
# Habitats and Biotopes Geodatabase Guide

Version 3.1

WP9 Data Management and Synthesis

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## 1. Introduction

CoCoNet is a European project that will produce guidelines to design, manage and monitor network of MPAs and Ocean Wind Farms. The Project covers a high number of Countries and involves researchers covering a vast array of subjects, developing a timely holistic approach and integrating the Mediterranean and Black Seas scientific communities through intense collective activities and a strong communication line with stakeholders and the public at large. Within this project we aim at providing a common framework for marine data management and final synthesis of the outcomes of different scientific topics from heterogeneous sources. An integrated Geodatabase and a WebGIS system will be the linking tool for all partners, regions and thematic research. It will involve the entire consortium at different levels in topics such as data provision and integration, GIS products, GIS interpretation, data archiving and data exchange. The work is organised around the following main objectives:

- assess the rules for data and metadata sharing between partners reviewing the existing common European protocols and standards (INSPIRE);
- design and implement data repositories (Marine Geodatabase) following the INSPIRE Directive, to store and retrieve the spatial data collected during the lifespan of the project for the Mediterranean and Black Sea areas and for the pilot study areas;
- develop the COCONET WebGIS to integrate the multi scale GIS layers derived from all regions going towards an integrated management of the marine resources;
- develop an analytical and evaluative framework for designing, managing and monitoring regional networks of MPAs, including wind farms, centred on science-based guidelines, criteria, concepts and models.

The CoCoNet project produced the architecture of ten Geodatabases storing data about the major themes starting from the INSPIRE Directive: Protected sites, Habitats and Biotopes, Threats, Geology, Biodiversity, Offshore Wind Farms, Elevation, Maritime Units, Oceanography, Socioeconomics.

The final goal will be to deliver digital maps of networks of marine protected areas and offshore wind farms as final synthesis of the outcome from all scientific topics. The integrated Geodatabase will be a fundament tool to produce the guidelines to design, manage and monitor network of MPAs, and an enriched wind atlas for both the Mediterranean and the Black Seas. The Project will identify groups of putatively interconnected MPAs in the Mediterranean and the Black Seas, shifting from local (single MPA) to regional (Networks of MPAs) and basin (network of networks) scales. The identification of physical and biological connections with clear the processes that govern patterns of biodiversity distribution. This will enhance policies of effective environmental management, also to ascertain if the existing MPAs are sufficient for ecological networking and to suggest how to design further protection schemes based on effective exchanges between protected areas.

## 2. Geodatabase design

The INSPIRE data model is the conceptual model which the Elevation Geodatabase is inspired. The logic model is built in Microsoft Visio 2007 using ESRI classes. The physical model is a ESRI File Geodatabase, with

Feature Classes, Object Classes, Domains, Subtypes, Relationship Classes, Feature Dataset and RasterCatalogs.

Feature Class: a collection of geographic features with the same geometry type (such as point, line, or polygon), the same attributes, and the same spatial reference. Feature classes can be stored in geodatabases, shapefiles, coverages, or other data formats. Feature classes allow homogeneous features to be grouped into a single unit for data storage purposes. For example, highways, primary roads, and secondary roads can be grouped into a line feature class named "roads." In a geodatabase, feature classes can also store annotation and dimensions

Object Class: In a geodatabase, a collection of nonspatial data of the same type or class. While spatial objects (features) are stored in feature classes in a geodatabase, nonspatial objects are stored in object classes.

Relationship Class: An item in the geodatabase that stores information about a relationship. A relationship class is visible as an item in the ArcCatalog tree or contents view.

Domains: The range of valid values for a particular metadata element.

Code Value Domain: A type of attribute domain that defines a set of permissible values for an attribute in a geodatabase. A coded value domain consists of a code and its equivalent value. For example, for a road feature class, the numbers 1, 2, and 3 might correspond to three types of road surface: gravel, asphalt, and concrete. Codes are stored in a geodatabase, and corresponding values appear in an attribute table.

Subtype: In geodatabases, a subset of features in a feature class or objects in a table that share the same attributes. For example, the streets in a streets feature class could be categorized into three subtypes: local streets, collector streets, and arterial streets. Creating subtypes can be more efficient than creating many feature classes or tables in a geodatabase.

Feature Dataset: In ArcGIS, a collection of feature classes stored together that share the same spatial reference; that is, they share a coordinate system, and their features fall within a common geographic area. Feature classes with different geometry types may be stored in a feature dataset.

Raster Catalog: A collection of raster datasets defined in a table of any format, in which the records define the individual raster datasets that are included in the catalog. Raster catalogs can be used to display adjacent or overlapping raster datasets without having to mosaic them together into one large file (http://support.esri.com/en/knowledgebase/GISDictionary/term/object%20class).

The Habitats and Biotopes Geodatabase can store spatial data (vector, grid and raster) and nonspatial data (.dbf).

The Habitats and Biotopes Geodatabase is available as .xml file. To use it in ArcGIS, create an empty File Geodatabase and import the .xml file.

## 3. Geodatabase architecture

The Habitats and Biotopes Geodatabase consists of two Feature Dataset, the first one named Habitats is used to store vector data (HabitatPoint, HabitatLine, HabitatArea), the second one named SamplingFeatures is used to store vector data (Station, Transect, SurveyArea). Lastly, in the Geodatabase

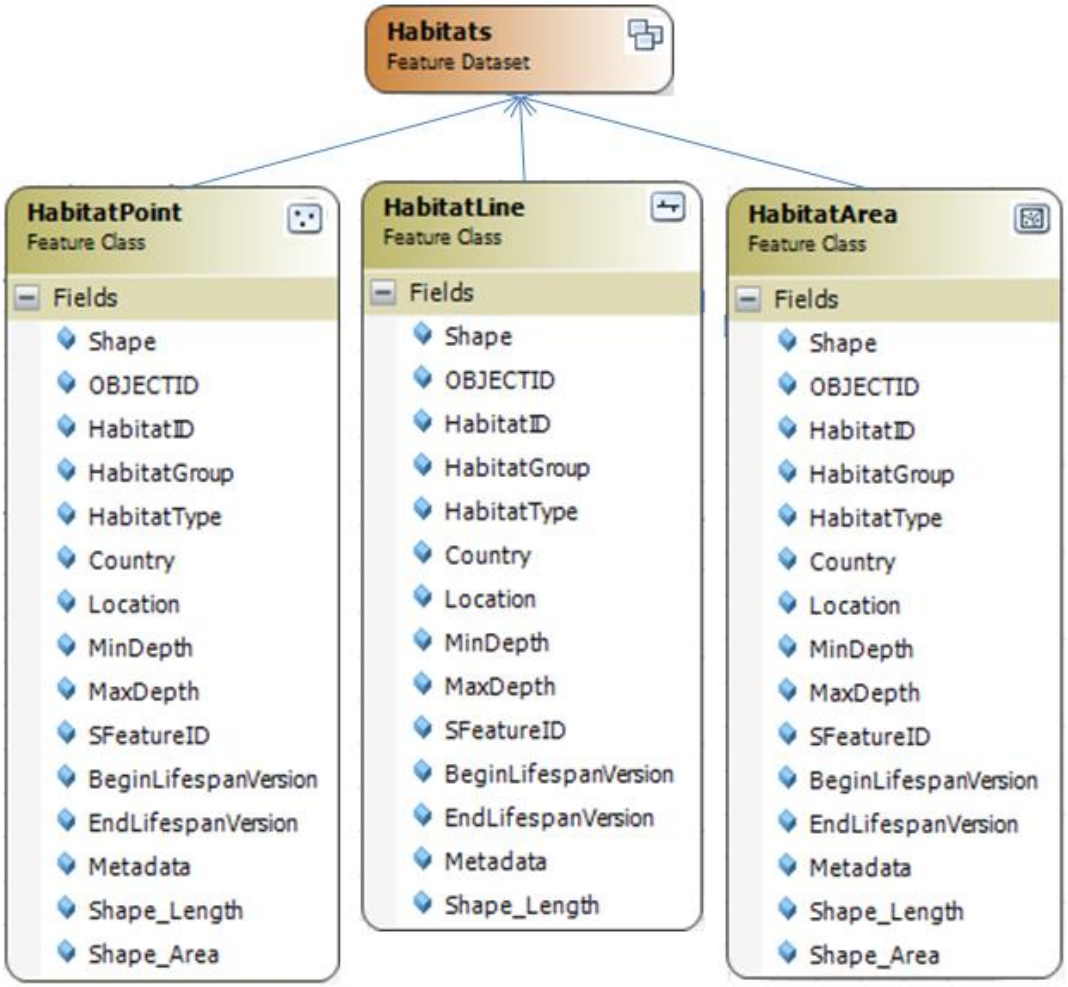
there are four tables: HabitatSpeciesType, HabitatTypeCoverType, RelatedParty and SourceMethodType. The tables are linked to the Feature Classes though Relationship Classes. Domains and Subtypes are present In the Feature Classes and in the Object Classes.

### 3.1. Feature Dataset– Habitats

Geographical areas characterized by specific ecological conditions, processes, structure, and functions that physically support the organisms that live there. A Habitat area (HabitatArea), line (HabitatLine) or point (HabitatPoint) may comprise one or more HabitatTypesCoverTypes according to one or more habitat classification schemes, often depending on the data capture process or related to the scale of a map. So a habitat feature might represent a complex of different HabitatTypesCoverTypes (INSPIRE Directive, r4618). The Feature Dataset consists of three Feature Classes:

- HabitatPoint
- HabitatLine
- HabitatArea

GeometryType: abstract



### 3.1.1. Feature Class: HabitatPoint

Geographical areas characterized by specific ecological conditions, processes, structure, and functions that physically support the organisms that live there (INSPIRE Directive, r4618). This Feature Class collect punctual data.

GeometryType: Point

| Field | Type | Restriction | Description |
|---|---|---|---|
| HabitatID | String | None | Identification string of the punctual habitat object. |
| HabitatGroup | String | Code Value Domain | Large group the object belongs, for example Seagrass or BiogenicHabitat |
| HabitatType | String | | Description of the habitat |
| Country | String | Code Value Domain | Country that have the sovereign on the EEZ where the habitat is located |
| Location | String | None | Description of the location where the habitat is located. |
| MinDepth | Double | None | Minimal depth where the habitat is located in this point. Or the water depth in the point of the sighting when the range along the column is not available |
| MaxDepth | Double | None | Maximal depth where the habitat is located in this point. |
| SFeatureID | String | None | Identification string of the sampling feature related to the punctual data |
| BeginLifespanVersion | Date | None | Date at which this version of the spatial object was inserted or changed in the spatial data set (INSPIRE Directive, r4618) |
| EndLifespanVersion | Date | None | Date at which this version of the spatial object was superseded or retired in the spatial data set (INSPIRE Directive, r4618) |
| Metadata | String | None | Name of the metadata file available in the SeaDataNet repository |

Note 1: the ID fields have to be unique in the entire Geodatabase

### 3.1.2. Feature Class: HabitatLine

Geographical areas characterized by specific ecological conditions, processes, structure, and functions that physically support the organisms that live there (INSPIRE Directive, r4618). This Feature Class collect linear data.

GeometryType: Polyline

| Field | Type | Restriction | Description |
|---|---|---|---|
| HabitatID | String | None | Identification string of the linear habitat object |
| HabitatGroup | String | Code Value Domain | Large group the object belongs, for example Seagrass or BiogenicHabitat |
| HabitatType | String | | Description of the habitat |
| Country | String | Code Value Domain | Country that have the sovereign on the EEZ where the habitat is located |
| Location | String | None | Description of the location where the habitat is located |
| MinDepth | Double | None | Minimal depth where the habitat is located along the line. Or the water depth in the point of the sighting when the |

| | | | |
|---|---|---|---|
| | | | range along the column is not available |
| MaxDepth | Double | None | Maximal depth where the habitat is located along the line |
| SFeatureID | String | None | Identification string of the sampling feature related to the linear data |
| BeginLifespanVersion | Date | None | Date at which this version of the spatial object was inserted or changed in the spatial data set (INSPIRE Directive, r4618) |
| EndLifespanVersion | Date | None | Date at which this version of the spatial object was superseded or retired in the spatial data set (INSPIRE Directive, r4618) |
| Metadata | String | None | Name of the metadata file available in the SeaDataNet repository |

### 3.1.3. Feature Class: HabitatArea

Geographical areas characterized by specific ecological conditions, processes, structure, and functions that physically support the organisms that live there (INSPIRE Directive, r4618). This Feature Class collect areal data.

GeometryType: Polygon

| Field | Type | Restriction | Description |
|---|---|---|---|
| HabitatID | String | None | Identification string of the areal habitat object |
| HabitatGroup | String | Code Value Domain | Large group the object belongs, for example Seagrass or BiogenicHabitat |
| HabitatType | String | | Description of the habitat |
| Country | String | Code Value Domain | Country that have the sovereign on the EEZ where the habitat is located |
| Location | String | None | Description of the location where the habitat is located |
| MinDepth | Double | None | Minimal depth where the habitat is located in the area. Or the water depth in the point of the sighting when the range along the column is not available |
| MaxDepth | Double | None | Maximal depth where the habitat is located in the area |
| SFeatureID | String | None | Identification string of the sampling feature related to the areal data |
| BeginLifespanVersion | Date | None | Date at which this version of the spatial object was inserted or changed in the spatial data set (INSPIRE Directive, r4618) |
| EndLifespanVersion | Date | None | Date at which this version of the spatial object was superseded or retired in the spatial data set (INSPIRE Directive, r4618) |
| Metadata | String | None | Name of the metadata file available in the SeaDataNet repository |

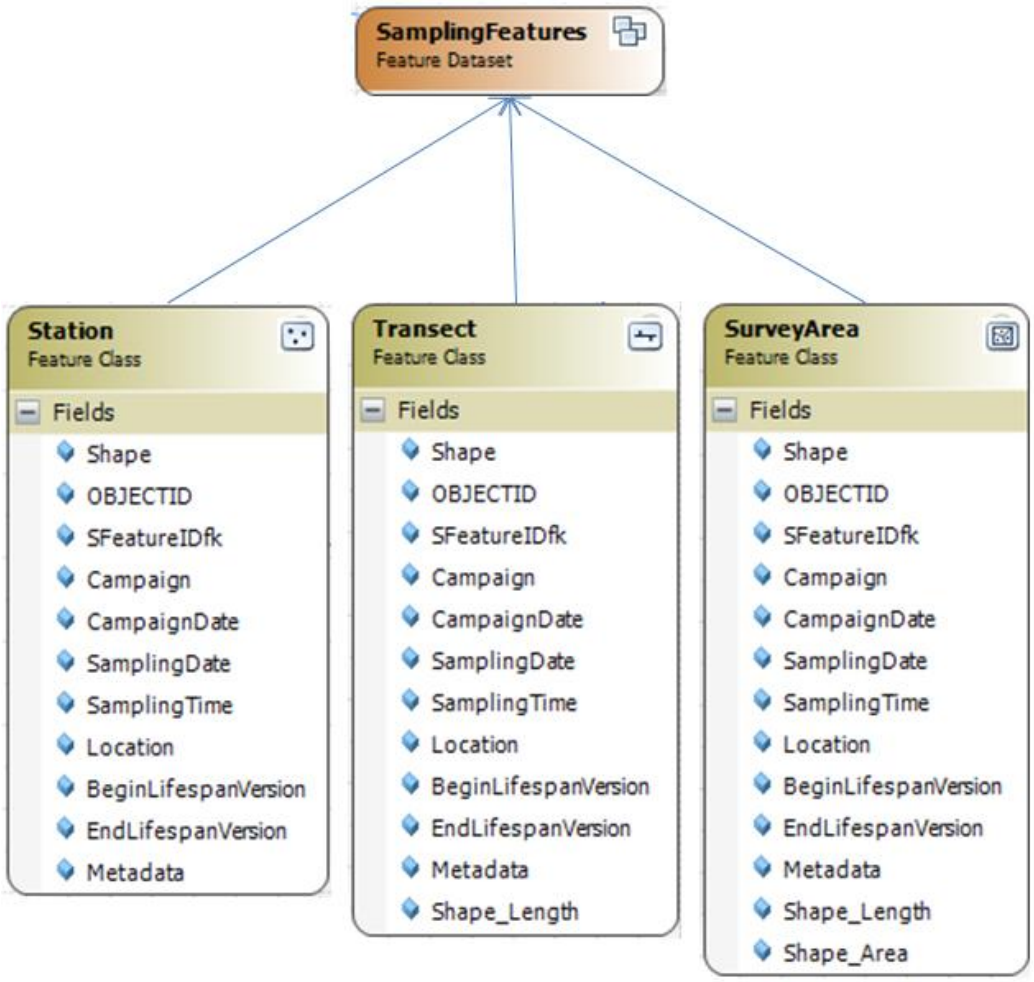
## 3.2. Feature Dataset: SamplingFeatures

Features used in the sampling, they can be points in case of punctual sampling (Station), polylines in case of linear sampling (Transect) or areas (SurveyArea) when we take into account the area of the entire survey. The Feature Dataset consists of three Feature Classes:

- Station

- Transect
- SurveyArea

GeometryType: abstract




### 3.2.1. Feature Class: Station

Station of a punctual sample.

GeometryType: Point

| Field | Type | Restriction | Description |
|---|---|---|---|
| SFeatureID | String | None | Identification string of the sampling feature |
| Campaign | String | None | Name of the survey for collecting data |
| CampaignDate | Integer | None | Year in which the campaign was carried out |
| SamplingDate | Date | None | Date in with the sampling was carried out |
| SamplingTime | String | hh:mm | Time at which the sampling was carried out |
| Location | String | None | Description of the location in which the sampling was carried out |
| BeginLifespanVersion | Date | None | Date at which this version of the spatial object was inserted or changed in the spatial data set (INSPIRE Directive, r4618) |
| EndLifespanVersion | Date | None | Date at which this version of the spatial object was superseded or retired in the spatial data set (INSPIRE |

| | | | |
|---|---|---|---|
| | | | Directive, r4618) |
| Metadata | String | None | Name of the metadata file available in the SeaDataNet repository |

### 3.2.2. Feature Class: Transect

A usually straight line along which measurements or observations are made at regular intervals.

GeometryType: Polyline

| Field | Type | Restriction | Description |
|---|---|---|---|
| SFeatureID | String | None | Identification string of the sampling feature |
| Campaign | String | None | Name of the survey for collecting data |
| CampaignDate | Integer | None | Year in which the campaign was carried out |
| SamplingDate | Date | None | Date in with the sampling was carried out |
| SamplingTime | String | hh:mm | Time at which the sampling was carried out |
| Location | String | None | Description of the location in which the sampling was carried out |
| BeginLifespanVersion | Date | None | Date at which this version of the spatial object was inserted or changed in the spatial data set (INSPIRE Directive, r4618) |
| EndLifespanVersion | Date | None | Date at which this version of the spatial object was superseded or retired in the spatial data set (INSPIRE Directive, r4618) |
| Metadata | String | None | Name of the metadata file available in the SeaDataNet repository |

### 3.2.3. Feature Class: SurveyArea

Area of the entire survey. We can use this information to derive absence data.

GeometryType: Polygon

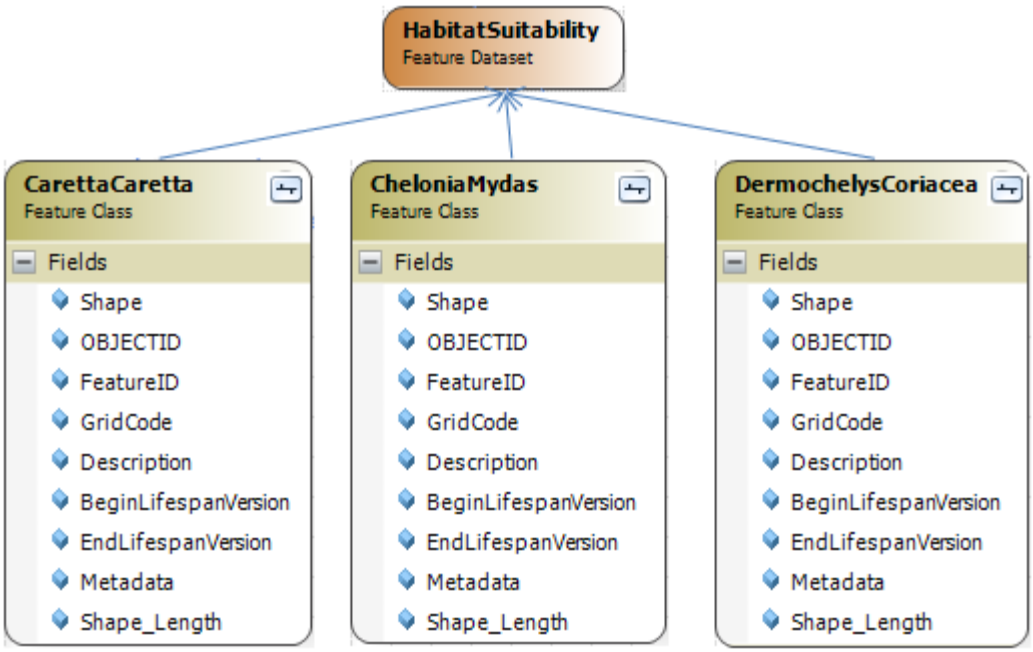
| Field | Type | Restriction | Description |
|---|---|---|---|
| SFeatureID | String | None | Identification string of the sampling feature |
| Campaign | String | None | Name of the survey for collecting data |
| CampaignDate | Integer | None | Year in which the campaign was carried out |
| SamplingDate | Date | None | Date in with the sampling was carried out |
| SamplingTime | String | hh:mm | Time at which the sampling was carried out |
| Location | String | None | Description of the location in which the sampling was carried out |
| BeginLifespanVersion | Date | None | Date at which this version of the spatial object was inserted or changed in the spatial data set (INSPIRE Directive, r4618) |
| EndLifespanVersion | Date | None | Date at which this version of the spatial object was superseded or retired in the spatial data set (INSPIRE Directive, r4618) |
| Metadata | String | None | Name of the metadata file available in the SeaDataNet repository |

## 3.3. Feature Dataset: HabitatSuitability

The Feature Dataset collects all the Feature Classes about the habitat suitability models:

- CarettaCaretta
- CheloniaMydis
- DermochelysCoriacea

GeometryType: abstract




### 3.3.1. Feature Class: CarettaCaretta

Spatial distributions of nesting habitat under current climatic conditions for the turtle *Caretta caretta* derived from species information criteria and maximum entropy modeling (STATE OF THE WORLD'S SEA TURTLES, SWOT).

GeometryType: Polyline

| Field | Type | Restriction | Description |
|---|---|---|---|
| FeatureID | String | None | Identification string of the feature |
| GridCode | Integer | None | Code used in the legend to set colors, each code matches with a description in the field “Description” (1,2,3,4) |
| Description | String | CodeValue Domain | Type of presence of the species along the coast (marginal, moderate, good, excellent) |
| BeginLifespanVersion | Date | None | Date at which this version of the spatial object was inserted or changed in the spatial data set (INSPIRE Directive, r4618) |
| EndLifespanVersion | Date | None | Date at which this version of the spatial object was superseded or retired in the spatial data set (INSPIRE Directive, r4618) |
| Metadata | String | None | Name of the metadata file available in the SeaDataNet repository |

### 3.3.2. Feature Class: CheloniaMydas

Spatial distributions of nesting habitat under current climatic conditions for the turtle *Chelonia Mydas* derived from species information criteria and maximum entropy modeling (STATE OF THE WORLD'S SEA TURTLES, SWOT).

GeometryType: Polyline

| Field | Type | Restriction | Description |
|---|---|---|---|
| FeatureID | String | None | Identification string of the feature |
| GridCode | Integer | None | Code used in the legend to set colors, each code matches with a description in the field “Description” (1,2,3,4) |
| Description | String | CodeValue Domain | Type of presence of the species along the coast (marginal, moderate, good, excellent) |
| BeginLifespanVersion | Date | None | Date at which this version of the spatial object was inserted or changed in the spatial data set (INSPIRE Directive, r4618) |
| EndLifespanVersion | Date | None | Date at which this version of the spatial object was superseded or retired in the spatial data set (INSPIRE Directive, r4618) |
| Metadata | String | None | Name of the metadata file available in the SeaDataNet repository |

### 3.3.3. Feature Class: DermochelysCoriacea

Spatial distributions of nesting habitat under current climatic conditions for the turtle *Dermochelys Coriacea* derived from species information criteria and maximum entropy modeling (STATE OF THE WORLD'S SEA TURTLES, SWOT).

GeometryType: Polyline

| Field | Type | Restriction | Description |
|---|---|---|---|
| FeatureID | String | None | Identification string of the feature |
| GridCode | Integer | None | Code used in the legend to set colors, each code matches with a description in the field “Description” (1,2,3,4) |
| Description | String | CodeValue Domain | Type of presence of the species along the coast (marginal, moderate, good, excellent) |
| BeginLifespanVersion | Date | None | Date at which this version of the spatial object was inserted or changed in the spatial data set (INSPIRE Directive, r4618) |
| EndLifespanVersion | Date | None | Date at which this version of the spatial object was superseded or retired in the spatial data set (INSPIRE Directive, r4618) |
| Metadata | String | None | Name of the metadata file available in the SeaDataNet repository |

## 3.4. RasterCatalog: HabitatSuitabilityModelCatalog

Raster catalog that stores and manages raster mosaics representing habitat suitability models.

GeometryType: polygon

| Field | Type | Restriction | Description |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Name | String | None | Name of the mosaic |
| RasterID | String | None | Identification string of the mosaic |
| Variable | String | None | Represented variable |
| BeginLifespanVersion | Date | None | Date at which this version of the spatial object was inserted or changed in the spatial data set (INSPIRE Directive, r4618) |
| EndLifespanVersion | Date | None | Date at which this version of the spatial object was superseded or retired in the spatial data set (INSPIRE Directive, r4618) |
| Metadata | String | None | Name of the metadata file available in the SeaDataNet repository. |
| Raster | Raster | None | Image of the mosaic |

## 3.5. Object Classes

### 3.5.1. Object Class: HabitatTypeCoverType

Habitat type according to an international, national or local habitat classifications scheme (INSPIRE Directive, r4618).

| Field | Type | Restriction | Description |
|---|---|---|---|
| habitatIDfk | String | None | Identification string of the habitat object. The field is used as foreign key (fk) |
| ReferenceHabitatTypeScheme | String | Code Value Domain | Reference list defining a nomenclatural and taxonomical standard to which all local species names and taxonomic concepts shall be mapped to (INSPIRE Directive, r4618) |
| ReferenceHabitatTypeID | String | None | Identifier of one of the reference lists given by the referenceSpeciesScheme (INSPIRE Directive, r4618) |
| ReferenceHabitatTypeName | String | None | Name of the habitat type according to one Pan-European classification scheme (INSPIRE Directive, r4618) |
| SubstrateType | String | Code Value Domain | Type of substrate (e.g. Hard, Mobile) |
| Substrate | String | None | Substrate |
| Representativity | String | Code Value Domain | (A.a) of Annex III. Degree of representativity of the natural habitat type on the site (NATURA 2000 form: Explanatory Notes 1) |
| ConservationStatus | String | Code Value Domain | A.c) of Annex III. Degree of conservation of the structure and functions of the natural habitat type concerned. and restoration possibilities site (NATURA 2000 form: Explanatory Notes 1) |

### 3.5.2. Object Class: HabitatSpeciesType

Species which occurs in a certain habitat at the time of mapping (INSPIRE Directive, r4618).

| Field | Type | Restriction | Description |
|---|---|---|---|
| habitatIDfk | String | None | Identification string of the habitat object. The field is used as foreign key (fk) |
| ReferenceSpeciesScheme | String | Code Value | Reference list defining a nomenclatural and |

| | | | |
|---|---|---|---|
| | | Domain<br><br>Initial value: WoRMS | taxonomical standard to which all local species names and taxonomic concepts shall be mapped to. In the framework of the CoCoNet project we decided to use the WoRMS classification |
| ReferenceSpeciesID | String | None | Identifier of one of the reference lists given by the ReferenceSpeciesScheme |
| ReferenceSpeciesName | String | None | Name of the species of one of the reference lists given by the ReferenceSpeciesScheme |
| Kingdom | String | None | Taxonomy of the species of one of the reference lists given by the ReferenceSpeciesScheme |
| Phylum | String | None | Taxonomy of the species of one of the reference lists given by the ReferenceSpeciesScheme |
| Class | String | None | Taxonomy of the species of one of the reference lists given by the ReferenceSpeciesScheme |
| Order_ | String | None | Taxonomy of the species of one of the reference lists given by the ReferenceSpeciesScheme |
| Family | String | None | Taxonomy of the species of one of the reference lists given by the ReferenceSpeciesScheme |
| Genus | String | None | Taxonomy of the species of one of the reference lists given by the ReferenceSpeciesScheme |
| Species | String | None | Taxonomy of the species of one of the reference lists given by the ReferenceSpeciesScheme |
| Author | String | None | Author of the species of one of the reference lists given by the ReferenceSpeciesScheme |
| ResearchYear | Integer | None | Year in which the research is carried out |
| Description | String | None | Description of the species/community |
| Note_ | String | None | Some notes about species |

### 3.5.3. Object Class: SourceMethodType

Contains metadata about specific instances of elevation object. Refers to the methods on how observations have been made or recorded (INSPIRE Directive, r4618).

| Campo | Tipo | Limitazioni | Definizione |
|---|---|---|---|
| ObjectIDfk | String | None | Identification string of the elevation object. The field is used as foreign key |
| MethodScheme | String | None | Scheme used to compiling the Method Value field (Article17SourceMethodValue or GeneralSourceMethod) (INSPIRE Directive, r4618) |
| MethodValue | String | None | Method by which the data on elevation object is collected (INSPIRE Directive, r4618) |
| MethodReference | String | None | A reference to a description of the method by which the data on elevation object is collected (INSPIRE Directive, r4618) |
| SourceDatabase | String | None | Name of the database where the elevation object data is retrieved from (INSPIRE Directive, r4618) |

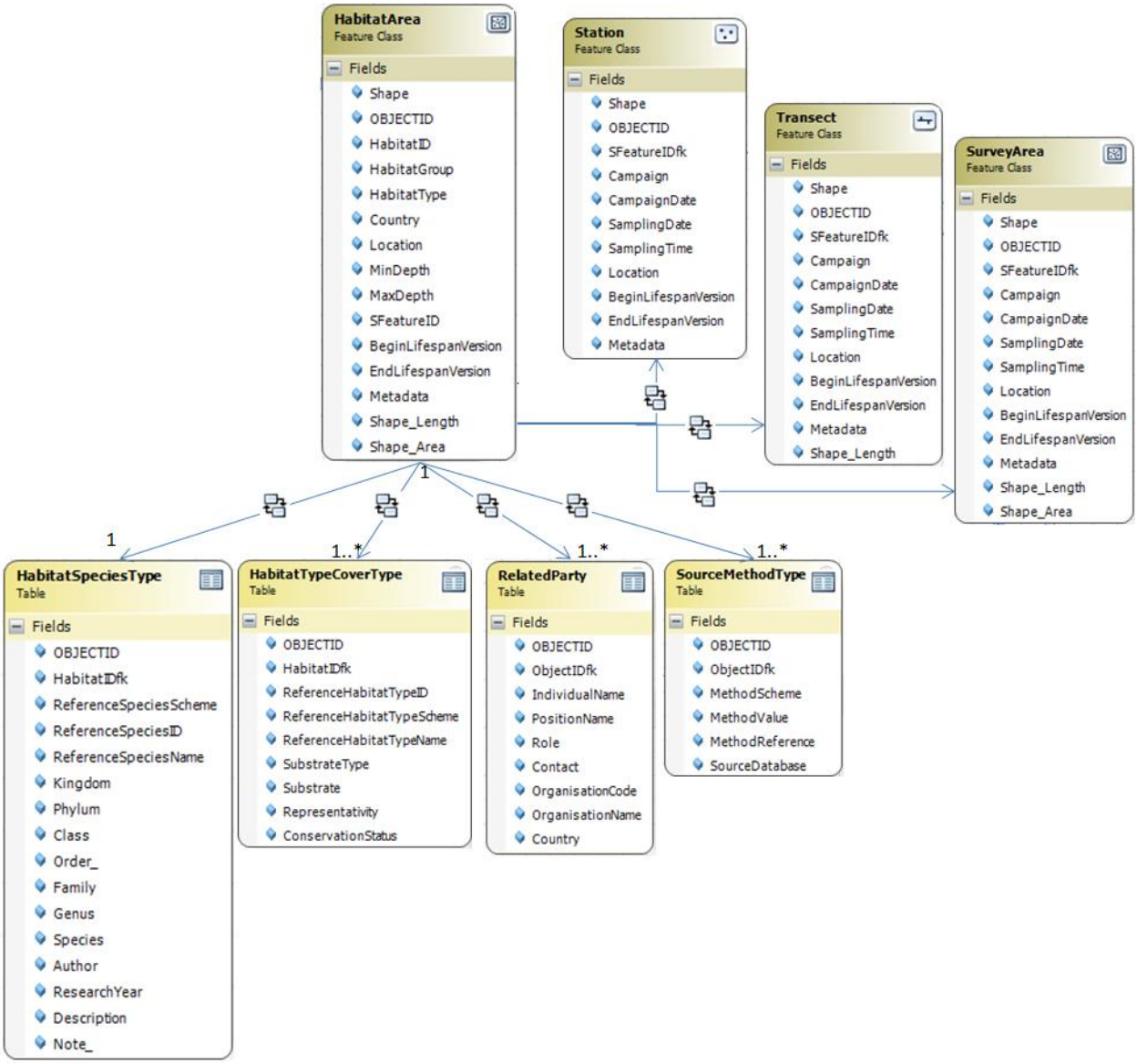
### 3.5.4. Object Class: RelatedParty

An organization or a person with a role related to a re source (INSPIRE Directive, r4618).

| Campo | Tipo | Limitazioni | Definizione |
|---|---|---|---|
| ObjectIDfk | String | None | Identification string of the elevation object. The field is used |

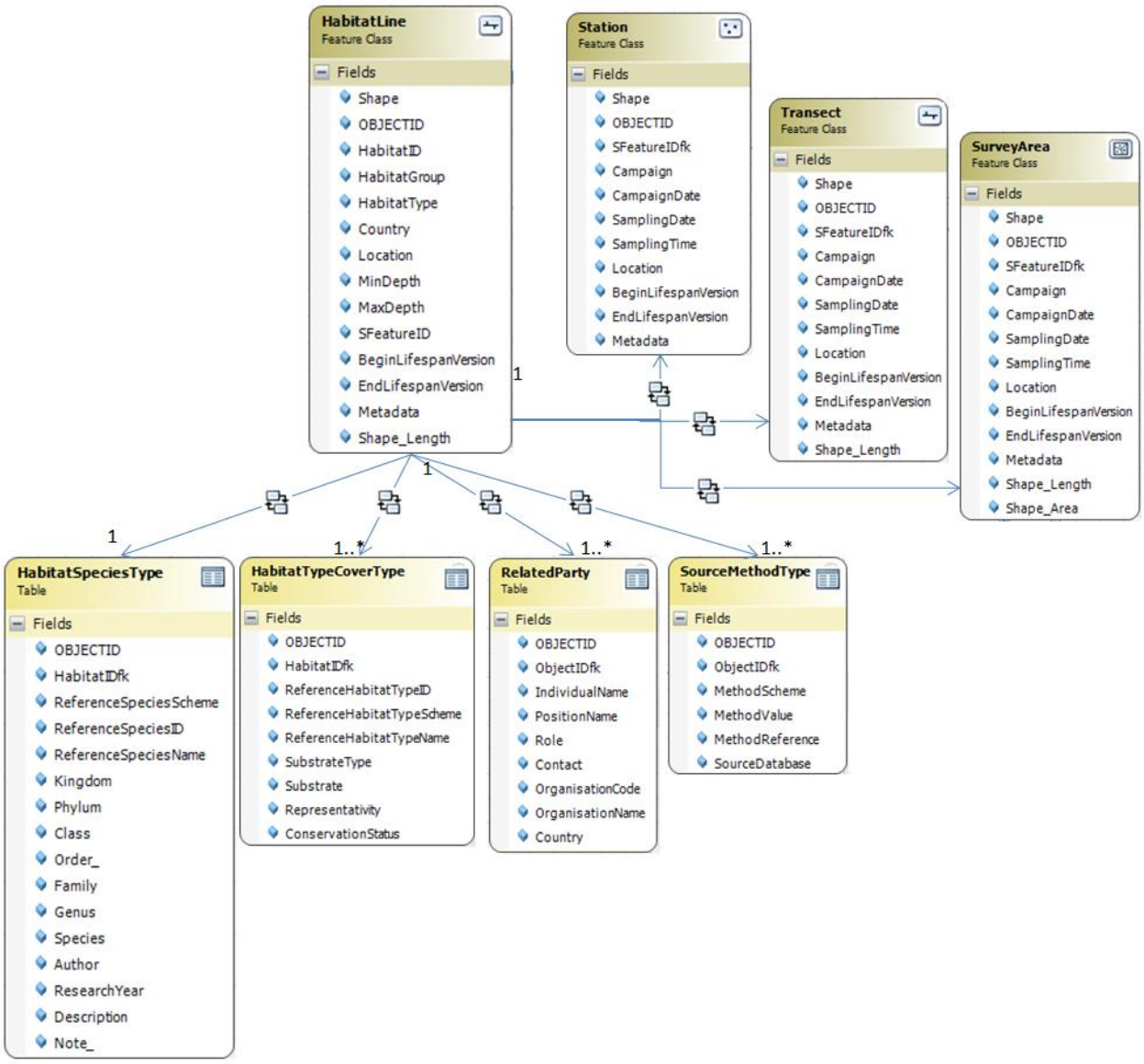
| | | | |
|---|---|---|---|
| | | | as foreign key |
| IndividualName | String | None | Name of the related party (INSPIRE Directive, r4618) |
| PositionName | String | None | Position of the party in relation to a resource, such as head of department (INSPIRE Directive, r4618) |
| Role | String | Code Value Domain | Role(s) of the party in relation to a resource, such as owner (INSPIRE Directive, r4618) |
| Contact | String | None | Contact information for the related party (INSPIRE Directive, r4618) |
| OrganizationCode | String | None | Code of the related organization (INSPIRE Directive, r4618) |
| OrganizationName | String | None | Name of the related organization (INSPIRE Directive, r4618) |
| Country | String | Code Value Domain | Country of the related organization (INSPIRE Directive, r4618) |

### 3.6. Relationship Classes



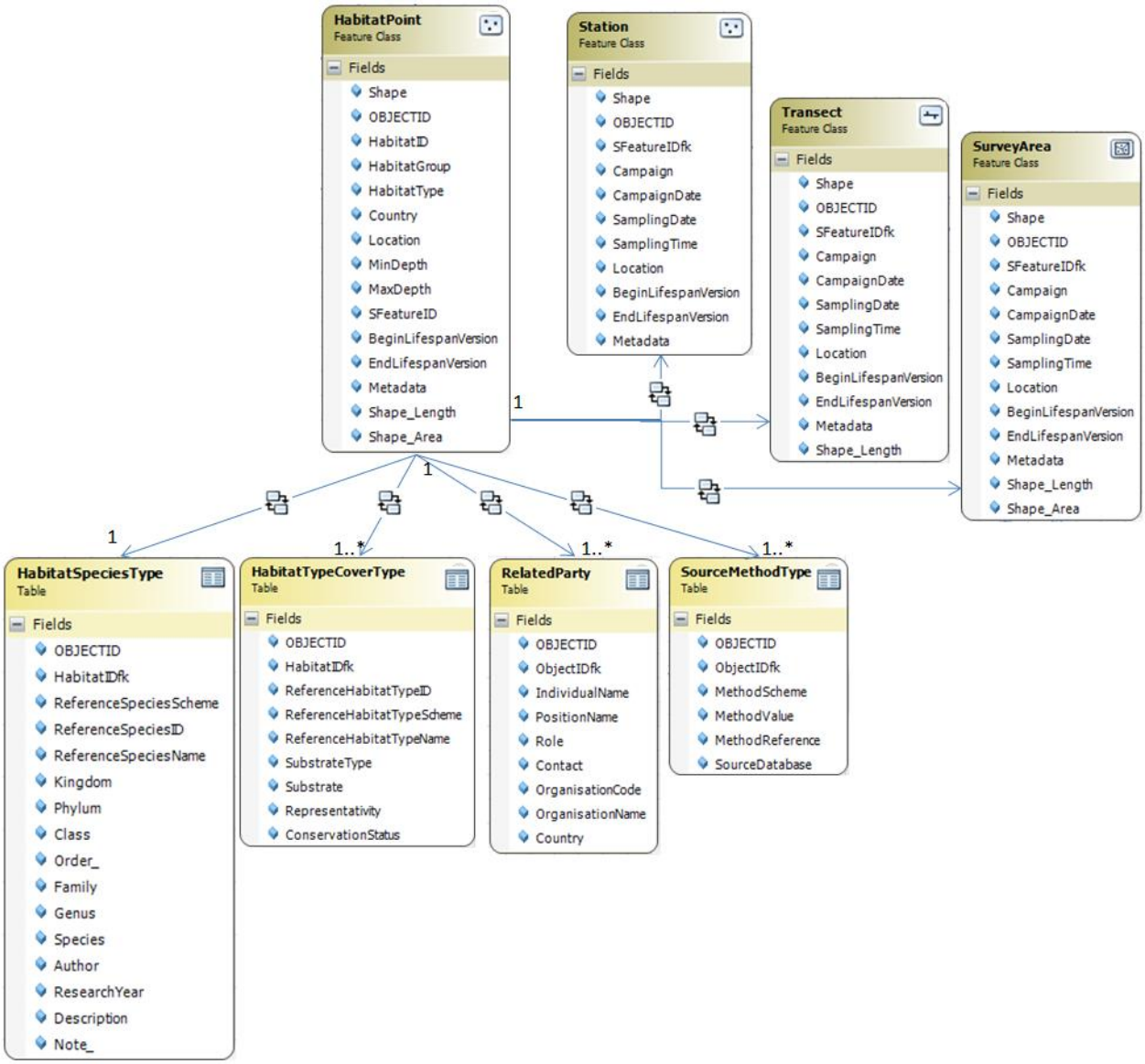

| Name | Multiplicity | Origin class | Destination class | Primarykey | Foreignkey |
|---|---|---|---|---|---|
| HabitatAreaHas | 1→1 | HabitatArea | HabitatTypeCoverType | HabitatID | HabitatIDfk |

| | | | | | |
|---|---|---|---|---|---|
| HabitatTypeCoverType | | | | | |
| HabitatAreaHas HabitatSpeciesType | 1→1 | HabitatArea | HabitatSpeciesType | HabitatID | HabitatIDfk |
| HabitatAreaHas SourceMethdoType | 1→1..* | HabitatArea | SourceMethodType | HabitatID | ObjectIDfk |
| HabitatAreaHas RelatedParty | 1→1..* | HabitatArea | RelatedParty | HabitatID | ObjectIDfk |
| HabitatAreaHas Station | 1→1..* | HabitatArea | Station | HabitatID | HabitatIDfk |
| HabitatAreaHas Transect | 1→1..* | HabitatArea | Transect | HabitatID | HabitatIDfk |
| HabitatAreaHas SurveyArea | 1→1 | HabitatArea | SurveyArea | HabitatID | HabitatIDfk |



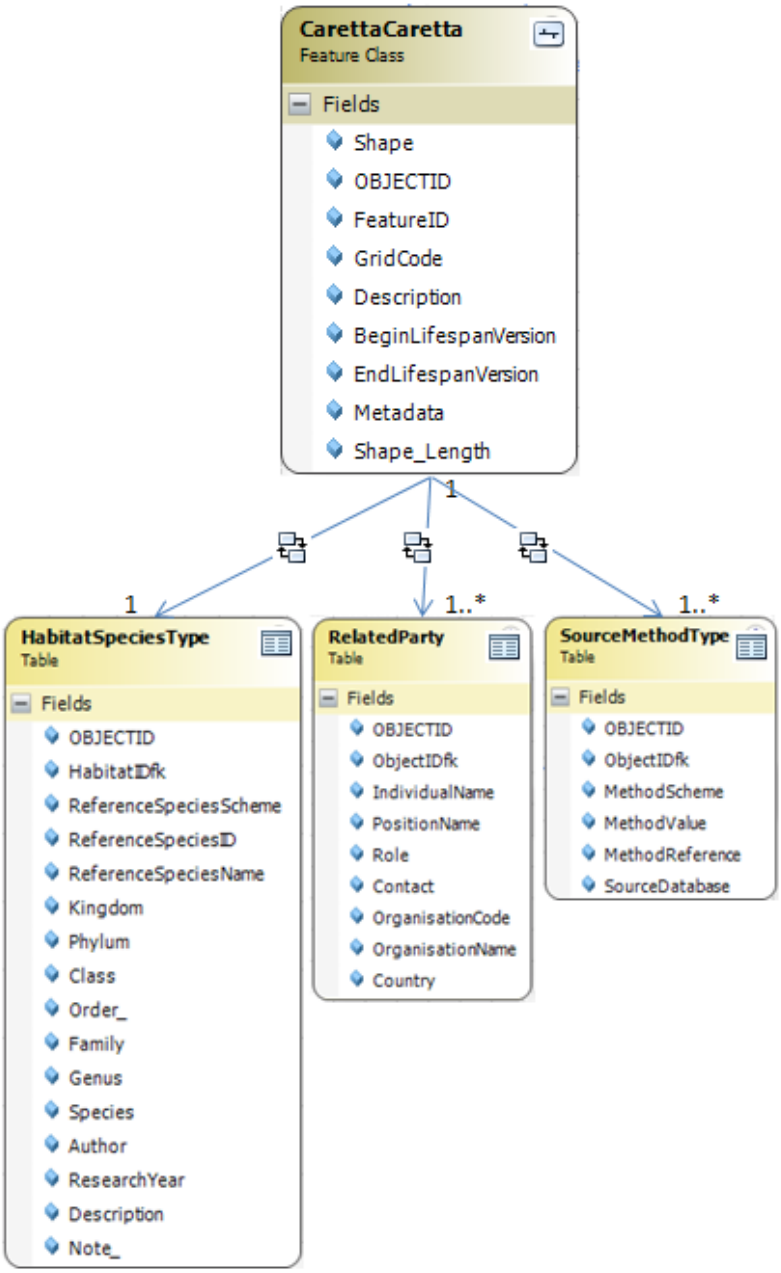

| Name | Multiplicity | Origin class | Destination class | Primary key | Foreign key |
|---|---|---|---|---|---|
| HabitatLineHas HabitatTypeCoverType | 1→1 | HabitatLine | HabitatTypeCoverType | HabitatID | HabitatIDfk |
| HabitatLineHas | 1→1 | HabitatLine | HabitatSpeciesType | HabitatID | HabitatIDfk |

| | | | | | |
|---|---|---|---|---|---|
| HabitatSpeciesType | | | | | |
| HabitatLineHas SourceMethdoType | 1→1..* | HabitatLine | SourceMethodType | HabitatID | ObjectIDfk |
| HabitatLineHas RelatedParty | 1→1..* | HabitatLine | RelatedParty | HabitatID | ObjectIDfk |
| HabitatLineHasStation | 1→1..* | HabitatLine | Station | HabitatID | HabitatIDfk |
| HabitatLineHasTransect | 1→1..* | HabitatLine | Transect | HabitatID | HabitatIDfk |
| HabitatLineHasSurveyArea | 1→1 | HabitatLine | SurveyArea | HabitatID | HabitatIDfk |

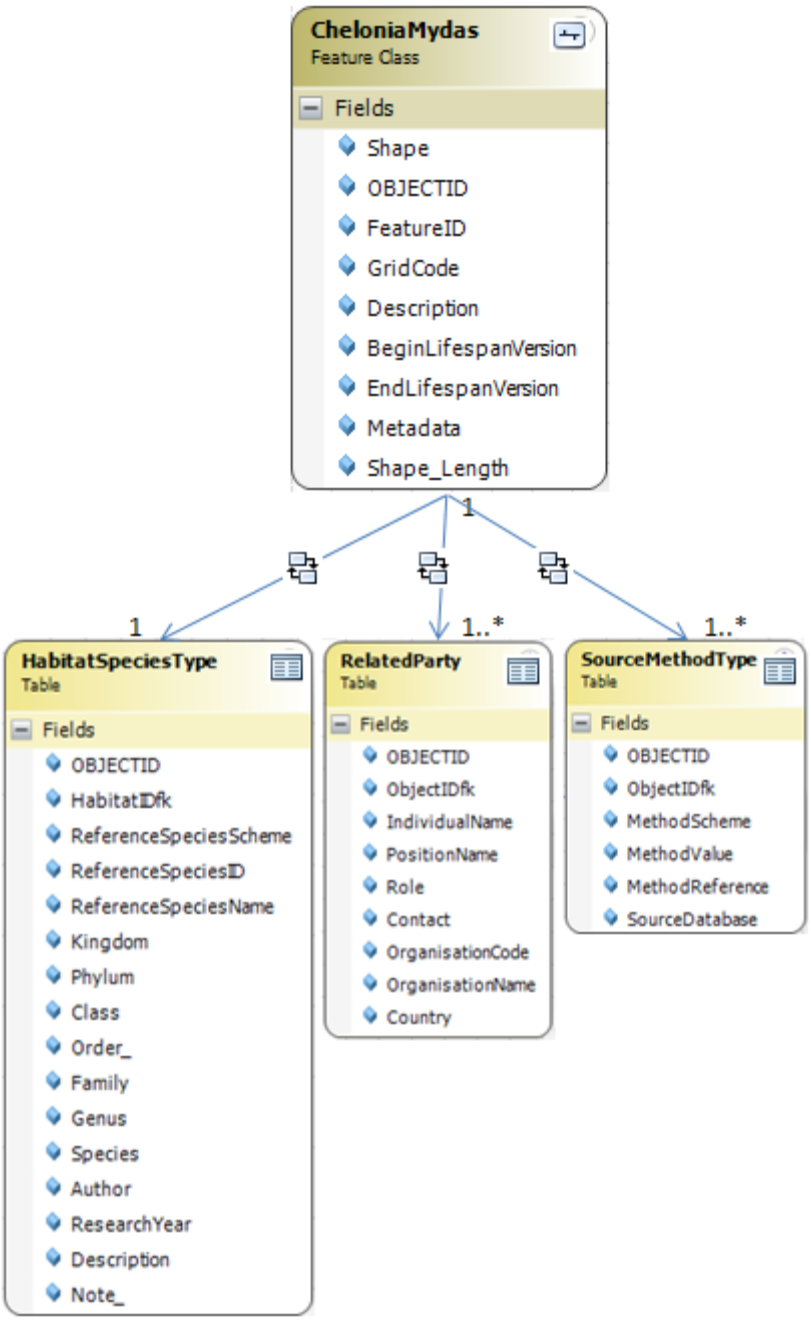



| Name | Multiplicity | Origin class | Destination class | Primary key | Foreign key |
|---|---|---|---|---|---|
| HabitatPointHas HabitatTypeCoverType | 1→1 | HabitatPoint | HabitatTypeCoverType | HabitatID | HabitatIDfk |
| HabitatPointHas HabitatSpeciesType | 1→1 | HabitatPoint | HabitatSpeciesType | HabitatID | HabitatIDfk |
| HabitatPointHas SourceMethdoType | 1→1..* | HabitatPoint | SourceMethodType | HabitatID | ObjectIDfk |
| HabitatPointHas RelatedParty | 1→1..* | HabitatPoint | RelatedParty | HabitatID | ObjectIDfk |

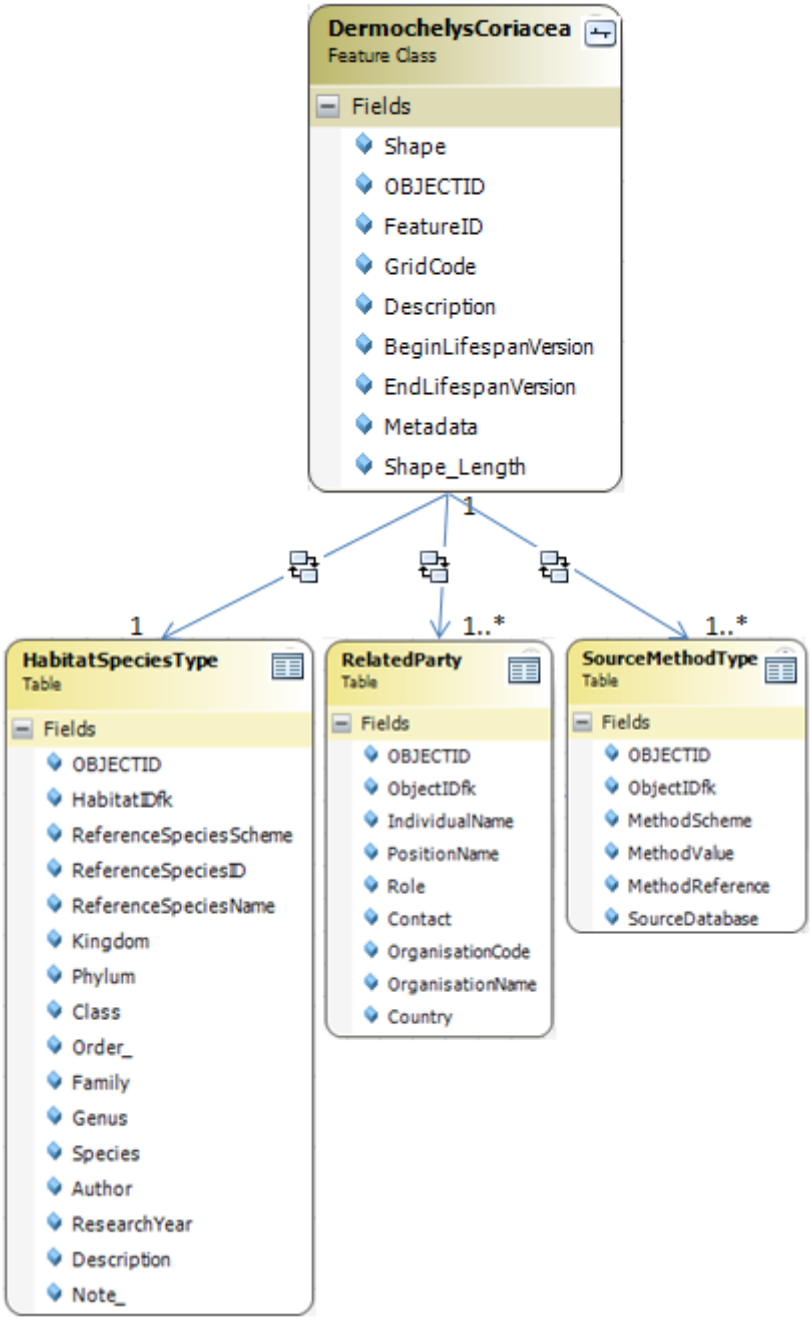
| | | | | | |
|---|---|---|---|---|---|
| HabitatPointHas Station | 1→1..* | HabitatPoint | Station | HabitatID | HabitatIDfk |
| HabitatPointHas Transect | 1→1..* | HabitatPoint | Transect | HabitatID | HabitatIDfk |
| HabitatPointHas SurveyArea | 1→1 | HabitatPoint | SurveyArea | HabitatID | HabitatIDfk |



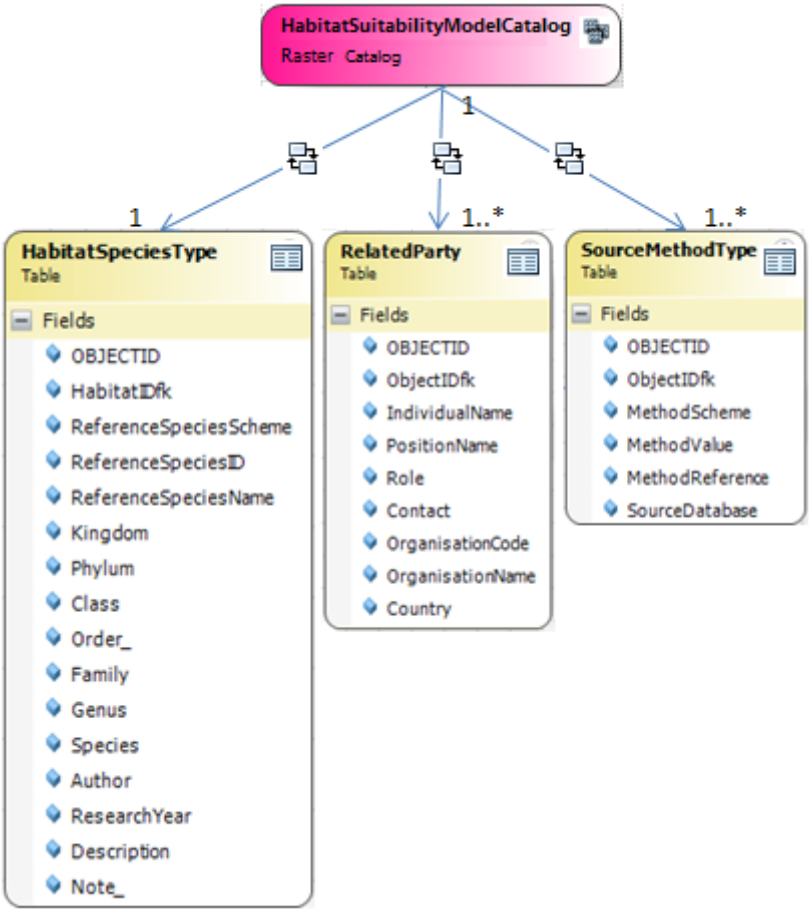

| Name | Multiplicity | Origin class | Destination class | Primary key | Foreign key |
|---|---|---|---|---|---|
| CarettaCaretta Has HabitatSpeciesType | 1→1 | CarettaCaretta | HabitatSpeciesType | Metadata | HabitatIDfk |
| CarettaCaretta Has SourceMethdoType | 1→1..* | CarettaCaretta | SourceMethodType | Metadata | ObjectIDfk |
| CarettaCaretta Has RelatedParty | 1→1..* | CarettaCaretta | RelatedParty | Metadata | ObjectIDfk |




| Name | Multiplicity | Origin class | Destination class | Primary key | Foreign key |
|---|---|---|---|---|---|
| CheloniaMydisHas HabitatSpeciesType | 1→1 | CheloniaMydis | HabitatSpeciesType | Metadata | HabitatIDfk |
| CheloniaMydisHas SourceMethdoType | 1→1..* | CheloniaMydis | SourceMethodType | Metadata | ObjectIDfk |
| CheloniaMydisHas RelatedParty | 1→1..* | CheloniaMydis | RelatedParty | Metadata | ObjectIDfk |




| Name | Multiplicity | Origin class | Destination class | Primary key | Foreign key |
|---|---|---|---|---|---|
| DermochelysCoriaceaHas HabitatSpeciesType | 1→1 | Dermochelys Coriacea | HabitatSpeciesType | Metadata | HabitatIDfk |
| DermochelysCoriaceaHas SourceMethdoType | 1→1..* | Dermochelys Coriacea | SourceMethodType | Metadata | ObjectIDfk |
| DermochelysCoriaceaHas RelatedParty | 1→1..* | Dermochelys Coriacea | RelatedParty | Metadata | ObjectIDfk |




| Name | Multiplicity | Origin class | Destination class | Primary key | Foreign key |
|---|---|---|---|---|---|
| HabitatSuitability ModelCatalog HasHabitatSpeciesType | 1→1 | HabitatSuitability ModelCatalog | HabitatSpeciesType | Metadata | HabitatIDfk |
| HabitatSuitability ModelCatalog HasSourceMethdoType | 1→1..* | HabitatSuitability ModelCatalog | SourceMethodType | Metadata | ObjectIDfk |
| HabitatSuitability ModelCatalog HasRelatedParty | 1→1..* | HabitatSuitability ModelCatalog | RelatedParty | Metadata | ObjectIDfk |

## 4. Metadata

In the framework of the CoCoNet project, metadata are produced by Mikado software. Each Feature Class and raster layer has a CDI (Common Data Index) accessible though the SeaDataNet portal (http://seadatanet.maris2.nl/v_cdi_v3/search.asp). The CDIs are also available on the webpage http://coconetgis.ismar.cnr.it/ as .xml files, grouped by Geodatabase. Lastly, the metadata file is linked to the feature or to the raster file though a field in the attribute table.

**ANNEX 1**

**Acronyms**

CDI – Common Data Index

FC – Feature Class

FD – Feature Dataset

OC - Object Class

fk – foreign key

**References**

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)

D2.8.III.18 Data Specification on Habitats and Biotopes – Technical Guidelines (D2.8.III.18_v3.0)

http://inspire.ec.europa.eu/data-model/approved/r4618-ir/html/

http://coconetgis.ismar.cnr.it/

http://seadatanet.maris2.nl/v_cdi_v3/search.asp

WoRMS Editorial Board (2015). World Register of Marine Species. Available from http://www.marinespecies.org at VLIZ. Accessed 2015-05-26

**ANNEX 2 – Domains**

**Article17SourceMethodValue_v3**

Type: Code Value Domain

Description: The methods that have been used in the sources for compiling the information about the occurrences of the habitats within an aggregation unit for article 17 purposes. Describes how the information about the occurrences of the habitats within a a unit has been compiled (INSPIRE Directive, r4618-ir)

| Value | Code | Definition |
|---|---|---|
| Absent data | absentData | Absent data (INSPIRE Directive, r4618-ir) |
| Complete survey | completeSurvey | Complete survey (INSPIRE Directive, r4618-ir) |
| Estimate expert | estimateExpert | Estimate based in expert opinion with no or minimal sampling (INSPIRE Directive, r4618-ir) |
| Estimate partial | estimatePartial | Estimate based on partial data with some extrapolation and/or modeling (INSPIRE Directive, r4618-ir) |

Created: 20/05/2015
Modified: none
Author: CNR-ISMAR
State: approved
Used in: SourceMethodType (OC)
Extensibility: none
Note 1: The values of the list are found here: http://circa.europa.eu/Public/irc/env/monnat/library?l=/habitats_reporting/reporting_2007-2012/reporting_guidelines/reporting-formats_1/_EN_1.0_&a=d (D2.8.II.1_v3.0)

**ConservationStatus_v3**

Type: Code Value Domain

Description: A.c) of Annex III. Degree of conservation of the structure and functions of the natural habitat type concerned. and restoration possibilities site (NATURA 2000 form: Explanatory Notes 1)

| Value | Code | Definition |
|---|---|---|
| Favourable | favourable | |
| Unfavourable-inadequate | unfavourable-uInadequate | |
| Unfavourable-bad | unfavourableBad | |
| Unknown | Unknown | |

Created: 20/05/2015
Modified: none
Author: CNR-ISMAR
State: approved
Used in: HabitatTypeCoverType (OC)
Extensibility: none
Note 1: The values of the list are found here: NATURA 2000 form: Explanatory Notes 1

**CountryCode_v3**

Type: Code Value Domain

Description: Country code as defined in the Interinstitutional style guide published by the Publications Office of the European Union (INSPIRE Directive, r4618-ir)

| Value | Code |
|---|---|
| Albania | AL |
| Algeria | ZD |

| | |
|---|---|
| Bosnia and Herzegovina | BA |
| Bulgaria | BG |
| Cyprus | CY |
| Croatia | HR |
| Egypt | EG |
| France | FR |
| Georgia | GE |
| Gibraltar | GI |
| Greece | EL |
| Israel | IL |
| Italy | IT |
| Lebanon | LB |
| Libya | LY |
| Malta | MT |
| Monaco | MC |
| Morocco | MA |
| Montenegro | ME |
| Romania | RO |
| Russia | RU |
| Slovenia | SI |
| Spain | ES |
| Syria | SY |
| Tunisia | TN |
| Turkey | TR |
| Ukraine | UA |
| United Kingdom | UK |

Created: 20/05/2015
Modified: none
Author: CNR-ISMAR
State: approved
Used in: RelatedParty (OC), HabitatPoint (FC), HabitatLine(FC), HabitatArea(FC)
Extensibility: none
Note 1: none

**GeneralSourceMethodValue_v3**

Type: Code Value Domain

Description: What are the methods that have been used in the sources for compiling the information about the elevation objects

| **Value** | **Code** | **Definition** |
|---|---|---|
| Collection examination | collectionExamination | Data collected from examinations of collections (INSPIRE Directive, r4618-ir) |
| Grid mapping | gridMapping | Data observations collected by systematic surveys in grid cells (INSPIRE Directive, r4618-ir) |
| Line sampling | lineSampling | Data collected by systematic surveys along linear transects (INSPIRE Directive, r4618-ir) |
| Literature examination | literatureExamination | Data collected from literature examinations like printed maps, tables (INSPIRE Directive, r4618-ir) |
| Prediction modeling | predictionModeling | Data from prediction modeling |
| Random | ramdomObservation | Data collected by randomly distributed (INSPIRE |

| | | |
|---|---|---|
| observation | | Directive, r4618-ir)collection/observation sites randomly outside a systematic survey (INSPIRE Directive, r4618-ir) |
| Remote sensing observation | remoteSensingObservation | Data collected by the Remote Sensing Observation method |
| Statistical sampling | statisticalSampling | Data collected on locations selected by statistical sampling methods (INSPIRE Directive, r4618-ir) |

Created: 20/05/2015
Modified: none
Author: CNR-ISMAR
State: approved
Used in: SourceMethodType (OC)
Extensibility: yes
Note 1: none

**HabitatGroup_v3**

Type: Code Value Domain

Description: categories of habitats

| Value | Code | Definition |
|---|---|---|
| Barren | barren | |
| Biogenic habitat | biogenicHabitat | |
| Canopy | canopy | |
| Deep-sea habitat | deepSeaHabitat | |
| Mosaic | mosaic | |
| Rocky subtidal | rockySubtidal | |
| Seagrass | seagrass | |
| Sublittoral sediment | sublittoralSediment | |
| Not applicable | notApplicable | |

Created: 20/05/2015
Modified: none
Author: CNR-ISMAR
State: approved
Used in: HabitatPoint (FC), HabitatLine(FC), HabitatArea(FC)
Extensibility: yes
Note 1: none

**DescriptionTypeHSM_v3**

Type: Code Value Domain

Description: presence of the species along the coast

| Value | Code | Definition |
|---|---|---|
| Marginal | 1 | |
| Moderate | 2 | |
| Good | 3 | |
| Excellent | 4 | |

Created: 11/03/2016
Modified: none
Author: CNR-ISMAR
State: approved
Used in: CarettaCaretta (FC), ChaloniaMydis (FC), DermochelysCoriacea (FC)
Extensibility: no

Note 1: the code value list comes from SWOT

**PartyRoleValue_v3**

Type: Code Value Domain

Description: Roles of parties related to or responsible for a resource (INSPIRE Directive, r4618-ir)

| Value | Code | Definition |
|---|---|---|
| Author | author | Author of the data (INSPIRE Directive, r4618-ir) |
| Custodian | custodian | Guardian or keeper responsible for maintaining data (INSPIRE Directive, r4618-ir) |
| Distributor | distributor | Person or organisation who distributes the data (INSPIRE Directive, r4618-ir) |
| Originator | originator | Responsible party who created the dataset or metadata (INSPIRE Directive, r4618-ir) |
| Owner | owner | Person who owns the data (INSPIRE Directive, r4618-ir) |
| Point of contact | pointOfContact | Responsible party who can be contacted for acquiring knowledge about or acquisition of the data (INSPIRE Directive, r4618-ir) |
| Principal investigator | principalInvestigator | Key person responsible for gathering information and conducting research (INSPIRE Directive, r4618-ir) |
| Processor | processor | Responsible party who has processed the data in a manner in which data has been modified (INSPIRE Directive, r4618-ir) |
| Publisher | publisher | Responsible party who published the data (INSPIRE Directive, r4618-ir) |
| Resource provider | resourceProvider | Party that supplies the data (INSPIRE Directive, r4618-ir) |
| User | user | Person who uses the data (INSPIRE Directive, r4618-ir) |

Created: 20/05/2015
Modified: none
Author: CNR-ISMAR
State: approved
Used in: RelatedParty (OC)
Extensibility: yes
Note 1: none

**ReferenceHabitatTypeSchemeValue_v3**

Type: Code Value Domain

Description: This value defines which pan-european habitat classification scheme has been used (INSPIRE Directive, r4618-ir)

| Value | Code | Definition |
|---|---|---|
| EUNIS | eunis | EUNIS habitat classification (INSPIRE Directive, r4618-ir) |
| Habitat Directive | habitatDirective | Habitat Directive Annex I habitats (INSPIRE Directive, r4618-ir) |
| Marine Strategy Framework Directive | marineStrategyFrameworkDirective | Marine Strategy Framework Directive, Annex III table 3 (INSPIRE Directive, r4618-ir) |
| Not applicable | notApplicable | The habitat in not present in any of the three previous classifications |

Created: 20/05/2015
Modified: none

Author: CNR-ISMAR
State: approved
Used in: HabitatTypeCoverType (OC)
Extensibility: none
Note 1: none

**ReferenceSpeciesSchemeValue_v3**

Type: Code Value Domain

Description: Reference lists defining a nomenclatural and taxonomical standard to which local names and taxonomic concepts can be mapped. The authorized ReferenceSpeciesScheme provides reference species list which defines the ReferenceSpeciesName with its scientific name plus author and ReferenceSpeciesId (INSPIRE Directive, r4618-ir)

| Value | Code | Definition |
|---|---|---|
| EuNomen | eunomen | Names and taxonomic concepts as defined by the Pan European Species Inventory, published by eunomen.eu/portal (INSPIRE Directive, r4618-ir) |
| EUNIS | eunis | Names and taxonomic concepts as defined by the EUNIS Species list (INSPIRE Directive, r4618-ir) |
| Nature Directives | natureDirectives | Names and taxonomic concepts as defined by the nature directives species list (INSPIRE Directive, r4618-ir) |
| WoRMS | worms | Names and taxonomic concepts as defined by the World Register of Marine Species (WoRMS Editorial Board (2015) |

Created: 20/05/2015
Modified: none
Author: CNR-ISMAR
State: approved
Used in: HabitatSpeciesType (OC)
Extensibility: none
Note 1: In the framework of the CoCoNet project we decided that the WoRMS register has the priority. It is always updated and it includes only the marine species.

**Representativity_v3**

Type: Code Value Domain

Description: (A.a) of Annex III. Degree of representativity of the natural habitat type on the site (NATURA 2000 form: Explanatory Notes 1).

| Value | Code | Definition |
|---|---|---|
| Excellent representativity | excellentRepresentativity | |
| Good representativity | goodRepresentativity | |
| Significant representativity | significantRepresentativity | |
| Non-significant presence | nonSignificantPresence | |

Created: 20/05/2015
Modified: none
Author: CNR-ISMAR
State: approved
Used in: HabitatTypeCoverType (OC)
Extensibility: none
Note 1: The values of the list are found here: NATURA 2000 form: Explanatory Notes 1.

**SubstrateTypeValue_v3**

Type: Code Value Domain

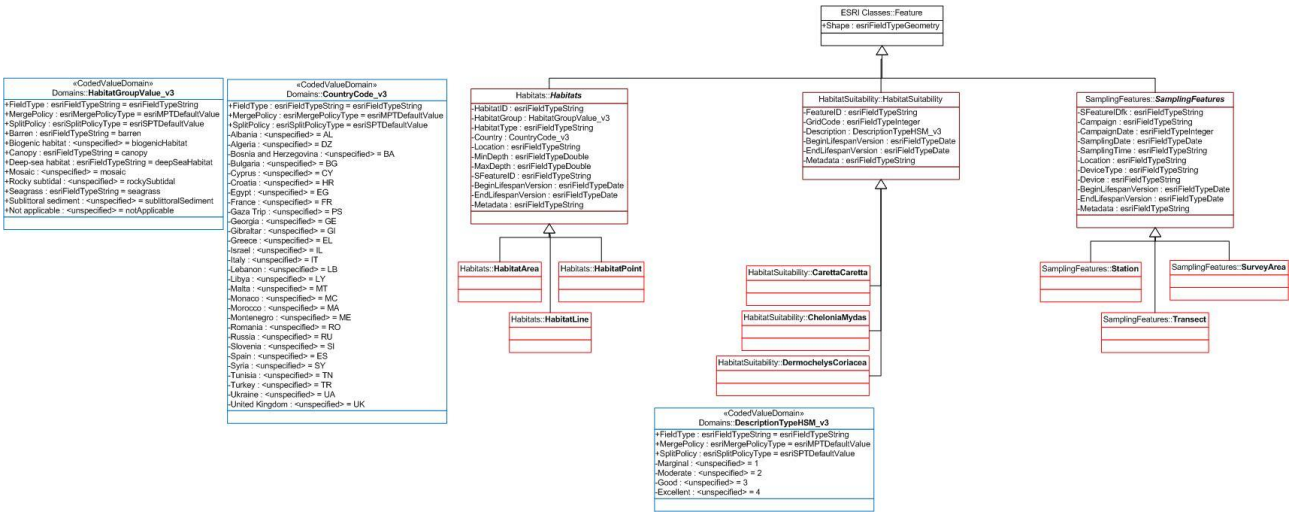
Description: type of substrate

| Value | Code | Definition |
|---|---|---|
| Hard | hard | |
| Mobile | mobile | |
| Mixed | mixed | |

Created: 20/05/2015
Modified: none
Author: CNR-ISMAR
State: approved
Used in: HabitatTypeCoverType (OC)
Extensibility: none
Note 1: none

## Annex 3 –UML diagram

### Feature classes

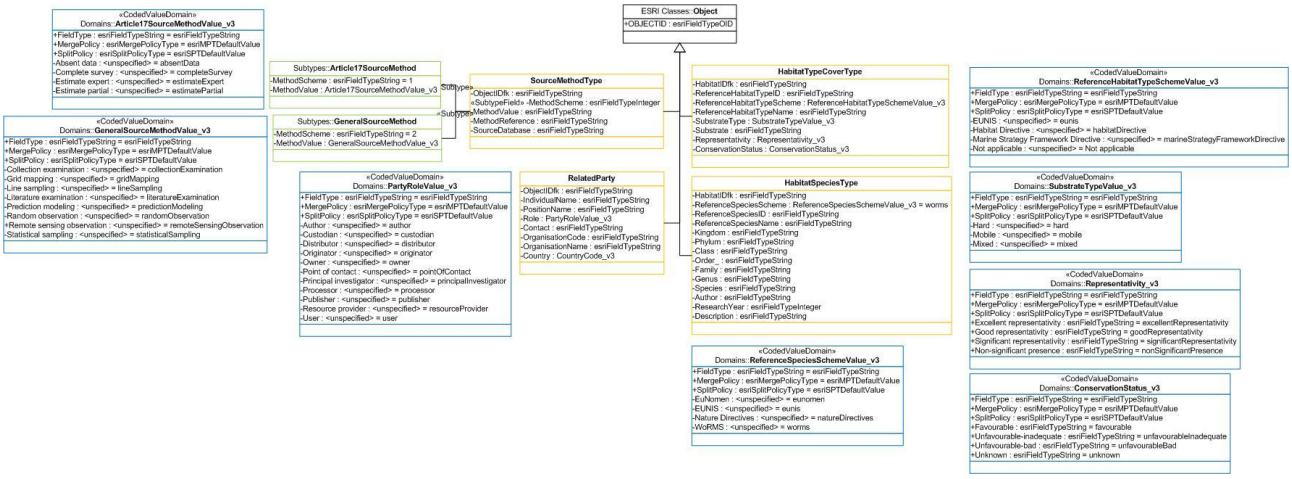



Feature Class (abstract): brown

Feature Class: red

Domain: blue

### Object classes

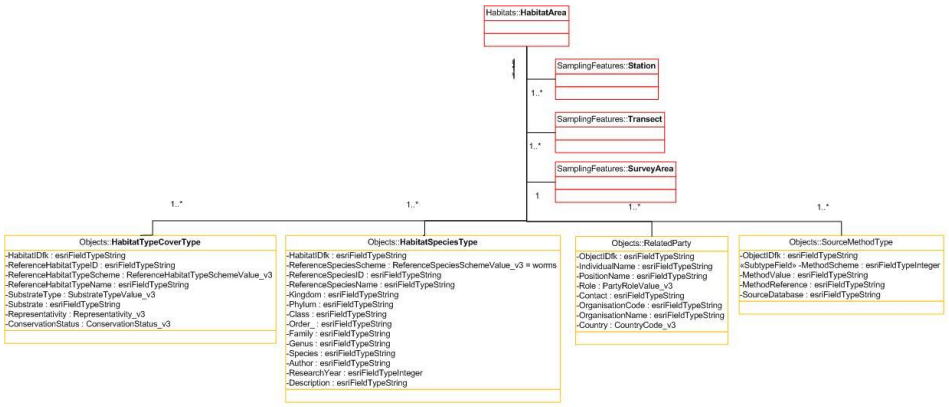


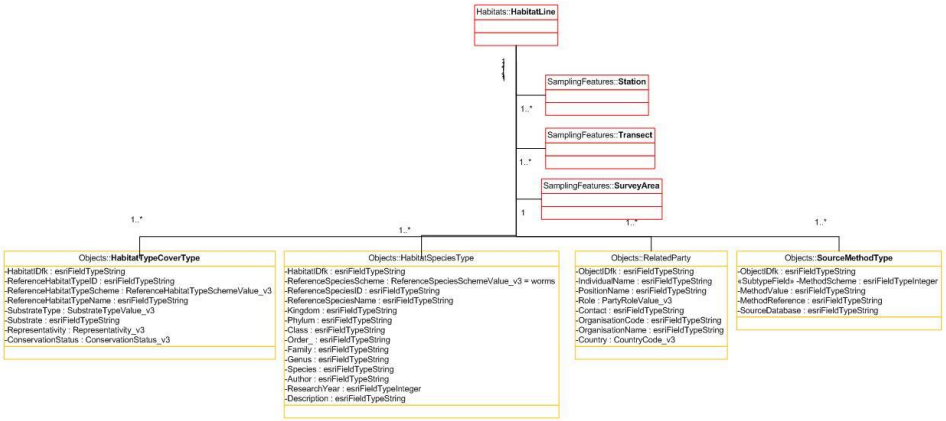

Object Class: orange

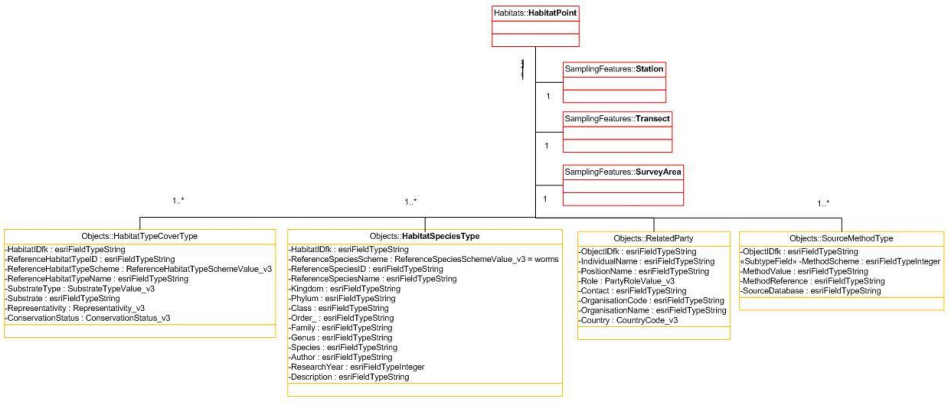
Subtype: green

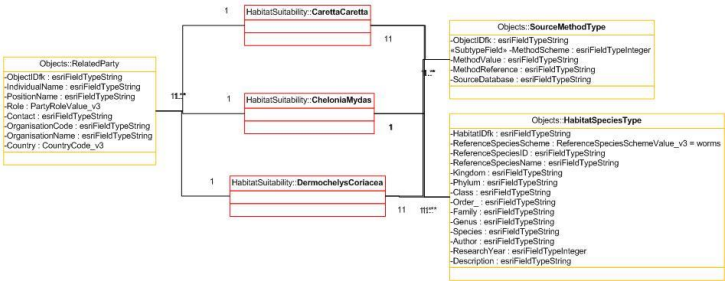
Domain: blue

## Relationship classes




Feature Class: red

Object Class: orange

**Annex 4 – Layer visualization**