113:2005, Geographic Information – Quality principles

INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page 4

- [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 19123] EN ISO 19123:2007, Geographic Information – Schema for coverage geometry and functions
- [ISO 19135] EN ISO 19135:2007 Geographic information – Procedures for item registration (ISO 19135:2005)
- [ISO 19138] ISO/TS 19138:2006, Geographic Information – Data quality measures
- [ISO 19139] ISO/TS 19139:2007, Geographic information – Metadata – XML schema implementation
- [OGC 06-103r3] Implementation Specification for Geographic Information - Simple feature access – Part 1: Common Architecture v1.2.0
- NOTE This is an updated version of "EN ISO 19125-1:2006, Geographic information – Simple feature access – Part 1: Common architecture". A revision of the EN ISO standard has been proposed.
- [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 1089/2010/EC] Regulation 1089/2010/EC 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 Glossary¹³.

Open issue 1: Terms and definitions may need to be added for version 3.0

2.5 Symbols and abbreviations

2.6 Notation of requirements and recommendations

To make it easier to identify the mandatory requirements and the recommendations for spatial data sets in the text, they are highlighted and numbered.

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

INSPIRE		Reference: D2.8.III.18_v2.0	
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page 5

IR Requirement X Requirements that are reflected in the Implementing Rule on interoperability of spatial data sets and services are shown using this style.

DS Requirement X Requirements that are not reflected in the Implementing Rule on interoperability of spatial data sets and services are shown using this style.

Recommendation 1 Recommendations are shown using this style.

2.7 Conformance

DS Requirement 1 Any dataset claiming conformance with this INSPIRE data specification shall pass the requirements described in the abstract test suite presented in Annex A.

3 Specification scopes

This data specification does not distinguish different specification scopes, but just considers one general scope.

NOTE For more information on specification scopes, see [ISO 19131:2007], clause 8 and Annex D.

4 Identification information

NOTE Since the content of this chapter was redundant with the overview description (section 2) and executive summary, it has been decided that this chapter will be removed in v3.0.

5 Data content and structure

IR Requirement 1 Spatial data sets related to the theme **Habitats and Biotopes** shall be provided using the spatial object types and data types specified in the application **schema(s)** in this section.

IR Requirement 2 Each spatial object shall comply with all constraints specified for its spatial object type or data types used in values of its properties, respectively.

Recommendation 1 The reason for a void value should be provided where possible using a listed value from the VoidValueReason code list to indicate the reason for the missing value.

NOTEThe application schema specifies requirements on the properties of each spatial object including its multiplicity, domain of valid values, constraints, etc. All properties have to be reported, if the relevant information is part of the data set. Most properties may be reported as “void”, if the data set does not include relevant information. See the Generic Conceptual Model [INSPIRE DS-D2.5] for more details.

5.1 Basic notions

This section explains some of the basic notions used in the INSPIRE application schemas. These explanations are based on the GCM [DS-D2.5].

5.1.1 Stereotypes

In the application schemas in this sections several stereotypes are used that have been defined as part of a UML profile for use in INSPIRE [INSPIRE DS-D2.5]. These are explained in Table 1 below.

Table 1 – Stereotypes (adapted from [INSPIRE DS-D2.5])

Stereotype	Model element	Description
applicationSchema	Package	An INSPIRE application schema according to ISO 19109 and the Generic Conceptual Model.
featureType	Class	A spatial object type.
type	Class	A conceptual, abstract type that is not a spatial object type.
dataType	Class	A structured data type without identity.
union	Class	A structured data type without identity where exactly one of the properties of the type is present in any instance.
enumeration	Class	A fixed list of valid identifiers of named literal values. Attributes of an enumerated type may only take values from this list.
codeList	Class	A flexible enumeration that uses string values for expressing a list of potential values.
placeholder	Class	A placeholder class (see definition in section 5.1.2).
voidable	Attribute, association role	A voidable attribute or association role (see definition in section 5.1.3).
lifeCycleInfo	Attribute, association role	If in an application schema a property is considered to be part of the life-cycle information of a spatial object type, the property shall receive this stereotype.
version	Association role	If in an application schema an association role ends at a spatial object type, this stereotype denotes that the value of the property is meant to be a specific version of the spatial object, not the spatial object in general.

5.1.2 Placeholder and candidate types

Some of the INSPIRE Annex I data specifications (which were developed previously to the current Annex II+III data specifications) refer to types that thematically belong and were expected to be fully specified in Annex II or III spatial data themes. Two kinds of such types were distinguished:

- *Placeholder types* were created as placeholders for types (typically spatial object types) that were to be specified as part of a future spatial data theme, but which was already used as a value type of an attribute or association role in this data specification.

INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page 7

Placeholder types received the stereotype «placeholder» and were placed in the application schema package of the future spatial data theme where they thematically belong. For each placeholder, a definition was specified based on the requirements of the Annex I theme. The Annex II+III TWGs were required to take into account these definitions in the specification work of the Annex II or III theme.

If necessary, the attributes or association roles in the Annex I data specification(s) that have a placeholder as a value type shall be updated if necessary.

- *Candidate types* were types (typically spatial object types) for which already a preliminary specification was given in the Annex I data specification. Candidate types did not receive a specific stereotype and were placed in the application schema package of the future spatial data theme where they thematically belong. For each candidate type, a definition and attributes and association roles were specified based on the requirements of the Annex I theme. The Annex II+III TWGs were required to take into account these specifications in the specification work of the Annex II or III theme.

If the type could not be incorporated in the Annex II or III data specification according to its preliminary specification, it should be moved into the application schema of the Annex I theme where it had first been specified. In this case, the attributes or association roles in the Annex I data specification(s) that have the type as a value type shall be updated if necessary.

Open issue 2: For all Annex II+III themes for which placeholders and candidate types were specified in an Annex I data specification, it should be clearly indicated in the data specification, how the placeholder and candidate types were taken into account. If the proposed solution would require any changes to an Annex I data specification (and the corresponding section in the IR for interoperability of spatial data sets and services), this should also be clearly indicated.

A thorough investigation of the implications of the proposed changes of candidate types (in particular related to requirements of Annex I maintenance) will have to be performed for v3.0 of the data specifications.

5.1.3 Voidable characteristics

If a characteristic of a spatial object is not present in the spatial data set, but may be present or applicable in the real world, the property shall receive this stereotype.

If and only if a property receives this stereotype, the value of *void* may be used as a value of the property. A *void* value shall imply that no corresponding value is contained in the spatial data set maintained by the data provider or no corresponding value can be derived from existing values at reasonable costs, even though the characteristic may be present or applicable in the real world.

It is possible to qualify a value of void in the data with a reason using the *VoidValueReason* type. The *VoidValueReason* type is a code list, which includes the following pre-defined values:

- *Unpopulated*: The characteristic is not part of the dataset maintained by the data provider. However, the characteristic may exist in the real world. For example when the “elevation of the water body above the sea level” has not been included in a dataset containing lake spatial objects, then the reason for a void value of this property would be ‘Unpopulated’. The characteristic receives this value for all objects in the spatial data set.
- *Unknown*: The correct value for the specific spatial object is not known to, and not computable by the data provider. However, a correct value may exist. For example when the “elevation of the water body above the sea level” of a *certain lake* has not been measured, then the reason for a void value of this property would be ‘Unknown’. This value is applied on an object-by-object basis in a spatial data set.

NOTE It is expected that additional reasons will be identified in the future, in particular to support reasons / special values in coverage ranges.

INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page 8

The «voidable» stereotype does not give any information on whether or not a characteristic exists in the real world. This is expressed using the multiplicity:

- If a characteristic may or may not exist in the real world, its minimum cardinality shall be defined as 0. For example, an if an Address may or may not have a house number, the multiplicity of the corresponding property shall be 0..1.
- If at least one value for a certain characteristic exists in the real world, the minimum cardinality shall be defined as 1. For example, if an Administrative Unit always has at least one name, the multiplicity of the corresponding property shall be 1..*.

In both cases, the «voidable» stereotype can be applied. A value (the real value or void) only needs to be made available for properties that have a minimum cardinality of 1.

5.1.4 Code lists and Enumerations

5.1.4.1. Style

All code lists and enumerations use the following modelling style:

- No initial value, but only the attribute name part, is used.
- The attribute name conforms to the rules for attributes names, i.e. is a lowerCamelCase name. Exceptions are words that consist of all uppercase letters (acronyms).

5.1.4.2. Governance of code lists

Two types of code lists are defined in INSPIRE. These two types are distinguished using the tagged value “extendableByMS” in the UML data model:

- *Code lists that **may not** be extended by Member States.* For these code lists, the tagged value is set to “false”. They shall be managed centrally in the INSPIRE code list register, and only values from that register may be used in instance data.
- *Code lists that **may** be extended by Member States.* For these code lists, the tagged value is set to “true”.

5.2 Application schema HabitatsAndBiotopes

5.2.1 Description

5.2.1.1. Narrative description

Habitats and Biotopes are spatially delimited by specific ecological conditions, processes, structure and life support functions that physically support the organisms that live there. There exists a multitude of approaches and methodologies for classifying habitats, however only a few of them would allow for cross-boarder comparison and are harmonized on a European level. Therefore one common application schema can not support all approaches and methodologies across all stakeholders. The intention of this data specification is to create a generic application schema that can be broadly used to enable maximum data distribution between various data sources. Nevertheless, due to the heterogeneity and complexity of habitats and biotopes concepts i.e different approaches, definitions and terms and resulting data sources, it can be expected that not all habitat datasets can be mapped against the proposed application schema.

The application schema “HabitatsAndBiotopes” has been developed according the Rules for applicaton schemas defined in ISO 19109. It can be considered as an instrument for generating pan-European representations of habitats and biotopes. In order to meet the variety of habitat data sources an abstract spatial object type Habitat has been conceived that supports the representation of habitats and biotopes through both features and coverages. At the same time greater interoperability can be

INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page 9

provided with regard to the classification of habitats by implementing the use of widely known reference lists next to the use of a scientific local name coming from the national nomenclature.

Data that are representing a geographical distribution of biotopes are modelled in this application schema as Coverages, realizing the ISO 19123 standard that defines the Coverage representation from a conceptual point of view. The coverage representation should be applied in order to present habitat distribution data aggregated over grid cells or other analytical units.

Detailed information on the properties of the mapping or distribution of habitats can be provided through the spatial object types *HabitatMapping* or *HabitatDistributionCoverage* (where each spatial object in a coverage represents spatial object type *HabitatDistributionUnit*). Both spatial object types cover information on the classification and covered area within the feature/unit. *HabitatMapping* represents each habitat and its delineation as single objects; this delineation being as precise as the spatial resolution will allow. *HabitatDistributionCoverage* represents habitat information by some tessellation of space (typically a grid).

Further metadata information on object level on the habitat mapping or distribution can be provided through the spatial object type *SourceInformation*. It is highly recommended that information on the method used for collecting data on habitats (for example through field surveys or statistical samples) and, if relevant, the aggregation method is documented as metadata to each of the habitat features. This type of information is essential to interpret the habitats and biotopes information correctly.

Finally, it should also be emphasized that a strong link exists between the habitats and biotopes and Annex I theme Protected Sites. Habitats may in total or partly be overlapping with Protected Sites (e.g. for nature conservation purposes), however, they need to have a geometry of their own, because both, Protected Sites and habitats/biotopes features may change over time, without any obligation for change of the other spatial object type. Besides it can also be of importance to know which species and vegetation types constitute a given habitat.

5.2.1.2. UML Overview

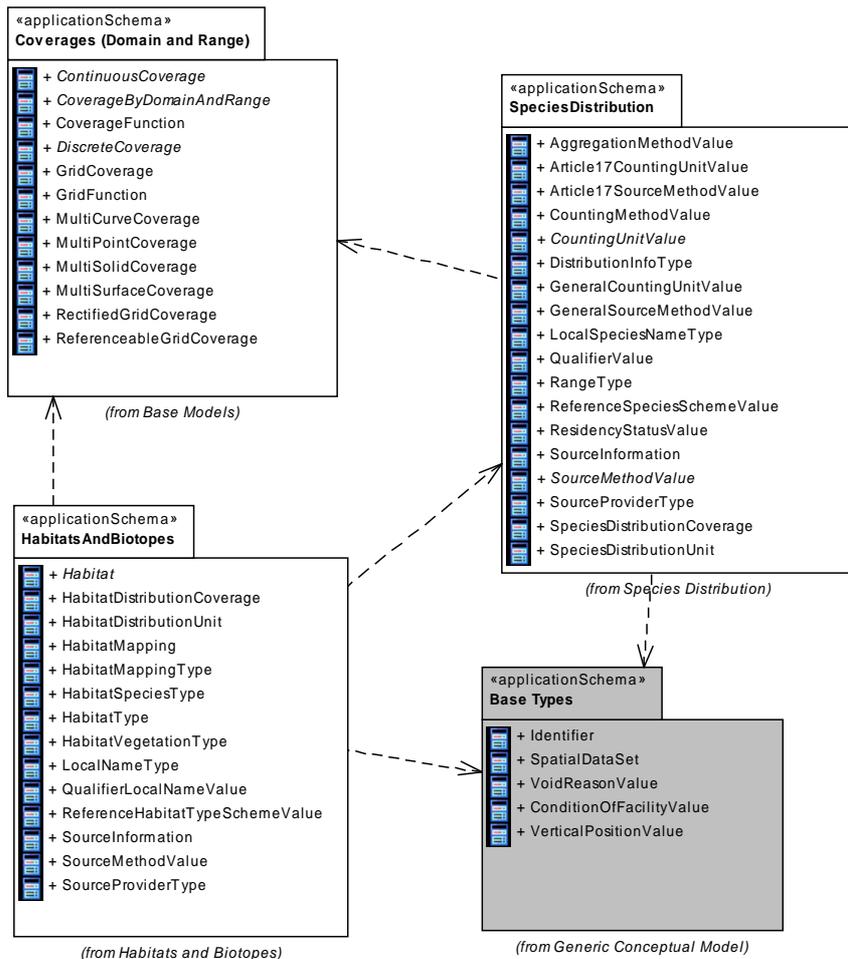


Figure 1 – UML class diagram: Overview of the Habitats and Biotopes application schema package dependencies

An overview of the Habitat and Biotopes package and referenced packages is depicted in Figure 1. The diagram shows the relations between the Habitats and Biotopes application schema and packages defined in the INSPIRE General Conceptual Model. Besides the specification of base types the GCM also includes an implementation profile of the relevant ISO 19123 types that can be applied within all INSPIRE data specifications to represent different types of Coverages in a consistent and harmonized way. Finally, the application schema is dependent on the SpeciesDistribution application schema as one datatype is imported (*ReferenceSpeciesSchemeValue*).

The complete application schema for Habitats and Biotopes is shown in Figure 2 and described in detail below.

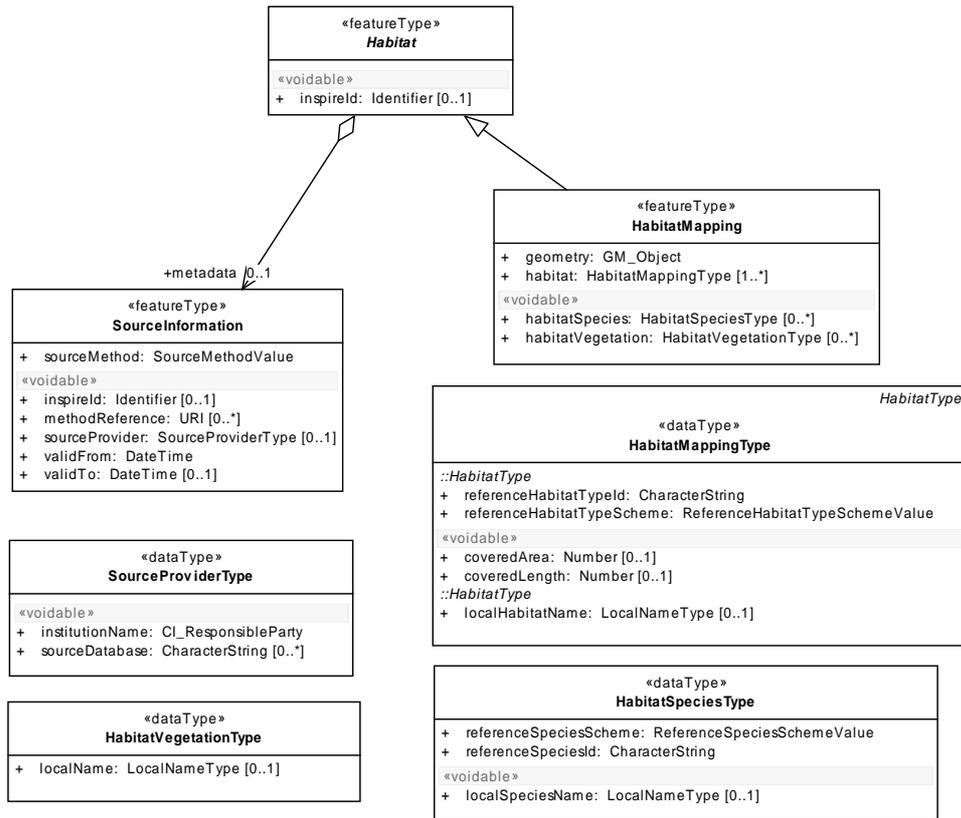


Figure 3 – Habitat mapping representation. Each habitat represented as individual features.

In Figure 4 the coverage representation is depicted.

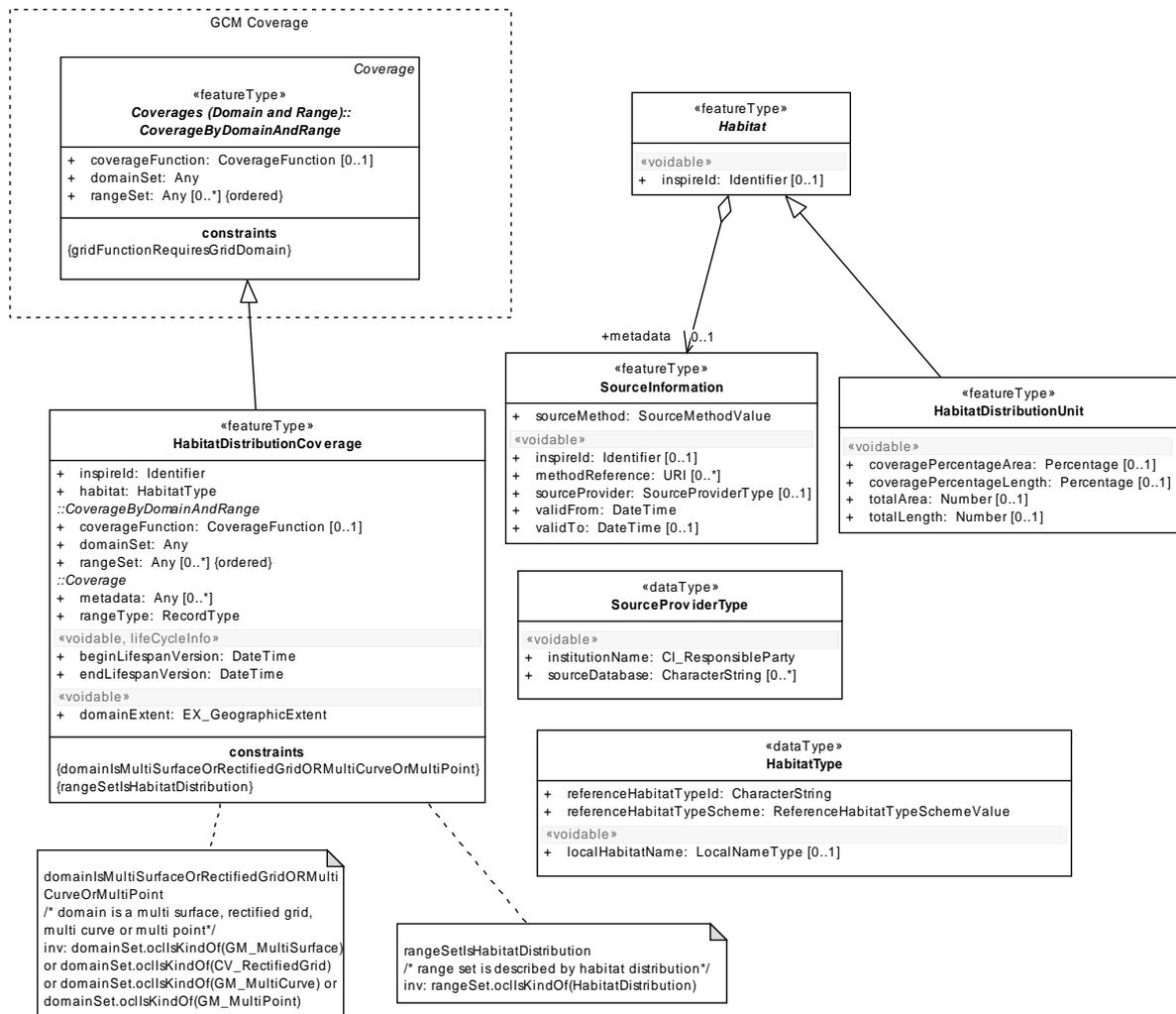


Figure 4 – Habitat distribution coverage. Presence of habitats are summarised based on a tessellation of space, e.g., by grids.

In this case the domain and range properties of the coverage (*HabitatDistributionCoverage*) specify the building blocks of the habitat distribution. Since information on the distribution of habitats is aggregated based on either regular grid systems, irregular polygons, lines, or points, the domain of the Coverage shall be a Multi Surface, MultiCurve, MultiPoint, or Rectified Grid.

IR Requirement 3 The Grid_ETRS89-LAEA as defined in Regulation 1089/2010/EC shall be used when defining a rectified grid.

NOTE The Grid_ETRS89-LAEA is hierarchical, with resolutions of 1m, 10m, 100m, 1 000m, 10 000m and 100 000m. The grid orientation is south-north, west-east.

The rangeSet of the Coverage is determined by the *HabitatDistributionUnit* spatial object type. In this application schema the type of Coverage shall be a discrete coverage that returns the same feature attribute values (attributes of the *HabitatDistributionUnit* spatial object type) for every direct position within any single spatiotemporal object in its domain. Unlike the *HabitatMapping* spatial object type that allows for defining several habitat types, i.e., habitat complexes, in case of *HabitatDistributionUnit*, an instance may refer to only one instance of *HabitatType* (which is represented in the *HabitatDistributionCoverage* spatial object).

INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page 14

“*HabitatType*” (and its subclass *HabitatMappingType* for the habitat mapping representation) is an important data type with regard to the classification of habitats. Each instance of *HabitatType* has at least one (harmonized) encoding from the Habitat Directive list of “Habitats of European interest” – these are the Habitat Types which are listed in the Annex I of the Habitats Directive (92/43/EEC) – **or** from the “EUNIS habitat classification” list, if the habitat does not meet the definition of one of the habitat types of the Habitat Directive and thus it is not appropriate to attribute an encoding from the list of “Habitats of European interest”:

- **Habitat Directive**
The aim of the Habitats Directive is to contribute towards ensuring bio-diversity by means of the conservation of natural habitats and of wild fauna and flora in the European territory of the Member States. Within the annexes a list of habitats has been defined which are considered to be of European interest following criteria given in the directive.
- **EUNIS**
EUNIS data are collected and maintained by the *European Topic Centre on Biological Diversity* for the *European Environment Agency* and the *European Environmental Information Observation Network* to be used for environmental reporting and for assistance to the NATURA2000 process (EU Birds and Habitats Directives) and coordinated to the related EMERALD Network of the Bern Convention.
The EUNIS Habitat types classification is a comprehensive pan-European system to facilitate the harmonised description and collection of data across Europe through the use of criteria for habitat identification; it covers all types of habitats from natural to artificial, from terrestrial to freshwater and marine. (Source: EEA EUNIS website)

Additionally, and very frequently, a *HabitatType* will carry a *localHabitatName* from a registered (recommended) *localHabitatScheme*.

IR Requirement 4 It is mandatory to encode at least one habitat type according to a (pan-european) *referenceHabitatTypeScheme* listed in the *referenceHabitatTypeSchemeValue* code list. This encoding is intended to allow for queries on habitat types on a pan-european harmonized level.

Recommendation 2 It is strongly recommended to refer to the *habitatsDirective* code list values in the first place, if the habitat meets the definition of one of the habitat types listed in Annex I of the Habitats Directive. If this is not appropriate, a code value from the EUNIS habitats classification code list should be referenced instead.

Recommendation 3 Any local classification schemes should be registered on national level (INSPIRE national focus point).

If more than one *HabitatType* occurs in one “Habitat” feature, i.e., consisting of a biotope/habitat complex, the degree of coverage of each habitat type should be indicated either as *coveredPercentage* or as *coveredArea/Length*. Habitats represented as a Coverage (*HabitatCoverageDistribution*) could for each spatial object (e.g. unit or grid cell) indicate the total area/length within each spatial object covered by a habitat type and/or the percentage of each spatial object covered by a habitat type (attributes *coveragePercentage* and *coverageArea/Length*).

Only “*HabitatMapping*” features are furthermore attributed with two ‘voidable’ attributes *HabitatVegetation* and *HabitatSpecies* allowing for linking a habitat to species and vegetation types that constitute the habitat. Vegetation information can be provided using *localVegetationNameValue(s)* derived from a registered (recommended) *localSchemeURI*.

INSPIRE		Reference: D2.8.III.18_v2.0	
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page 15

Recommendation 4 It is recommended to give the full name of the vegetation type rather than a mere code. The use of Synbiosys conspectus of European vegetation types. (<http://www.synbiosys.alterra.nl/synbiosyseu/>) is recommended as a reference list.

The abstract 'habitat' spatial object type is also associated with the *SourceInformation* spatial object type in order to describe metadata information about specific instances of habitats. These metadata can be shared among several concrete features or habitat distributions.

The *SourceInformation* contains the following attributes:

- *SourceMethod*: the method used in collecting the source data either in the field, from analog written texts and/or maps or using other methods

If available, additional information on the data provider or bibliographic references can be provided within this spatial object type.

The Feature Catalogue for Habitats and Biotopes described in section 5.2.2 provides a complete list of the features, their attributes and their possible values arranged in code lists or enumerations.

5.2.1.3. Consistency between spatial data sets

There are no other consistency rules than those defined within the application schema. No consistency rules between Species Distribution and other spatial datasets have been identified.

5.2.1.4. Identifier management

Only one spatial object has a mandatory identifier attribute specified (*HabitatDistributionCoverage*) needs to provide a unique identifier. This identifier shall be maintained by the national or regional authority. The identifier shall consist of two parts: the namespace and a local id (see also the Generic Conceptual Model [DS-D2.5]).

5.2.1.5. Modelling of object references

Internal references: An aggregation construct is modelled between *DistributionInfoType* and *SourceInformation*. This basically means that many instances of *DistributionInfoType* can share the same source information. An attribute in *DistributionInfoType* will contain a reference to the *SourceInformation* object.

External references:

Open issue 3: The relationships to external themes are not specified for version 2.0 of the specification. It is still an open issue how (and if) this will be done (is required).

5.2.1.6. Geometry representation

IR Requirement 5 The value domain of spatial properties used in this specification shall be restricted to the Simple Feature spatial schema as defined by EN ISO 19125-1.

NOTE The specification restricts the spatial schema to 0-, 1-, 2-, and 2.5-dimensional geometries where all curve interpolations are linear.

NOTE The topological relations of two spatial objects based on their specific geometry and topology properties can in principle be investigated by invoking the operations of the types defined in ISO 19107 (or the methods specified in EN ISO 19125-1).

5.2.1.7. Temporality representation

The application schema(s) use(s) the derived attributes "beginLifespanObject" and "endLifespanObject" to record the lifespan of a spatial object.

The attributes "beginLifespanVersion" specifies the date and time at which this version of the spatial object was inserted or changed in the spatial data set. The attribute "endLifespanVersion" specifies the date and time at which this version of the spatial object was superseded or retired in the spatial data set.

NOTE 1 The attributes specify the beginning of the lifespan of the version in the spatial data set itself, which is different from the temporal characteristics of the real-world phenomenon described by the spatial object. This lifespan information, if available, supports mainly two requirements: First, knowledge about the spatial data set content at a specific time; second, knowledge about changes to a data set in a specific time frame. The lifespan information should be as detailed as in the data set (i.e., if the lifespan information in the data set includes seconds, the seconds should be represented in data published in INSPIRE) and include time zone information.

NOTE 2 Changes to the attribute "endLifespanVersion" does not trigger a change in the attribute "beginLifespanVersion".

Recommendation 5 If life-cycle information is not maintained as part of the spatial data set, all spatial objects belonging to this data set should provide a void value with a reason of "unpopulated".

5.2.2 Feature catalogue

Table 3 - Feature catalogue metadata

Feature catalogue name	INSPIRE feature catalogue HabitatsAndBiotopes
Scope	HabitatsAndBiotopes
Version number	2.0
Version date	2011-06-14
Definition source	INSPIRE data specification HabitatsAndBiotopes

Table 4 - Types defined in the feature catalogue

Type	Package	Stereotypes	Section
Habitat	HabitatsAndBiotopes	«featureType»	5.2.2.1.1
HabitatDistributionCoverage	HabitatsAndBiotopes	«featureType»	5.2.2.1.2
HabitatDistributionUnit	HabitatsAndBiotopes	«featureType»	5.2.2.1.3
HabitatMapping	HabitatsAndBiotopes	«featureType»	5.2.2.1.4
HabitatMappingType	HabitatsAndBiotopes	«dataType»	5.2.2.2.1
HabitatSpeciesType	HabitatsAndBiotopes	«dataType»	5.2.2.2.2
HabitatType	HabitatsAndBiotopes	«dataType»	5.2.2.2.3
HabitatVegetationType	HabitatsAndBiotopes	«dataType»	5.2.2.2.4
LocalNameType	HabitatsAndBiotopes	«dataType»	5.2.2.2.5
QualifierLocalNameValue	HabitatsAndBiotopes	«codeList»	5.2.2.3.1

Type	Package	Stereotypes	Section
ReferenceHabitatTypeSchemeValue	HabitatsAndBiotopes	«codeList»	5.2.2.3.2
SourceInformation	HabitatsAndBiotopes	«featureType»	5.2.2.1.5
SourceMethodValue	HabitatsAndBiotopes	«codeList»	5.2.2.3.3
SourceProviderType	HabitatsAndBiotopes	«dataType»	5.2.2.2.6

5.2.2.1. Spatial object types

5.2.2.1.1. Habitat

Habitat (abstract)

Definition: Abstract class to cover Geographical areas characterised by specific ecological conditions, processes, structure and (life support) functions that physically support the organisms that live there.

Description: Includes terrestrial and aquatic areas distinguished by geographical, abiotic and biotic features, whether entirely natural or semi-natural that are characterised by specific ecological conditions, processes, structure and (life support) functions that physically support the organisms that live there. Areas may consist of one or many habitat types, depending on the mapping method. Habitat type encoding generally refers to habitat classification schemes. There are many classification schemes in use, only few of them would allow for cross-boarder comparison and are harmonized on a European level.

Includes areas represented by natural boundaries and classified according to their biodiversity, ecological or (geo-)physical conditions with delineations of their own, rather than being mere attributes for other feature types. Habitats may in total or partly be overlapping with Protected Sites (e.g. for nature conservation purposes), however, they need to have a geometry of their own, because both, Protected Sites and habitats/biotopes features may change over time, without any obligation for change of the other feature type.

Habitats are mapped based on remote sensing image interpretation (e.g. aerial photograph interpretation) and/or, most frequently, fieldwork; they are sometimes even based on modelling. Mapping results may be represented by distinct polygons or by Grid coverages. Some mapping methods allow for a collection of various habitat types to constitute one feature (complex biotopes/habitats), while others only have one habitat type per feature (typical examples for the latter are habitats derived from remote sensing data and their modelling process).

Besides their typological reference representing ecological concepts, habitats support concrete organisms that live there. Thus it is important to know, which species constitute/were found in a given habitat, and for the plant species covering the surface it is helpful to know, in which phytocoenoses they are organized. This information is typical of terrestrial mapping, but will be absent from other mapping methods for obvious reasons. Therefore, this information is voidable.

Status: Proposed
Stereotypes: «featureType»
URI: null

Attribute: inspireId

Value type: Identifier
Definition: External object identifier of the spatial object.
Description: An external object identifier is a unique object identifier published by the responsible body, which may be used by external applications to reference the spatial object. The identifier is an identifier of the spatial object, not an identifier of the real-world phenomenon.

INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page 18

Habitat (abstract)

Multiplicity: 0..1
Stereotypes: «voidable»

Association role: metadata

Value type: SourceInformation
Definition: Source of information on habitats.
Description: EXAMPLE Surveys, monitoring programs, etc.
Multiplicity: 0..1

5.2.2.1.2. *HabitatDistributionCoverage*

HabitatDistributionCoverage

Subtype of: CoverageByDomainAndRange
Definition: Geographical distribution of habitats.
Description:
Status: Proposed
Stereotypes: «featureType»
URI: null

Attribute: beginLifespanVersion

Value type: DateTime
Definition: Date and time at which this version of the spatial object was inserted or changed in the spatial data set.
Description: NOTE This date is recorded to enable the generation of change only update files.
Multiplicity: 1
Stereotypes: «voidable,lifeCycleInfo»

Attribute: domainExtent

Value type: EX_GeographicExtent
Definition: The geographic extent of the domain of the coverage.
Multiplicity: 1
Stereotypes: «voidable»

Attribute: endLifespanVersion

Value type: DateTime
Definition: Date and time at which this version of the spatial object was superseded or retired in the spatial data set.
Description: NOTE This date is recorded primarily for those systems which "close" an entry in the spatial data set in the event of an attribute change.
Multiplicity: 1
Stereotypes: «voidable,lifeCycleInfo»

Attribute: habitat

Value type: HabitatType
Definition: Identifier for habitat types using one or more classification schemes.
Description: This Habitat may consist of only one HabitatType according to one or more classification schemes.
Multiplicity: 1

Attribute: inspireId

Value type: Identifier
Definition: External object identifier of the spatial object.

HabitatDistributionCoverage

Description: An external object identifier is a unique object identifier published by the responsible body, which may be used by external applications to reference the spatial object. The identifier is an identifier of the spatial object, not an identifier of the real-world phenomenon.

Multiplicity: 1

Constraint: domainIsMultiSurfaceOrRectifiedGridORMultiCurveOrMultiPoint

Natural language: domain is a multi surface, rectified grid, multi curve or multi point

OCL: inv: domainSet.ocllsKindOf(GM_MultiSurface) or
domainSet.ocllsKindOf(CV_RectifiedGrid) or
domainSet.ocllsKindOf(GM_MultiCurve) or
domainSet.ocllsKindOf(GM_MultiPoint)

Constraint: rangeSetIsHabitatDistribution

Natural language: range set is described by habitat distribution

OCL: inv: rangeSet.ocllsKindOf(HabitatDistribution)

5.2.2.1.3. HabitatDistributionUnit

HabitatDistributionUnit

Subtype of: Habitat

Definition: Occurrence (presence/absence) of a habitat within a certain unit based on reference data (e.g. a geographic grid system).

Status: Proposed

Stereotypes: «featureType»

URI: null

Attribute: coveragePercentageArea

Value type: Percentage

Definition: The area (expressed in percentages) of a habitat within the geometric object that is used to collect, store and present information on the distribution of the habitat (type).

Description: EXAMPLE Percentage of grid cell.

Multiplicity: 0..1

Stereotypes: «voidable»

Attribute: coveragePercentageLength

Value type: Percentage

Definition: The length (expressed in percentage of the total length of the given habitat type) of a habitat within the geometric object that is used to collect, store and present information on the distribution of the habitat (type).

Description: EXAMPLE Percentage of total rivers' lengths (linear objects) where submerse vegetation of the type Ranunculon fluitantis constitutes the habitat type EmeraldNatura2000 - code: 3260.

Multiplicity: 0..1

Stereotypes: «voidable»

Attribute: totalArea

Value type: Number

Definition: The area of a habitat (expressed in hectares) within the geometric object that is used to collect, store and present information on the distribution of the habitat (type).

Description: EXAMPLE Area within a grid cell.

Multiplicity: 0..1

INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page 20

HabitatDistributionUnit	
Stereotypes:	«voidable»
Attribute: totalLength	
Value type:	Number
Definition:	The length of a habitat (expressed in kilometers) within the geometric object that is used to collect, store and present information on the distribution of the habitat (type).
Description:	EXAMPLE Total length where submerse vegetation of the type Ranunculion fluitantis constitutes the habitat type EmeraldNatura2000 - code: 3260.
Multiplicity:	0..1
Stereotypes:	«voidable»

5.2.2.1.4. *HabitatMapping*

HabitatMapping	
Subtype of:	Habitat
Definition:	The extent and location of the habitat represented by natural boundaries, that are characterised by specific ecological conditions, processes, structure and (life support) functions that physically support the organisms that live there.
Description:	A HabitatMapping area, line or point may comprise one or more HabitatMappingTypes according to one or more classification schemes. Depending on the data capture process in the member states two types of habitat mapping types must be distinguished: In many cases a habitat/biotope mapping feature will consist of only one habitat type, according to other methods a habitat mapping feature will have one or many habitat types (complex biotopes). Respectively, mapping habitats may be done for one or many (e.g. ecological guild) (animal) species of interest and result in one or many habitat types within a HabitatMapping area.
Status:	Proposed
Stereotypes:	«featureType»
URI:	null
Attribute: geometry	
Value type:	GM_Object
Definition:	The area (extent) of the habitat based on natural boundaries.
Multiplicity:	1
Attribute: habitat	
Value type:	HabitatMappingType
Definition:	The identifier for the habitat class using one or more national or international classification schemes.
Description:	Habitat according to one or more classification systems.
Multiplicity:	1..*
Attribute: habitatSpecies	
Value type:	HabitatSpeciesType
Definition:	List of species which constitute a certain habitat.
Multiplicity:	0..*
Stereotypes:	«voidable»
Attribute: habitatVegetation	
Value type:	HabitatVegetationType
Definition:	List of vegetation types which constitute a certain habitat.

INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page 21

HabitatMapping

Description:	Different classification schemes exists throughout Europe. The use of Synbiosys conspectus of European vegetation types (http://www.synbiosys.alterra.nl/synbiosyseu/) as a reference list is recommended.
Multiplicity:	0..*
Stereotypes:	«voidable»

5.2.2.1.5. SourceInformation

SourceInformation

Definition:	Contains metadata on the information sources of the habitat.
Description:	Different sources are used to produce data on habitats. This varies from data from extensive surveys to expert knowledge or technical processing and modelling. May be shared among several Habitat distributions or mapping methods.
Status:	Proposed
Stereotypes:	«featureType»
URI:	null
	EXAMPLE Monitoring programs, etc.

Attribute: inspireId

Value type:	Identifier
Definition:	External object identifier of the spatial object.
Description:	An external object identifier is a unique object identifier published by the responsible body, which may be used by external applications to reference the spatial object. The identifier is an identifier of the spatial object, not an identifier of the real-world phenomenon.
Multiplicity:	0..1
Stereotypes:	«voidable»

Attribute: methodReference

Value type:	URI
Definition:	References to publications and scientific data concerning the habitat object.
Description:	NOTE 1 This attribute corresponds to item Attribute: documentation of the dataspecification for annex I Protected Sites and there corresponds to 4.6 of the Natura2000 Standard Data Form: documentation. NOTE 2 Information entered should be made according to standard conventions for scientific references. Unpublished items or communications referring to the information given in the recording form should be included where ever useful.
Multiplicity:	0..*
Stereotypes:	«voidable»

Attribute: sourceMethod

Value type:	SourceMethodValue
Definition:	The method that is applied to collect and produce data on specific habitats.
Description:	EXAMPLE Extensive surveys and monitoring programs or erratic observations or selective mapping etc.
Multiplicity:	1

Attribute: sourceProvider

Value type:	SourceProviderType
Definition:	Name, surname and affiliation of the object creator/surveyor/mapper.
Multiplicity:	0..1

SourceInformation	
Stereotypes:	«voidable»
Attribute: validFrom	
Value type:	DateTime
Definition:	The time when the phenomenon started to exist in the real world.
Multiplicity:	1
Stereotypes:	«voidable»
Attribute: validTo	
Value type:	DateTime
Definition:	The time from which the phenomenon no longer exists in the real world.
Multiplicity:	0..1
Stereotypes:	«voidable»

5.2.2.2. Data types

5.2.2.2.1. *HabitatMappingType*

HabitatMappingType	
Subtype of:	HabitatType
Definition:	Habitat type according to a local (often non Pan-European) classification scheme for habitats.
Description:	Includes additional covered area and covered percentage.
Status:	Proposed
Stereotypes:	«dataType»
URI:	null
Attribute: coveredArea	
Value type:	Number
Definition:	The surface of the area (expressed in hectares) covered by a certain habitat (mapping) type within the provided geometry of the habitatMapping feature.
Description:	In case a habitat is only covered by one habitat type this shall be 100. It can be used only in the case that the geometry provided in the HabitatMapping feature represents an area in which more than one habitat type exists. In this case, for each habitat type the surface of the covered area can be provided within this attribute. Since the geometry provided in the HabitatMapping feature can be larger than the total surface of the habitat types listed within that geometry, the total surface of the habitat types can be smaller than the surface of the provided geometry. On the other hand, since some habitat types may overlap (e.g. subterranean caves / habitat type on top) the total area of the habitat types can be bigger than the surface of the provided geometry. EXAMPLE Within a given habitat geometry of 30.2 hectares there are several habitat types, out of which two are natural habitat types of community interest, "91D0" covering 22.5 hectares and "7110" covering 5.3 hectares, thus in total are smaller than the total area.
Multiplicity:	0..1
Stereotypes:	«voidable»
Attribute: coveredLength	
Value type:	Number
Definition:	The length (expressed in kilometers) covered by a certain habitat (mapping) type within the provided geometry of the habitatMapping feature.

HabitatMappingType

Description:	EXAMPLE Within a given habitat geometry of 30.5 hectares there are several habitat types. Two natural habitat types of community interest, "91F0" and "9160" cover this total area. However, a third natural habitat types of community interest "3260" is listed, which is "linear" and thus expressed in kilometers of its length (e.g. 1.2 km).
Multiplicity:	0..1
Stereotypes:	«voidable»

5.2.2.2.2. *HabitatSpeciesType*

HabitatSpeciesType

Definition:	List of species which constitutes/occured in a certain habitat at the time of mapping.
Status:	Proposed
Stereotypes:	«dataType»
URI:	null

Attribute: *localSpeciesName*

Value type:	LocalNameType
Definition:	Local name of the species.
Multiplicity:	0..1
Stereotypes:	«voidable»

Attribute: *referenceSpeciesId*

Value type:	CharacterString
Definition:	Code from reference species names schema.
Multiplicity:	1

Attribute: *referenceSpeciesScheme*

Value type:	ReferenceSpeciesSchemeValue
Definition:	Reference species names schema.
Multiplicity:	1

5.2.2.2.3. *HabitatType*

HabitatType

Definition:	The identifier for the habitat class using one or more national or international classification schemes.
-------------	--

INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page 24

HabitatType

Description: Habitat type according to one or more classification schemes. Different classification schemes exist throughout Europe. In many cases a local or national classification schema will be in daily use, however, references to international (European) classification schemas will already frequently be introduced (e.g. Habitat types of community interest, Habitat Directive). It is mandatory to encode at least one habitat type according to a (pan-European) referenceHabitatTypeScheme listed in the referenceHabitatSchemeValue code list. This encoding is intended to allow for queries on habitat types on a pan-European harmonized level.

It is strongly recommended to refer to the habitatsDirective code list values in the first place, if the habitat meets the definition of one of the habitat types listed in Annex I of the Habitats Directive. If this is not appropriate, a code value from the EUNIS habitats classification code list should be referenced instead. The referenceHabitatSchemeValue code list may be extended over time, covering more pan-European habitat classification schemes which allow for this harmonization purpose. However, the purpose of harmonization by nature restricts this list to a reasonable number.

Furthermore, it is possible (voidable) to encode the habitat type with a localHabitatName derived from a national, regional or local classification schema. This will (by nature) be the most frequent case. Any local classification schemes should (recommendation) be registered on national level (INSPIRE national focal point).

Status: Proposed
Stereotypes: «dataType»
URI: null

Attribute: localHabitatName

Value type: LocalNameType
Definition: Habitat type according to a local (often non Pan-European) classification scheme for habitats.
Description: Habitat types used in a certain area (i.e: Mediterranean Sea), or in a certain country, or even more restricted in a certain region, county or any other local level.

EXAMPLE Classification of Benthic Marine Habitat Types for the Mediterranean Region, Habitats of Romania, German Biotoptypen, Nordic Vegetation types, UK National Vegetation Classification, etc.

Multiplicity: 0..1
Stereotypes: «voidable»

Attribute: referenceHabitatTypeId

Value type: CharacterString
Definition: Habitat type unique identifier (code) according to one Pan-European classification scheme.
Description: EXAMPLE "1110", "40C0", "95A0", etc., if the referenceHabitatScheme is "habitatsDirective", or "A1.111", "A1.1121", "G1.1111", "X34", etc., if the ReferenceHabitatScheme is "eunis".
Multiplicity: 1

Attribute: referenceHabitatTypeScheme

Value type: ReferenceHabitatTypeSchemeValue
Definition: One of the Pan-European classification schemes, that are widely used in Europe.

INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page 25

HabitatType

Description: The list includes at least the classification of the natural habitat types of community interest listed in Annex I of the Habitats Directive, as well as the hierarchic classification of the habitat types of interest for biodiversity and nature protection listed in the EUNIS database, which is maintained by the EEA.

Multiplicity: 1

5.2.2.2.4. *HabitatVegetationType*

HabitatVegetationType

Definition: List of vegetation types which constitute a certain habitat.

Status: Proposed

Stereotypes: «dataType»

URI: null

Attribute: *localName*

Value type: LocalNameType

Definition: Vegetation class (vegetation type) according to local classification scheme.

Description: Different classification schemes exists throughout Europe. For better understanding, it is recommended to give the full name of the vegetation type rather than a mere code. NOTE The use of Synbiosys conspectus of European vegetation types. (<http://www.synbiosys.alterra.nl/synbiosyseu/>) is recommended as a reference list.

Multiplicity: 0..1

5.2.2.2.5. *LocalNameType*

LocalNameType

Definition: Name according to local classification scheme.

Status: Proposed

Stereotypes: «dataType»

URI: null

Attribute: *localSchemeURI*

Value type: URI

Definition: Uniform resource identifier of a local classification scheme.

Description: EXAMPLE "http://www.rac-spa.org/sites/default/files/doc_fsd/lchm_en.pdf", for the Classification of Benthic Marine Habitat Types for the Mediterranean Region or "http://www.lifenatura2000.ro/doc/Habitatele din Romania.pdf", for the Romanian habitats classification.

Multiplicity: 1

Attribute: *localNameValue*

Value type: CharacterString

Definition: Natural language name according to a local classification scheme.

Description: EXAMPLE: "Comunitati vest-pontice cu Camphosma annua si Kochia laniflora" for the habitat „R1508" from the Romanian habitat classification or „Biocenosis of abyssal muds" for the habitat „VI.1.1." from the Classification of Benthic Marine Habitat Types for the Mediterranean Region or "Stellario alsines – Montietum rivularis (Hinterlang 1992)" for a vegetation type.

Multiplicity: 1

Attribute: *qualifierLocalName*

Value type: QualifierLocalNameValue

Definition: The relation between the local name and its related name of the pan-european schema.

INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page 26

LocalNameType

Description: EXAMPLE The local habitat can be the same as the Pan-European habitat, the relationship (congruence) or the local habitat may be a subtype of the Pan-European habitat, therefore the relationship should be "includedIn", etc.

Multiplicity: 1

Stereotypes: «voidable»

5.2.2.2.6. SourceProviderType

SourceProviderType

Definition: Provider of the source of information on habitat.

Status: Proposed

Stereotypes: «dataType»

URI: null

Attribute: institutionName

Value type: CI_ResponsibleParty

Definition: Name of the institute/agency/person that provided the source of information on habitat.

Multiplicity: 1

Stereotypes: «voidable»

Attribute: sourceDatabase

Value type: CharacterString

Definition: Name of the database that contains the sources of information on habitat.

Multiplicity: 0..*

Stereotypes: «voidable»

5.2.2.3. Code lists

5.2.2.3.1. QualifierLocalNameValue

QualifierLocalNameValue

Definition: List of values that specify the relation of a locally used name to a name used on pan-european level.

Status: Proposed

Stereotypes: «codeList»

Governance: May not be extended by Member States.

URI: <http://inspire-registry.jrc.ec.europa.eu/registers/CLR/QualifierLocalNameValue>

Value: congruent

Definition: This value expresses that the local type is conceptually the same as its related Pan-European type.

Value: excludes

Definition: This value expresses that the Pan-European habitat type is conceptually no subtype of its related local type.

Value: includedIn

Definition: This value expresses that the local type is conceptually a subtype of its related Pan-European type.

Value: includes

Definition: This value expresses that the Pan-European habitat type is conceptually a subtype of its related local type.

Value: overlaps

INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page 27

QualifierLocalNameValue

Definition: This value expresses that between the local and its related Pan-European type there is a certain overlap according to their definition and that differs from the other values of this list.

5.2.2.3.2. ReferenceHabitatTypeSchemeValue

ReferenceHabitatTypeSchemeValue

Definition: Encoding taken from a pan-european habitat classification schema.
Description: Encoding items from a pan-european habitat classification schema. The identification code is required, NOT the name of the value in natural language.
EXAMPLE "9160" etc., if the referenceHabitatScheme is "habitatsDirective" or "G1.1111", "X34", etc., if the referenceHabitatScheme is "eunis".
Status: Proposed
Stereotypes: «codeList»
Governance: May not be extended by Member States.
URI: <http://inspire-registry.jrc.ec.europa.eu/registers/CLR/ReferenceHabitatTypeSchemeValue>

Value: eunis

Definition: EUNIS habitat types classification.
Description: <http://eunis.eea.europa.eu/>.

Value: habitatsDirective

Definition: Habitats Directive Annex I habitats.
Description: http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm.

5.2.2.3.3. SourceMethodValue

SourceMethodValue

Definition: Method of data collection of the information source.
Description: Method of the data collection covering the total area of interest.
Status: Proposed
Stereotypes: «codeList»
Governance: May not be extended by Member States.
URI: <http://inspire-registry.jrc.ec.europa.eu/registers/CLR/SourceMethodValue>

Value: absentData

Definition: No data available.

Value: completeMapping

Definition: Data collected based on (habitat) mapping covering the total area.
Description: Data collection covering the total area of interest. This is a typical result of processing data from remote sensing (e.g. CIR-photography), but also typical of terrestrial mapping within small areas of interest (e.g. protected sites).

Value: expertOpinion

Definition: Data collected based on expert knowledge.

Value: extrapolationFromSurveyPartOfArea

Definition: Data collected based on extensive surveys.

Value: extrapolationFromSurveySampling

Definition: Data collected based on extrapolation from survey sampling.

Value: remoteSensingImageInterpretation

Definition: Data collected based on interpretation of remote sensing images.

INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page 28

SourceMethodValue

Value: selectiveBiotopeSurvey

Definition:	Data collected based on extensive survey, but creating only features of special interest.
Description:	Only those areas relevant as ecologically functional entities that support biodiversity, are delineated. These entities may contain one or many (different) habitat types.

5.2.2.4. Imported types (informative)

This section lists definitions for feature types, data types and enumerations and code lists that are defined in other application schemas. The section is purely informative and should help the reader understand the feature catalogue presented in the previous sections. For the normative documentation of these types, see the given references.

5.2.2.4.1. *CI_ResponsibleParty*

CI_ResponsibleParty

Package:	INSPIRE Consolidated UML Model::Foundation Schemas::ISO TC211::ISO 19115:2006 Metadata (Corrigendum)::Citation and responsible party information [Include reference to the document that includes the package, e.g. INSPIRE data specification, ISO standard or the GCM]
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5.2.2.4.2. *CharacterString*

CharacterString

Package:	INSPIRE Consolidated UML Model::Foundation Schemas::ISO TC211::ISO 19103:2005 Schema Language::Basic Types::Primitive::Text [Include reference to the document that includes the package, e.g. INSPIRE data specification, ISO standard or the GCM]
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5.2.2.4.3. *CoverageByDomainAndRange*

CoverageByDomainAndRange (abstract)

Package:	INSPIRE Consolidated UML Model::Generic Conceptual Model::Base Models::Coverages (Domain and Range) [Include reference to the document that includes the package, e.g. INSPIRE data specification, ISO standard or the GCM]
Definition:	coverage which provide the domain and range as separate properties

5.2.2.4.4. *DateTime*

DateTime

Package:	INSPIRE Consolidated UML Model::Foundation Schemas::ISO TC211::ISO 19103:2005 Schema Language::Basic Types::Primitive::Date and Time [Include reference to the document that includes the package, e.g. INSPIRE data specification, ISO standard or the GCM]
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5.2.2.4.5. *EX_GeographicExtent*

EX_GeographicExtent (abstract)

Package:	INSPIRE Consolidated UML Model::Foundation Schemas::ISO TC211::ISO 19115:2006 Metadata (Corrigendum)::Extent information [Include reference to the document that includes the package, e.g. INSPIRE data specification, ISO standard or the GCM]
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5.2.2.4.6. *GM_Object*

GM_Object (abstract)

Package:	INSPIRE Consolidated UML Model::Foundation Schemas::ISO TC211::ISO 19107:2003 Spatial Schema::Geometry::Geometry root [Include reference to the document that includes the package, e.g. INSPIRE data specification, ISO standard or the GCM]
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INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page 29

5.2.2.4.7. Identifier

Identifier	
Package:	INSPIRE Consolidated UML Model::Generic Conceptual Model::Base Types [Include reference to the document that includes the package, e.g. INSPIRE data specification, ISO standard or the GCM]
Definition:	External unique object identifier published by the responsible body, which may be used by external applications to reference the spatial object.
Description:	NOTE1 External object identifiers are distinct from thematic object identifiers. NOTE 2 The voidable version identifier attribute is not part of the unique identifier of a spatial object and may be used to distinguish two versions of the same spatial object. NOTE 3 The unique identifier will not change during the life-time of a spatial object.

5.2.2.4.8. Number

Number (abstract)	
Package:	INSPIRE Consolidated UML Model::Foundation Schemas::ISO TC211::ISO 19103:2005 Schema Language::Basic Types::Primitive::Numerics [Include reference to the document that includes the package, e.g. INSPIRE data specification, ISO standard or the GCM]

5.2.2.4.9. Percentage

Percentage	
Package:	INSPIRE Consolidated UML Model::Themes::Annex I::Protected Sites::Protected Sites Simple [Include reference to the document that includes the package, e.g. INSPIRE data specification, ISO standard or the GCM]
Definition:	A percentage value, being an integer between 0 and 100 inclusive.

5.2.2.4.10. ReferenceSpeciesSchemeValue

ReferenceSpeciesSchemeValue	
Package:	INSPIRE Consolidated UML Model::Themes::Annex III::Species Distribution::SpeciesDistribution [Include reference to the document that includes the package, e.g. INSPIRE data specification, ISO standard or the GCM]
Definition:	Defines the Reference Lists that have to be used as standard for mapping local species names to the standard defined by the given lists.

5.2.2.4.11. SourceProviderType

SourceProviderType	
Package:	INSPIRE Consolidated UML Model::Themes::Annex III::Species Distribution::SpeciesDistribution [Include reference to the document that includes the package, e.g. INSPIRE data specification, ISO standard or the GCM]
Definition:	Identifier of the source of data on species distribution.

5.2.2.4.12. URI

URI	
Package:	INSPIRE Consolidated UML Model::Foundation Schemas::ISO TC211::ISO 19136 GML::basicTypes [Include reference to the document that includes the package, e.g. INSPIRE data specification, ISO standard or the GCM]

INSPIRE		Reference: D2.8.III.18_v2.0	
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page 30

6 Reference systems

6.1 Coordinate reference systems

6.1.1 Datum

IR Requirement 6 For the coordinate reference systems used for making available the INSPIRE spatial data sets, the datum shall be the datum of the European Terrestrial Reference System 1989 (ETRS89) in areas within its geographical scope, and the datum of the International Terrestrial Reference System (ITRS) or other geodetic coordinate reference systems compliant with ITRS in areas that are outside the geographical scope of ETRS89. Compliant with the ITRS means that the system definition is based on the definition of the ITRS and there is a well established and described relationship between both systems, according to EN ISO 19111.

6.1.2 Coordinate reference systems

IR Requirement 7 INSPIRE spatial data sets shall be made available using one of the three-dimensional, two-dimensional or compound coordinate reference systems specified in the list below.

Other coordinate reference systems than those listed below may only be used for regions outside of continental Europe. The geodetic codes and parameters for these coordinate reference systems shall be documented, and an identifier shall be created, according to EN ISO 19111 and ISO 19127.

1. Three-dimensional Coordinate Reference Systems
 - Three-dimensional Cartesian coordinates
 - Three-dimensional geodetic coordinates (latitude, longitude and ellipsoidal height), using the parameters of the GRS80 ellipsoid
2. Two-dimensional Coordinate Reference Systems
 - Two-dimensional geodetic coordinates, using the parameters of the GRS80 ellipsoid
 - Plane coordinates using the Lambert Azimuthal Equal Area projection and the parameters of the GRS80 ellipsoid
 - Plane coordinates using the Lambert Conformal Conic projection and the parameters of the GRS80 ellipsoid
 - Plane coordinates using the Transverse Mercator projection and the parameters of the GRS80 ellipsoid

INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page 31

3. Compound Coordinate Reference Systems

- For the horizontal component of the compound coordinate reference system, one of the two-dimensional coordinate reference systems specified above shall be used
- For the vertical component on land, the European Vertical Reference System (EVRS) shall be used to express gravity-related heights within its geographical scope
- Other vertical reference systems related to the Earth gravity field shall be used to express gravity-related heights in areas that are outside the geographical scope of EVRS. The geodetic codes and parameters for these vertical reference systems shall be documented and an identifier shall be created, according to EN ISO 19111 and ISO 19127
- For the vertical component measuring the depth of the sea floor, where there is an appreciable tidal range, the Lowest Astronomical Tide shall be used as reference surface. In marine areas without an appreciable tidal range, in open oceans and effectively in waters that are deeper than 200 m, the depth of the sea floor shall be referenced to the Mean Sea Level
- For the vertical component measuring depths above the sea floor in the free ocean, barometric pressure shall be used
- For the vertical component in the free atmosphere, barometric pressure, converted to height using ISO 2533:1975 International Standard Atmosphere shall be used

6.1.3 Display

IR Requirement 8 For the display of the INSPIRE spatial data sets with the View Service specified in D003152/02 Draft Commission Regulation implementing Directive 2007/2/EC of the European Parliament and of the Council as regards Network Services, at least the two dimensional geodetic coordinate system shall be made available.

6.1.4 Identifiers for coordinate reference systems

IR Requirement 9 For referring to the non-compound coordinate reference systems listed in this Section, the identifiers listed below shall be used.

For referring to a compound coordinate reference system, an identifier composed of the identifier of the horizontal component, followed by a slash (/), followed by the identifier of the vertical component, shall be used.

- ETRS89-XYZ for Cartesian coordinates in ETRS89
- ETRS89-GRS80h for three-dimensional geodetic coordinates in ETRS89 on the GRS80 ellipsoid
- ETRS89-GRS80 for two-dimensional geodetic coordinates in ETRS89 on the GRS80
- EVRS for height in EVRS
- LAT for depth of the sea floor, where there is an appreciable tidal range
- MSL for depth of the sea floor, in marine areas without an appreciable tidal range, in open oceans and effectively in waters that are deeper than 200m
- ISA for pressure coordinate in the free atmosphere
- PFO for Pressure coordinate in the free ocean
- ETRS89-LAEA for ETRS89 coordinates projected into plane coordinates by the Lambert Azimuthal Equal Area projection
- ETRS89-LCC for ETRS89 coordinates projected into plane coordinates by the Lambert Conformal Conic projection
- ETRS89-TMzn for ETRS89 coordinates projected into plane coordinates by the Transverse Mercator projection

6.2 Temporal reference system

INSPIRE		Reference: D2.8.III.18_v2.0	
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page 32

IR Requirement 10 The Gregorian Calendar shall be used for as a reference system for date values, and the Universal Time Coordinated (UTC) or the local time including the time zone as an offset from UTC shall be used as a reference system for time values.

6.3 Theme-specific requirements and recommendations on reference systems

There are no theme-specific requirements or recommendations on reference systems.

7 Data quality

This chapter includes a description of data quality elements and sub-elements as well as the associated data quality measures (section 7.1). The selected data quality measures should be used to evaluate quality of data sets for a specific data quality element / sub-element. The evaluation can be performed at the level of spatial object, spatial object type, dataset or dataset series.

The results of the evaluation are then reported at the spatial object type or dataset level in metadata utilising the same data quality elements and measures (see chapter 8).

NOTE The selection of appropriate data quality measures represents the first step towards the harmonisation of documenting data quality.

In addition, for some of the data quality elements described in section 7.1, minimum data quality requirements or recommendations may be defined. These are described in the section 1.2.

Recommendation 1 If data quality information is required at spatial object level then it should be modelled in the data model as an attribute of a relevant spatial object type.

7.1 Data quality elements and measures

No data quality elements for quantitative evaluation are defined for this theme.

Open issue 4: Data quality requirements based on real use cases

In case stakeholders participating on consultation & testing will identify via comments requirements for data quality and related measures based on real use cases these can be introduced for ver. 03 of this Data specification.

7.2 Minimum data quality requirements and recommendations

No minimum data quality requirements are defined.

8 Dataset-level metadata

Metadata can be reported for each individual spatial object (spatial object-level metadata) or once for a complete dataset or dataset series (dataset-level metadata). Spatial object-level metadata is fully described in the application schema (section 5). If data quality elements are used at spatial object level, the documentation shall refer to the appropriate definition in section 7. This section only specifies dataset-level metadata elements.

For some dataset-level metadata elements, in particular on data quality and maintenance, a more specific scope can be specified. This allows the definition of metadata at sub-dataset level, e.g. separately for each spatial object type. When using ISO 19115/19139 to encode the metadata, the following rules should be followed:

- The scope element (of type DQ_Scope) of the DQ_DataQuality subtype should be used to encode the scope.
- Only the following values should be used for the level element of DQ_Scope: Series, Dataset, featureType.
- If the level is featureType the levelDescription/MDScopeDescription/features element (of type Set< GF_FeatureType>) shall be used to list the feature type names.

NOTE The value featureType is used to denote spatial object type.

Mandatory or conditional metadata elements are specified in Section 8.1. Optional metadata elements are specified in Section 8. The tables describing the metadata elements contain the following information:

- The first column provides a reference to a more detailed description.
- The second column specifies the name of the metadata element.
- The third column specifies the multiplicity.
- The fourth column specifies the condition, under which the given element becomes mandatory (only for Table 2 and Table 3).

8.1 Common metadata elements

IR Requirement 11 The metadata describing a spatial data set or a spatial data set series related to the theme **Habitats and Biotopes** shall comprise the metadata elements required by Regulation 1205/2008/EC (implementing Directive 2007/2/EC of the European Parliament and of the Council as regards metadata) for spatial datasets and spatial dataset series (Table 2) as well as the metadata elements specified in Table 3.

Table 2 – Metadata for spatial datasets and spatial dataset series specified in Regulation 1205/2008/EC (implementing Directive 2007/2/EC of the European Parliament and of the Council as regards metadata)

Metadata Regulation Section	Metadata element	Multiplicity	Condition
1.1	Resource title	1	
1.2	Resource abstract	1	
1.3	Resource type	1	

1.4	Resource locator	0..*	Mandatory if a URL is available to obtain more information on the resource, and/or access related services.
1.5	Unique resource identifier	1..*	
1.7	Resource language	0..*	Mandatory if the resource includes textual information.
2.1	Topic category	1..*	
3	Keyword	1..*	
4.1	Geographic bounding box	1..*	
5	Temporal reference	1..*	
6.1	Lineage	1	
6.2	Spatial resolution	0..*	Mandatory for data sets and data set series if an equivalent scale or a resolution distance can be specified.
7	Conformity	1..*	
8.1	Conditions for access and use	1..*	
8.2	Limitations on public access	1..*	
9	Responsible organisation	1..*	
10.1	Metadata point of contact	1..*	
10.2	Metadata date	1	
10.3	Metadata language	1	

Table 3 – Mandatory and conditional common metadata elements

INSPIRE Data Specification Habitats and Biotopes Section	Metadata element	Multiplicity	Condition
8.1.1	Coordinate Reference System	1	
8.1.2	Temporal Reference System	0..*	Mandatory, if the spatial data set or one of its feature types contains temporal information that does not refer to the Gregorian Calendar or the Coordinated Universal Time.
8.1.3	Encoding	1..*	
8.1.4	Character Encoding	0..*	Mandatory, if an encoding is used that is not based on UTF-8.

INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page 35

8.1.5	Data Quality – Logical Consistency – Topological Consistency	0..*	Mandatory, if the data set includes types from the Generic Network Model and does not assure centreline topology (connectivity of centrelines) for the network.
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8.1.1 Coordinate Reference System

Metadata element name	Coordinate Reference System
Definition	Description of the coordinate reference system used in the dataset.
ISO 19115 number and name	13. referenceSystemInfo
ISO/TS 19139 path	referenceSystemInfo
INSPIRE obligation / condition	mandatory
INSPIRE multiplicity	1
Data type(and ISO 19115 no.)	189. MD_CRS
Domain	<p>Either the referenceSystemIdentifier (RS_Identifier) or the projection (RS_Identifier), ellipsoid (RS_Identifier) and datum (RS_Identifier) properties shall be provided.</p> <p>NOTE More specific instructions, in particular on pre-defined values for filling the referenceSystemIdentifier attribute should be agreed among Member States during the implementation phase to support interoperability.</p>
Implementing instructions	
Example	<pre>referenceSystemIdentifier: code: ETRS_89 codeSpace: INSPIRE RS registry</pre>
Example XML encoding	<pre><gmd:referenceSystemInfo> <gmd:MD_ReferenceSystem> <gmd:referenceSystemIdentifier> <gmd:RS_Identifier> <gmd:code> <gco:CharacterString>ETRS89 </gco:CharacterString> </gmd:code> <gmd:codeSpace> <gco:CharacterString>INSPIRE RS registry</gco:CharacterString> </gmd:codeSpace> </gmd:referenceSystemIdentifier> </gmd:MD_ReferenceSystem> </gmd:referenceSystemInfo></pre>
Comments	

8.1.2 Temporal Reference System

Metadata element name	Temporal Reference System
Definition	Description of the temporal reference systems used in the dataset.
ISO 19115 number and name	13. referenceSystemInfo
ISO/TS 19139 path	referenceSystemInfo
INSPIRE obligation / condition	Mandatory, if the spatial data set or one of its feature types contains temporal information that does not refer to the Gregorian Calendar or the Coordinated Universal Time.
INSPIRE multiplicity	0..*

INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page 36

Data type(and ISO 19115 no.)	186. MD_ReferenceSystem
Domain	<p>No specific type is defined in ISO 19115 for temporal reference systems. Thus, the generic MD_ReferenceSystem element and its reference SystemIdentifier (RS_Identifier) property shall be provided.</p> <p>NOTE More specific instructions, in particular on pre-defined values for filling the referenceSystemIdentifier attribute should be agreed among Member States during the implementation phase to support interoperability.</p>
Implementing instructions	
Example	<pre>referenceSystemIdentifier: code: GregorianCalendar codeSpace: INSPIRE RS registry</pre>
Example XML encoding	<pre><gmd:referenceSystemInfo> <gmd:MD_ReferenceSystem> <gmd:referenceSystemIdentifier> <gmd:RS_Identifier> <gmd:code> <gco:CharacterString>GregorianCalendar</gco:CharacterString> </gmd:code> </gmd:codeSpace> <gco:CharacterString>INSPIRE RS registry</gco:CharacterString> </gmd:codeSpace> </gmd:RS_Identifier> </gmd:referenceSystemIdentifier> </gmd:MD_ReferenceSystem> </gmd:referenceSystemInfo></pre>
Comments	

8.1.3 Encoding

Metadata element name	Encoding
Definition	Description of the computer language construct that specifies the representation of data objects in a record, file, message, storage device or transmission channel
ISO 19115 number and name	271. distributionFormat
ISO/TS 19139 path	distributionInfo/MD_Distribution/distributionFormat
INSPIRE obligation / condition	mandatory
INSPIRE multiplicity	1
Data type (and ISO 19115 no.)	284. MD_Format
Domain	See B.2.10.4. The property values (name, version, specification) specified in section 9 shall be used to document the default and alternative encodings.
Implementing instructions	
Example	<pre>name: Habitats and Biotopes GML application schema version: version 2.0, GML, version 3.2.1 specification: D2.8.III.18 Data Specification on Habitats and Biotopes – Draft Guidelines</pre>

Example XML encoding	<pre> <gmd:MD_Format> <gmd:name> <gco:CharacterString> Habitats and Biotopes GML application schema </gco:CharacterString> </gmd:name> <gmd:version> <gco:CharacterString>2.0, GML, version 3.2.1</gco:CharacterString> </gmd:version> <gmd:specification> <gco:CharacterString>D2.8.III.18 Data Specification on Habitats and Biotopes – Draft Guidelines</gco:CharacterString> </gmd:specification> </gmd:MD_Format> </pre>
Comments	

8.1.4 Character Encoding

Metadata element name	Character Encoding
Definition	The character encoding used in the data set.
ISO 19115 number and name	
ISO/TS 19139 path	
INSPIRE obligation / condition	Mandatory, if an encoding is used that is not based on UTF-8.
INSPIRE multiplicity	0..*
Data type (and ISO 19115 no.)	
Domain	
Implementing instructions	
Example	-
Example XML encoding	<pre> <gmd:characterSet> <gmd:MD_CharacterSetCode codeListValue="8859part2" codeList="http://standards.iso.org/ittf/PubliclyAvailableStandard s/ISO_19139_Schemas/resources/Codelist/ML_gmxCodelists.x ml#CharacterSetCode">8859-2</gmd:MD_CharacterSetCode> </gmd:characterSet> </pre>
Comments	

8.1.5 Data Quality – Logical Consistency – Topological Consistency

Metadata element name	Data Quality – Logical Consistency – Topological Consistency
Definition	Correctness of the explicitly encoded topological characteristics of the dataset as described by the scope
ISO 19115 number and name	18. dataQualityInfo
ISO/TS 19139 path	dataQualityInfo
INSPIRE obligation / condition	Mandatory, if the data set includes types from the Generic Network Model and does not assure centreline topology (connectivity of centrelines) for the network.
INSPIRE multiplicity	0..*
Data type (and ISO 19115 no.)	115. DQ_TopologicalConsistency
Domain	Lines 100-107 from ISO 19115
Implementing instructions	This metadata should be filled, at least, with these elements: - valueUnit: UnitOfMeasure - value: Record
Example	

Example XML encoding	
Comments	<p>See clauses on topological consistency in section 7 for detailed information.</p> <p>This metadata element is mandatory if connectivity is not assured for network centrelines in the dataset. In this case the <i>Connectivity tolerance</i> parameter – as described in section 7 – must be provided in order to ensure automatic and unambiguous creation of centreline topology in post-process.</p>

8.2 Metadata elements for reporting data quality

Information concerning the metadata elements for reporting data quality for this version (ver.02) is only defined in Chapter 8.4.

Open issue 5: Metadata for data quality reporting

In case stakeholders participating on consultation & testing will identify via comments requirements for data quality and related measures based on real use cases (to be defined in chapter 7), relevant metadata elements for reporting data quality can be introduced for ver. 03 of this Data specification.

Recommendation 2 For reporting the results of the data quality evaluation quantitatively, the data quality elements and measures defined in chapter 7 should be used.

The scope for reporting may be different from the scope for evaluating data quality (see section 7). If data quality is reported at the data set or spatial object type level, the results are usually derived or aggregated.

Metadata element name	See chapter 7
Definition	See chapter 7
ISO 19115 number and name	80. report
ISO/TS 19139 path	dataQualityInfo/*/report
INSPIRE obligation / condition	optional
INSPIRE multiplicity	0..*
Data type (and ISO 19115 no.)	Corresponding DQ_xxx element from ISO 19115, e.g. 109. DQ_CompletenessCommission
Domain	<p>Lines 100-107 from ISO 19115</p> <p>100. nameOfMeasure : CharacterString [0..*] 101. measureIdentification : MD_Identifier [0..1] 102. measureDescription : CharacterString [0..1] 103. evaluationMethodType : DQ_EvaluationMethodTypeCode [0..1] 104. evaluationMethodDescription : CharacterString [0..1] 105. evaluationProcedure : CI_Citation [0..1] 106. dateTime : DateTime [0..*] 107. result : DQ_Result [1..2]</p>

INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page 39

Implementing instructions	<p>Recommendation 3 For each DQ result included in the metadata, at least the following properties should be provided:</p> <p>100. nameOfMeasure NOTE This should be the name as defined in Chapter 7.</p> <p>103. evaluationMethodType</p> <p>104. evaluationMethodDescription NOTE If the reported data quality results are derived or aggregated (i.e. the scope levels for evaluation and reporting are different), the derivation or aggregation should also be specified using this property.</p> <p>106. dateTime NOTE This should be data or range of dates on which the data quality measure was applied.</p> <p>107. result NOTE This should be of type DQ_QuantitativeResult</p>
Example	
Example XML encoding	
Comments	See Chapter 7 for detailed information on the individual data quality elements and measures to be used.

Open issue 6: In the ongoing revision of ISO 19115 and development of new ISO 19157 standard (Geographic Information – Data quality), a new element is introduced (DQ_DescriptiveResult). This element enables to describe and report qualitative results of the data quality evaluation and could be used instead of DQ_QuantitativeResult. Once the new (version of the) standards are approved, these guidelines will be revisited and be updated if necessary.

Open issue 7: For reporting compliance with minimum data quality requirements and recommendations specified in section 7, the INSPIRE conformity metadata element should be used.

However, since this issue is part of the larger discussion on the Abstract Test Suite and the definition of conformance classes for the data specification, detailed instructions on how to provide metadata on compliance with minimum data quality requirements and recommendations will only be provided for v3.0.

8.3 Theme-specific metadata elements

No mandatory theme-specific metadata elements are defined for this theme.

Recommendation 4 The metadata describing a spatial data set or a spatial data set series related to the theme **Habitats and Biotopes** should comprise the theme-specific metadata elements specified in Table 4.

Table 4 – Optional theme-specific metadata elements for the theme Habitats and Biotopes

INSPIRE Data Specification Habitats and Biotopes Section	Metadata element	Multiplicity
8.3.1	Maintenance information	0..1
8.3.2	Purpose	0..1

8.3.1 Maintenance information

Metadata element name	Maintenance information
Definition	Information about the scope and frequency of updating
ISO 19115 number and name	30. resourceMaintenance
ISO/TS 19139 path	identificationInfo/MD_Identification/resourceMaintenance
INSPIRE obligation / condition	Optional
INSPIRE multiplicity	0..1
Data type (and ISO 19115 no.)	142. MD_MaintenanceInformation
Domain	<p>This is a complex type (lines 143-148 from ISO 19115). At least the following elements should be used (the multiplicity according to ISO 19115 is shown in parentheses):</p> <ul style="list-style-type: none"> – maintenanceAndUpdateFrequency [1]: frequency with which changes and additions are made to the resource after the initial resource is completed / domain value: MD_MaintenanceFrequencyCode – updateScope [0..*]: scope of data to which maintenance is applied / domain value: MD_ScopeCode – maintenanceNote [0..*]: information regarding specific requirements for maintaining the resource / domain value: free text
Implementing instructions	
Example	<pre>resourceMaintenance: maintenanceAndUpdateFrequency: asNeeded updateScope: dataset maintenanceNote: .</pre>

Example XML encoding	<pre> <gmd:resourceMaintenance> <gmd:MD_MaintenanceInformation> <gmd:maintenanceAndUpdateFrequency> <gmd:MD_MaintenanceFrequencyCode code- List="http://standards.iso.org/ittf/PubliclyAvailableStandards/IS O_19139_Schemas/resources/Codelist/gmxCodelists.xml#MD_ MaintenanceFrequencyCode" codeList- Value="weekly"> asNeeded </gmd:MD_MaintenanceFrequencyCod e> </gmd:maintenanceAndUpdateFrequency> <gmd:updateScope> <gmd:MD_ScopeCode codeList-Value="dataset" code- List="http://standards.iso.org/ittf/PubliclyAvailableStandards/IS O_19139_Schemas/resources/Codelist/gmxCodelists.xml#MD_ ScopeCode">dataset</gmd:MD_ScopeCode> </gmd:updateScope> <gmd:maintenanceNote> <gco:CharacterString> </gco:CharacterString> </gmd:maintenanceNote> </gmd:MD_MaintenanceInformation> </gmd:resourceMaintenance> </pre>
Comments	

8.3.2 Purpose

Metadata element name	Purpose
Definition	summary of the intentions with which the resource(s) was developed
ISO 19115 number and name	26. purpose
ISO/TS 19139 path	identificationInfo/MD_DataIdentification/purpose
INSPIRE obligation / condition	Optional
INSPIRE multiplicity	0..1
Data type (and ISO 19115 no.)	CharacterString
Domain	Free text
Implementing instructions	
Example	Purpose: Dataset has been developed to fulfil INSPIRE requirements to provide information about habitats distribution. Degree of conformance with INSPIRE and legal requirements is evaluated in the Conformity INSPIRE metadata element.
Example XML encoding	<pre> <gmd:purpose> <gco:CharacterString>Dataset has been developed to fulfil INSPIRE requirements to provide information about habitats distribution.Degree of conformance with INSPIRE and legal requirements is evaluated in the Conformity INSPIRE metadata element. </gco:CharacterString> </gmd:purpose> </pre>
Comments	

INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page 42

8.4 Guidelines on using metadata elements defined in Regulation 1205/2008/EC

8.4.1 Conformity

The *Conformity* metadata element defined in Regulation 1205/2008/EC allows to report the conformance with the Implementing Rule for interoperability of spatial data sets and services or another specification. The degree of conformity of the dataset can be *Conformant* (if the dataset is fully conformant with the cited specification), *Not Conformant* (if the dataset does not conform to the cited specification) or *Not evaluated* (if the conformance has not been evaluated).

Recommendation 5 The Conformity metadata element should be used to report conceptual consistency with this INSPIRE data specification. The value of Conformant should be used for the Degree element only if the dataset passes all the requirements described in the abstract test suite presented in Annex A. The Specification element should be given as follows:

- title: "INSPIRE Data Specification on <Theme Name> – Draft Guidelines"
- date:
 - dateType: publication
 - date: 2011-06-15

Open issue 8: Conformance testing is still an open issue under discussion.

Instructions on conformance testing and a common abstract test suite (including detailed instructions on how to test specific requirements) will be added at a later stage.

This may also lead to an update of the recommendations on how to fill the conformity metadata element.

This metadata element will also allow data producers to report that a specific dataset fulfils the obligations from particular legal regulation.

NOTE 1 In order to improve the interoperability, domain templates and instructions for filling these free text elements (descriptions) are specified in an Annex C of this data specification.

8.4.2 Lineage

Recommendation 6 Following the ISO 19113 Quality principles, if a data provider has a procedure for quality validation of their spatial data sets then the data quality elements listed in the Chapters 7 and 8 should be used. If not, the *Lineage* metadata element (defined in Regulation 1205/2008/EC) should be used to describe the overall quality of a spatial data set.

According to Regulation 1205/2008/EC, lineage "is a statement on process history and/or overall quality of the spatial data set. Where appropriate it may include a statement whether the data set has been validated or quality assured, whether it is the official version (if multiple versions exist), and whether it has legal validity. The value domain of this metadata element is free text".

The Metadata Technical Guidelines based on EN ISO 19115 and EN ISO 19119 specify that the statement sub-element of LI_Lineage (EN ISO 19115) should be used to implement the lineage metadata element.

INSPIRE		Reference: D2.8.III.18_v2.0	
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page 43

Recommendation 7 To describe the transformation steps and related source data, it is recommended to use the following sub-elements of LI_Lineage:

- For the description of the transformation process of the local to the common INSPIRE data structures, the LI_ProcessStep sub-element should be used.
- For the description of the source data the LI_Source sub-element should be used.

NOTE 1 This recommendation is based on the conclusions of the INSPIRE Data Quality Working Group to avoid overloading of the overall lineage statement element with information on the transformation steps and related source data.

NOTE 2 In order to improve the interoperability, domain templates and instructions for filling these free text elements (descriptions) are specified in an Annex C of this data specification.

Open issue 9: The suggested use of the LI_Lineage sub-elements needs to be discussed as part of the maintenance of the INSPIRE metadata Technical Guidelines.

8.4.3 Temporal reference

According to Regulation 1205/2008/EC, at least one of the following temporal reference metadata elements shall be provided: temporal extent, date of publication, date of last revision, date of creation. If feasible, the date of the last revision of a spatial data set should be reported using the *Date of last revision* metadata element.

9 Delivery

9.1 Delivery medium

DS Requirement 2 Data conformant to this INSPIRE data specification shall be made available through an INSPIRE network service.

DS Requirement 3 All information that is required by a calling application to be able to retrieve the data through the used network service shall be made available in accordance with the requirements defined in the Implementing Rules on Network Services.

EXAMPLE 1 Through the Get Spatial Objects function, a download service can either download a pre-defined data set or pre-defined part of a data set (non-direct access download service), or give direct access to the spatial objects contained in the data set, and download selections of spatial objects based upon a query (direct access download service). To execute such a request, some of the following information might be required:

- the list of spatial object types and/or predefined data sets that are offered by the download service (to be provided through the Get Download Service Metadata operation),

INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page 44

- and the query capabilities section advertising the types of predicates that may be used to form a query expression (to be provided through the Get Download Service Metadata operation, where applicable),
- a description of spatial object types offered by a download service instance (to be provided through the Describe Spatial Object Types operation).

EXAMPLE 2 Through the Transform function, a transformation service carries out data content transformations from native data forms to the INSPIRE-compliant form and vice versa. If this operation is directly called by an application to transform source data (e.g. obtained through a download service) that is not yet conformant with this data specification, the following parameters are required: Input data (mandatory). The data set to be transformed.

- Source model (mandatory, if cannot be determined from the input data). The model in which the input data is provided.
- Target model (mandatory). The model in which the results are expected.
- Model mapping (mandatory, unless a default exists). Detailed description of how the transformation is to be carried out.

9.2 Encodings

9.2.1 Default Encoding(s)

DS Requirement 4 Data conformant to the application schema(s) defined in section 5.2 shall be encoded using the encoding(s) specified in this section.

9.2.1.1. Default encoding for application schema <application schema name>

Name: HabitatsAndBiotopes Implementation GML Application Schema

Version: version 2.0, GML, version 3.2.1

Specification: D2.8.III.18 Data Specification on **Habitats and Biotopes** – Draft Guidelines

Character set: UTF-8

The GML Application Schema is distributed in a zip-file separately from the data specification document.

9.2.1.1.1. *Implementation UML model used for generating the GML application schema*

The GML application schema was not derived directly from the conceptual model described in section 5, but from an implementation model (for a schematic illustration of this process, see Figure 5).

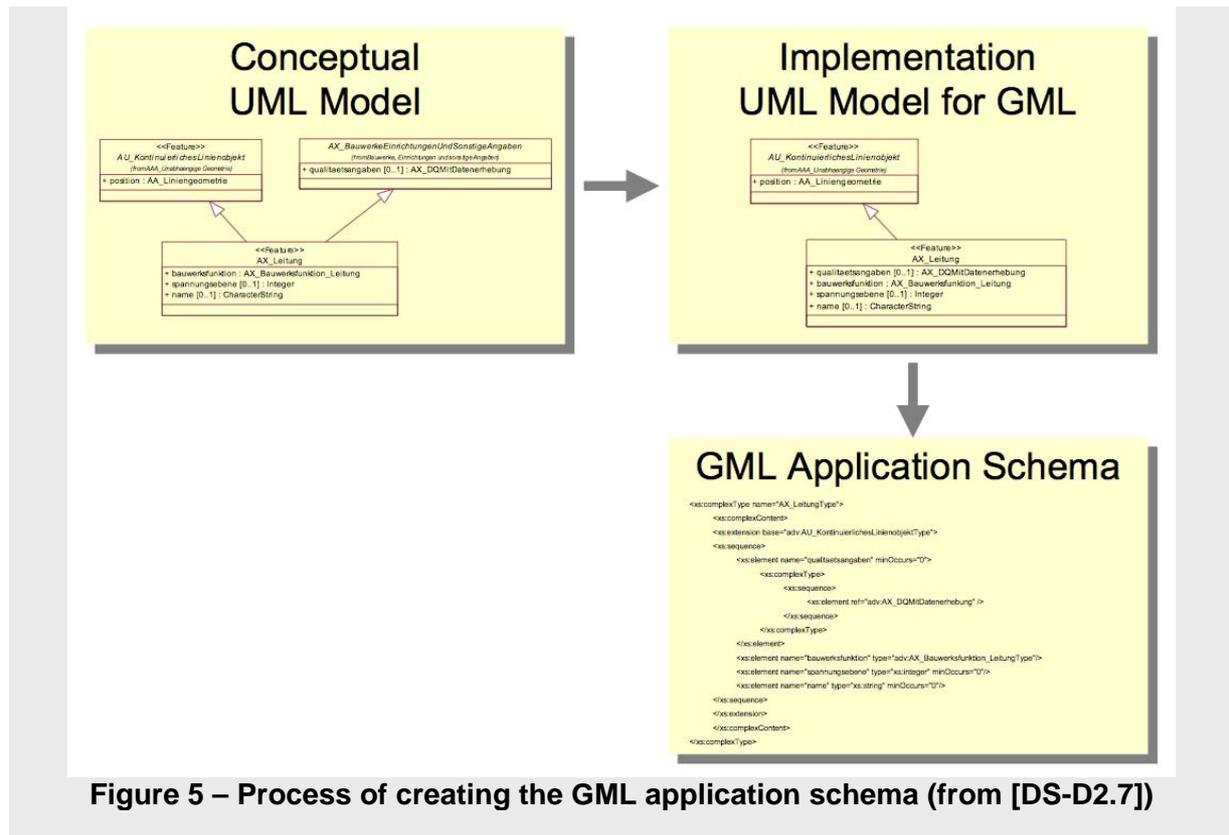


Figure 5 – Process of creating the GML application schema (from [DS-D2.7])

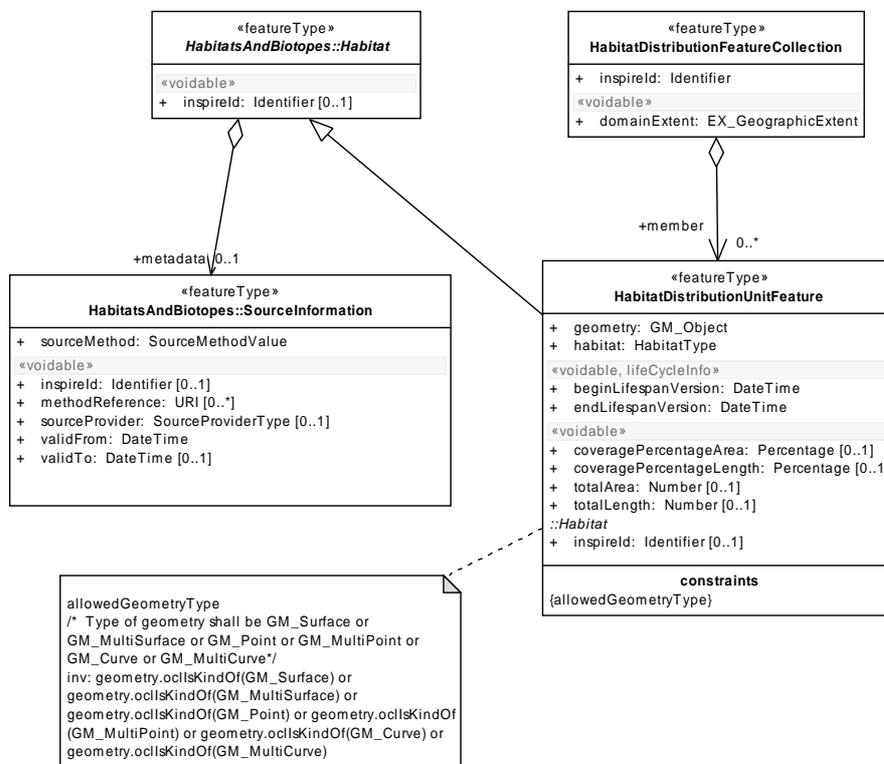


Figure 6 – UML class diagram: Overview of the implementation model for the Habitats and Biotopes application schema

The implementation model replaces the conceptual coverage type with a feature collection pattern. The main reason is that the specific coverage types specified in the conceptual model are not supported by current implementations. Basically two new feature types are introduced: *HabitatDistributionFeatureCollection* and *HabitatDistributionUnitFeature*. *HabitatDistributionUnitFeature* represents each unit in a conceptual coverage as individual features. *HabitatDistributionFeatureCollection* represents collection of features (*HabitatDistributionUnitFeature*). This allows for a dataset level attribute, the *domainExtent* which represents the spatial coverage of the dataset.

All other feature types, data types, and code lists remain the same as in the conceptual model. For the full model see Figure 7.

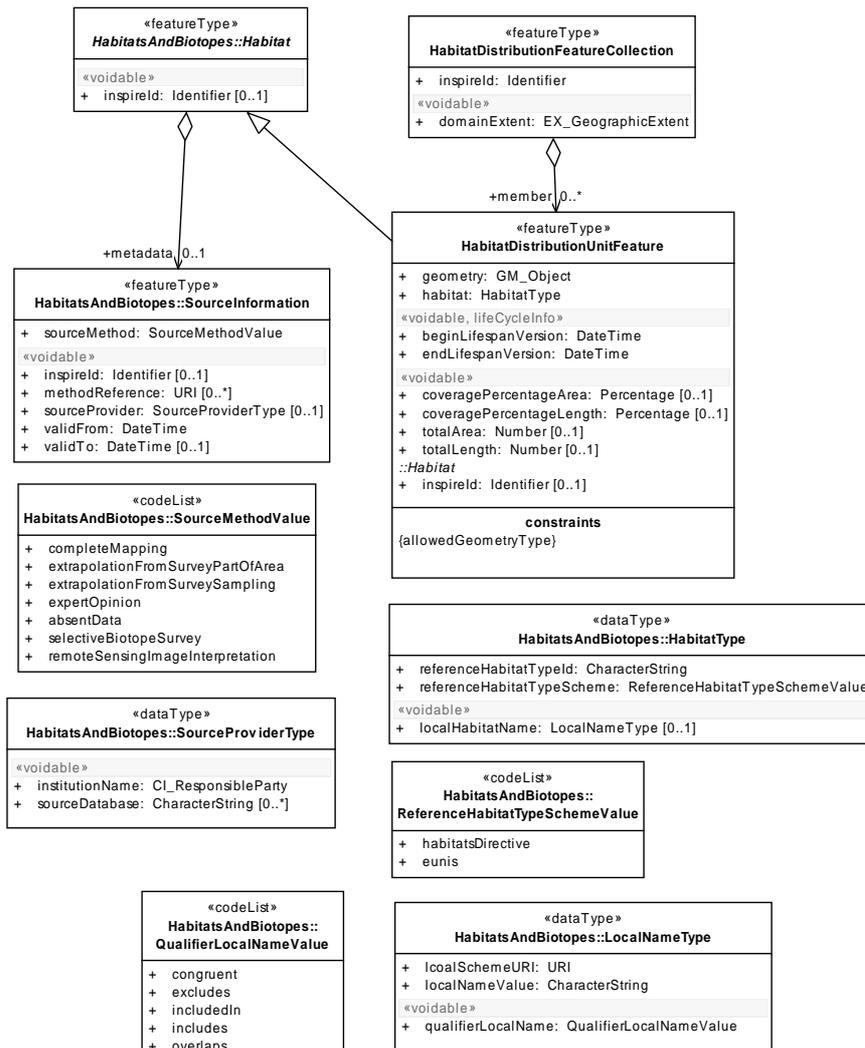


Figure 7 – UML class diagram: Full implementation model for the Habitats and Biotopes application schema

9.2.2 Alternative Encoding(s)

Recommendation 8 It is recommended that also the encodings specified in this section be provided for the relevant application schemas.

INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page 47

9.2.2.1. Alternative encoding for application schema HabitatsAndBiotopes

As an alternative encoding, the GML coverage representation is also provided.

NOTE This application schema has to be used if the *HabitatMapping* spatial object type needs to be encoded.

Open issue 10: It has to be considered for version 3 of the specification, whether the *HabitatMapping* spatial object type needs its own application schema. (ie., a reorganization of the application schemas: 1 for the core, 1 for coverage representation, 1 for habitat mapping, and 1 for implementation.

Name: HabitatsAndBiotopes GML Application Schema

Version: version 2.0, GML, version 3.2.1

Specification: D2.8.III.18 Data Specification on **Habitats and Biotopes** – Draft Guidelines

Character set: UTF-8

The GML Application Schema is distributed in a zip-file separately from the data specification document.

10 Data Capture

There is no specific guidance required with respect to data capture.

11 Portrayal

This clause defines the rules for layers and styles to be used for portrayal of the spatial object types defined for this theme.

In section 11.1, the *types* of layers are defined that are to be used for the portrayal of the spatial object types defined in this specification. A view service may offer several layers of the same type, one for each dataset that it offers on a specific topic.

Section 11.2 specifies the styles that shall be supported by INSPIRE view services for each of these layer types.

In section 11.3, further styles can be specified that represent examples of styles typically used in a thematic domain. It is recommended that also these styles should be supported by INSPIRE view services, where applicable.

Where XML fragments are used in these sections, the following namespace prefixes apply:

- sld="http://www.opengis.net/sld" (WMS/SLD 1.1)
- se="http://www.opengis.net/se" (SE 1.1)
- ogc="http://www.opengis.net/ogc" (FE 1.1)

INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page 48

IR Requirement 12 If an INSPIRE view services supports the portrayal of data related to the theme **Habitats and Biotopes**, it shall provide layers of the types specified in this section.

DS Requirement 5 If an INSPIRE view network service supports the portrayal of spatial data sets corresponding to the spatial data theme **Habitats and Biotopes**, it shall support the styles specified in section 11.2.

If no user-defined style is specified in a portrayal request for a specific layer to an INSPIRE view service, the default style specified in section 11.2 for that layer shall be used.

Recommendation 9 In addition to the styles defined in section 11.2, it is recommended that, where applicable, INSPIRE view services also support the styles defined in section 11.3.

11.1 Layers to be provided by INSPIRE view services

Open issue 11: PLEASE NOTE: This section has not been finalized. There are several uncertainties, e.g., is it at all possible to agree on a common portrayal? Also a default very simple style in which polygons/points are e.g. gray or black does not really make sense for a distribution dataset. What we have done in the current specification is simply to include an example. Of course this will be changed for a version 3.0. We appreciate any feedback from the stakeholders on this issue.

Layer Name	Layer Title	Spatial object type(s)	Keywords
HB.HabitatDistributionFeature	Habitat Distribution (Features)	HabitatDistributionUnit Feature	Natura2000, habitat type,
HB.HabitatDistributionCoverage	Habitat Distribution (Coverage)	HabitatDistributionUnit	Natura2000, habitat type,

11.1.1 Layers organisation

None.

11.2 Styles to be supported by INSPIRE view services

11.2.1 Styles for the layer HB.HabitatDistributionFeature

Style Name	HB.HabitatDistributionFeature.Default
Default Style	yes
Style Title	Species Distribution (Features) Default Style

INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page 49

Style Abstract	<p>Natura2000 habitat types in North Rhine-Westphalia, Germany are presented in maps that have commonly used these styles for the app. 40 habitat types of the Habitat Directive that occur in North Rhine-Westphalia over the past ten years. Thus this style could serve as an EXAMPLE for a style for all habitat types under the Habitat Directive.</p> <p>An sld encoding will be prepared for version 3.</p>
Symbology	<p>An example is:</p>

Lebensraumtypen

- Natura 2000
 - Vogelschutzgebiete
 - 
 - FFH-Gebiete
 - 
- Lebensraumtypen
 - Punkte
 -  Lueckige Kalkpionierasen
 -  Trespen-Schwingel Kalktrockenrasen
 -  Kalkhaltige Schutthalden des Huegel- und Berglandes
 -  Kalkfelsen mit Felsspaltenvegetation
 -  Silikatfelsen mit Felsspaltenvegetation
 -  Silikatfelsen mit ihrer Pioniervegetation
 -  nicht touristisch erschl. Hoehlen
 - Linien
 -  Fließgewaesser mit Unterwasservegetation
 -  Feuchte Hochstaudenfluren
 -  Kalktuffquellen
 -  Erlen- Eschen- und Weichholz-Auenwaelder
 - Flächen
 -  1340 Salzwiesen im Binnenland
 -  2310 Sandheiden auf Dünen
 -  2330 Sandtrockenrasen auf Binnendünen
 -  3110 nährstoffarme Littorella-Gewässer
 -  3130 nährstoffärmere basenarme Stillgewässer
 -  3140 nährstoffärmere kalkhaltige Stillgewässer
 -  3150 natürl. eutrophe Seen und Altarme
 -  3160 Dystrophe Seen
 -  3260 Fließgewässer mit Unterwasservegetation
 -  3270 Flüsse mit Schlammhängen und einj. Vegetation
 -  4010 Feuchte Heidegebiete mit Glockenheide
 -  4030 Trockene Heidegebiete
 -  5130 Wacholderbestände mit Kalkheiden und -rasen
 -  6110 Lückige Kalk-Pionierasen
 -  6120 Trockene, kalkreiche Sandrasen
 -  6130 Schwermetallrasen
 -  6210 Trespen-Schwingel Kalktrockenrasen
 -  6230 Borstgrasrasen im Mittelgebirge
 -  6410 Pfeifengraswiesen auf kalkr., torfigen und tonig-schluffigen Böden
 -  6430 Feuchte Hochstaudenfluren
 -  6510 Glatthafer- und Wiesenknopf-Silgenwiesen
 -  6520 Berg-Mähwiesen
 -  7110 Lebende Hochmoore
 -  7120 noch renaturierungsfäh. degradierte Hochmoore
 -  7140 Übergangs- und Schwinggrasmoore
 -  7150 Moorschlenken-Pioniergesellschaften
 -  7210 Schneidenriede und Kalkflachmoore
 -  7220 Kalktuffquellen
 -  7230 Kalkreiche Niedermoore
 -  8150 Kieselhaltige Schutthalden der Berglagen
 -  8160 Kalkhaltige Schutthalden des Hügel- und Berglandes
 -  8210 Kalkfelsen mit Felsspaltenvegetation
 -  8220 Silikatfelsen mit Felsspaltenvegetation
 -  8230 Silikatfelsen mit ihrer Pioniervegetation
 -  8310 nicht tour. erschl. Höhlen
 -  9110 Hainsimsen-Buchenwald
 -  9130 Waldmeister-Buchenwald
 -  9150 Orchideen-Kalk-Buchenwald
 -  9160 Stieleichen-Hainbuchenwald
 - 9170 Labkraut-Eichen-Hainbuchenwald
 - 9180 Schlucht- und Hangmischwälder
 - 9190 Alte bodensaure Eichenwälder auf Sandebenen
 - 91D0 Moorwälder
 - 91E0 Erlen-Eschen- und Weichholz-Auenwälder
 - 91F0 Hartholz-Auenwälder

INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page 51

Minimum & maximum scales	1:1,000 – 1:50,000
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11.3 Other recommended styles

11.3.1 Styles for the layer HB.HabitatDistributionCoverage

Style Name	HB.HabitatDistributionFeature.Default
Default Style	yes
Style Title	Species Distribution (Coverage) Default Style
Style Abstract	<p>Natura2000 habitat types in North Rhine-Westphalia, Germany are presented in maps that have commonly used these styles for the app. 40 habitat types of the Habitat Directive that occur in North Rhine-Westphalia over the past ten years. Thus this style could serve as an EXAMPLE for a style for all habitat types under the Habitat Directive.</p> <p>An sld encoding will be prepared for version 3.</p>
Symbology	An example is:

Lebensraumtypen

- Natura 2000
 - Vogelschutzgebiete
 - 
 - FFH-Gebiete
 - 
- Lebensraumtypen
 - Punkte
 -  Lueckige Kalkpionierrasen
 -  Trespen-Schwingel Kalktrockenrasen
 -  Kalkhaltige Schutthalden des Huegel- und Berglandes
 -  Kalkfelsen mit Felsspaltenvegetation
 -  Silikatfelsen mit Felsspaltenvegetation
 -  Silikatfelsen mit ihrer Pioniervegetation
 -  nicht touristisch erschl. Hoehlen
 - Linien
 -  Fließgewässer mit Unterwasservegetation
 -  Feuchte Hochstaudenfluren
 -  Kalktuffquellen
 -  Erlen- Eschen- und Weichholz-Auenwälder
 - Flächen
 -  1340 Salzwiesen im Binnenland
 -  2310 Sandheiden auf Dünen
 -  2330 Sandtrockenrasen auf Binnendünen
 -  3110 nährstoffarme Littorella-Gewässer
 -  3130 nährstoffärmere basenarme Stillgewässer
 -  3140 nährstoffärmere kalkhaltige Stillgewässer
 -  3150 natürl. eutrophe Seen und Altarme
 -  3160 Dystrophe Seen
 -  3260 Fließgewässer mit Unterwasservegetation
 -  3270 Flüsse mit Schlammhängen und einj. Vegetation
 -  4010 Feuchte Heidegebiete mit Glockenheide
 -  4030 Trockene Heidegebiete
 -  5130 Wacholderbestände mit Kalkheiden und -rasen
 -  6110 Lückige Kalk-Pionierrasen
 -  6120 Trockene, kalkreiche Sandrasen
 -  6130 Schwermetallrasen
 -  6210 Trespen-Schwingel Kalktrockenrasen
 -  6230 Borstgrasrasen im Mittelgebirge
 -  6410 Pfeifengraswiesen auf kalkr., torfigen und tonig-schluffigen Böden
 -  6430 Feuchte Hochstaudenfluren
 -  6510 Glatthafer- und Wiesenknopf-Silgenwiesen
 -  6520 Berg-Mähwiesen
 -  7110 Lebende Hochmoore
 -  7120 noch renaturierungsfäh. degradierte Hochmoore
 -  7140 Übergangs- und Schwingrasenmoore
 -  7150 Moorschlenken-Pioniergesellschaften
 -  7210 Schneidenriede und Kalkflachmoore
 -  7220 Kalktuffquellen
 -  7230 Kalkreiche Niedermoore
 -  8150 Kieselhaltige Schutthalden der Berglagen
 -  8160 Kalkhaltige Schutthalden des Hügel- und Berglandes
 -  8210 Kalkfelsen mit Felsspaltenvegetation
 -  8220 Silikatfelsen mit Felsspaltenvegetation
 -  8230 Silikatfelsen mit ihrer Pioniervegetation
 -  8310 nicht tour. erschl. Höhlen
 -  9110 Hainsimsen-Buchenwald
 -  9130 Waldmeister-Buchenwald
 -  9150 Orchideen-Kalk-Buchenwald
 -  9160 Stieleichen-Hainbuchenwald
 - 9170 Labkraut-Eichen-Hainbuchenwald
 - 9180 Schlucht- und Hangmischwälder
 - 9190 Alte bodensaure Eichenwälder auf Sandebenen
 - 91D0 Moorwälder
 - 91E0 Erlen-Eschen- und Weichholz-Auenwälder
 - 91F0 Hartholz-Auenwälder

INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page 53

Minimum & maximum scales	1:1,000 – 1:50,000
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INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page 54

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INSPIRE		Reference: D2.8.III.18_v2.0	
TWG-HB	Data Specification on <i>Habitats and Biotores</i>	2011-06-15	Page 56

Annex A (normative)

Abstract Test Suite

Any dataset conforming to this INSPIRE data specification shall meet all requirements specified in this document.

Open issue 12: Conformance testing is still an open issue under discussion.

Instructions on conformance testing and a common abstract test suite (including detailed instructions on how to test specific requirements) will be added at a later stage.

Annex B (informative) Use Cases

Use Case: Habitat directive

The Habitat Directive (92/43/EEC) requires Member States to report on the implementation of the directive in the form of country reports submitted every six years.

The national reports consist of the general part and the specific part, which includes information about the status and main threats for all of the habitats and species listed in the Annexes of the Directive. The characterisation of the status of the habitats and species is reported using descriptive data as well as maps of the range and distribution. The information that forms these reports should be based upon monitoring (as stated in Article 11), however most of the Member States do not have sufficiently developed biodiversity monitoring networks therefore the data is often collected from various sources.

The European Topic Center on Biological Diversity in close cooperation with the Scientific Working Group (group of experts from the Member States) has developed a guidance document specifying the information that should be submitted within the Article 17 reporting. The guidance document specifies that; the spatial datasets provided by Member States should conform to the European 10kmx10km grid to achieve necessary data harmonization on the EU level.

The Article 17 report containing spatial datasets and descriptive information is uploaded by the Member States to the Reportnet's Central Data Repository and quality checked by the ETC/BD.

The national spatial data sets are harmonised and subsequently merged to form EU-wide datasets.

Based upon the information provided in the Member State reports the ETC/BD produces National Reports for each Member State and a Technical report summarizing the main results of the assessment of the conservation status at the EU biogeographical level. The resulting reports feed into the Composite report which is in accordance with Article 17 prepared by the Commission.

Use Case Description	
Name	Reporting on Article 17 of Habitats Directive
Priority	High
Description	Article 17 of the Habitats Directive obliges MSs to report every six years about the progress of the implementation of the directive. It is applicable for habitat types and species listed in the Annexes of the Directive.
Pre-condition	National datasets on habitat type and species distribution. Specifications for the data input.
Flow of Events – Basic Path	
Step 1	MS produces 2 obligatory spatial datasets (distribution of habitat types and species) and one descriptive (tabular) dataset. MS follow the encodings given in the Article 17 Guidelines. The same habitat types and their codings are also used in the Natura 2000 Standard Data Form. (Remark: All habitat types of the Habitats Directive are cross-referenced to EUNIS habitats classification)
Step 2	MS uploads the datasets as XML and GML into Reportnet's CDR
Step 3	The ETC/BD downloads the national datasets from the CDR
Step 4	The ETC/BD performs a series of quality assessment on the data
Step 5	In case the report or data requires improvement, the ETC/BD notifies MS via Reportnet and provides a report on data suggesting improvements. Steps 2,3,4 are

	repeated then.
Step 6	The assessments for the conservation status of a habitat type are done at the biogeographical level. Therefore the ETC/BD split the MS data by biogeographical region. This is done in 2 steps, first off the regions a habitat type occurs in are selected from the tabular data (this list simply states that Habitat X occurs in bioregion Y), secondly based on the first step the grid cells of the habitat types that occur in a region are extracted from the MS submission by overlaying the distribution with the biogeographical regions (link: Annex III theme 17) and spatial selecting all those grids that occur within the region (see Figure 1 and Figure 2). All the datasets per region are merged into one dataset upon which the assessments are carried out. The end product will be merged boundaries for 9 biogeographical regions and 5 marine regions. This process does lead to those grid cells along the boundaries of regions which belonging to two regions being 'doubly represented' visually, where necessary one of the double sets will be removed.
Step 7	The assessment of the conservation status of the habitat types are calculated per region, ideally, based on attributes from the tabular data. Where the tabular data is poor, or inconsistent or absent the spatial data is used as one of the parameters to calculate the Conservation Status
Step 8	The ETC/BD merges the 9 biogeographical regions and 5 marine regions into a European dataset, which is disseminated to the public, used in the Natura 2000 viewer etc.
Step 9	ETC/BD produces National reports and a Technical report for DG ENVIRONMENT
Step 10	DG ENVIRONMENT produces a Composite Report
Flow of Events – Alternative Paths	
Step m	
Step m+1	
Post-condition	Published national and EU27 reports
Data source: Habitat types distribution	
Description	Distribution of Habitat types listed in Annex I of the Habitats Directive,
Data provider	National
Geographical scope	National
Thematic scope	Habitats
Scale, resolution	10kmx10km (ETRS 89 LAEA 5210 'European grid')
Documentation	http://ec.europa.eu/environment/nature/knowledge/rep_habitats/index_en.htm
Data source: Biogeographical regions	
Description	Biogeographical regions according to Habitat Directive
Data provider	EEA
Geographical scope	EU27
Thematic scope	Biogeographical regions of Europe
Scale, resolution	1:1.000.000
Documentation	http://dataservice.eea.europa.eu/dataservice/metadetails.asp?id=1054

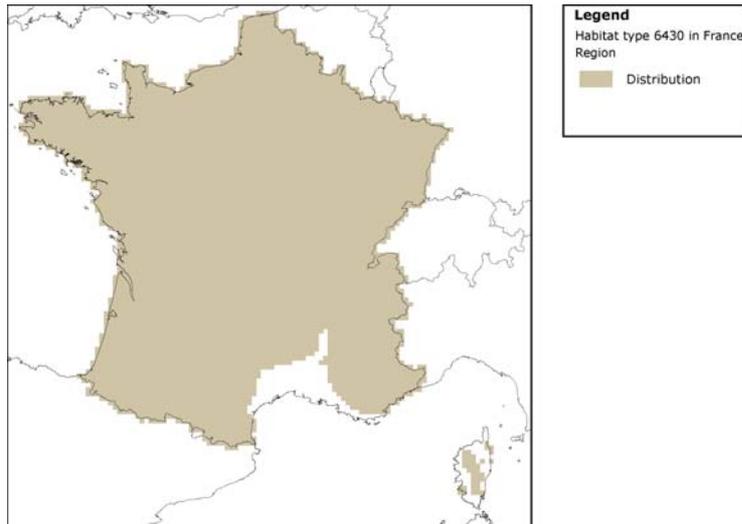


Figure 1 – Distribution of the wide spread habitat type 6430 in France

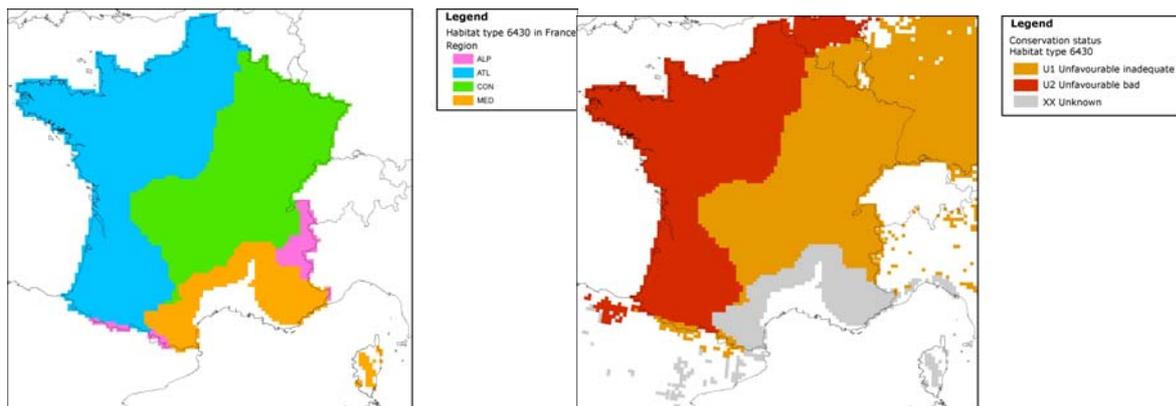


Figure 2 – Distribution of the wide spread habitat type 6430 in France as split by Biogeographical region, now 4 files upon which a Conservation status is calculated. The right figure shows the conservation status as calculated from the entire region.

Reporting format on the 'main results of the surveillance under Article 11' for Annex I Habitats Types

<i>Data</i>	<i>Comments / Brief explanations</i>
Habitat Code	From Annex I of the Habitats Directive, e.g. 1110 (do not use subtypes)
Member State	The MS for which the reported data apply; use 2 digit ISO code
1. National level	
1.1. Distribution	Distribution within the country concerned
1.1.1. Map	Submit a map as a GIS file – together with relevant metadata. Standard for submission is 10x10km ETRS grid cells, projection ETRS LAEA 5210. Map submitted: Yes / No

1.1.2. Data source - map NEW	3 = complete mapping 2 = extrapolation from surveys or part of the area or from sampling 1 = only or mostly based on expert opinion 0 = absent data
1.1.3. Date (or period) NEW	Date or period when actual data was collected
1.1.4. Additional distribution map - optional	This is for cases if MS wishes to submit an additional map deviating from standard submission map under 1.1.1.
1.1.5. Range map – optional	It is no longer compulsory for a range map to be submitted.

2. Biogeographical level complete for each biogeographical region or marine region concerned	
2.1. Biogeographical region or marine regions	Alpine (ALP), Atlantic (ATL), Black Sea (BLS), Boreal (BOR), Continental (CON), Mediterranean (MED), Macaronesian (MAC), Pannonian (PAN), Steppic (STE)), Marine Atlantic (MATL), Marine Mediterranean (MMED), Marine Black Sea (MBLS), Marine Macaronesian (MMAC) and Marine Baltic Sea (MBAL)
2.2. Published sources	If data given below is from published sources give bibliographical references or link to Internet site(s). Give author, year, title of publication, source, volume, number of pages, web address.
2.3. Range	Range within the biogeographical region concerned (for definition, see Annex F).
2.3.1. Surface area	Total surface area of the range within biogeographical region concerned in km ² . Use of IT tool is recommended (the tool is under development).
2.3.2. Short-term trend	2001-2012 (rolling 12-year time window) or period as close as possible to it. Indicate the used period here. The short-term trend is to be used for the assessment*.
2.3.3. Trend direction	0 = stable + = increase - = loss ? = unknown NEW
2.3.4. Trend magnitude - optional	In km ² .
2.3.5. Additional information	Is the difference between the reported value in 2.3.1. and the previous reporting round mainly due to a) improved knowledge/more accurate data? YES/NO b) use of different method (e.g. IT-tool) YES/NO
2.3.6. Long-term trend – optional NEW	This means trend of around 24 years and for 2013 reports it is optional. Repeat data-fields as for short-term trend above.*
2.3.7. Favourable reference range	In km ² or use operators (≈, >, >>)*. Indicate method used to set reference value (if other than operators) (coded list under preparation including use of operators).
2.4. Area covered by habitat	Area covered by habitat within the range in the biogeographical region concerned (km ²)
2.4.1. Surface area	In km ²
2.4.2. Date	Date (or period) when data for area surface was recorded.
2.4.3. Data source	3 = full ground survey (ground based or thorough remote sensing) 2 = extrapolation from partial/rough surveys 1 = expert opinion 0 = absent data NEW

2.4.4. Short-term trend	2001-2012 (rolling 12-year time window) or period as close as possible to it. Indicate the used period here. The short-term trend is to be used for the assessment*.		
2.4.5. Trend direction	0 = stable + = increase - = loss ? = unknown NEW		
2.4.6. Trend magnitude - optional	In km ² - optional information	<i>Confidence interval NEW</i> Indicate confidence interval in case the data source is no 3*.	
2.4.7. Data source – trend NEW	3 = complete survey and/or exhaustive and statistically liable sampling scheme 2 = partial data (e.g. less accurate sampling) with some extrapolation or sampling 1 = expert opinion 0 = absent data (in cases trend is unknown)		
2.4.8. Additional information	Is the difference between the reported value in 2.4.1. and the previous reporting round mainly due to improved knowledge/more accurate data? YES/NO		
2.3.6. Long-term trend – optional NEW	This means trend of around 24 years and for 2013 reports it is optional*. Repeat data-fields as for short-term trend above.		
2.4.9. Favourable reference area	In km ² or use operators (≈, >, >>, <).	Indicate method used to set reference value (if other than operators) (coded list under preparation including use of operators).	
2.5. Structure and function NEW	Proportion of area with unfavourable structures and functions*.		
2.5.1. Data source NEW	Same options as under 2.7.1.		
2.6. Main pressures	<i>Pressure</i> List max 20 pressures. Use codes from Appendix E to the Standard Data Forms to min 2 nd level.	<i>Ranking</i> • H = high importance (max 5 entries) • M = medium importance • L = low importance	<i>Pollution qualifier (optional)*</i>
2.7. Threats	<i>Pressure</i> Same explanation as for the pressure	<i>Ranking</i> Same explanation as for the pressure.	<i>Pollution qualifier (optional)*</i>
2.7.1. Data source – threats and pressures NEW	3 = based exclusively or to a larger extent on real data from sites/occurrences or other data sources 2 = mainly based on expert judgement and other data 1 = based only on expert judgements		
2.8. Complementary information			
2.8.1. Typical species	List the typical species used and describe method used to assess their status.		
2.8.2. Justification of % thresholds for trends	In case a MS is not using the indicative suggested value of 1% per year when assessing trends, this should be duly justified in this free text field		
2.8.3. Other relevant information			

2.9. Conclusions <i>(assessment of conservation status at end of reporting period)</i>	
2.9.1. Range	Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)
2.9.2. Area	Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)
2.9.3. Specific structures and functions (incl. typical species)	Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)
2.9.4. Future prospects	Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)
2.9.5. Overall assessment of Conservation Status	Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)
Overall trend	use '+' (improving) or '-' (declining), '=' (stable) or '?' (unknown) to indicate an overall trend in conservation status*

NEW 3. Information on Natura 2000 & Annex I habitat types – ATTENTION – DRAFT! <i>Details are currently under debate in the WP3 Subgroup</i>	
3.1. Habitat surface area (%) covered by the network	Estimation of the % of the surface area of the Annex I habitat type included in the network (of the same biogeographical region). Give integer value, no decimals.
3.1.1. Data source	Data source in scale good/moderate/poor (details to be defined).
3.2. Conservation measures	Report the 3 most important conservation measures taken (i.e. already being implemented) until the end of the reporting period. Hierarchical classification of the conservation measures is under development.

Assessing conservation status of a HABITAT type

General evaluation matrix (per biogeographic region within a MS)

Parameter	Conservation Status			
	Favourable ('green')	Unfavourable – Inadequate ('amber')	Unfavourable - Bad ('red')	Unknown (insufficient information to make an assessment)
2.3 Range¹⁴	Stable (loss and expansion in balance) or increasing <u>AND</u> not smaller than the 'favourable reference range'	Any other combination	Large decrease: Equivalent to a loss of more than 1% per year within period specified by MS <u>OR</u> More than 10% below 'favourable reference range'	<i>No or insufficient reliable information available</i>
2.4 Area covered by habitat type within range¹⁵	Stable (loss and expansion in balance) or increasing <u>AND</u> not smaller than the 'favourable reference	Any other combination	Large decrease in surface area: Equivalent to a loss of more than 1% per year (indicative value	<i>No or insufficient reliable information available</i>

¹⁴ Range within the biogeographical region concerned (for definition, see Annex F, further guidance on how to define range (e.g. scale and method) will be given in a foreseen guidance document to be elaborated by ETC-BD.

¹⁵ There may be situations where the habitat area, although above the 'Favourable Reference Area', has decreased as a result of management measures to restore another Annex I habitat or habitat of an Annex II species. The habitat could still be considered to be at 'Favourable Conservation Status' but in such cases please give details in the Complementary Information section ("Other relevant information") of Annex D.

Parameter	Conservation Status			
	Favourable ('green')	Unfavourable – Inadequate ('amber')	Unfavourable - Bad ('red')	<i>Unknown (insufficient information to make an assessment)</i>
	area' AND without significant changes in distribution pattern within range (if data available)		MS may deviate from if duly justified) within period specified by MS OR With major losses in distribution pattern within range OR More than 10% below 'favourable reference area'	
Specific structures and functions (including typical species¹⁶)	Structures and functions (including typical species) in good condition and no significant deteriorations / pressures.	Any other combination	More than 25% of the area is unfavourable as regards its specific structures and functions (including typical species) ¹⁷	<i>No or insufficient reliable information available</i>
Future prospects (as regards range, area covered and specific structures and functions)	The habitats prospects for its future are excellent / good, no significant impact from threats expected; long-term viability assured.	Any other combination	The habitats prospects are bad, severe impact from threats expected; long-term viability not assured.	<i>No or insufficient reliable information available</i>
Overall assessment of CS¹⁸	All 'green' OR three 'green' and one 'unknown'	One or more 'amber' but no 'red'	One or more 'red'	Two or more 'unknown' combined with green or all "unknown"

¹⁶ See definition of typical species in the guidance document, on page ??

¹⁷ E.g. by discontinuation of former management, or is under pressure from significant adverse influences, e.g. critical loads of pollution exceeded.

¹⁸ A specific symbol (+/-/=/?) is recommended to be used in the unfavourable categories to indicate recovering habitats

INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page 64

Use Case: Provide data on habitats and biotopes to meet monitoring and reporting obligations of the Habitats Directive and regional obligations of the Government of NorthRhine-Westphalia, Germany

The scenario describes how data about the occurrence of habitats will be collected and provided. This process is of crucial relevance for preservation and development of a good conservation status of habitats by designating protected sites, for well-directed site management, for land purchase or contractual measures of nature conservation. Monitoring obligations of the Habitats Directive demand an updated report on all sites at least every six years.

This use case describes how data will be collated and evaluated and finally provided.

Use Case Description	
Name	provision of data on habitats
Priority	high
Description	The user is the MS Germany or the nature conservation administration of the „Bundesländer“, who provide data on habitats to meet reporting and monitoring obligations of the Habitats Directive. Habitat data have to be added to the Standard Data Form for Natura2000 sites and provided in compliance with „Explanatory Notes & Guidelines on Assessment, monitoring and reporting under Article 17 of the Habitats Directive“ (1-2006)
Pre-condition	harmonized standards for data collection and processing on all levels and for providing data from regional to federal level
Flow of Events – User 1	
Step 1.	The regional administrative services responsible for habitat inventory and data provision identify the necessity of data collection from reporting obligations under the Habitats Directive and regional state government requirements.
Step 2.	Biotope mapping paying regard to theme-specific, methodological and data-technical specifications of state or federal government. Regular dataset comprises: Geometry, coding of habitat-type in compliance with standardized coding lists (e.g. habitat types of Habitats Directive), vegetation types (using regional coding systems), plant species (typical species), biotope structures, disturbance and conservation status (compl. to Hab.Dir.). Encoding is harmonized on a federal level using a common evaluation schema. Data will be collated by the regional administrative services.
Step 3.	Quality assessment of the collated data. (Inventory)Data transfer/transmission to theme-specific information systems.
Step 4.	The data necessary for reporting under Art. 17 Hab.Dir. have to be processed by the regional administrative services to meet the obligations of the guidelines. Conclusions will comprise: <ul style="list-style-type: none"> • habitat distribution (range, trends, reference distribution) • total area (range, grid map, trend, reference range) • structures and functions (incl. typical species) • future prospects (main pressures) The results (data) will be provided to the federal administration and collated there from all „Bundesländer“. The federal government will finally provide the data to the EU-Commission. The state services in charge with regional duties, on the other hand, will exploit the same data for their own purposes on regional level.

INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page 65

Use Case Description	
Step 5.	These processed reporting data will also be published in specific information systems on the internet by state administrative services.
Post-condition	The inventory results may show up deficits and initiate closer examinations of habitats in the field. Data processing may reveal gaps of the evaluation procedure. Since evaluation processes depend on comparable data, iterative processing may be necessary.
Data source: Member State Data Set	
Description	Geo-data collected complying to (EU)standards or harmonisation agreed upon between the Bundesländer. Geodata administration in GIS. Data publishing in theme-specific information systems on the internet, often IMS or WMS.
Data provider	The regional administrative services of the Bundesländer.
Geographic scope	Germany, however, a similar process is obligatory in all EU-MS.
Thematic scope	Habitat types (within and outside of protected sites (incl. Natura2000))
Scale, resolution	The highest resolution that the member state can provide, usually better than 1:25.000, for most parts of DE 1:5.000.
Delivery	These data will be published in specific information systems on the internet by state administrative services including view services. Data will be provided in proprietary format via the federal government towards EU-COM
Documentation	EU-Guidance document „ Assessment, monitoring and reporting under Article 17 of the Habitats Directive: Explanatory Notes and Guidelines“, Draft 2 (SWG 06-02/04)

INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page 66

Use Case: EBONE, provide data on European habitat stock and change

The scenario describes how data on the occurrence of habitats are being collected Europe wide. This process is of crucial relevance for harmonisation of habitat data to measure stock and change.

This use case describes how data are collected and summary statistics are made and provided.

Use Case Description	
Name	GHC habitat surveillance as a European pilot for harmonisation of habitat data (EBONE)
Priority	high
Description	Data collection and integration from different European countries. The methodology is appropriate for coordinating information on habitats and vegetation in order to obtain statistically robust estimates of their extent and associated changes in biodiversity. It combines data from different countries in a common database.
Pre-condition	harmonized standards for data collection and processing for integrating field data in different countries collected in different schemes
Flow of Events – User 1	
Step 1.	The mapping and comparison of stock and change of habitats in Europe was not possible using EUNIS. The improvement of reporting at the European level required a habitat classification system that is based on strict rules and can be processed statistically. These are the General Habitat Categories (GHC).
Step 2.	Habitat mapping has been done in a stratified random way in UK, Sweden, Field data have been collected Regular dataset comprises: Geometry, coding of habitat-type in compliance with standardized coding lists (GHCs), with additional information on dominant species and Annex I types of Habitats Directive/EUNIS, and environmental qualifiers. UK and Swedish data have been recoded to harmonise the dataset..
Step 3.	Quality assessment of the collected data. Digitising of the data and transfer to the common database.
Step 4.	Data in the database are field data collected in 2009-2010 in Spain, Portugal, Greece, Romania, Austria, Slovak Republic, Estonia, France, Israel, Norway, South Africa, Italy. Data from the Swedish NILS project and the UK Countryside survey and the Austrian SINUS project are being integrated and are being analysed jointly.
Step 5.	EBONE provides a European data set on the share and diversity of the general habitat categories using the EBONE web viewer
Step 6	EBONE produces a report on the status and trends of habitats based on the general habitat categories
Post-condition	The report may be used for assessing the usefulness of the method. GIS-analyses and resulting data have to be stored for later use and are available to be shared with EEA. The evaluation processes made possible to compare data..
Data source: Data Set EBONE project	
Description	EBONE habitat database
Data provider	EBONE
Geographic scope	Europe and Mediterranean countries: Israel, South Africa
Thematic scope	Habitat surveillance
Scale, resolution	1 km ²
Delivery	EBONE 2011

Use Case Description	
Documentation	<p>Bunce, R.G.H., M.M.B. Bogers, P. Roche, M. Walczak, I.R. Geijzendorffer and R.H.G. Jongman, 2011. Manual for Habitat and Vegetation Surveillance and Monitoring, Temperate, Mediterranean and Desert Biomes</p> <p>Bunce, R.G.H.; Bogers, M.M.B.; Evans, D.; Jongman, R.H.G. (2010). D 4.2: Rule based system for Annex I habitats : Version 3 Document date : 2010-01-24</p> <p>Bunce, R.G.H., Bogers, M.M.B., Ortega, M., Morton, D., Allard, A., Prinz, M., Peterseil, J. and R. Elena-Rossello. 2010. <u>D4.1: Protocol for converting field habitat data sources into common standards</u> Deliverable report</p> <p>http://www.ebone.wur.nl/UK/Project+information+and+products/ http://www.ebone.wur.nl/UK/Publications/</p>

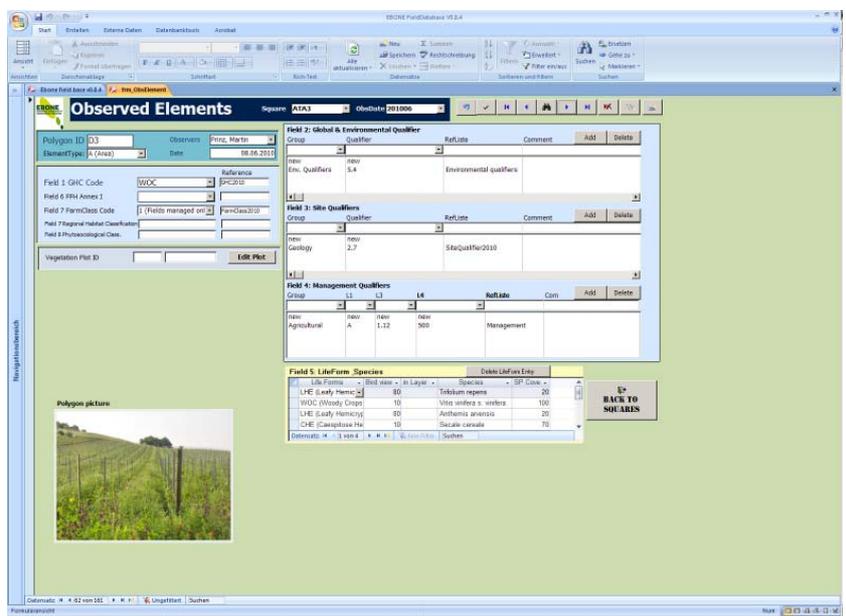


Figure 3 – Habitat mapping tool on a tablet computer using GHCs. The observed habitat is a vineyard (Wooded Crop (WOC) with grass undergrowth). The element is identified by code, GPS position and photograph.

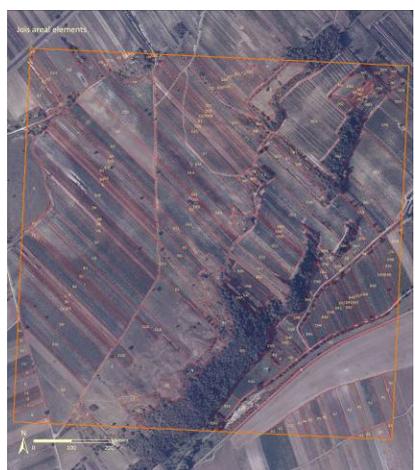


Figure 4 – Jois km square (Austria) with mapped areal features, both natural and agricultural

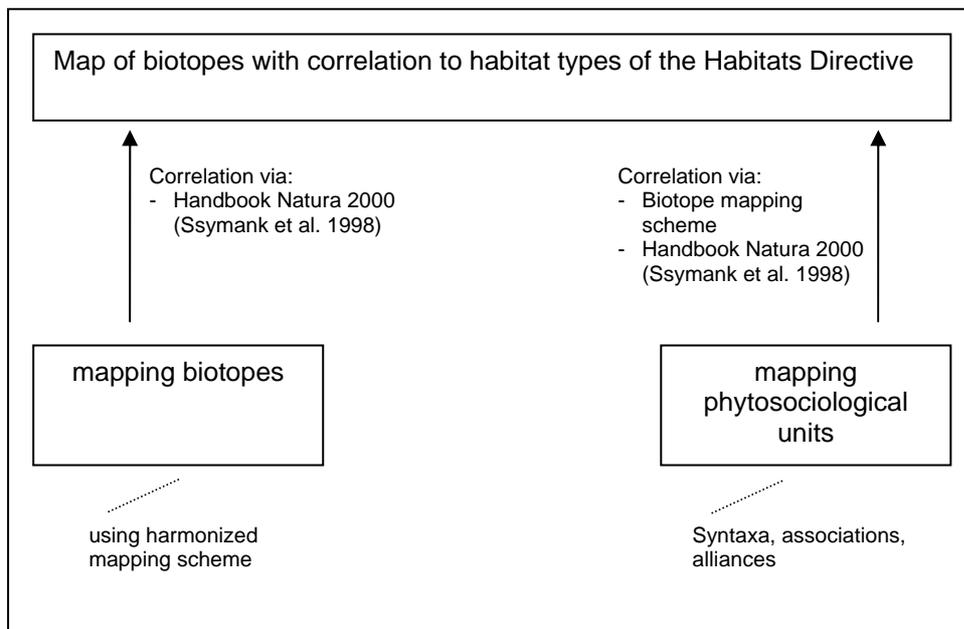
Use Case: status quo compilation of habitats and biotopes in a site of community interest (SCI) in Germany

The compilation of the status quo of habitats and biotopes in protected sites is very important for the management of these sites and also necessary for *impact regulation under nature protection law*. The scenario describes how mapping of German habitats and biotopes works. Data on the occurrence of biotopes are collected in the field. A biotope is an abstract habitat typifying an entire class of similar natural habitats whose ecological conditions offer living communities largely uniform circumstances different from those offered by other types. Biotopes are defined with reference to abiotic factors and biotic factors. Some 690 biotopes can be distinguished in Germany. Data on the occurrence of phytosociological vegetation are also collected.

Use Case Description	
Name	Mapping of habitats and biotopes in Germany
Priority	High
Description	The mapping of stock of biotopes in Germany is mostly harmonized in the 16 states. Each of it has its own mapping scheme (Biotopkartierung). There is also a German check list and red list of biotopes. The data are collected e.g. in a site of community interest (SCI). A local code list of the state is used to identify the special biotopes. Phytosociological mapping is done too.
Pre-condition	Harmonized standards for data collection
Flow of Events – User project planning/ implementation and appropriate assessment	
Step 1.	Mapping of biotopes in the protected site (using a special mapping scheme) → biotope-types
Step 2.	Mapping of phytosociological vegetation in the protected site (maybe in an other part of the site) → vegetation association
Step 3.	Giving additional information about the conservation status of the biotope types
Step 4.	Information about position and size of the biotope types
Step 5.	Correlation of the vegetation associations to biotope types (biotope-mapping-scheme) and to habitat types of the Habitats Directive (Ssymanck et al. 1998)
Step 6	For European comparison: correlation of the vegetation associations to alliances; after that correlation of the alliances and biotope-types to EUNIS Codes via Rodwell et al. 2002 and Riecken et al. 2006.
Step 7.	Quality assessment of the collected data. Digitalisation of the data and transfer to common database.
Post condition	The map of the status quo of habitats and biotopes in the protected site may be used for the planning of the management to improve the conservation status. Because of the harmonized mapping method, the result can be compared with a mapping e.g. 6 years later.
Data source: local data set	
Description	Data set created by a local institution or agency.
Data provider	Local institution / agency
Geographic scope	Germany
Thematic scope	Habitat mapping and surveillance
Scale, resolution	Different, 1:2500
Delivery	Several German institutions /agencies

Use Case Description	
Documentation	<p>Riecken, U., Finck, P., Raths, U., Schröder, E. & Ssymank, S. (2006): Rote Liste der gefährdeten Biotoptypen Deutschlands. – Naturschutz und Biologische Vielfalt 34. 318 S. ISBN: 987-3-7843-3934-4</p> <p>Ssymank, A., Hauke, U., Rückriem, C & Schröder, E. (1998): Das europäische Schutzgebietssystem Natura 2000. – Schriftenreihe für Landschaftspflege und Naturschutz 53. 558 S. ISBN: 3-89624-113-3</p> <p>Rodwell, J., S., Schaminée, J., H., J., Mucina, L., Pignatti, S., Dring, J & Moss, D. (2002): The Diversity of European Vegetation. An overview of phytosociological alliances and their relationships to EUNIS habitats. Wageningen, NL. EC-LNV. Report EC-LNV nr. 2002/054. 167 S. ISBN: 90-75789-10-6</p> <p>Biotope-mapping-schema example: http://www.naturschutz-fachinformationssysteme-nrw.de</p>

Diagram: Mapping habitats and biotopes in a protected site in Germany.



INSPIRE		Reference: D2.8.III.18_v2.0	
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page 70

Annex C (informative) Examples

This Annex provides examples of use metadata elements defined in Regulation 1205/2008/EC.

C.1 Examples on using metadata elements defined in Regulation 1205/2008/EC

C.1.1 Conformity

This metadata element will also allow data producers to report that a specific dataset fulfils INSPIRE requirements as well as obligations from particular legal regulation.

Conformity example:

```

<gmd:report>
  <gmd:DQ_DomainConsistency>
    <gmd:result>
      <gmd:DQ_ConformanceResult>
        <gmd:specification>
          <gmd:CI_Citation>
            <gmd:title>
              <gco:CharacterString>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</gco:CharacterString>
            </gmd:title>
            <gmd:date>
              <gmd:CI_Date>
                <gmd:date>
                  <gco>Date>2010-12-08</gco>Date>
                </gmd:date>
                <gmd:dateType>
                  <gmd:CI_DateTypeCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas/resources/Cod
elist/ML_gmxCodelists.xml#CI_DateTypeCode"
codeListValue="publication">publication</gmd:CI_DateTypeCode>
                  </gmd:dateType>
                </gmd:CI_Date>
              </gmd:date>
            </gmd:CI_Citation>
          </gmd:specification>
          <gmd:explanation>
            <gco:CharacterString>See the referenced specification</gco:CharacterString>
          </gmd:explanation>
          <gmd:pass>
            <gco:Boolean>>false</gco:Boolean>
          </gmd:pass>
        </gmd:DQ_ConformanceResult>
      </gmd:result>
    </gmd:DQ_DomainConsistency>
  </gmd:report>
<gmd:report>
  <gmd:DQ_DomainConsistency>
    <gmd:result>
      <gmd:DQ_ConformanceResult>
        <gmd:specification>

```

INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page 71

```

<gmd:CI_Citation>
  <gmd:title>
    <gco:CharacterString>Council Directive 92/43/EEC of 21 May 1992 on
the conservation of natural habitats and of wild fauna and flora</gco:CharacterString>
  </gmd:title>
  <gmd:date>
    <gmd:CI_Date>
      <gmd:date>
        <gco:Date>1992-05-02</gco:Date>
      </gmd:date>
      <gmd:dateType>
        <gmd:CI_DateTypeCode codeListValue="creation"
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas/resources/Cod
elist/ML_gmxCodelists.xml#CI_DateTypeCode">publication</gmd:CI_DateTypeCode>
      </gmd:dateType>
    </gmd:CI_Date>
  </gmd:date>
</gmd:CI_Citation>
</gmd:specification>
<gmd:explanation>
  <gco:CharacterString>See the referenced specification</gco:CharacterString>
</gmd:explanation>
<gmd:pass>
  <gco:Boolean>>false</gco:Boolean>
</gmd:pass>
</gmd:DQ_ConformanceResult>
</gmd:result>
</gmd:DQ_DomainConsistency>
</gmd:report>

```

C.1.2 Lineage

This metadata element will also allow data producers to report as well as data users to see what kind of transformation methodologies were used to transform local data to common INSPIRE structures, including description of the source data.

Example for Lineage element is available in Annex C

```

<gmd:lineage>
  <gmd:LI_Lineage>
    <gmd:statement>
      <gco:CharacterString>Source observation data has been aggregated to distribution
data using spatial operators buffer and intersect.</gco:CharacterString>
    </gmd:statement>
    <gmd:processStep>
      <gmd:LI_ProcessStep>
        <gmd:description>
          <gco:CharacterString>For the data transformation from local to the INSPIRE
model, the following methodology has been used: 1. Harmonization between the source and target
(INSPIRE) data model. 2. Semantic mapping of individual features and their attributes. 3. Additional
rules for data conversion, as data type conversions, data grouping, data concatenate, constants
definition. 4. Implementation of the transformation means completely automated crosswalk by means
of the application of some type of tool (Geoserver - Application schema extension and XML
MapForce)</gco:CharacterString>
        </gmd:description>
      </gmd:LI_ProcessStep>
    </gmd:processStep>
  </gmd:source>
  <gmd:LI_Source>
    <gmd:description>

```

INSPIRE	Reference: D2.8.III.18_v2.0		
TWG-HB	Data Specification on <i>Habitats and Biotopes</i>	2011-06-15	Page 72

<gco:CharacterString>Each sample within the source dataset was collected by selecting relevant areas of high biodiversity (selective biotope mapping) during the vegetation period (spring-autumn) reporting information on the habitat structure, the vegetation types and relevant plant species constituting the habitat. Animal species were added either as a result of observation during the mapping process or copied from specific species geo-data bases, if there was an observation within the past five years within the area (=occurrence).</gco:CharacterString>

</gmd:description>
</gmd:LI_Source>
</gmd:source>
</gmd:LI_Lineage>
</gmd:lineage>