INSPIRE
Infrastructure for Spatial Information in Europe

D2.8.III.11 Data Specification on Area management/restriction/regulation zones and reporting units – Draft Guidelines

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Foreword
How to read the document?

This document describes the *"INSPIRE data specification on Area management/restriction/regulation zones and reporting units – Guidelines"* version 2.0 as developed by the Thematic Working Group (TWG) *Area management/restriction/regulation zones and reporting units* 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 *Area management/restriction/regulation zones and reporting units* 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 *Area management/restriction/regulation zones and reporting units.*

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.

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 Directive[1] 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 technical[3] surveys, proposed experts for the Data Specification Drafting Team[4] and Thematic Working Groups[5].

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[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

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 Services[6] 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 Scope[7] 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 Model[8] 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 Specifications[9] 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 language[11].

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 schemas[12] developed for each spatial data theme. The multilingual INSPIRE Feature Concept Dictionary contains the definition

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[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)

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.

Area management/restriction/regulation zones and reporting units – Executive Summary

Definition of INSPIRE spatial data theme Area management/restriction/regulation zones and reporting units (theme AM) reflects the heterogeneous nature of the domains and topics that could be covered by this INSPIRE spatial data theme. The broadest scope could relate to diverse socio-economic activities, policies related to sustainable development, or environment. The INSPIRE Thematic Working Group "Area management/restriction/regulation zones and reporting units" (TWG AM) introduces two basic concepts of this spatial data theme: (1) the need for spatial information on areas where specific management, regulative or restriction regimes are established and (2) the way to provide the established reporting units. Both concepts are presented in two separate ways within the theme AM, but they share the following common characteristics:

(a) Environmental issues: The priority domain is focused on diverse environmental issues or issues of any human activity that can significantly influence the environment or is aimed directly at the protection or preservation of the environment. Environmental issues could be related to any of the basic environmental physical media, for example air, water, soil/land and biotic (living) components, or to the different states of the environment, for example with regard to quality or pollution.

(b) Legislative basis: The theme AM incorporates only those areas that have a specific legal characteristic which distinguishes them from the rest of the territory. The establishment of areas managed, regulated or used for reporting has to be defined by legislation that can be adopted at different levels, for example: international (international conventions), European, national and sub-national levels (for example regional and local legislation levels).

(c) Generic approach: The heterogeneity of the thematic topics, where some of them are directly mentioned in the definition of the theme AM in Annex III of the INSPIRE Directive, is supported by the generic model (generic approach) which provides important basic information and it can be easily used to exchange spatial data between different domains and public authorities. It could be further extended into specific thematic domains.

Two concepts of the theme AM are modelled within two separate application schemas:
- Area Management, Restriction and Regulation Zones application schema, and
- Reporting Units application schema.

The Area Management, Restriction and Regulation Zones application schema defines the specification for zones that have been established in accordance with specific legislative requirements to deliver the following environmental aims:
- Protect and improve environmental quality,
- Protect environmental and natural resources,
- Protect and control risk from natural and man-made hazards,
- Protect plant, animal and human health, and
- Control development/spatial planning.

The application schema can incorporate a wide range of zone types, thus the initial set of zones has been identified that fall within the scope of this theme, but it is not exhaustive and other types of zones can be added. Application schema also includes information about the responsible authority, management information, and information on the controlled activities that are performed within those zones.

The Reporting Units are seen as spatial objects that provide the spatial extent for related reporting information. Therefore, reporting units can be almost any spatial object from any INSPIRE Annex Theme. The Reporting Units application schema does not include the details about the spatial object types that form the reporting units. This responsibility is with the other INSPIRE Annex themes or thematic domains, which can directly include the attributes required for the reporting or can define application schema for spatial objects that do not correspond to any INSPIRE Annex theme. The Reporting Units application schema provides some other information about the reporting, for which the reporting units have been formed, such as reporting period, reporting obligation and reporting authority.

Theme AM has many interrelationships with other INSPIRE themes that arise from different situations, for example: when a complex thematic issue could be supported by many INSPIRE spatial data themes (in this case, the theme AM presents only one part in this complex topic) or when the same legal restriction or regulation is used in different INSPIRE themes (in this case, other INSPIRE themes might re-use the application model from theme AM), or when it is necessary to keep more different views on the same geographic/natural/abstract phenomena (where certain duplication is accepted).

This document also includes specific use cases which were used as the basis in the development process and illustrated examples describing how specific thematic topics fit to the application schemas in theme AM or how it is possible to extend the generic application schemas of the theme AM into more detailed specific thematic topics.

This version of the data specification includes open issues not resolved or harmonised during the current development and which require more attention, hopefully with the valuable feedback from the consultation and testing phase of draft data specifications of INSPIRE Directive Annex II and III spatial data themes.

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The Thematic Working Group Area management/restriction/regulation zones and reporting units (TWG-AM) included:
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Other contributors to the INSPIRE data specifications are the Drafting Team Data Specifications, the JRC data specifications team and the INSPIRE stakeholders - Spatial Data Interested Communities (SDICs) or Legally Mandated Organisations (LMOs).

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1 Scope

This document specifies a harmonised data specification for the spatial data theme *Area management/restriction/regulation zones and reporting units* 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 Area management/restriction/regulation zones and reporting units.

2.2 Informal description

Definition:
Areas managed, regulated or used for reporting at international, European, national, regional and local levels. Includes dumping sites, restricted areas around drinking water sources, nitrate-vulnerable zones, regulated fairways at sea or large inland waters, areas for the dumping of waste, noise restriction zones, prospecting and mining permit areas, river basin districts, relevant reporting units and coastal zone management areas. [Directive 2007/2/EC]

Description:
The definition of the INSPIRE spatial data theme *"Area management/restriction/regulation zones and reporting units"* (AM) reflects two basic concepts: (1) the need for spatial information on areas where specific management, regulative or restriction regimes are established and (2) to present the established reporting units. Both concepts are presented on two separate ways within the theme AM.

For INSPIRE, the mentioned activities associated to these areas can be defined as follows:

- manage: plan, perform, monitor and/or control certain activities to achieve a certain purpose/goal according to legally defined responsibilities, obligations and/or incentives.

  NOTE Goals can be continuous, e.g. the maintenance of a certain state.

- restrict: prohibit or limit certain activities, to only be performed within specific bounds, in order to achieve a certain purpose/goal according to legally defined responsibilities or obligations.

- regulate: control or require certain activities in order to achieve a certain purpose/goal according to legally defined responsibilities or obligations. A regulated activity may require that if the environmental status is degraded then particular actions must be enacted to resort good environmental status.

  NOTE 1 In specific cases, it may define a set of acceptable limit/threshold values to protect the human health or the environment.

NOTE 2 The distinction between regulation and restriction is not always very clear. In such cases, both terms may be used synonymously.

- report: publish data and information (i.e. spatial data, observation, statistics, indicators) that can be used to assess progress towards maintaining or improving good environmental status and achievement of policy objectives.

  NOTE Reporting data and information can be published in near-real time (e.g. observations) or is published on a regular schedule (e.g. annually, 3 years), defined within the relevant legislative instrument. Reporting data and information is often made publicly available after delivery to the relevant authority.

The heterogeneity of the thematic domains and issues mentioned in the definition of the theme opens the main question how broad the scope of the theme AM should be to support the aim of the INSPIRE Directive that *"the infrastructure should assist policy-making in relation to policies and activities that may have a direct or indirect impact on the environment".* Three main issues were raised to understand and define the scope of the theme AM:

- How broad the thematic areas should be? The thematic areas might cover a wide range of socio-economic activities, policies related to the sustainable development and policies related to the environmental issues and protection.
- The requirements for the areas managed, regulated or used for reporting might be very diverse at different levels. This presents another indication of a broad scope which is related to the various levels - international, European, national and sub-national (regional and local) levels - to which those areas might be related or at which they are defined or established.
- How to balance between the requirements to include all relevant thematic areas and the need for deeper level of details within individual thematic area?

It is therefore important to further limit the scope of the theme AM from the following points of view: (1) from the point of view of the priority domains covered and (2) from the point of view of the model level of detail (from generic towards more domain-specific).

(1) Following the aim of the INSPIRE Directive, the scope of the theme AM is related to the diverse environmental issues or issues of any human activity that can significantly influence the environment or is aimed directly on the protection or preservation of the environment. Environmental issues could be related to any of the basic environmental physical media, for example air, water, soil/land and biotic (living) component, or to the different state of the environment, for example with regard to the quality or pollution. The mentioned examples[13] in the definition of the INSPIRE Directive are in the scope of the theme AM. However, the scope is not limited only to those examples.

(2) To capture the heterogenity of the thematic domains, the main focus is given to the generic approach in data specification by specifying the essential common properties of those areas and reporting units.

Reference to the legislation

The establishment of areas managed, regulated or used for reporting has to be defined by legislation active at different levels, for example: international (international conventions), European, national and sub-national levels (for example regional and local legislation levels). The scope of the theme AM is dealing with the areas that have a specific legal characteristic which distinguish them from the rest of the territory. Existing practice shows great variety where the areas are established or regulated by legal acts or laws and based on the legal systems of the Member States or international communities. This legal basis also defines the purpose and aspects of management, regulation and reporting areas.

Management areas, restriction and regulation zones

Management, restrictions and regulations are related to the areas where those obligations are performed and executed. A specific area can be at the same time the subject to various restrictions / regulations or

[13] dumping sites and areas for the dumping of waste, restricted areas around drinking water sources, nitrate-vulnerable zones, noise restriction zones, river basin districts, coastal zone management areas, regulated fairways at sea or large inland waters, prospecting and mining permit areas

management regimes which may define diverse activities within those areas. For example: the same physical areas can have restrictions, specific management actions, plus reporting requirements, such as "sand replenishment to repair beach erosion" – all mandated by different legislation or regulations. Those areas may correspond to the real world objects and phenomena (for example: lakes, rivers), natural resources (for example: drinking water sources), or to the specific landscape areas (for example: coastal areas, mountain areas, areas of the seas) or to the influences or impacts of human activities on the environment (for example: pollution). Thus, the concept is based on a single area which is further classified into a specific thematic type and where different controlled activities are mandated – all defined on the legal basis.

The boundaries of the areas don't necessary apply to the natural borders of geographic or natural phenomena and they could be based on a decision by the responsible authorities. In many cases they cover cross-border situations, where the areas are defined within different levels of administrative units (as they are defined within the INSPIRE spatial data theme *Administrative units*). For example: a set of local administrative units (LAU2 level) or their parts might compose an agglomeration area; restriction zones around the coast, lakes or rivers might cover more than one local administrative unit or the river basin districts correspond to the flow of rivers through many countries (cross-country borders).

The spatial dimension of the areas is a core element of the theme AM and it requires providing the exact geometry of spatial objects, even in the cases when the geometry could be composed of other spatial objects defined within the INSPIRE spatial data themes. The areas have to be uniquely identified within the purpose of their establishment and the thematic scope allowing also to link additional theme- or domain-specific data to them. Nevertheless, the content of the reports, plans or other instruments (or the underlying data) is not in the scope of the theme AM.

The scope of the theme AM is focused on providing the generic information about the management / restriction / regulation areas: the spatial information of the areas, the legal obligation[14] on which the areas are based and the related responsible authority. To provide more exact information which types of areas fit into the scope of the theme AM, the initial set of the types of areas is defined which could be extended later.

This generic model can be used to exchange spatial data between different domains and public authorities. It could be further extended into thematic domains, for example: to support specific regulated activity, management of a thematic issue or to support the reporting obligation. This detailed and domain-specific information are out of the scope of the theme AM. However, this data specification includes use cases (in Annex B) and informal examples (in Annex C) demonstrating how it is possible to extend the generic model into more specific and detailed thematic models.

Reporting units

The second concept of the theme AM is related to the relevant reporting units that are based on legally defined reporting obligations. The scope of the theme AM allows that the diverse spatial objects, defined within different thematic domains of INSPIRE spatial data themes could be used for the reporting and therefore, treated as reporting units – providing spatial information and the information on the reporting.

Interrelationships with other INSPIRE spatial data themes

Because of the wide heterogeneity of the domains covered by the theme AM, it is very likely to find some interrelationships or overlaps with other INSPIRE spatial data themes. Where the scopes of other INSPIRE spatial data themes require including their domain specific management or regulated areas or reporting units within those themes, than those topics stay out of the scope of the theme AM. For example: bio-geographical regions are defined within the INSPIRE theme *Bio-geographical regions*, INSPIRE theme *Protected sites* includes theme specific protected areas, etc.
On the other hand, some duplications might be necessary, because of the different views (and scope) on the same geographical / natural phenomena, for example: the sea regions might be defined in the INSPIRE theme *Sea regions* on the basis of physical or chemical characteristics, while the sea/marine regions defined for the management purpose are included in the theme AM.

[14] A description of the harmonised approach to referencing the legislation can be found in: Proposed Changes to the Generic Conceptual Model and Encoding Guidelines".

Another source for cross-theme interrelationships or overlaps originates from the legal basis which specifies the regulative or restricted regimes or reporting obligations that are included in the diverse INSPIRE themes. It is especially present in:

Annex I:

- *Administrative units* (with links to the marine administrative units or used as reporting units);
- *Hydrography* (with WFD reporting schema);
- *Protected sites* (links to the reporting of the protected sites);

- Annex III:
  - *Soil* (restricted use of soil contaminated sites);
  - *Land use* (restrictions on land and land properties in planning activities);
  - *Utility and governmental services* (restrictions and permits);
  - *Environmental monitoring facilities* (legally based monitoring programmes, many regulatory obligations);
  - *Production and industrial facilities* (restrictions, permits, industrial zoning regulations);
  - *Agricultural and aquaculture facilities* (restrictions, regulations, permits);
  - *Area management/regulation/restriction zones and reporting units* (specific examples and all other potential regulations, restrictions or reporting obligations);
  - *Natural risk zones* (e.g. could define floodplains, landslide or subsidence zones for which specific building regulations or restrictions exist, or nationally administered insurance/compensation regimes);
  - *Sea regions* (with links to the marine administrative units or marine cadastre, reporting obligations under MSFD);
  - *Habitats and biotopes* (potential restrictions on use of the areas defined and/or monitoring requirement);
  - *Species distribution* (potential restrictions on use of the areas defined and/or monitoring requirement);
  - *Energy resources* (specific permit areas, regulatory monitoring of the resources);
  - *Mineral resources* (specific permit areas, regulatory monitoring of the resources).

Open issue 1: Those cross-theme issues need additional attention and harmonization. For example:

- The same legally based restriction might be used in different INSPIRE themes (for example: AM, LU, PS).
- Complex thematic topic could be covered by different INSPIRE themes, for example: waste management: US, AM or reporting under Marine Strategy Framework Directive (AM, SR, EL (bathymetry), …). Will such an overview stay out of the INSPIRE data specifications and it will be developed only if required? For example: by developing the specific use cases and the thematic extensions of INSPIRE data specifications for specific thematic area?

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

[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

NOTEThis 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

2.4 Terms and definitions

General terms and definitions helpful for understanding the INSPIRE data specification documents are defined in the INSPIRE Glossary[15].

Specifically, for the theme Area management/restriction/regulation zones and reporting units The following terms are defined:

(1) Manage
Plan, perform, monitor and/or control certain activities to achieve a certain purpose/goal according to legally defined responsibilities, obligations and/or incentives.

NOTE Goals can be continuous, e.g. the maintenance of a certain state.

(2) Restrict
Prohibit or limit certain activities, to only be performed within specific bounds, in order to achieve a certain purpose/goal according to legally defined responsibilities or obligations.

(3) Regulate
Control or require certain activities in order to achieve a certain purpose/goal according to legally defined responsibilities or obligations. A regulated activity may require that if the environmental status is degraded then particular actions must be enacted to resort good environmental status.

NOTE 1 In specific cases, it may define a set of acceptable limit/threshold values to protect the human health or the environment.

NOTE 2 The distinction between regulation and restriction is not always very clear. In such cases, both terms may be used synonymously.

(4) Report

[15] The INSPIRE Glossary is available from http://inspire-registry.jrc.ec.europa.eu/registers/GLOSSARY

Publish data and information (i.e. spatial data, observation, statistics, indicators) that can be used to assess progress towards maintaining or improving good environmental status and achievement of policy objectives.

NOTE Reporting data and information can be published in near-real time (e.g. observations) or is published on a regular schedule (e.g. annually, 3 years), defined within the relevant legislative instrument. Reporting data and information is often made publicly available after delivery to the relevant authority.

2.5 Symbols and abbreviations

AM	Area management/restriction/regulation zones and reporting units
CAFÉ	Clean Air for Europe (Programme and/or Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe)
EC	European Commission
EEA	European Environment Agency
GCM	Generic Conceptual Model
MSFD	Marine Strategy Framework Directive
RBD	River Basin District
SAC	Special Area of Conservation
SPA	Special Protection Area
TWG	Thematic Working Group
WFD	Water Framework Directive

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.

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 *Area management/restriction/regulation zones and reporting units* 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.

  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.

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

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 'Area Management, Restriction and Regulation Zones'

5.2.1 Description

The Area Management, Restriction and Regulation Zones application schema defines zones that have established in accordance with specific legislative requirements to deliver the following environmental aims:

- Protect and improve environmental quality
- Protect environmental and natural resources
- Protect and control risk from natural and man-made hazards
- Protect plant, animal and human health
- Control development/spatial planning

To achieve these aims, a competent authority must be defined who is responsible for defining, regulating and delivering specific environmental objectives which are commonly defined within management plans or action programmes. Within such plans or programmes a ranges of measures may be defined which may control specific activities through restriction or promotion. Such activities may be controlled over continuous time periods or only within specific schedules. For example, noise levels from an entertainment venue may not exceed acceptable limit values between 23:00 and 08:00 Sunday to Thursday and between 12 midnight and 08:00 Friday and Saturday.

The Area Management, Restriction and Regulation Zones application schema defines a general model that supports the ability to define a wide range of management, restriction and regulation zones for many environmental domains.

Separation of management areas, restriction or regulation zones into separate spatial object types were debated. However, due to difficulties in precisely defining where boundaries exist between management, restriction and regulation it was agreed that only one spatial object type shall be defined.

Overlap between Area Management, Restriction and Regulation Zones and Protected Sites

There is overlap between the scope of Area Management, Restriction and Regulation Zones and the Annex I theme – Protected Sites. The key difference between the two themes is that Protected Sites are established to manage, regulate and restrict activities to conserve nature, biodiversity and cultural heritage, only. , However, there are zones that are defined to deliver multiple environmental objectives including nature and biodiversity conservation (e.g. River Basin Districts). Where this occurs, then the data should only be published once as Area Management, Restriction and Regulation Zones.

IR Requirement 3	If a zone has been established to deliver multiple objectives including nature and biodiversity conservation then these should be encoded as an Area Management, Restriction and Regulation Zone.

5.2.1.1. Narrative description and UML overview

The Area Management, Restriction and Regulation Zones application schema defines a core set of properties required to define Area Management, Restriction or Regulation Zones.

The application schema contains two spatial object types (Figure 11):

1. **ManagementRegulationOrRestrictionZoneCollection:** this is an optional, identifiable spatial object which acts as a collection feature for all the individual zones. If all of the ManagementRegulationOrRestrictionZones are defined by a single legislation, then rather than repeat this information for each zone then it can be defined once at the collection level.
2. **ManagementRegulationOrRestrictionZone ManagementRegulationOrRestrictionZone:** these are individual spatial objects representing the area management, restriction or regulation zones defined in accordance with specific legislative requirements.

IR Requirement 4	The legalBasis attribute is mandatory and must be provided as part of either the ManagementRegulationOrRestrictionZoneCollection or ManagementRegulationOrRestrictionZone.

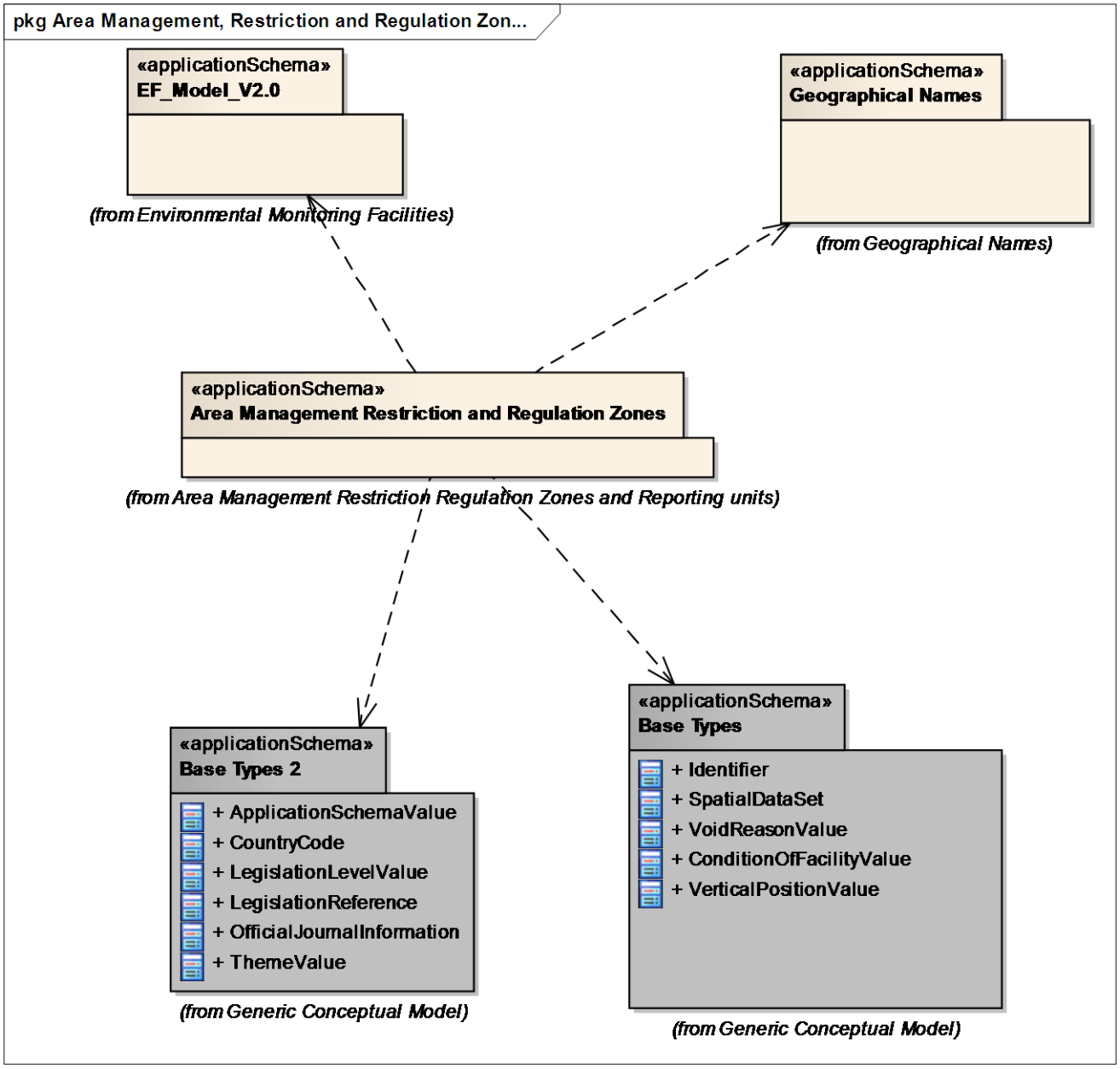


Figure 1. Package Diagram illustrating the relationships between the Area Management, Restriction and Regulation Zones application and other INSPIRE application schemas

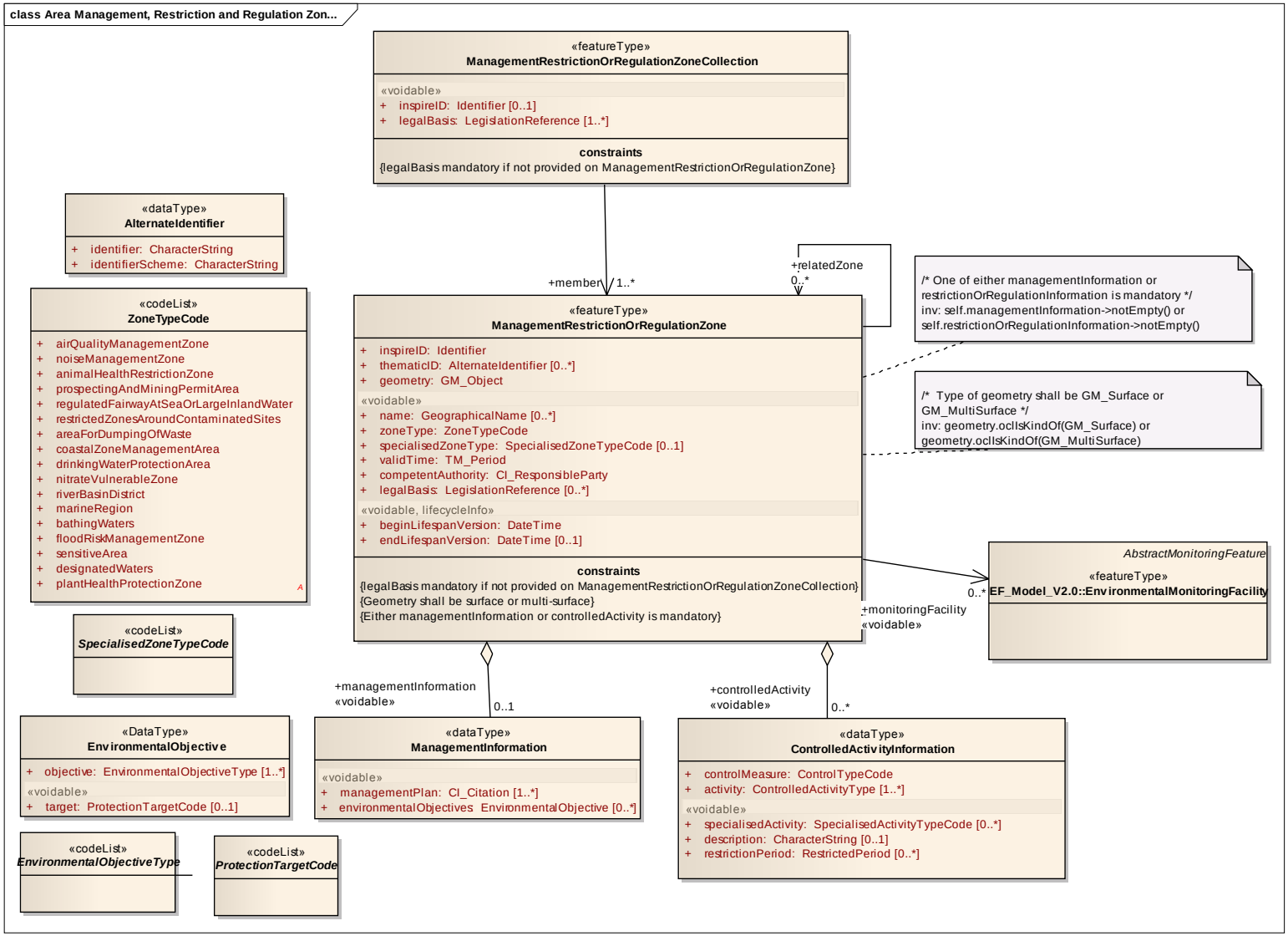


Figure 2 – UML class diagram: Overview of the Area Management, Restriction and Regulation Zones application schema

Overview of ManagementRegulationOrRestrictionZone Spatial Object

The *ManagementRegulationOrRestrictionZone* spatial object type contains 13 core properties and two properties that provide further information about the environmental objectives and measures undertaken in the zone.

Core Properties:

- *INSPIRE Identifier*: a persistent, unique identifier assigned to the zone which can be used to ensure good lifecycle management, to request the object and link the zone to other information (e.g. reporting information);

- *Thematic identifier:* zones may have been assigned multiple identifiers: a system identifier and one or more thematic identifiers defined in accordance to one or more reporting requirements. Where thematic identifiers are assigned they should define which classification scheme defined them (e.g. River Basin Districts are assigned multiple identifiers at Member State and European level);

- *Name:* optional name assigned to the zone;

- *Geometry*: which explicitly defines the geographic extent of the zone (see 5.3.1.5 for implementation requirements);

- *Zone Type*: classification of the zone type (e.g. animalHealthRestrictionZone). NOTE: for some domains, this may be generalized, so further classification may be required;

- *Specialised Zone Type:* Where zones are belong to a generalised classification the specialized zone type can be used to define a domain specific classification of the zone type (Figure 3). This value should be derived from a relevant domain or Member State controlled vocabulary or codelist;

- *Valid Time:* time period defining when the zone is effective;

- *Competent authority*: Authority assigned the responsibility with managing, regulating or restricting activities or measures within the zone;

- *Begin Lifespan Version*: system date defining when the version of the zone was created or edited;

- *End Lifespan Version:* system date defining when the version of the zone was superceded or the date when feature was deleted;

- *Legal basis:* if not provided at the dataset level, information identifying the legislative instrument that required the establishment of the zone;

- *Related Zone:* reference to one or more related zones. Zones may be comprised of one or more sub-zones or have relationships to other zones these may be other zone types.

- *Monitoring Facility:* reference to one or monitoring facilities that have been established in the zone for monitoring or surveillance

Furthermore, one or both of the following properties are required:

- *Controlled Activity:* provides additional information about activities that may be controlled within the zone. A set of high-level activities types have been defined, more specialized activity types (domain specific) can also be provided. This value should be derived from a relevant domain or Member State controlled vocabulary or code list.

- *Management Information:* provides additional information about the measures and environmental objectives established to protect the environment within the zone.

If no management information or controlled activity information are contained in the data, then these shall be assigned a nilReason value.

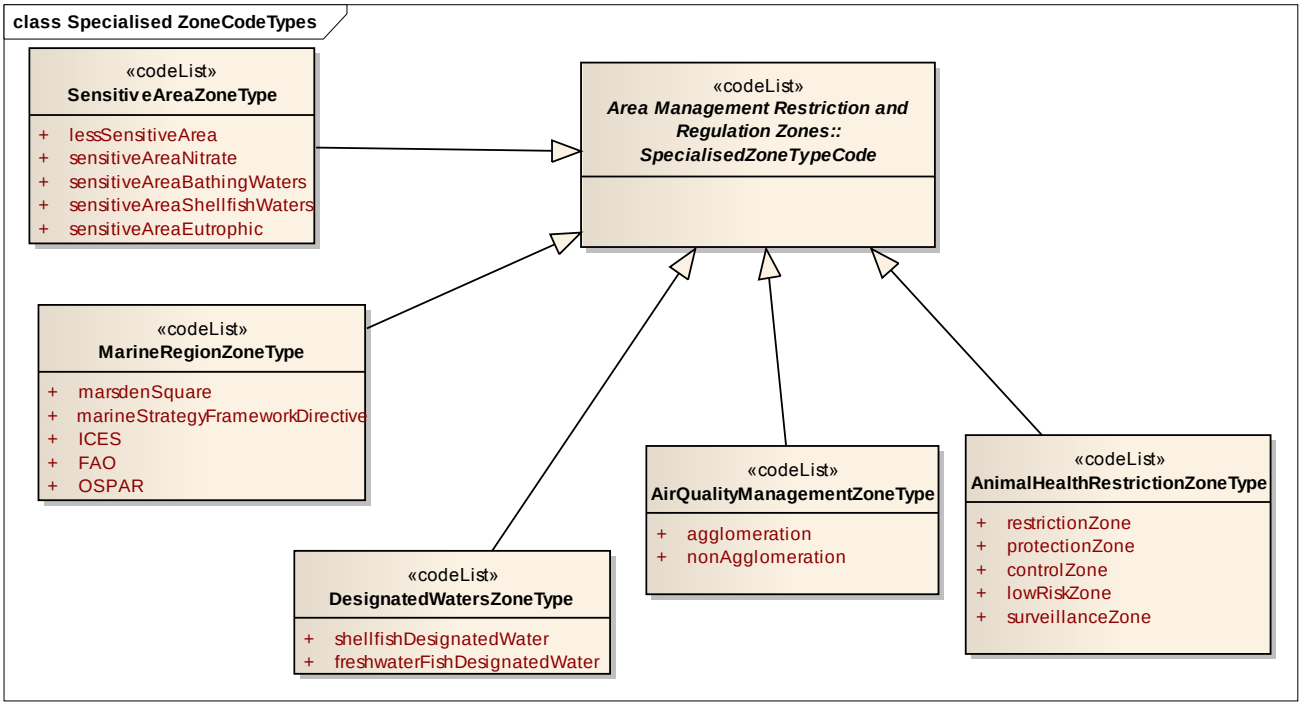


Figure 3. Illustrative examples of how to extend the specialised zone type code

Open issue 3: An initial set of zones have been identified that fall within the scope of this theme. This list is not exhaustive, and may not cover all domains. A code list of high-level zone types shall be defined within Implementing Rule (IR). Therefore, if specific zone types are missing for a domain, please suggest them.

Legal Basis

Zones are established in accordance with legislative requirements. The *legalBasis* attribute is a complex property defined by the *LegislationReference* data Type (Figure 4) (NOTE: The data type LegislationReference is described in more details in the "Proposed Changes to the Generic Conceptual Model and Encoding Guidelines"). It contains a set of properties to cite the legislative instrument and specific articles within the legislation. The following five properties have to be provided as the minimum information for citing the legalBasis:

- *Legal Name:* official name assigned to the legislative instrument
- *Publication Date:* date when the legislative instrument was published in the official journal (NOTE: this is different to when it entered into force)
- *Date when entered into force:* Date when the legislative instrument entered into force
- *Level:* value defining the level at which the legislative instrument is adopted
- *Link to Legislative Instrument:* this is a reference to the online resource

IR Requirement 5	For each management, restriction or regulation zone (data set), at least the most specific legislative instrument that required the establishment of zone(s) shall be provided.

Recommendation 2	If applicable, the relevant legal basis at European level should also be provided.

IR Requirement 6	If the *linkToLegislativeInstrument* property is void, because the legal act is not available online, then the *journalCitation* must be provided. [See constraint in LegislationReference]

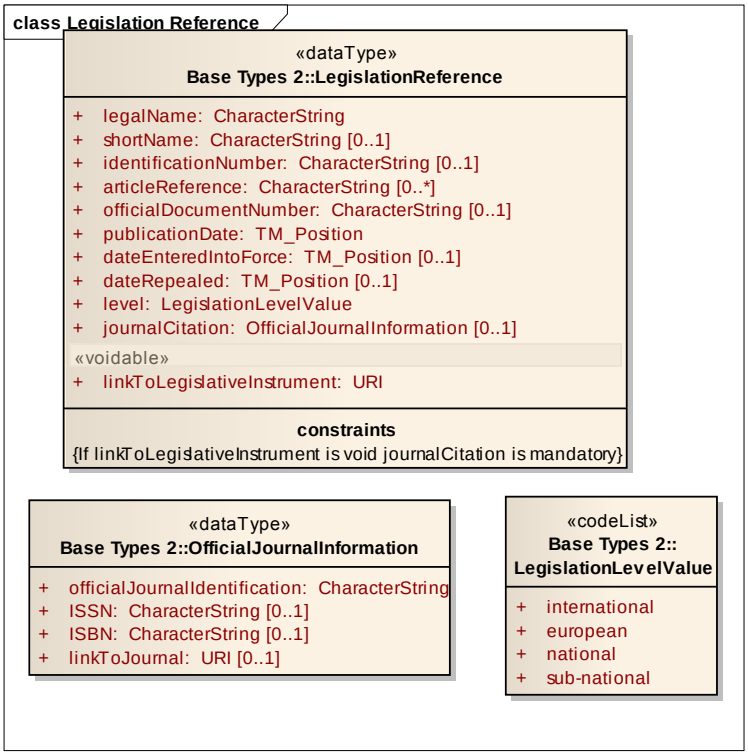


Figure 4. Information required to describe legal basis

Controlled Activity

The controlledActivity property is a complex property defined by the ControlledActivityInformation datatype (Figure 5). It provides information about an activity that may be controlled within the zone. It is comprised of 5 attributes:

- *Control Measure*: defines whether the activity is permitted, restricted, prohibited or promoted
- *Activity*: high-level classification of the type of activity that is controlled in the zone. This list shall be managed as an INSPIRE code list
- *Specialised Activity*: this is an abstract INSPIRE code list which shall be extended by domains or Member States to define specific activity types relevant to their domain. See Figure 6 for some examples of how this code list could be extended.
- *Description:* free text field to allow encoding of more detailed information about the controlled activity
- *Restriction Period:* if the activity is not permanent then the time when the activity is restricted shall be defined. This is a choice of either validTime which is used to define a continuous period of time or a scheduledPeriod which is used to define activities restricted to specific times.

Recommendation 3	If restrictions apply to a time instant rather than a period, then the start and e*nd times should be t*he same.

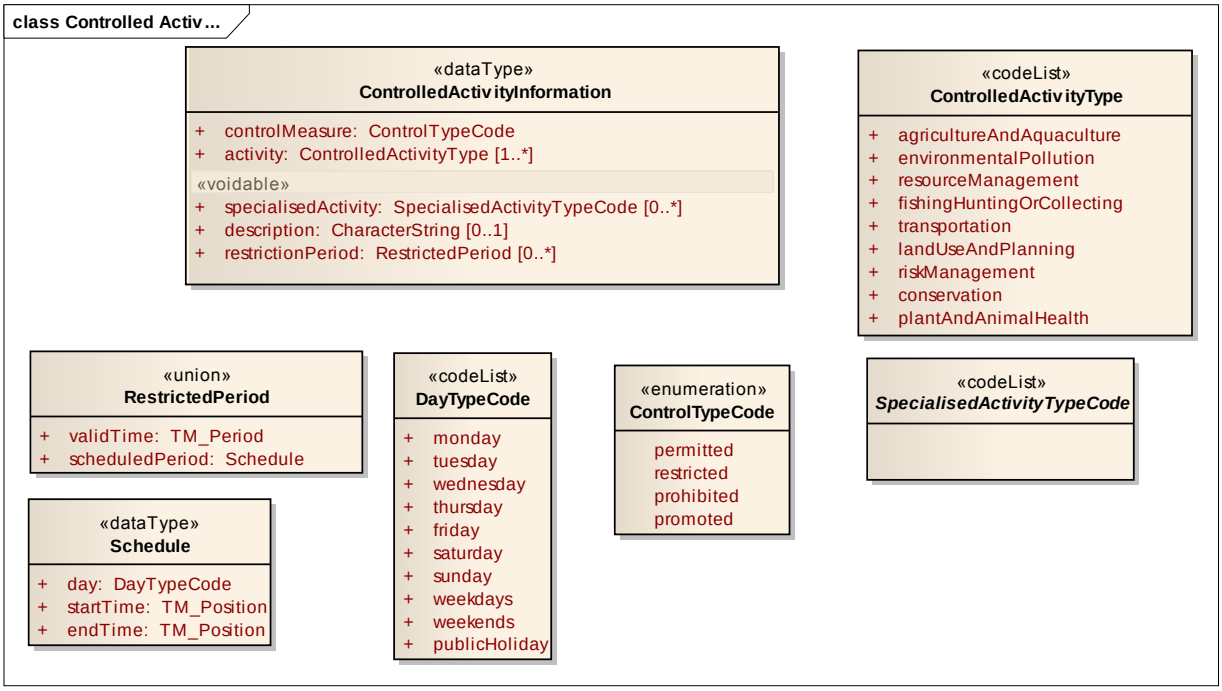


Figure 5. Controlled Activity

Open issue 4: Are detailed information related to controlled activities explicitly defined in the zones dataset or are they only contained in supporting resources such as management plans/action programmes or legislation?

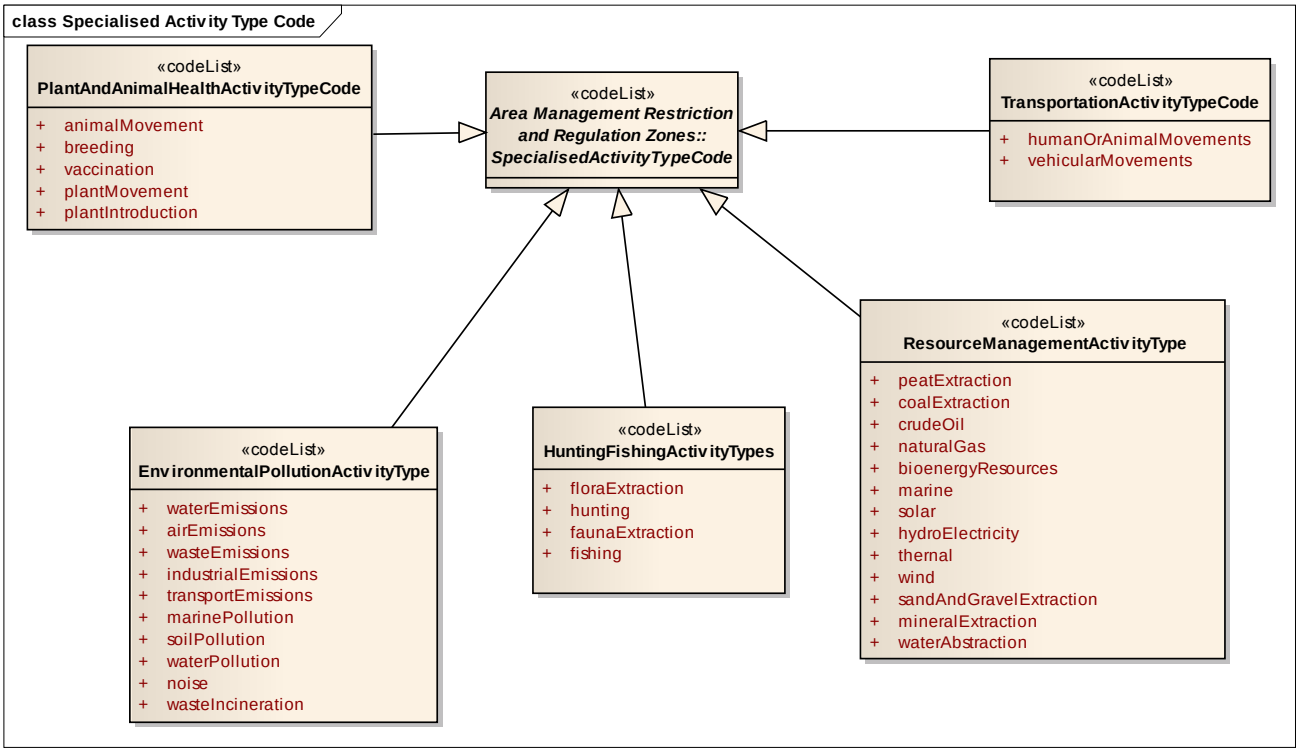


Figure 6. Illustrative example of how to extend SpecialisedActivityTypeCode

Management Information

The managementInformation property is a complex property defined by the Management Information datatype. It provides information about specific environmental objectives established to protect the environment and reference to the management plan or action programme containing a detailed

description of the objectives and measures to be established in the zone to achieve good environmental status.

There are two properties contained in the ManagementInformation data type:

- *Management plan*: this is either a direct reference to the online management plan or action programme or full citation if it is only available offline.

- *Environmental Objectives:* this property is used to include information about specific environmental objectives (e.g. pollutants, harmful organisms or diseases) and protection targets (e.g. human health, specific plants or animals). The values for the *objective* and *target* properties should be derived from a domain or Member State controlled vocabulary (Figure 7).

NOTE: it is envisaged that the environmental objectives property should only be used for specific objectives related to individual zones, generic objectives that apply to all zones as defined in environmental legislation or management plans or action programmes should not be included.

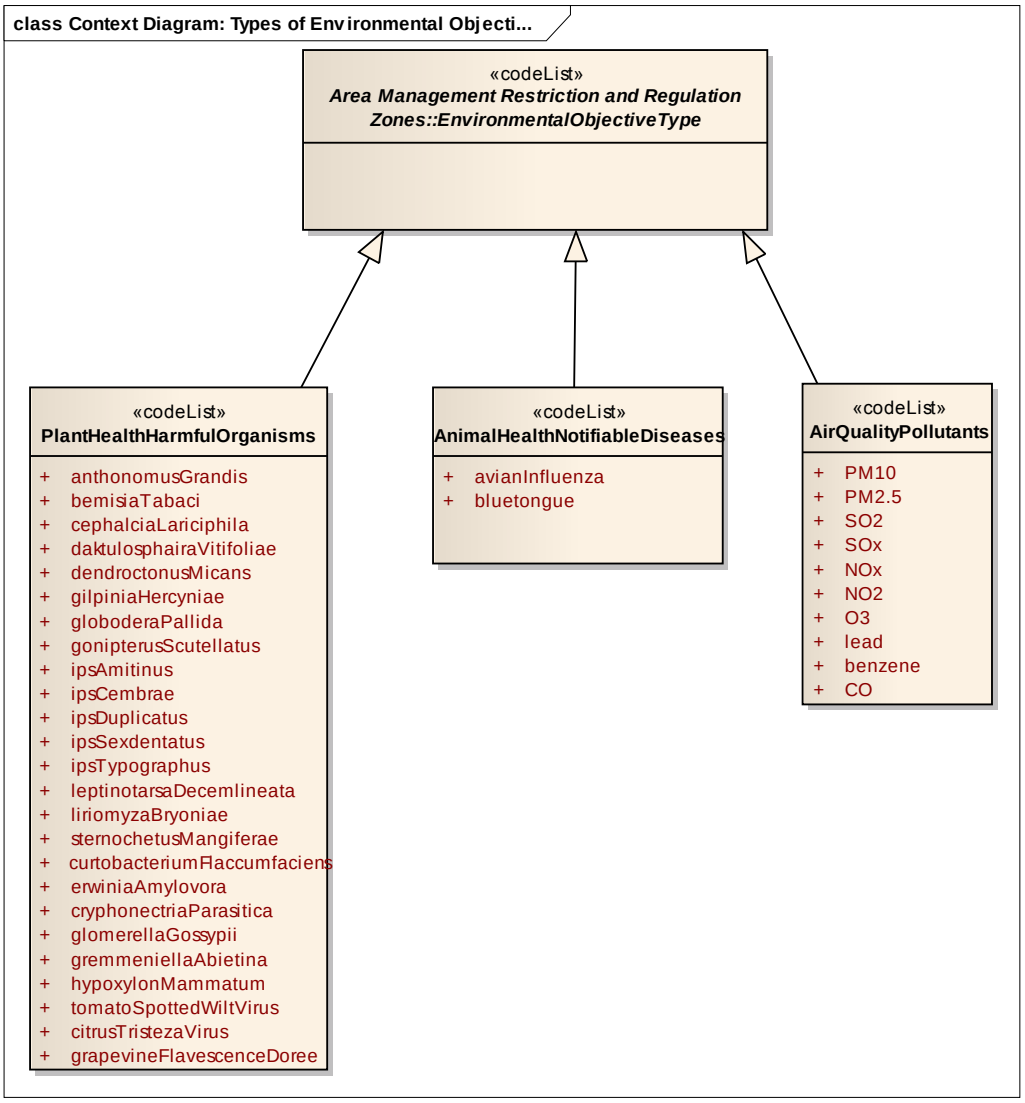


Figure 7. Illustrative examples of objectives

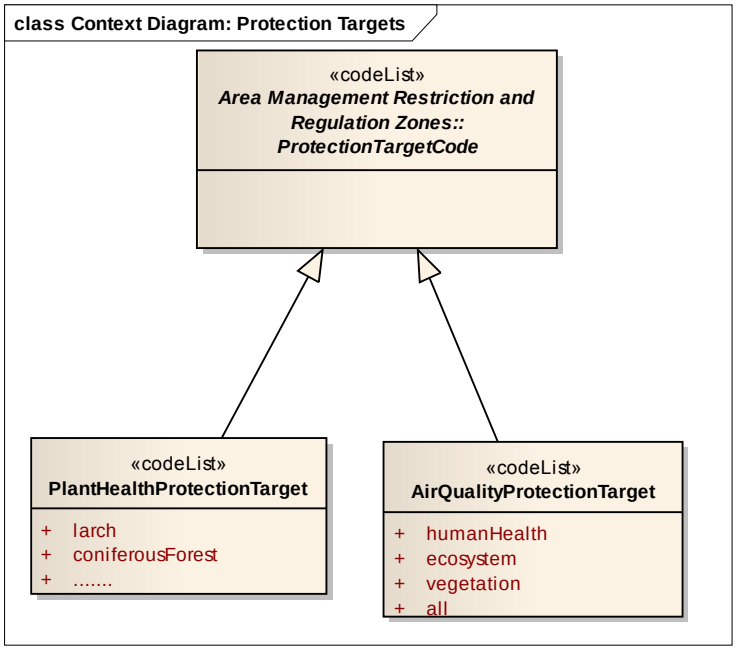


Figure 8 Illustrative examples of targets

5.2.1.2. Consistency between spatial data sets

5.2.1.2.1. Consistency along boundaries

IR Requirement 7	To ensure that data can be seamlessly integrated into applications the geometries of spatial objects coincident to a boundary (e.g. administrative boundary: state, country or management boundary: catchment area) shall be consistent.

The methods to ensure that the geometries do not overlap or have gaps are described in Annex B of D2.6 Methodology for the development of data specifications.

5.2.1.2.2. Consistency at the same level of detail between themes

The geometry of a ManagementRestrictionOrRegulation zone must be explicitly defined so may be derived from the geometry of another spatial object:

- Air Quality Management Zone may correspond with the extent of an *Administrative Unit* or *NUTS Region*
- Marine Region may correspond with the extent of a *Sea Region*
- prospectingAndMiningArea may correspond with the extent of an *Energy Resource*

IR Requirement 8	Where the geometry of the spatial object is derived from another spatial object the geometries of the two objects shall be consistent.

Any inconsistencies can be detected using data matching algorithms.

5.2.1.3. Identifier management

IR Requirement 9	Each spatial object shall be assigned at least one persistent identifier: *inspireID* to ensure good lifecycle management and enable linkage to other information such as reporting information and/or management plans.

Recommendation 4	If additional thematic identifiers have been assigned to a zone they should be provided to ensure continued linkages to other information (e.g. reporting information).

5.2.1.4. Modelling of object references

The property *monitoringFacility* shall be encoded as an object reference. The value of this reference shall be a URI that can be traversed to enable the client to retrieve the referenced feature. See D2.5 and D2.7 for further guidance.

5.2.1.5. Geometry representation

The geometry of a *ManagementRegulationOrRestrictionZone* shall be explicitly defined, and references to geometries of other spatial objects are not allowed. If the geometry of a zone is derived from the geometry of another spatial object type as they share the same extent (e.g. Administrative or Statistical Unit), then a description of the lineage should be provided in the metadata (see section **Error! Reference source not found.**).

IR Requirement 10	The geometry of a *ManagementRegulationOrRestrictionZone* shall be explicitly defined, and references to geometries of other spatial object types are not allowed.

IR Requirement 11	The geometry of the spatial objects shall be either GM_Surface or GM_MultiSurface. [See constraint in *ManagementRegulationOrRestrictionZone*]

IR Requirement 12	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.

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

NOTEThe 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).

5.2.1.6. Temporality representation

The property *validTime* is used to represent the temporality describing when the *ManagementRegulationOrRestrictionZone* was effective in the real-world.

The Area Management, Regulation and Restriction Zones application schema uses the derived attributes "beginLifespanVersion" and "endLifespanVersion" 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".

These attributes can be used in conjunction with the version attribute of the inspireID to manage the lifecycle of the spatial object.

5.2.2 Feature catalogue

Table 3 - Feature catalogue metadata

Feature catalogue name	INSPIRE feature catalogue Area Management Restriction and Regulation Zones
Scope	Area Management Restriction and Regulation Zones
Version number	2.0
Version date	2011-06-20
Definition source	INSPIRE data specification Area Management Restriction and Regulation Zones

Table 4 - Types defined in the feature catalogue

Type	Package	Stereotypes	Section
AlternateIdentifier	Area Management Restriction and Regulation Zones	«dataType»	5.2.2.2.1
ControlTypeCode	Area Management Restriction and Regulation Zones	«enumeration»	5.2.2.3.1
ControlledActivityInformation	Area Management Restriction and Regulation Zones	«dataType»	5.2.2.2.2
ControlledActivityType	Area Management Restriction and Regulation Zones	«codeList»	5.2.2.4.1
DayTypeCode	Area Management Restriction and Regulation Zones	«codeList»	5.2.2.4.2
EnvironmentalObjectiveType	Area Management Restriction and Regulation Zones	«codeList»	5.2.2.4.3
ManagementInformation	Area Management Restriction and Regulation Zones	«dataType»	5.2.2.2.3
ManagementRegulationOrRestrictionZone	Area Management Restriction and Regulation Zones	«featureType»	5.2.2.1.1
ManagementRegulationOrRestrictionZoneCollection	Area Management Restriction and Regulation Zones	«featureType»	5.2.2.1.2
ProtectionTargetCode	Area Management Restriction and Regulation Zones	«codeList»	5.2.2.4.4
RestrictedPeriod	Area Management	«union»	5.2.2.2.4

Type	Package	Stereotypes	Section
	Restriction and Regulation Zones		
Schedule	Area Management Restriction and Regulation Zones	«dataType»	5.2.2.2.5
SpecialisedActivityTypeCode	Area Management Restriction and Regulation Zones	«codeList»	5.2.2.4.5
SpecialisedZoneTypeCode	Area Management Restriction and Regulation Zones	«codeList»	5.2.2.4.6
ZoneTypeCode	Area Management Restriction and Regulation Zones	«codeList»	5.2.2.4.7

5.2.2.1. Spatial object types

5.2.2.1.1. ManagementRegulationOrRestrictionZone

ManagementRegulationOrRestrictionZone

Name:	Management Regulation Or Restriction Zone
Definition:	Area managed, regulated or used for reporting at international, European, national, regional and local levels.
Description:	SOURCE [INSPIRE Directive]
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.
Multiplicity:	1
Stereotypes:	«voidable,lifeCycleInfo»

Attribute: competentAuthority

Value type:	CI_ResponsibleParty
Definition:	Organisation responsible for managing/restricting or regulating measures or activities within the zone or for delivering measures established to protect the environment.
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.
Multiplicity:	0..1
Stereotypes:	«voidable,lifeCycleInfo»

Attribute: geometry

Value type:	GM_Object
Definition:	The geometry representing the spatial extent of the spatial object.

ManagementRegulationOrRestrictionZone

Description:	NOTE 1:The geometry of a Management Area, Restriction or Regulation Zone shall be either a GM_Surface or GM_MultiSurface. NOTE 2: The geometry shall be encoded directly as coordinates and not by reference to natural, cadastral or administrative boundaries, although it may originally have been defined from these. NOTE 3: It is recommended that a data provider should provide information describing which dataset (and version) that the geometry was derived from.
Multiplicity:	1

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 application to reference the spatial object. The identifier is an identifier of the spatial object, not an identifier of the real-world phenomenon.
Multiplicity:	1

Attribute: legalBasis

Value type:	LegislationReference
Definition:	Legislative instrument that required the establishment of the Management, Restriction or Regulation Zone.
Description:	NOTE 1 A Management, Restriction or Regulation Zone is an area that has been defined by law to delimit where specific control measures have been established to protect the environment. NOTE 2 The latest legislative information should be recorded. NOTE 3 This attribute does not need to be provided if the legalBasis has been defined at the SpatialDataset level.
Multiplicity:	0..*
Stereotypes:	«voidable»

Attribute: name

Name	common name
Value type:	GeographicalName
Definition:	Common name used to identify the management area, regulation or restriction zone.
Multiplicity:	0..*
Stereotypes:	«voidable»

Attribute: specialisedZoneType

Value type:	SpecialisedZoneTypeCode
Definition:	Additional classification value which further specialises the type of management, regulation or restriction zone relevant to the domain.
Description:	While the zoneType provides a high-level classification of the type of management, regulation or restriction zone, the specialisedZoneType can be used to provide further domain specific classification of the zone. EXAMPLE: An airQualityManagementZone can be further classified as either an agglomeration or nonAgglomeration NOTE: This value should be derived from a relevant domain-specific controlled vocabulary, where available.

ManagementRegulationOrRestrictionZone

Multiplicity: 0..1
Stereotypes: «voidable»

Attribute: thematicId

Value type: AlternateIdentifier
Definition: Alternative thematic identifier to uniquely identify the spatial object.
Description: Some management, restriction or regulation zones may be assigned multiple identifiers. These may have been established to meet the reporting requirements of different legislative instruments at International, European or at Member State levels.
Multiplicity: 0..*

Attribute: validTime

Value type: TM_Period
Definition: Time period defining when the Management Area, Regulation or Restriction Zone was in force.
Description: NOTE 1: validTime uses the ISO 19107 TM_Period which is comprised of two properties - beginPosition and endPosition. If the zone shall remain in force for an indefinite period of time then the endPosition value can be set to "indeterminate".
Multiplicity: 1
Stereotypes: «voidable»

Attribute: zoneType

Value type: ZoneTypeCode
Definition: High level classification defining the type of management area, regulation or restriction zone.
Multiplicity: 1
Stereotypes: «voidable»

Association role: monitoringFacility

Value type: EnvironmentalMonitoringFacility
Definition: Reference to the monitoring facilities that are established within the ManagementRestrictionOrRegulationZone to monitor the state of the environment to enable assessment
Multiplicity: 0..*
Stereotypes: «voidable»

Association role: relatedZone

Value type: ManagementRegulationOrRestrictionZone
Definition: A zone within the managed, regulated or reporting unit, for which specific management, restriction or regulation measures apply.
Description: EXAMPLE Add some zone example here.
Multiplicity: 0..*

Constraint: Either managementInformation or controlledActivity is mandatory

Natural language: One of either managementInformation or controlledActivity is mandatory
OCL: inv: self.managementInformation->notEmpty() or self.controlledActivity->notEmpty()

Constraint: Geometry shall be surface or multi-surface

Natural language: Type of geometry shall be GM_Surface or GM_MultiSurface
OCL: inv: geometry.oclIsKindOf(GM_Surface) or geometry.oclIsKindOf(GM_MultiSurface)

Constraint: legalBasis mandatory if not provided on ManagementRestrictionOrRegulationZoneCollection

ManagementRegulationOrRestrictionZone	
Natural language:	legalBasis is mandatory if not provided on ManagementRegulationOrRestrictionZoneCollection
OCL:	inv: self.legalBasis->notEmpty() or context.ManagementRegulationOrRestrictionZoneCollection self.legalBasis->notEmpty()

5.2.2.1.2. ManagementRegulationOrRestrictionZoneCollection

ManagementRegulationOrRestrictionZoneCollection	
Name:	Management Regulation Or Restriction Zone Collection
Definition:	Identifiable collection of ManagementRestrictionOrRegulationZone spatial objects.
Description:	A collection of ManagementRestrictionOrRegulationZone is provided to enable inclusion of a collection level legalBasis property which shall be inherited by all spatial objects. This can be used instead of the feature level legalBasis property to prevent un-necessary data redunancy.
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 application 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: legalBasis	
Value type:	LegislationReference
Definition:	Legislative instrument that required the establishment of the Management, Restriction or Regulation Zone.
Description:	NOTE 1 A Management, Restriction or Regulation Zone is an area that has been defined by law to delimit where specific control measures have been established to protect the environment. NOTE 2 The latest legislative information should be recorded. NOTE 3 This attribute does not need to be provided if the legalBasis shall be been defined at the feature level.
Multiplicity:	1..*
Stereotypes:	«voidable»
Association role: member	
Value type:	ManagementRegulationOrRestrictionZone
Multiplicity:	1..*
Constraint: legalBasis mandatory if not provided on ManagementRestrictionOrRegulationZone	
Natural language:	legalBasis is mandatory if not provided on ManagementRegulationOrRestrictionZone
OCL:	inv: self.legalBasis->notEmpty() or context.ManagementRegulationOrRestriction self.legalBasis->notEmpty()

5.2.2.2. Data types

5.2.2.2.1. AlternateIdentifier

AlternateIdentifier	
Name:	Alternate Identifier
Definition:	Alternative thematic identifier to uniquely identify the spatial object
Description:	Some management, restriction or regulation zones may be assigned multiple identifiers. These may have been established to meet the reporting requirements of different legislative instruments at International, European or at Member State levels.
Status:	Proposed
Stereotypes:	«dataType»
URI:	null
Attribute: identifier	
Value type:	CharacterString
Definition:	Unique identifier used to identify the spatial object within the specified identification scheme.
Multiplicity:	1
Attribute: identifierScheme	
Value type:	CharacterString
Definition:	Identifier defining the scheme used to assign the identifier.
Description:	NOTE 1: Reporting requirements for different environmental legislation mandate that each spatial object is assigned an identifier conforming to specific lexical rules. NOTE 2: These rules are often inconsistent so a spatial object may be assigned multiple identifiers which are used for object referencing to link information to the spatial object.
Multiplicity:	1

5.2.2.2.2. ControlledActivityInformation

ControlledActivityInformation	
Name:	Controlled Activity Information
Definition:	Information describing the type of measure or activity that is controlled (restricted, promoted, regulated) within the zone.
Description:	The ManagementRestrictionOrRegulationZone has been established to achieve or maintain good environmental status. To achieve this goal Public Authorities must establish a range of measures. These measures may include controlling particular activities within the zone. Examples include: • controlling emissions to the environment • restricting movements within the zone • limiting pollutant values to protect health • controlling urban or industrial development to protect cultural heritage, nature and biodiversity and greenspaces
Status:	Proposed
Stereotypes:	«dataType»
URI:	null

ControlledActivityInformation

Attribute: activity

Value type: ControlledActivityType
Definition: Type of activity that is controlled or promoted within the zone.
Multiplicity: 1..*

Attribute: controlMeasure

Value type: ControlTypeCode
Definition: Type of control method used to manage activities or measures within the zone.
Description: An activity can be controlled using different types of method to achieve different types of objective.

EXAMPLES:

- Air quality may be regulated to protect human health
- Water abstraction or mineral extraction may be regulated (i.e. require a permit) to avoid over-utilisation of a resource
- Animal movements may be restricted or prohibited in the instance of an animal health epidemic (e.g. blue tongue or avian influenza)
- Hunting may be permitted or prohibited during a specific time.

Multiplicity: 1

Attribute: description

Value type: CharacterString
Definition: Narrative summary providing more detailed information describing the controlled activity or measure.
Description: NOTE: The description shall include any additional information that explain the objectives that are to be achieved by the controlling measures.
Multiplicity: 0..1
Stereotypes: «voidable»

Attribute: restrictionPeriod

Value type: RestrictedPeriod
Definition: Time period or scheduled time defining when the controls apply to the activity or measure.
Description: NOTE: Specific controls may apply to the activities or measures within specified time periods.
Multiplicity: 0..*
Stereotypes: «voidable»

Attribute: specialisedActivity

Value type: SpecialisedActivityTypeCode
Definition: Domain specific activity type controlled or promoted in the zone.
Description: To enable data providers to more specifically define the types of activity or measure controlled in the zone relative to their domain. The values to be used in the specialisedActivty should be derived from a domain specific or Member State codelist.
Multiplicity: 0..*

ControlledActivityInformation	
Stereotypes:	«voidable»
Association role:	
Value type:	ManagementRegulationOrRestrictionZone
Multiplicity:	

5.2.2.2.3. ManagementInformation

ManagementInformation	
Name:	Management Information
Definition:	Information describing the authority responsible for the Management, Regulation or Reporting Zone and any management plans defining the objectives and measures that will be undertaken in the zone to protect the environment.
Status:	Proposed
Stereotypes:	«dataType»
URI:	null
Attribute: environmentalObjectives	
Value type:	EnvironmentalObjective
Definition:	Key environmental objectives established to protect environmental status.
Description:	Specific environmental objectives may be defined within a management area or zone. This is a generic data type that shall enable domains to define a wide range of environmental objectives. Where available, these values should be taken from existing domain or MS codelists.
Multiplicity:	0..*
Stereotypes:	«voidable»
Attribute: managementPlan	
Value type:	CI_Citation
Definition:	Reference to the management plan or action programme describing the objectives and measures that shall be undertaken in the zone to protect the environment.
Multiplicity:	1..*
Stereotypes:	«voidable»
Association role:	
Value type:	ManagementRegulationOrRestrictionZone
Multiplicity:	

5.2.2.2.4. RestrictedPeriod

RestrictedPeriod	
Name:	Restricted Period
Definition:	The RestrictedPeriod defines the either: 1. Time period (e.g. 01 Jan 2011 to 31 March 2011) when an activity is restricted, prohibited or permitted, or 2. Scheduled time period when an activity is restricted, prohibited or permitted.
Status:	Proposed
Stereotypes:	«union»
URI:	null
Attribute: scheduledPeriod	
Value type:	Schedule

RestrictedPeriod

Definition: Definition of the temporality of an activity where the restrictions are not applied continuously.
Description: EXAMPLE: Weekdays from 09:00 to 17:00.
Multiplicity: 1

Attribute: validTime

Value type: TM_Period
Definition: Contiguous time period over which the restriction applies.
Description: EXAMPLE 1: startPosition = Jan 2010
endPosition = Jan 2020

EXAMPLE 2: startPosition = 01 January 2010
endPosition = 31 December 2010

EXAMPLE 3: startPosition = 2010-01-01T00:00:00
endPosition = 2010-01-31T23:59:00

To support the wide range of possible data and time encodings TM_Period is used which is a union of ISO 8601 DateTime, Date and Time and other TM_TemporalPosition.
Multiplicity: 1

5.2.2.2.5. Schedule

Schedule

Name: Schedule
Definition: Temporality of an activity where the restrictions are not applied continuously.
Description: EXAMPLE: Weekdays from 09:00 to 17:00
Status: Proposed
Stereotypes: «dataType»
URI: null

Attribute: day

Value type: DayTypeCode
Definition: Day or days to which the restriction applies.
Multiplicity: 1

Attribute: endTime

Value type: TM_Position
Definition: Time defining when the restriction ends.
Description: NOTE: The time should be defined as an ISO 8601 time:

- hh
- hh:mm
- hh:mm:ss

Multiplicity: 1

Attribute: startTime

Value type: TM_Position
Definition: Time defining when the restriction starts.

Schedule	
Description:	NOTE: The time should be defined as an ISO 8601 time: • hh • hh:mm • hh:mm:ss
Multiplicity:	1

5.2.2.3. Enumerations

5.2.2.3.1. ControlTypeCode

ControlTypeCode	
Name:	Control Type Code
Definition:	Types of control used to manage activities within the zone.
Status:	Proposed
Stereotypes:	«enumeration»
URI:	null
Value: permitted	
Definition:	The activity is allowed to be performed within the zone.
Description:	NOTE 1: To achieve or maintain good environmental status only a specific activity or activities may be allowed to be performed in the zone. NOTE 2: If an activity is only allowed between a particular time period then this should be documented in the validTime attribute.
Value: prohibited	
Definition:	An activity is not allowed to be performed within the zone.
Description:	NOTE 1:To achieve or maintain good environmental status specific activity or activities may not be allowed to be performed in the zone. NOTE 2: If an activity is prohibited within a particular time period then this should be documented in the validTime attribute.
Value: promoted	
Definition:	An activity that is positively promoted or introduced within the zone to achieve good environmental status.
Value: restricted	
Definition:	An activity is limited to only be performed within specific bounds.
Description:	NOTE 1: To achieve or maintain good environmental status an activity may be restricted to mitigate the risk of environmental degradation. NOTE 2: If an activity is restricted between a particular time period then this should be documented in the validTime attribute EXAMPLE: Water abstraction: is restricted and controlled by licence where the operator may be limited to abstracting a specific amount of water per day.

5.2.2.4. Code lists

5.2.2.4.1. ControlledActivityType

ControlledActivityType

ControlledActivityType	
Name:	Controlled Activity Type
Definition:	Classification of the types of activities controlled within the zone.
Description:	A zone may be contain a number of activities that are controlled via regulation/restriction
Status:	Proposed
Stereotypes:	«codeList»
Governance:	May not be extended by Member States.
URI:	http://inspire-registry.jrc.ec.europa.eu/registers/CLR/ControlledActivityType
Value: agricultureAndAquaculture	
Definition:	Activities related to agriculture and aquaculture.
Value: conservation	
Definition:	Activities related to conservation of nature and cultural heritage.
Value: environmentalPollution	
Definition:	Activities causing environmental pollution.
Value: fishingHuntingOrCollecting	
Definition:	Activities related to fishing, hunting and/or collecting of flora or fauna.
Value: landUseAndPlanning	
Definition:	Activities related to land use and planning.
Value: plantAndAnimalHealth	
Definition:	Activities related to protection and eradication of harmful organisms and disease related to plant and animal health.
Value: resourceManagement	
Definition:	Activities related to mining and extraction of materials.
Value: riskManagement	
Definition:	Activities related to risk management.
Value: transportation	
Definition:	Activities related to transportation.

5.2.2.4.2. DayTypeCode

DayTypeCode	
Name:	Day Type Code
Definition:	Day or days when the activity is scheduled to be controlled.
Status:	Proposed
Stereotypes:	«codeList»
Governance:	May not be extended by Member States.
URI:	http://inspire-registry.jrc.ec.europa.eu/registers/CLR/DayTypeCode
Value: friday	
Definition:	Friday is the day of the week between Thursday and Saturday.
Value: monday	
Definition:	Monday is the day of the week between Sunday and Tuesday
Value: publicHoliday	
Definition:	Any day that is a public holiday.
Value: saturday	

DayTypeCode	
Definition:	Saturday is the day of the week between Friday and Sunday.
Value: sunday	
Definition:	Sunday is the day of the week between Saturday and Monday.
Value: thursday	
Definition:	Thursday is the day of the week between Wednesday and Friday.
Value: tuesday	
Definition:	Tuesday is the day of the week between Monday and Wednesday.
Value: wednesday	
Definition:	Wednesday is the day of the week between Tuesday and Thursday.
Value: weekdays	
Definition:	Weekdays refers to all days contained within a working week: Monday, Tuesday, Wednesday, Thursday and Friday.
Value: weekends	
Definition:	Weekdays refers to all days contained within a weekend: Saturday and Sunday.

5.2.2.4.3. EnvironmentalObjectiveType

EnvironmentalObjectiveType (abstract)	
Name:	Environmental Objective Type
Definition:	Controlled vocabulary or code list defined by domains or Member States of key environmental objectives (e.g. pollutant types, harmful organisms or diseases) for which measures have been established within the zone.
Status:	Proposed
Stereotypes:	«codeList»
URI:	null

5.2.2.4.4. ProtectionTargetCode

ProtectionTargetCode (abstract)	
Name:	Protection Target Code
Definition:	Controlled vocabulary or code list defined by domains or Member States of key protection targets related to the environmental objective.
Status:	Proposed
Stereotypes:	«codeList»
URI:	null

5.2.2.4.5. SpecialisedActivityTypeCode

SpecialisedActivityTypeCode (abstract)	
Name:	Specialised Activity Type Code
Definition:	Controlled vocabulary or code list defined by domains or Member States of specific controlled activty types related to their domain.
Status:	Proposed
Stereotypes:	«codeList»
URI:	null

5.2.2.4.6. SpecialisedZoneTypeCode

SpecialisedZoneTypeCode (abstract)	
Name:	Specialised Zone Type Code
Definition:	Additional classification value that defines the specialised type of zone.

SpecialisedZoneTypeCode (abstract)	
Description:	For some ManagementRestrictionOrRegulationZones each zone may be further specialised. This is used to indicate that additional controls (activities or measures)may be in force depending on its specialised type. Example 1: Air Quality Management Zones - can be specialised as either: • agglomerations • nonAgglomeration Example 2: Animal Health Restriction Zones - can be specialised as either: • restrictionZone • protectionZone • controlZone • lowerRiskZone • surveillanceZone
Status:	Proposed
Stereotypes:	«codeList»
URI:	null

5.2.2.4.7. ZoneTypeCode

ZoneTypeCode	
Name:	Zone Type Code
Definition:	High-level classification defining the type of Management Area, Restriction or Regulation Zone.
Status:	Proposed
Stereotypes:	«codeList»
Governance:	May not be extended by Member States.
URI:	http://inspire-registry.jrc.ec.europa.eu/registers/CLR/ZoneCodeType
Value: airQualityManagementZone	
Definition:	Part of the territory of a Member State, as delimited by that Member State for the purposes of air quality assessment and management. -- Description SOURCE: CAFE Directive (2008/50/EC).
Value: animalHealthRestrictionZone	
Definition:	Restriction zones established for the control and eradiation of notifiable animal diseases

ZoneTypeCode

Description: EXAMPLE: Bluetongue Restriction Zones (Council Directive 2000/75/EC).

EXAMPLE: Avian Influenze Restriction Zones (Council Directive 2005/94/EC).

EXAMPLE: African Horse Sickness (Council Directive 92/35/EEC).

Value: areaForDumpingOfWaste

Definition: Area affected by uncontrolled disposal of waste as defined in Waste Framework Directive (2006/12/EC) Art 4.

Value: bathingWaters

Definition: Coastal waters or inland waters (rivers, lakes) explicitly authorised, or not prohibited for recreational bathing by large numbers of people.

Description: NOTE: Bathing waters are set limits for physical, chemical and microbiological parameters to ensuring clean bathing waters to protect public health and the environment.

Value: coastalZoneManagementArea

Definition: Area in which "integrated coastal zone management" takes place.

Description: DEFINITION: "Integrated coastal zone management" is a dynamic process for the sustainable management and use of coastal zones, taking into account at the same time the fragility of coastal ecosystems and landscapes, the diversity of activities and uses, their interactions, the maritime orientation of certain activities and uses and their impact on both the marine and land parts.

SOURCE: Protocol on Integrated Coastal Zone Management in the Mediterranean - signed in Madrid on 20-21 January 2008.

Value: designatedWaters

Definition: Marine, coastal or surface waters designated by Member States as needing protection or improvement in order to support fish life.

Description: Member States are required to define designated waters to protect freshwater fish and shellfish by the Fisheries Directive (2006/44/EC) and Shellfish Waters Directive (2006/113/EEC).

Value: drinkingWaterProtectionArea

Definition: Area in which waste water leakage, use of fertilizer or pesticides, or establishment of waste disposal sites are prohibited.

Description: EXAMPLE: From Directive 80/778, relating to the quality of water intended for human consumption.
According to the article 8 providing that Member States shall take all the necessary measures to ensure that any substances used in the preparation of water for human consumption do not remain in concentrations higher than the maximum admissible.

Value: floodRiskManagementZone

Definition: Coastal areas or individual river basins assigned as the unit of management established for the assessment and management of flood risk.

Description: These are coastal areas or individual river basins assigned as a unit of management different from those assigned pursuant to Article 3(1) of Directive 2000/60/EC.

SOURCE: 2007/60/EC Art 3(2)b.

Value: marineRegion

Definition: Marine regions and their subregions are sea regions designated for the purpose of assessment, management and regulation.

ZoneTypeCode

Description: For each Marine Region a marine strategy shall be developed and implemented to maintain and improve good environmental status.

SOURCE: Marine Strategy Framework Directive (2008/56/EC).

Value: nitrateVulnerableZone

Definition: Areas of land which drain into polluted or threatened waters and which contribute to nitrate pollution.

Description: SOURCE: Art 3 of Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources.

Value: noiseManagementZone

Definition: An area where measures have been established to mitigate noise pollution.

Description: NOTE: Noise Management Areas or Zones may encompass areas surrounding airports, roads or entertainment venues.

Value: plantHealthProtectionZone

Definition: Protection zone within which protective measures are established against the introduction of organisms harmful to plants or plant products and against their spread.

Description: SOURCE: COMMISSION REGULATION (EC) No 690/2008.

Value: prospectingAndMiningPermitArea

Definition: The area on which the prospection or extraction of any mineral has been authorised and for which that right or permit is granted.

Description: EXAMPLE: Directive 94/22/EC on conditions for granting and using authorisations for the prospection, exploration and production of hydrocarbons, stipulates that the limits of the geographical areas covered by an authorisation and the duration of that authorisation must be determined in proportion to what is justified in terms of the best possible exercise of the activities from an economic and technical point of view.

Value: regulatedFairwayAtSeaOrLargeInlandWater

Definition: Regulated navigation areas port-to-port established in accordance with Decision 884/2004/EC of the European Parliament and Council of 29 April 2004 amending Decision No 1692/96/EC on Community guidelines for the development of the trans - European transport network to organise sailing traffic, prevent accident and pollution.

Value: restrictedZonesAroundContaminatedSites

Definition: Zones established to protect human, plant and animal health and control movement and development within a contaminated site.

Description: EXAMPLE: Chernobyl Nuclear Power Plant Exclusion Zone which was established to evacuate the local population and to prevent people from entering the heavily contaminated territory.

EXAMPLE: Zone established around an area suffering from soil contamination to restrict development and protect human health.

Value: riverBasinDistrict

Definition: Area of land and sea, made up of one or more neighbouring river basins together with their associated groundwaters and coastal waters, identified under Article 3(1) as the main unit for management of river basins.

Description: SOURCE: Art 2 (15) of DIRECTIVE 2000/60/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 October 2000 establishing a framework for Community action in the field of water policy.

ZoneTypeCode	
Value: sensitiveArea	
Definition:	Sensitive areas are surface waters (freshwater, estuaries and coastal waters) that require protection against eutrophication.
Description:	SOURCE: Urban Waste Water Treatment Directive (91/271/EEC).

5.2.2.5. 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.

5.2.2.5.1. CI_Citation

CI_Citation	
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]

5.2.2.5.2. 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]

5.2.2.5.3. 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]

5.2.2.5.4. 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]

5.2.2.5.5. EnvironmentalMonitoringFacility

EnvironmentalMonitoringFacility	
Package:	INSPIRE Consolidated UML Model::Themes::Annex III::Environmental Monitoring Facilities::Environmental Monitoring Facilities [Include reference to the document that includes the package, e.g. INSPIRE data specification, ISO standard or the GCM]
Definition:	An Environmental Monitoring Facility is a georeferenced object directly collecting and or processing data or hosting other Environmental Monitoring Facility objects collecting data about features whose properties (e.g. physical, chemical, biological or other aspects of environmental conditions) are repeatedly observed/measured using static or mobile, in-situ or remote methods. An Environmental Monitoring Facility encompasses notions of platform/site/station/sensor often found within various thematic domains.

EnvironmentalMonitoringFacility	
Description:	NOTE 1: An Environmental Monitoring Facility is not a Facility from an Inspire annex Buildings perspective NOTE 2: Laboratories are not Environmental Monitoring Facilities from INSPIRE perspective as the exact location of the laboratory does not add further information to the measurement. The methodology used in the laboratory should be provided with observational data. NOTE 3: From INSPIRE perspective, an Environmental Monitoring Facility requires the provision of Observations only in the case that these have been required under a given reporting obligation or a commonly agreed voluntarily based one.

5.2.2.5.6. 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]

5.2.2.5.7. GeographicalName

GeographicalName	
Package:	INSPIRE Consolidated UML Model::Themes::Annex I::Geographical Names::Geographical Names [Include reference to the document that includes the package, e.g. INSPIRE data specification, ISO standard or the GCM]
Definition:	Proper noun applied to a real world entity.

5.2.2.5.8. 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.

5.2.2.5.9. LegislationReference

LegislationReference	
Package:	INSPIRE Consolidated UML Model::Generic Conceptual Model::Base Types 2 [Include reference to the document that includes the package, e.g. INSPIRE data specification, ISO standard or the GCM]
Definition:	information to unambiguously reference a legal act or a specific part of a legal act

5.2.2.5.10. TM_Period

TM_Period	
Package:	INSPIRE Consolidated UML Model::Foundation Schemas::ISO TC211::ISO 19108:2006 Temporal Schema::Temporal Objects [Include reference to the document that includes the package, e.g. INSPIRE data specification, ISO standard or the GCM]

5.2.2.5.11. TM_Position

TM_Position

TM_Position	
Package:	INSPIRE Consolidated UML Model::Foundation Schemas::ISO TC211::ISO 19108:2006 Temporal Schema::Temporal Reference System [Include reference to the document that includes the package, e.g. INSPIRE data specification, ISO standard or the GCM]

5.3 Application schema 'Reporting Units'

5.3.1 Description

Reporting units are spatial objects that provide the spatial extent for related reporting information. Therefore, reporting units can be almost any spatial object from an INSPIRE Annex Theme. Table 2 identifies reporting units for a range of European level reporting requirements. Reporting units are often reporting information in their own right. They are commonly used to generate maps of environmental status by joining the reporting information with the spatial object (Figure 9 and Figure 10).

Table 2. Examples of typical spatial objects that representing the Reporting Unit for reporting information

Directive	**Reporting Information**	**Reporting Unit**	**INSPIRE Theme**
CAFE Directive	Exceedence of limit/threshold values Distribution of monitoring sites	Air Quality Management Zone	AM
	Summary statistics for observed pollutant values	Air Quality Monitoring Station	EF
Water Framework Directive	Distribution of monitoring sites	River Basin District	AM
	Indicator of ecological or chemical status	Physical Water (River, Lake, Groundwater)	HY/GE
Habitats and Birds Directive	Species distribution	100 km grids	GG
	Assessment of conservation status	Special Area of Conservation (SAC) and Special Protection Areas (SPA)	PS
????	???	Administrative Unit/Statistical Unit	AU/SU

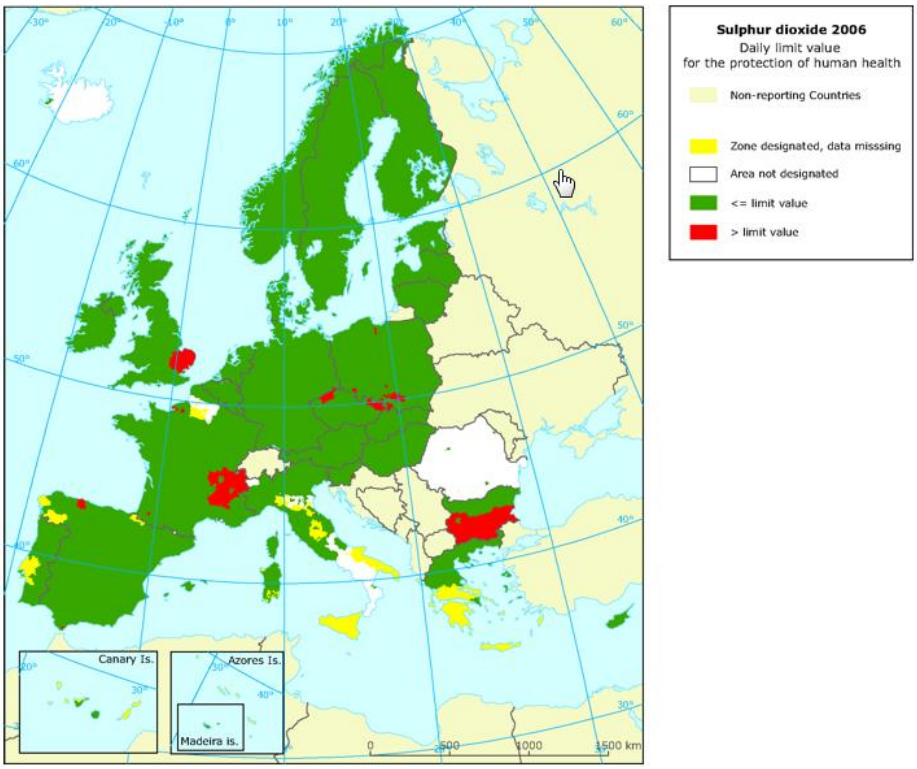


Figure 9. Air Quality Management Zones where Sulphur Dioxide Daily limit value for the protection of human health levels were exceeded, 2006

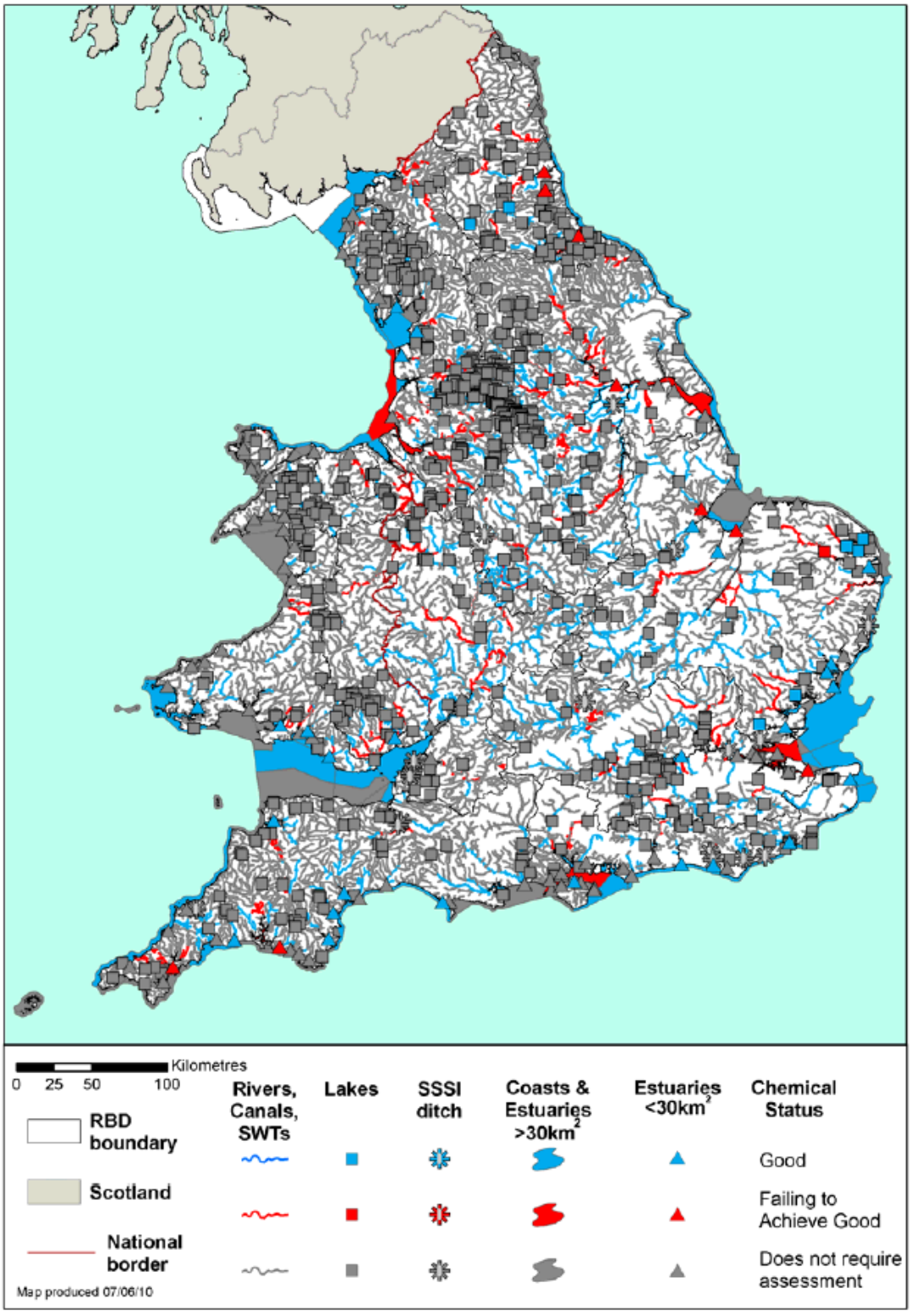


Figure 10. Chemical status for rivers, lakes, estuarine and coastal water in England and Wales, 2009

5.3.1.1. Narrative description and UML overview

The Reporting Units application schema has adopted a "keep it simple" approach for encoding Reporting Units. It is **not** the responsibility of the Reporting Units application schema to define the application schema for the spatial object types that form reporting units. This shall remain the responsibility of other INSPIRE Annex themes or thematic domains that either extend application schema within INSPIRE themes to include additional attributes that are required for reporting or define application schema for spatial objects that do not correspond to any INSPIRE Annex theme.

The Reporting Units application schema is simple, containing a single feature type: *ReportingUnits*. The *ReportingUnits* spatial object type shall act as a container feature that defines the reporting instance and provide either references to the spatial object that forms the spatial .

The *ReportingUnits* spatial object type is comprised of the following attributes (Figure 11):

- *INSPIRE Identifier:* unique, persistent identifier used to identify the reporting units
- *Reporting Unit Name:* name of the spatial object type that forms the reporting unit. This is required to enable discovery and selection, where there may be multiple reporting units
- *Reporting Period:* time defining the reporting period to which the reporting units are applicable;
- *Reporting Authority:* Public Authority responsible for submitting the reporting units dataset to the relevant reporting authority;
- *Begin lifespan version:* the spatial objects contained within the unit attribute, represent a snapshot version of the dataset from which they are derived. This property shall be used to capture when this snapshot was generated;
- *End lifespan version:* date defining when the version of the reporting units dataset was superseded;
- *Unit:* Reference to or inline encoding of the spatial object representing the reporting unit;
- *Reporting Obligation:* summary of the reporting obligation that requires the generation of the reporting information for which the reporting units provide the spatial extent;
- *Related Reporting Information:* this property can be used to link the reporting unit to specific reporting information objects, where known

Reporting Obligation Information:

The reporting obligation information data type contains four properties:

- *Title*: common name or title used to refer to the reporting obligation;
- *Description*: optional description of the reporting obligation;
- *Legal Basis:* citation to the legislative instrument that established the reporting obligation;
- *Reports to:* reference to the authority responsible for receiving or collecting the report

IR Requirement 13	Each *ReportingUnits* spatial object shall contain only one type of spatial object.If multiple types of spatial object form reporting units for a specific legislation then two or more reporting units shall be defined.

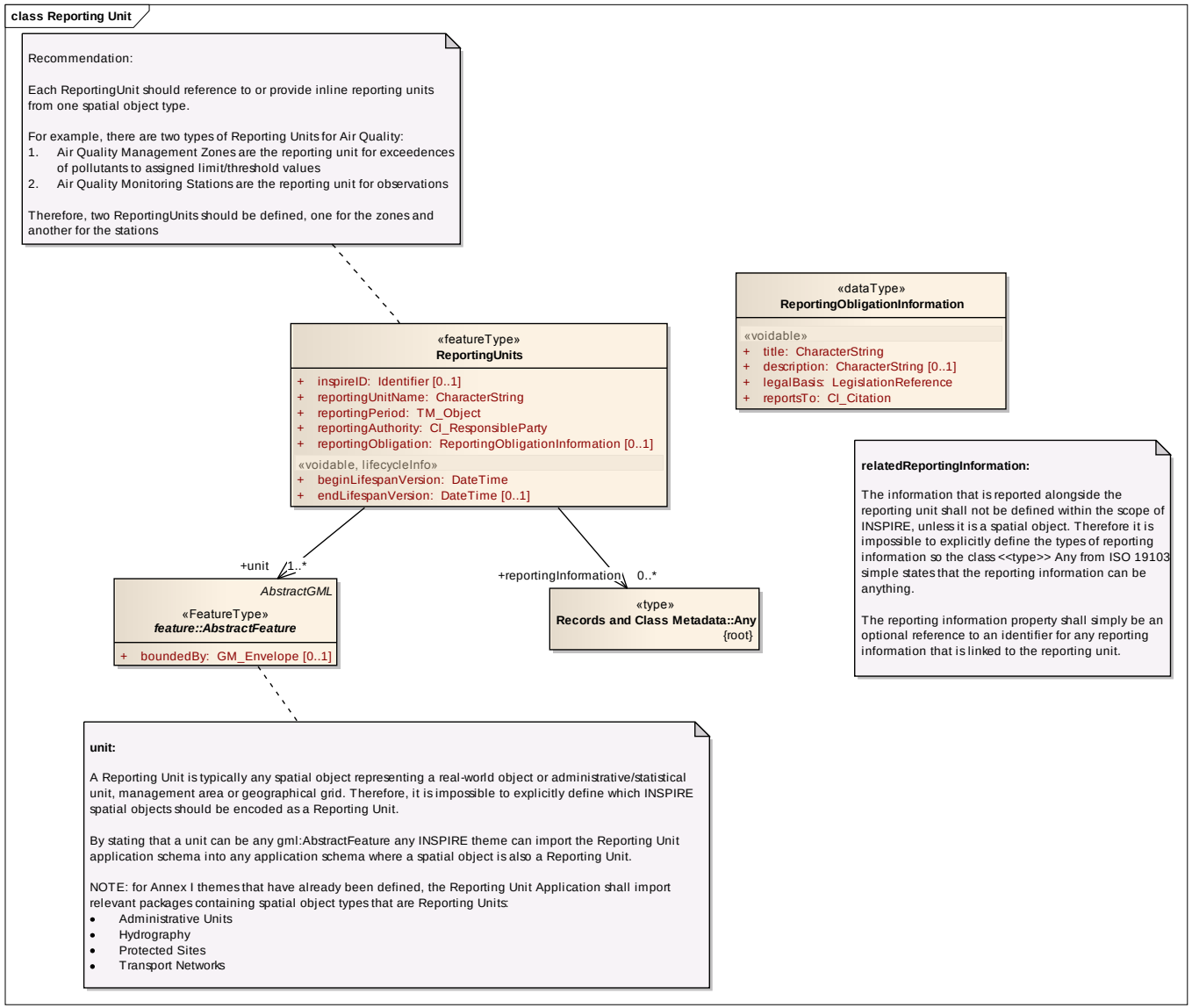


Figure 11 – UML class diagram: Overview of the Reporting Units application schema

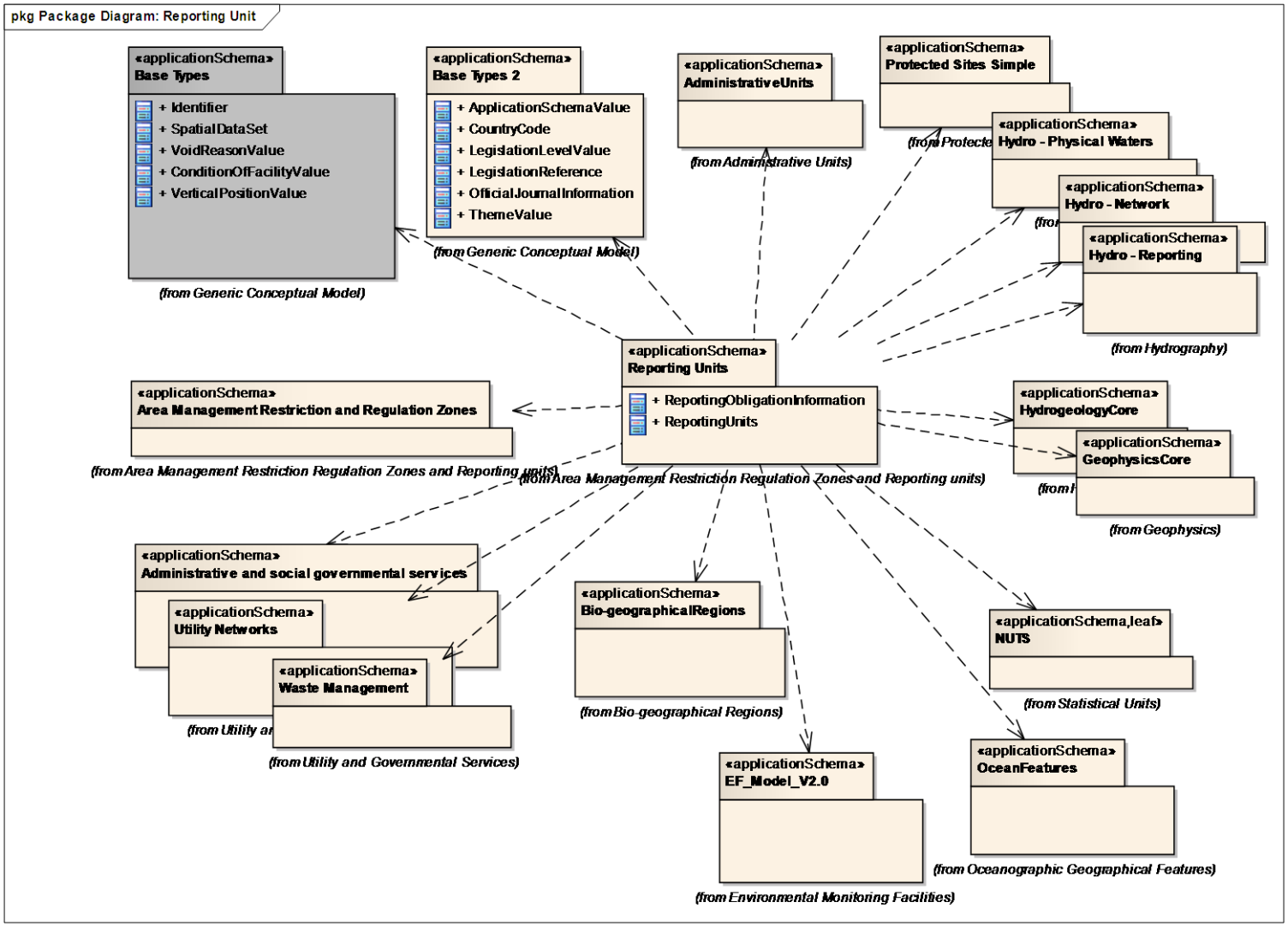


Figure 12 – UML package diagram: Relationship between the Reporting Units application schema and application schemas in other INSPIRE themes

Example encoding of Reporting Obligation Information for air quality monitoring zones:

```
<am-ru:reportingObligation>
    <am-ru:ReportingObligationInformation>
        <am-ru:title>Delimitation of zones and agglomerations</am-ru:title>
        <am-ru:legalBasis>
            <am:LegislationReference>
                <am:legalName>Council Directive 96/62/EC of 27 September 1996 on ambient air quality assessment and
management</am:legalName>
                <am:shortName>Air quality framework directive </am:shortName>
                <am:identificationNumber>96/62/EC</am:identificationNumber>
                <am:articleReference>Article 5</am:articleReference>
                <am:articleReference>Article 11(1b)</am:articleReference>
                <am:linkToLegislativeInstrument>http://eur-lex.europa.eu/LexUriServ/site/en/consleg/1996/L/01996L0062-
20031120-en.pdf</am:linkToLegislativeInstrument>
                <am:publicationDate>1996-11-26</am:publicationDate>
                <am:level>european</am:level>
            </am:LegislationReference>
    </am-ru:legalBasis>
   <am-ru:reportsTo xlink:href="http://rod.eionet.europa.eu/clients/2"/>
</am-ru:ReportingObligationInformation>
```

5.3.1.2. Consistency between spatial data sets

As the reporting units application schema does not explicitly define the data specification for the spatial object representing the unit, no additional requirements are required.

IR Requirement 14	Spatial objects derived from other INSPIRE Annex themes shall comply with the requirements for consistency between spatial data sets as defined in their respective data specification.

5.3.1.3. Identifier management

IR Requirement 15	Each *ReportingUnits* spatial object should be assigned an identifier which shall be unique and persistent.

5.3.1.4. Modelling of object references

The attributes *unit* and *relatedReportingInformation* may be encoded as references (or links) to external features or objects. This reference should contain a URI that can be traversed to enable the client to retrieve the feature or object. See D2.5 and D2.7 for further guidance.

Where the data is delivered via an INSPIRE pre-defined download service, the *units* must be encoded inline within the *ReportingUnits* feature.

IR Requirement 16	If the reporting units are not delivered through an INSPIRE direct access download service, spatial objects representing the reporting units shall be encoded inline, otherwise object referencing should be used.

5.3.1.5. Geometry representation

The reporting units application schema does not explicitly define the data specification for the spatial object representing the unit, so no requirements are necessary.

IR Requirement 17	Spatial objects derived from other INSPIRE Annex themes shall comply with the requirements for geometry representation as defined in their respective data specification.

5.3.1.6. Temporality representation

The Reporting Unit application schema uses the derived attributes "beginLifespanVersion" and "endLifespanVersion" 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 6 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".

These attributes can be used in conjunction with the version attribute of the inspireID to manage the lifecycle of the spatial object.

5.3.2 Feature catalogue

Table 3 - Feature catalogue metadata

Feature catalogue name	INSPIRE feature catalogue Reporting Units
Scope	Reporting Units
Version number	2.0
Version date	2011-06-20
Definition source	INSPIRE data specification Reporting Units

Table 4 - Types defined in the feature catalogue

Type	Package	Stereotypes	Section
ReportingObligationInformation	Reporting Units	«dataType»	5.3.2.2.1
ReportingUnits	Reporting Units	«featureType»	5.3.2.1.1

5.3.2.1. Spatial object types

5.3.2.1.1. ReportingUnits

ReportingUnits

Name:	Reporting Units
Definition:	Collection of spatial objects to which reporting information can be associated or linked to (i.e. statistics, indicators, observations and measurements or spatial data).
Description:	The collection of spatial objects that form the Reporting Unit provide the spatial framework for the associated reported information. The association or linkage between the spatial objects contained within the reporting unit and reporting information is used to join the data together for generate maps used to describe environmental state, identify long term trends or changes in state between reporting periods.
Status:	Proposed
Stereotypes:	«featureType»
URI:	null

Attribute: beginLifespanVersion

ReportingUnits

Value type:	DateTime
Definition:	Date and time at which this version of the spatial object was inserted or changed in the spatial dataset.
Multiplicity:	1
Stereotypes:	«voidable,lifeCycleInfo»

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.
Multiplicity:	0..1
Stereotypes:	«voidable,lifeCycleInfo»

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 application to reference the spatial object. The identifier is an identifier of the spatial object, not an identifier of the real-world phenomenon. NOTE This is not the same as the object identifier of the spatial object contained within the unit
Multiplicity:	0..1

Attribute: reportingAuthority

Value type:	CI_ResponsibleParty
Definition:	Contact information for the Public Authority responsible for creating or collating the data that represents the Reporting Unit and submitting the data to relevant Authority.
Description:	NOTE: Contact information for the Public Authority responsible for generating and submitting the Reporting Unit data should be provided to enable traceability.
Multiplicity:	1

Attribute: reportingObligation

Value type:	ReportingObligationInformation
Definition:	Name of the reporting obligation that defines the requirement providing information about the Reporting Unit.
Multiplicity:	0..1

Attribute: reportingPeriod

Value type:	TM_Object
Definition:	Date defining the reporting period. --Description -- NOTE: The reporting period may be represented as either a time period (e.g. 2011-01-01 to 2011-12-31) or as a single date representing the reporting year (e.g. 2011).
Multiplicity:	1

Attribute: reportingUnitName

Value type:	CharacterString
Definition:	Name of the spatial object that forms the reporting unit.
Description:	This is required to enable discovery and selection of specific reporting units. EXAMPLE: riverBasinDistrict. EXAMPLE: bluetongueRestrictionZone.

ReportingUnits	
Multiplicity:	1
Association role: reportingInformation	
Value type:	Any
Definition:	Reference to the relevant reporting information for which the spatial object defined in the unit provide the spatial extent.
Description:	The optional reportingInformation property can be used to provide a bi-directional association between the reportingUnit and the related information reported for the same reporting period. NOTE: it is assumed that the related information shall carry an association to the Reporting Unit.
Multiplicity:	0..*
Association role: unit	
Value type:	AbstractFeature
Definition:	A reporting unit is any spatial object used to represent the spatial extent to which the associated reporting information relates.
Description:	Reference to or inline encoding of the spatial objects that form the reporting unit.
Multiplicity:	1..*
Stereotypes:	«version»

5.3.2.2. Data types

5.3.2.2.1. ReportingObligationInformation

ReportingObligationInformation	
Name:	Reporting Obligation Information
Definition:	Information summarising the obligation that requires the exchange of information for the reporting.
Status:	Proposed
Stereotypes:	«dataType»
URI:	null
Attribute: description	
Value type:	CharacterString
Definition:	Summary description of reporting obligation.
Description:	EXAMPLE: Member States shall notify of all waters identified as bathing waters, including the reason for any change compared to the preceding year. (Bathing Water Directive 2006/7/EC Report - Identification of bathing areas).
Multiplicity:	0..1
Stereotypes:	«voidable»
Attribute: legalBasis	
Value type:	LegislationReference
Definition:	Reference to the article(s) within the legislative instrument that defined the reporting obligation.
Description:	NOTE The latest legislative information should be recorded.
Multiplicity:	1
Stereotypes:	«voidable»
Attribute: reportsTo	
Value type:	CI_Citation
Definition:	Reference to the authority responsible for receiving or collecting the report.
Multiplicity:	1
Stereotypes:	«voidable»

ReportingObligationInformation	
Attribute: title	
Value type:	CharacterString
Definition:	Official title or commonly used name used to describe the reporting obligation.
Description:	NOTE: Where available, the title or name used to describe the reporting obligation should be derived from an official source. For example EIONET Reporting Obligations Database (ROD). EXAMPLE: Bathing Water Directive 2006/7/EC Report - Identification of bathing areas. SOURCE: EIONET Reporting Obligations Database (ROD).
Multiplicity:	1
Stereotypes:	«voidable»

5.3.2.3. 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.

5.3.2.3.1. AbstractFeature

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

5.3.2.3.2. Any

Any	
Package:	INSPIRE Consolidated UML Model::Foundation Schemas::ISO TC211::ISO 19103:2005 Schema Language::Basic Types::Implementation::Records and Class Metadata [Include reference to the document that includes the package, e.g. INSPIRE data specification, ISO standard or the GCM]

5.3.2.3.3. CI_Citation

CI_Citation	
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]

5.3.2.3.4. 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]

5.3.2.3.5. 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]

5.3.2.3.6. DateTime

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]

5.3.2.3.7. 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.

5.3.2.3.8. LegislationReference

LegislationReference	
Package:	INSPIRE Consolidated UML Model::Generic Conceptual Model::Base Types 2 [Include reference to the document that includes the package, e.g. INSPIRE data specification, ISO standard or the GCM]
Definition:	information to unambiguously reference a legal act or a specific part of a legal act

5.3.2.3.9. TM_Object

TM_Object	
Package:	INSPIRE Consolidated UML Model::Foundation Schemas::ISO TC211::ISO 19108:2006 Temporal Schema::Temporal Objects [Include reference to the document that includes the package, e.g. INSPIRE data specification, ISO standard or the GCM]

5.4 Application schema ‘WFD’ (Candidate Types from HY)

Open issue 5: TWG AM has “inherited” a number of candidate types related to reporting under the Water Framework Directive (WFD).

Since these are just *one* domain-specific example of reporting units, it is proposed to move these types back into the “Hydrography” theme (included in a separate WFD application schema), and to refer to them from the Reporting Units application schema.

Recommendation 7

6 Reference systems

6.1 Coordinate reference systems

6.1.1 Datum

IR Requirement 18 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 19 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

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 20 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 21 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

IR Requirement 22 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

IR Requirement 23 A *ReportingUnits* refers to one or more spatial objects through the *unit* association role. If these spatial objects may be made available in INSPIRE using other coordinate reference systems than those defined in section 6.1.2, these coordinate reference systems may also be used to make available the *ReportingUnits* object.

NOTE This means that any exceptions specifying additional coordinate reference systems that may be used for a spatial object type referred to from the objects in a reporting unit data set are also valid for the reporting units.

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.

Recommendation 2 To evaluate and report the data quality of data sets related to the spatial data theme Area management/restriction/regulation zones and reporting units, the elements and measures listed in Table 3 should be used.

Table 3 – Data quality elements for evaluating and reporting the data quality of data sets related to the spatial data theme Area management/restriction/regulation zones and **reporting units**

Section	Data quality element and sub-element
7.1.1	Completeness – Omission

Open issue 6: Because of the nature of the information being reported in AM, some TWG members question whether or not it is possible or necessary to include 'Completeness – Commission' in the Quality specification, not only because it would be difficult to capture the required information, but they also question the value that this information would provide to users.

Open issue 7: Because the geographic areas covered by AM activities (management, restrictions, reporting, etc.) are sometimes (and often) defined in other themes, adding additional Quality elements such as Topological consistency, Positional accuracy, etc. seems to be unnecessary at this time. For example, in the case of 'Reporting units', legislation may simply refer to an area by name, e.g. in an international convention, where the spatial object(s) comprising the area are defined elsewhere, e.g. in Sea Regions or Hydrography (e.g. for WFD).

7.1.1 Completeness – Omission

Omission should be documented using the rate of missing items.

Name	**Rate of missing items**
Alternative name	–
Data quality element	Completeness
Data quality sub-element	Omission
Data quality basic measure	Error rate
Definition	Number of missing items in the dataset in relation to the number of items that should have been present.
Description	
Evaluation scope	spatial object type: ManagementRestrictionOrRegulationZone, ReportingUnits
Reporting scope	spatial object type: ManagementRestrictionOrRegulationZone, ReportingUnits
Parameter	–
Data quality value type	Real, percentage, ratio (example: 0,0189 ; 98,11% ; 11:582)
Data quality value structure	–
Source reference	–
Example	
Measure identifier	7 (ISO 19138)

7.2 Minimum data quality requirements and recommendations

No minimum data quality requirements are defined.

No minimum data quality recommendations 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.

NOTEThe 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 4 and Table 5).

8.1 Common metadata elements

IR Requirement 24 The metadata describing a spatial data set or a spatial data set series related to the theme **Area management/restriction/regulation zones and** reporting units 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 4) as well as the metadata elements specified in Table 5.

Table 4 – 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 5 – Mandatory and conditional common metadata elements

INSPIRE Data Specification Area management/restriction/regulation zones and **reporting units 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.
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.

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	Either the referenceSystemIdentifier (RS_Identifier) or the projection (RS_Identifier), ellipsoid (RS_Identifier) and datum (RS_Identifier) properties shall be provided. 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.
Implementing instructions	
Example	referenceSystemIdentifier: code: ETRS_89 codeSpace: INSPIRE RS registry
Example XML encoding	<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:RS_Identifier> </gmd:referenceSystemIdentifier> </gmd:MD_ReferenceSystem> </gmd:referenceSystemInfo>
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..*
Data type(and ISO 19115 no.)	186. MD_ReferenceSystem
Domain	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. NOTEMore 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.
Implementing instructions	
Example	referenceSystemIdentifier: code: GregorianCalendar codeSpace: INSPIRE RS registry

Example XML encoding	<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>
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	name: **Area management/restriction/regulation zones and** reporting units GML application schema version: version **2.0**, GML, version 3.2.1 specification: D2.8.**III**.**11** Data Specification on **Area management/restriction/regulation zones and** reporting units – Draft Guidelines
Example XML encoding	<gmd:MD_Format> <gmd:name> <gco:CharacterString> **Area management/restriction/regulation zones and** reporting units 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**.**11** Data Specification on **Area management/restriction/regulation zones and** reporting units – Draft Guidelines</gco:CharacterString> </gmd:specification> </gmd:MD_Format>

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	<gmd:characterSet> <gmd:MD_CharacterSetCode codeListValue="8859part2" codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas/resources/Codelist/ML_gmxCodelists.xml#CharacterSetCode">8859-2</gmd:MD_CharacterSetCode> </gmd:characterSet>
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	See clauses on topological consistency in section 7 for detailed information. This metadata element is mandatory if connectivity is not assured for network centrelines in the dataset. In this case the *Connectivity tolerance* parameter – as described in section 7 – must be provided in order to ensure automatic and unambiguous creation of centreline topology in post-process.

8.2 Metadata elements for reporting data quality

Recommendation 3 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	Lines 100-107 from ISO 19115 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]
Implementing instructions	**Recommendation 4** For each DQ result included in the metadata, at least the following properties should be provided: 100. nameOfMeasure NOTE This should be the name as defined in Chapter 7. 103. evaluationMethodType 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. 106. dateTime NOTE This should be data or range of dates on which the data quality measure was applied. 107. result NOTE This should be of type DQ_QuantitativeResult
Example	
Example XML encoding	
Comments	See Chapter 7 for detailed information on the individual data quality elements and measures to be used.

Open issue 8: 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 9: 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 5 The metadata describing a spatial data set or a spatial data set series related to the theme *Area management/restriction/regulation zones and reporting units* should comprise the theme-specific metadata elements specified in Table 6.

Table 6 – Optional theme-specific metadata elements for the theme Area management/restriction**/regulation zones and reporting units**

INSPIRE Data Specification AM Section	Metadata element	Multiplicity
8.3.1	Maintenance Information	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	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): – 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	
Example XML encoding	
Comments	

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 6 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: 2011-06-20

Open issue 10: 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.

8.4.2 Lineage

Recommendation 7 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.

Recommendation 8 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) may be specified in an Annex of this data specification.

Open issue 11: 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.

8.4.4 Lineage: Derived geometries for ManagementRegulationOrRestrictionZone

IR Requirement 25 If the geometry of the ManagementRegulationOrRestrictionZone spatial object is derived from the geometry of another spatial object type then the source dataset (including version) shall be described as part of the lineage metadata element.

8.4.5 Resource Abstract

The Resource Abstract metadata element defined in Regulation 1205/2008/EC allows to provide a brief summary of the content of the resource.

Recommendation 9 To enable effective discovery of specific types of *ManagementRegulationOrRestrictionZone* or *ReportingUnits* data providers should include the following information in the resource abstract:
- Type of zone or name of the spatial object that forms the reporting unit
- Official full name of legislation that requires the establishment of the zone or reporting requirements

EXAMPLE 1 Air Quality Management Zones for Slovakia defined as required under Article 4 of the *Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe* should be encoded like this:

```
<gmd:abstract>
  <gco:CharacterString>Air Quality Management Zones for Slovakia defined as required under Article 4 of the Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe</gco:CharacterString>
</gmd:abstract>
```

EXAMPLE 2 Air Quality Management Zone Reporting Units for the 2011 reporting period for the *Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe* should be encoded like this:

```
<gmd:abstract>
  <gco:CharacterString>Air Quality Management Zone Reporting Units for the 2011 reporting period for the Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe</gco:CharacterString>
</gmd:abstract>
```

8.4.6 Keywords

Keywords are used to classify the resource to facilitate effective discovery and thematic discovery. The keyword value is a commonly used word, formalised word or phrase used to describe the subject and thus help narrowing a full text search and they allow for structured keyword search.

IR Requirement 26 As both the ManagementRegulationOrRestrictionZone and ReportingUnits spatial objects are generic, data providers shall include the following keywords in addition to the mandatory keywords defined in Commission Regulation (EC) 1205/2008:

ManagementRegulationOrRestrictionZone

- **Spatial object type (Mandatory):** this is required to enable distinction of whether it is a *ManagementRegulationOrRestrictionZone* or *ReportingUnits*
- ***ZoneType (Mandatory):*** this is the high-level classification of the zone. This value shall be consistent with the *ZoneType* value assigned in the data. The INSPIRE codelist for the ZoneType shall be cited in the Keyword originating vocabulary.
- ***SpecialisedZoneType (Conditional):*** this should be provided if the ZoneType is a generalised classification of zone type. This value shall be consistent with the *specialisedZoneType* value assigned in the data and derived, where available from a domain or MS controlled vocabulary or codelist which should be cited in the Keyword originating vocabulary.
- ***Legislation Reference:*** this is required to enable discovery of all zones established for a particular legislation. The following keyword values shall be included:
  - **Short Name (Conditional):** official or commonly used short name for the legislation (e.g. Water Framework Directive, CAFE Directive)
  - **Official Document Number (Mandatory):** Official document number used to uniquely identify the legislative instrument. (e.g. CELEX Number used to uniquely identify European Union Legislation)
  - **Acronym (Conditional):** commonly used acronym used to refer to the legislation (e.g. WFD).

ReportingUnit

- **Name of the spatial object type (Mandatory):** name of the spatial object type that forms the reporting unit for the reporting information.
- **Reporting Period (Mandatory):** this is the reporting year or period to which the reporting unit applies
- ***Legislation Reference:*** this is required to enable discovery of all zones established for a particular legislation. The following keyword values shall be included:
  - **Short Name (Conditional):** official or commonly used short name for the legislation (e.g. Water Framework Directive, CAFE Directive)
  - **Official Document Number (Mandatory):** Official document number used to uniquely identify the legislative instrument. (e.g. CELEX Number used to uniquely identify European Union Legislation)
  - **Acronym (Conditional):** commonly used acronym used to refer to the legislation (e.g. WFD).

EXAMPLE 1 For River Basin Districts, the following keywords shall be included:

- ManagementRestrictionOrRegulationZone
- River Basin District
- Water Framework Directive
- WFD
- 32000L0060

EXAMPLE 2 For Air Quality Management Zone Reporting Units for the 2010 reporting period, the following keywords shall be included:

- ReportingUnits
- Air Quality Management Zone
- 2010
- CAFE Directive
- 32008L0050

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),
- 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 proviced 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 shall be encoded using the encoding(s) specified in this section.

9.2.1.1. Default encoding for application schema Area Management, Restriction and Regulation Zones

Name: Area Management, Restriction and Regulation Zones GML Application Schema
Version: version 2.0, GML, version 3.2.1
Specification: D2.8.III.11 Data Specification on Area management/restriction/regulation zones and reporting units – Draft Guidelines
Character set: UTF-8

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

9.2.1.2. Default encoding for application schema Reporting Units

Name: Reporting Units GML Application Schema
Version: version 2.0, GML, version 3.2.1
Specification: D2.8.III.11 Data Specification on Area management/restriction/regulation zones and reporting units – Draft Guidelines
Character set: UTF-8

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

9.2.2 Alternative Encoding(s)

Recommendation 10	It is recommended that also the encodings specified in this section be provided for the relevant application schemas.

No alternative encodings are specified for this theme.

10 Data Capture

No specific data capture rules have yet been described.

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)

IR Requirement 27 If an INSPIRE view services supports the portrayal of data related to the theme *Area management/restriction/*regulation zones and *reporting units*, 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 *Area management/restriction/*regulation zones and *reporting units*, 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 11 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

Layer Name	Layer Title	Spatial object type(s)	Keywords
AM.ManagementRestrictionOrRegulationZone	Management, Restriction or Regulation Zones	ManagementRestrictionOrRegulationZone (all zone types)	management zones, restriction zones, regulation zones, AM
AM.<zoneType code> One layer per zone type (e.g. air quality management zone) present in a specific view service. The name is constructed from the UpperCamelCase version of the zoneType code, prefixed by “AM.”. EXAMPLE AM.AirQualityManagementZone	Human-readable title of the zone code (set in plural). EXAMPLE Air quality management zones	ManagementRestrictionOrRegulationZone (only those spatial objects that have the corresponding zone type)	
AM.ReportingUnit	Reporting units	<Name of the spatial object type making up the reporting units>	reporting units

Open issue 12: It might be useful to also define one layer per reporting obligation type. However, to do this in an interoperable way, a code list of reporting obligation types (e.g. as used in the Eionet ROD database) would need to be added to the ReportingObligation data type. [See also discussions in the Reporting Units application schema, and in the metadata section]

11.1.1 Layers organisation

None.

11.2 Styles to be supported by INSPIRE view services

11.2.1 Styles for the layer AM.ManagementRestrictionOrRegulationZone

Style Name	**AM.ManagementRestrictionOrRegulationZone.Default**
Default Style	yes
Style Title	Management, Restriction or Regulation Zones Default Style
Style Abstract	The zone is rendered using a red (#FF0000), 30% opaque fill and a solid red (#FF0000) outline with a stroke width of 2 pixels, and labelled using the thematicId attribute (if present).

Symbology	The symbology is specified in 2 files:
	
	NamedLayer_AM.ManagementRestrictionOrRegulationZone.xml (definition of the layer)
	
	`<sld:NamedLayer …>`
	`  <se:Name>AM.ManagementRestrictionOrRegulationZone</se:Name>`
	`  <sld:LayerFeatureConstraints>`
	`  <sld:FeatureTypeConstraint>`
	
	`  <se:FeatureTypeName>ManagementRestrictionOrRegulationZone</se:FeatureTypeName>`
	`  </sld:FeatureTypeConstraint>`
	`  </sld:LayerFeatureConstraints>`
	`  <sld:UserStyle>`
	`  <se:FeatureTypeStyle>`
	`  <se:OnlineResource xlink:type="simple" xlink:href="UserStyle_AM_ManagementRestrictionOrRegulationZone_Default.xml"/>`
	`  </se:FeatureTypeStyle>`
	`  </sld:UserStyle>`
	`</sld:NamedLayer>`
	
	UserStyle_AM_ManagementRestrictionOrRegulationZone_Default.xml (definition of the style)
	
	`<sld:UserStyle …>`
	`  <se:Name>AM.ManagementRestrictionOrRegulationZone.Default</se:Name>`
	`  <sld:IsDefault>1</sld:IsDefault>`
	`  <se:FeatureTypeStyle version="1.1.0">`
	`  <se:Description>`
	`  <se:Title>Management, Restriction or Regulation Zones Default`

	Style</se:Title> <se:Abstract>The zone is rendered using a red (#FF0000), 30% opaque fill and a solid red (#FF0000) outline with a stroke width of 2 pixels, and labelled using the thematicId attribute (if present).</se:Abstract> </se:Description> <se:FeatureTypeName> ManagementRestrictionOrRegulationZone</se:FeatureTypeName> <se:Rule> <se:PolygonSymbolizer> <se:Geometry> <ogc:PropertyName>geometry</ogc:PropertyName> </se:Geometry> <se:Fill> <se:SvgParameter name="fill">#FF0000</se:SvgParameter> <se:SvgParameter name="fill-opacity">0.3</se:SvgParameter> <se:Fill> <se:Stroke> <se:SvgParameter name="stroke-width">2</se:SvgParameter> <se:SvgParameter name="stroke">#FF0000</se:SvgParameter> </se:Stroke> </se:PolygonSymbolizer> <se:TextSymbolizer> <se:Label> <ogc:PropertyName>thematicId</ogc:PropertyName> </se:Label> <se:Font/> <se:Fill/> </se:TextSymbolizer> </se:Rule> </se:FeatureTypeStyle> </sld:UserStyle>
Minimum & maximum scales	None
Example	<thematic_id>

11.2.2 Styles for the layer AM.<zone type code>

Style Name	**AM.<zone type code>.Default**
Default Style	yes
Style Title	<layer title> Default Style
Style Abstract	The zone is rendered using a red (#FF0000), 30% opaque fill and a solid red (#FF0000) outline with a stroke width of 2 pixels, and labelled using the thematicId attribute (if present).
Symbology	The symbology is specified in 2 files: **NamedLayer_AM_ZoneTypeCode.xml** (a template for defining the specific layers)

	<sld:NamedLayer …> <se:Name>AM.%ZoneType_Code%</se:Name> <sld:LayerFeatureConstraints> <sld:FeatureTypeConstraint> <se:FeatureTypeName>ManagementRestrictionOrRegulationZone</se:FeatureTypeName> <ogc:Filter> <ogc:Equals> <ogc:PropertyName>zoneType</ogc:PropertyName> <ogc:PropertyName>%zoneType_code%</ogc:PropertyName> </ogc:Equals> </ogc:Filter> </sld:FeatureTypeConstraint> </sld:LayerFeatureConstraints> <sld:UserStyle> <se:FeatureTypeStyle> <se:OnlineResource xlink:type="simple" xlink:href="UserStyle_AM_ManagementRestrictionOrRegulationZone_Default.xml"/> </se:FeatureTypeStyle> </sld:UserStyle> </sld:NamedLayer> **UserStyle_AM_ManagementRestrictionOrRegulationZone_Default.xml** (definition of the style, see above)
Minimum & maximum scales	None
Example	<thematic_id>

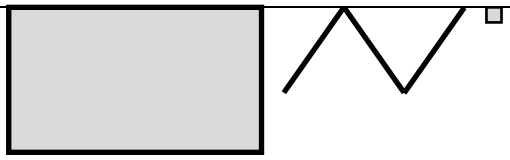
11.2.3 Styles for the layer AM.ReportingUnit

Style Name	**AM.ReportingUnit.Default**
Default Style	yes
Style Title	Reporting Units Default Style
Style Abstract	Reporting units with a point geometry are rendered as a square with a size of 6 pixels, with a 50% grey (#808080) fill and a black outline. Reporting units with a curve geometry are rendered as a solid black line with a stroke width of 2 pixels.Polygon reporting units are rendered using a 50% grey (#808080), 30% opaque fill and a solid black outline with a stroke width of 2 pixels.
Symbology	The symbology is specified in 2 files: **NamedLayer_AM.ManagementRestrictionOrRegulationZone.xml** (definition of the layer) <sld:NamedLayer …>

```
    <se:Name>AM.ReportingUnit.Default</se:Name>
    <sld:LayerFeatureConstraints>
        <sld:FeatureTypeConstraint>
            <se:FeatureTypeName>ReportingUnit.Default</se:FeatureTypeName>
        </sld:FeatureTypeConstraint>
    </sld:LayerFeatureConstraints>
    <sld:UserStyle>
        <se:FeatureTypeStyle>
            <se:OnlineResource xlink:type="simple"
xlink:href="UserStyle_AM_ReportingUnit_Default.xml"/>
        </se:FeatureTypeStyle>
    </sld:UserStyle>
</sld:NamedLayer>
```

UserStyle_AM_ReportingUnit_Default.xml (definition of the style)

```
<sld:UserStyle …>
            <se:Description>
            <se:Title>Reporting Units Default Style</se:Title>
            <se:Abstract>Reporting units with a point geometry are rendered as a square
with a size of 6 pixels, with a 50% grey (#808080) fill and a black outline. Reporting
units with a curve geometry are rendered as a solid black line with a stroke width of 2
pixels.Polygon reporting units are rendered using a 50% grey (#808080), 30% opaque
fill and a solid black outline with a stroke width of 2 pixels.</se:Abstract>
        </se:Description>
        <se:FeatureTypeName>$SPATIALOBJECTTYPE</se:FeatureTypeName>
        <se:Rule>
            <se:PointSymbolizer>
                <se:Geometry>
                    <ogc:PropertyName>$SPATIALPROPERTY</ogc:PropertyName>
                </se:Geometry>
                <se:Graphic/>
            </se:PointSymbolizer>
            <se:LineSymbolizer>
                <se:Geometry>
                    <ogc:PropertyName>$SPATIALPROPERTY</ogc:PropertyName>
                </se:Geometry>
                <se:Stroke>
                    <se:SvgParameter name="stroke-width">2</se:SvgParameter>
                </se:Stroke>
            </se:LineSymbolizer>
            <se:PolygonSymbolizer>
                <se:Geometry>
                    <ogc:PropertyName>$SPATIALPROPERTY</ogc:PropertyName>
                </se:Geometry>
                <se:Fill>
                    <se:SvgParameter name="fill">#808080</se:SvgParameter>
                    <se:SvgParameter name="fill-opacity">0.3</se:SvgParameter>
                </se:Fill>
                <se:Stroke>
                    <se:SvgParameter name="stroke-width">2</se:SvgParameter>
                </se:Stroke>
            </se:PolygonSymbolizer>
                <!-- se:TextSymbolizer>
                    <se:Label>
                        <ogc:PropertyName>thematicId</ogc:PropertyName>
                    </se:Label>
                    <se:Font/>
                    <se:Fill/>
```

	</se:TextSymbolizer --> </se:Rule> </se:FeatureTypeStyle> </sld:UserStyle>
Minimum & maximum scales	None
Example	

Open issue 13:	Should reporting units be labelled, too? If so, using which attribute?

DS Requirement 6	INSPIRE view services providing data according to the Reporting Units application schema shall support the styles to that are required to be supported for the spatial object type that makes up the reporting units.

11.3 Other recommended styles

No other styles are recommended.

Bibliography

[DS-D2.3] INSPIRE DS-D2.3, Definition of Annex Themes and Scope, v3.0, *http://inspire.jrc.ec.europa.eu/reports/ImplementingRules/DataSpecifications/D2.3_Definition_of_Annex_Themes_and_scope_v3.0.pdf*

[DS-D2.5] INSPIRE DS-D2.5, Generic Conceptual Model, v3.3, *http://inspire.jrc.ec.europa.eu/documents/Data_Specifications/D2.5_v3_3.pdf*

[DS-D2.6] INSPIRE DS-D2.6, Methodology for the development of data specifications, v3.0, *http://inspire.jrc.ec.europa.eu/reports/ImplementingRules/DataSpecifications/D2.6_v3.0.pdf*

[DS-D2.7] INSPIRE DS-D2.7, Guidelines for the encoding of spatial data, v3.2, *http://inspire.jrc.ec.europa.eu/documents/Data_Specifications/D2.7_v3.2.pdf*

[ISO 19101] EN ISO 19101:2005 Geographic information – Reference model (ISO 19101:2002)

[ISO 19103] ISO/TS 19103:2005, Geographic information – Conceptual schema language

[ISO 19107] EN ISO 19107:2005, Geographic information – Spatial schema (ISO 19107:2003)

[ISO 19108] EN ISO 19108:2005 Geographic information - Temporal schema (ISO 19108:2002)

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

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

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

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

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

[OGC 06-103r3] Implementation Specification for Geographic Information - Simple feature access – Part 1: Common Architecture v1.2.0

COM (2006) 15 final 2006/0005(COD) Proposal for a Directive of the European Parliament and of the Council on the assessment and management of floods

Commission Decision of 18 December 1996 concerning a site information format for proposed Natura 2000 sites (97/266/EC) – [sets out Natura 2000 activity type codes]

Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora

Directive 2000/60/EC of 23 October 2000 establishing a framework for Community action in the field of water policy (the Water Framework Directive – WFD)

Directive 2002/49/EC of the European Parliament and of the Council of 25 June 2002 relating to the assessment and management of environmental noise

Directive 2006/12/EC of the European Parliament and of the Council of 5 April 2006 on waste

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)

Directive 2008/1/EC of the European Parliament and of the Council of 15 January 2008 concerning integrated pollution prevention and control (Codified version)

Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives

Directive 2008/56/EC of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (the 'Marine Strategy Framework Directive')

Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe (the 'CAFE Directive')

Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (the 'Birds Directive')

INSPIRE Glossary
http://inspire-registry.jrc.ec.europa.eu/registers/GLOSSARY

International Hydrographic Bureau (IHB) Hydrographic Dictionary (S-32) - http://hd.iho.int/en/index.php/Main_Page

Recommendation of the European Parliament and of the Council of 30 May 2002 concerning the implementation of Integrated Coastal Zone Management in Europe

Annex A
(normative)

Abstract Test Suite

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

Open issue 14: 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

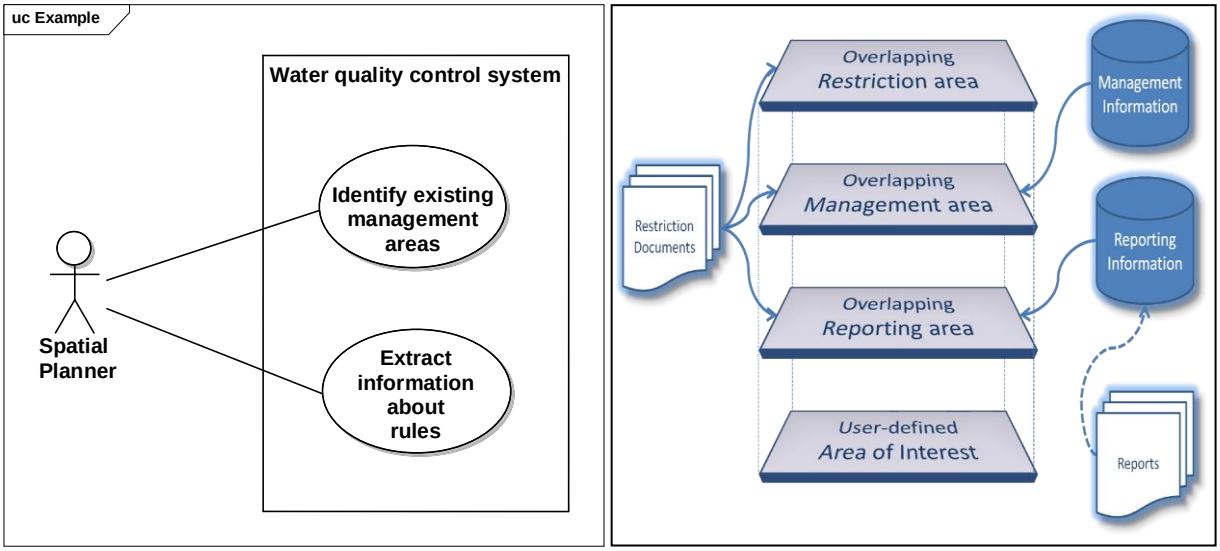
This annex describes the use cases that were used as a basis for the development of this data specification. The use-cases which are described here are supported through the information included in the high-level data specification. For each use-case there is a high-level description outlining the requirements as well as specific examples and illustrations to better explain data relationships in the AM specification and thus facilitate the comprehension and implementation of the data model.

B.1 Finding regulation, management and reporting area by location

Use Case Description*	
Name	Planning new management rules for water quality control
Primary actor	Spatial Planner
Goal	To introduce new restrictions and rules for river systems to protect / improve water quality by securing that they will be in line with rules which are already active in the area of interest or that they will not conflict with any valid regulation.
System under consideration	Water Quality Control System (operated by a municipal authority of hydraulic works)
Importance	High
Description	The spatial planner performs a spatial overlay analysis using the planning area of interest to select all features from AM datasets which are completely within, intersects or are within a buffer of a certain distance.
Pre-condition	The spatial data for planning area has been obtained / generated as a polygon coverage, as boundary lines for defining the extent, or defined as a buffer distance from the spatial object of interest (e.g. river branch). Data on protected areas (e.g. Natura2000) (according to the “protected sites” data specification) and on land use (according to the “land use” data specification) has been obtained from the relevant INSPIRE download services or adapted from local data sources.
Post-condition	Spatial intersection data set for regulation, management and/or reporting areas within the planning area, and attribute data about any associated regulation valid for the area
Flow of Events – Basic Path	
Step 1	The spatial planner defines the spatial boundaries of the planning area.
Step 2	The spatial planner uses a desktop GIS application to connect to the INSPIRE Geo-portal catalogue service and adds all AM datasets and other datasets (PS, LU datasets, for example) onto the map of planning region through a download service using the Web Feature Server protocol.
Step 3	Having included all data sources in the map, the spatial planner now performs a spatial overlay analysis using the planning area of interest to select all features from AM datasets which are completely within, intersects or are within a buffer of a certain distance.
Step 4	In order to observe the regulation, management and reporting areas in the local spatial plan, the planner interprets the spatial metadata associated with the features to determine the accuracy of the delineation and whether they are absolute or if they need to be further detailed and formalized through the local spatial plan.

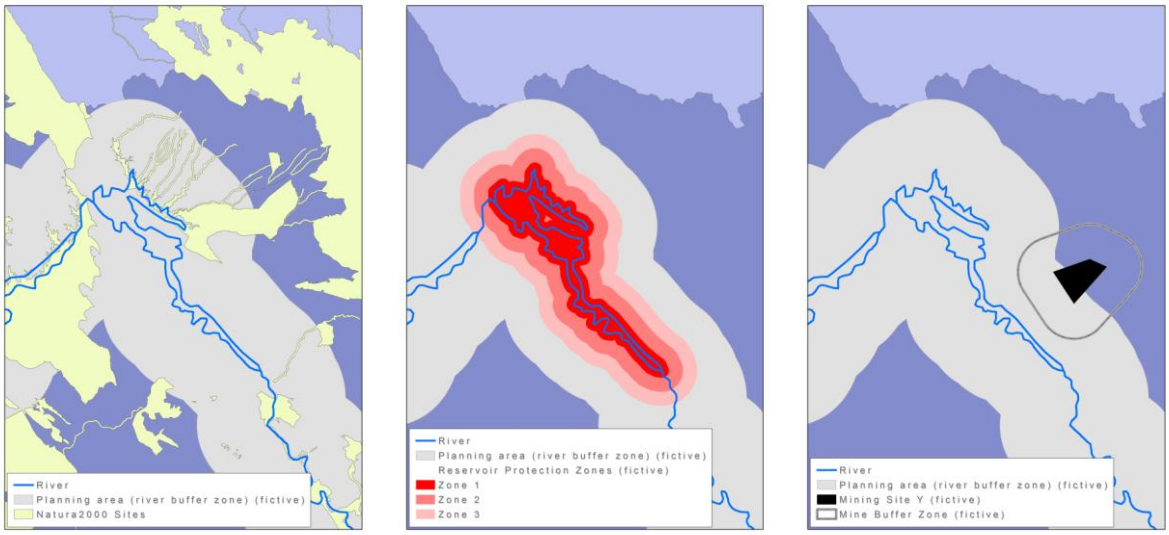
Use Case Description*	
Step 5	The spatial planner computes the relative shares of regulated / managed / restricted areas inside the planning area (as well as similar spatial information for existing land use types) to figure out relative importances of different management and reporting regimes associated with the legally-managed areas and continuous impacts of different practices particularly applied by dominant land uses
Step 6	The query provides the planner with the names of all regulations (laws, protocols and legally binding agreements) which are valid for each area in the result set. Furthermore, it allows to learn which authority on which administrative level is responsible for managing the regulation and any associated reporting regimes which may be established for them. It is also possible to capture necessary contact information for the relevant authorities in order to obtain more detailed information.
Step 7	As it may be important in some cases to compare between previous rules which are no longer active in the region and currently valid ones, the planner may also need to know which areas are historical and which are currently active. This information is visible from the attributes stating the start and end dates for the regulation itself and any associated management or reporting regime.
Flow of Events – Alternative Paths	
	NONE
Data set: Planning area extent	
Description	Planning area coverage showing the spatial boundaries of the planning area
Type	input
Data provider	National/sub-national authority of hydraulic works (hwa)
Geographic scope	Country C1
Thematic scope	Planning area extent. Available as a polygon coverage or as boundary lines for defining the extent, or spatially generated as a buffer polygon around the spatial object of interest based on the defined buffer distance.
Scale, resolution	1:25.000
Delivery	Soft Copies Online
Documentation	http://data.wqcs.hwa.gov.country_c1 (available from the water quality control system (wqcs) data service)
Data set: River Basin Districts	
Description	Spatial extent of river basin districts in Europe
Type	input
Data provider	European Environment Agency (EEA) (Data available directly from WISE – Water Information System for Europe or through the INSPIRE Geo-portal)
Geographic scope	European
Thematic scope	River basin districts
Scale, resolution	1:1.000.000
Delivery	Online
Documentation	http://www.eea.europa.eu/data-and-maps/data/wise-river-basin-districts-rbds
Data set: Mining Permit and Control Areas	
Description	Mining Permit Area Y and buffer zone to address safety, aesthetic-disturbance, environmental, and cultural issues/impacts due to mining operations in Mining Site Y
Type	input
Data provider	Ministry of Energy and Natural Resources of Country C1 (Data available through the INSPIRE Geo-portal)
Geographic scope	Mining Site Y
Thematic scope	Buffer zones around the Mining Site Y
Scale, resolution	1:25.000
Delivery	Online
Documentation	http://www.moenr.gov.country_c1/miningsites/siteY
Data set: Restricted areas around drinking water source	

Use Case Description*	
Description	Proximate, mediate and remote protection zones around drinking water supply reservoir
Type	input
Data provider	National/sub-national hydraulic works authority (Data available from national authorities through the INSPIRE Geo-portal)
Geographic scope	Country C1
Thematic scope	Reservoir protection zones to prevent water pollution in reservoir systems
Scale, resolution	1:25.000
Delivery	Online
Documentation	http://www.hwa.gov.country_c1/dams
Data set: Land use	
Description	Corine land cover (CLC) types for Europe (as proxy to land use information) Corine Land Cover 2006 seamless vector data - version 13 (02/2010) Corine Land Cover 2006 raster data - version 13 (02/2010) *Corine Land Cover 2000 seamless vector data - version 13 (02/2010)* *Corine Land Cover 2000 raster data - version 13 (02/2010)*
Type	input
Data provider	European Environment Agency (EEA)
Geographic scope	CLC2000: EU27, Albania, Bosnia and Herzegovina, Croatia, Liechtenstein, Macedonia, the former Yugoslavian Republic of, Montenegro, Norway, Serbia, Turkey CLC2006: EU27, Albania, Bosnia and Herzegovina, Croatia, Iceland, Liechtenstein, Macedonia, the former Yugoslavian Republic of, Montenegro, Norway, Serbia, Turkey
Thematic scope	Corine land cover classes
Scale, resolution	100m, 250m
Delivery	Online
Documentation	http://www.eea.europa.eu/data-and-maps/data
Data set: Natura2000 sites	
Description	*Natura 2000 data - the European network of protected sites*
Data provider	EEA, National Authority of Protected Sites (Available from the EEA data centre or national data sources through the INSPIRE Geo-portal)
Type	input
Geographic scope	Country C1
Thematic scope	Vector polygon data for sites
Scale, resolution	1:100.000
Delivery	Online
Documentation	http://www.eea.europa.eu/data-and-maps/data/natura-1
Data set: Intersection of planning area, nature conservation zones, reservoir protection zones and mining site buffer zone	
Description	Intersection of the planning area with the combination of nature conservation zones, reservoir protection zones and mining site buffer zone
Data provider	Municipal authority of hydraulic works
Type	output
Geographic scope	Relative shares of regulated / managed / restricted areas inside the planning area
Thematic scope	Associated set of rules valid for the area
Scale, resolution	1:25.000
Delivery	Through password-restricted data access area of Water Quality Control System
Documentation	https://intranet.wqcs.hwa.gov.country_c1/data_files



(a) *(b)*

Figure B1.1 – (a) Example UML use case diagram; (b) Sample use case data flow diagram



(a) *(b)* *(c)*

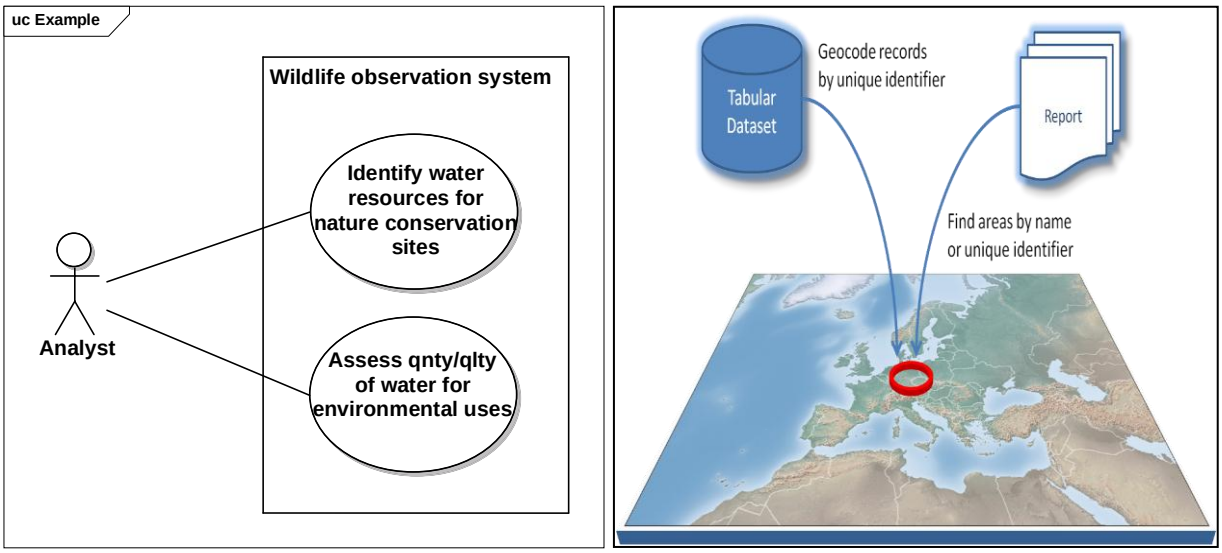
Figure B1.2 – (a) Natura 2000 sites, (b) Reservoir protection zones, (c) mining site and mine-specific buffer zone overlapping the sample planning area

B.2 Finding location of regulation, management or reporting area by identifier or name

Use Case Description*	
Name	Performing searches for regulation, management and reporting areas by name or identifier
Primary actor	Analyst
Goal	Identifying the location of individual areas across the territory of Europe and better interpreting and contextualizing the qualitative information contained within a report

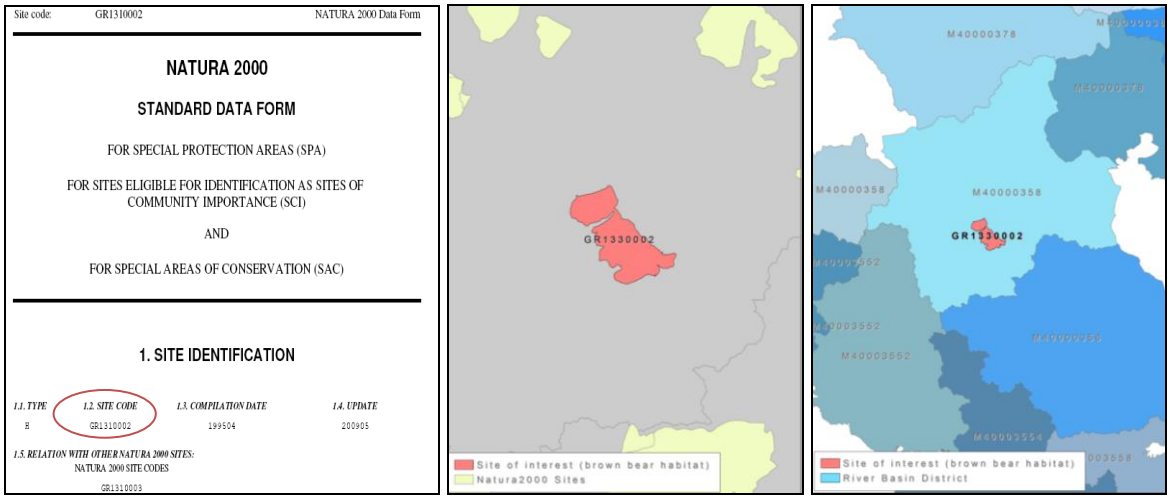
Use Case Description*	
System under consideration*	Wildlife Observation System (operated by an environmental sciences research institute)
Importance	Medium
Description	An analyst working for an environmental sciences research institute has received a report containing qualitative information about a number of reporting areas across the territory of Europe. Along with the report followed a DVD with tabular data associated with different reporting areas. In the report, the reporting areas are identified as a mix between formal unique identifiers and popular names – in the accompanying tabular datasets, all records are associated with formal unique identifiers.
Pre-condition	The report received/produced by the research institute contains tabular information including or images showing the name of the area of interest and/or the unique official identifier assigned to the area.
Post-condition	
Flow of Events – Basic Path	
Step 1	The analyst retrieves PS data (nature conservation zones) from the INSPIRE Geo-portal's download services.
Step 2	The analyst performs tabular searches for regulation, management and reporting areas (nature conservation zones) by name or identifier.
Step 3	The analyst retrieves AM data (river basin districts) from the INSPIRE Geo-portal's download services.
Step 4	The analyst performs spatial queries for regulation, management and reporting areas (selected nature conservation zones and corresponding river basin districts).
Step 5	The analyst retrieves HY data (hydrographical features) from the INSPIRE Geo-portal's download services or contacts the management authority of the relevant river basin district to collect information about hydrographical features in the proximity of her/his site(s) of interest
Step 6	In order to perform some further studies, the analyst would like to perform a correlation query between the data contained in a report and a number of case study sites. In order to achieve this, she/he adds the data from the report DVD to his desktop GIS application and "joins" the tabular data to the AM datasets using the areas unique identifier as a key.
Step 7	The analyst is now able to create geo-statistical visualizations, e.g. showing report values as graded colours on a map. She/he is also able to perform correlation analysis between her/his case study sites and the geocoded reporting data.
Flow of Events – Alternative Paths	
	NONE
Data set: Natura2000 sites	
Description	Natura 2000 data - the European network of protected sites
Data provider	EEA, National Authority of Protected Sites (in accordance with the "Protected Sites" data specification, available from the relevant INSPIRE download service, EEA data centre or national data sources)
Type	input
Geographic scope	Country C2
Thematic scope	Vector polygon data for sites
Scale, resolution	1:100.000
Delivery	Online

Use Case Description*	
Documentation	http://www.eea.europa.eu/data-and-maps/data/natura-1
Data set: River Basin Districts	
Description	Spatial extent of river basin districts in Europe
Type	input
Data provider	European Environment Agency (EEA) (Data available directly from WISE – Water Information System for Europe or via the INSPIRE Geo-portal's download services)
Geographic scope	European
Thematic scope	River basin districts
Scale, resolution	1:1.000.000
Delivery	Online
Documentation	http://www.eea.europa.eu/data-and-maps/data/wise-river-basin-districts-rbds
Data set: Inland water bodies	
Description	Natural or artificial stretches of water and/or water courses serving as water drainage channels
Data provider	National Hydrography Institute (Available from national data sources through the the INSPIRE Geo-portal according to the "HY" data specification)
Type	input
Geographic scope	Country C2
Thematic scope	Vector polygon data for hydrographical features
Scale, resolution	1:100.000
Delivery	Online
Documentation	http://www.nhi.gov.country_c2/rivers_and_lakes
Data set: Proximate water resources	
Description	Water resources in the proximity of the conservation area of interest
Data provider	Environmental sciences research institute of Country C2
Type	output
Geographic scope	The conservation area of interest and its proximity
Thematic scope	Quantity and quality of water available for environmental purposes
Scale, resolution	1:100.000
Delivery	Accessible from soft-/hard-copies of assessment report
Documentation	http://www.esri.org.country_c2/publications/report_no_1.pdf



(a) *(b)*

Figure B2.1 – (a) Example UML use case diagram; (b) Sample use case data flow diagram



(a) *(b)* *(c)*

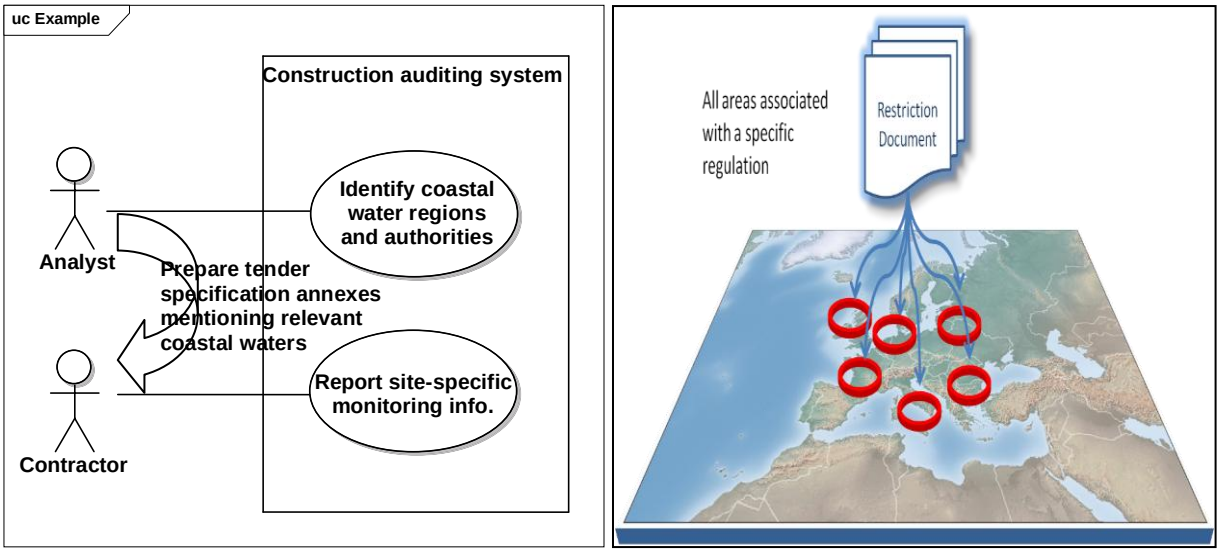
Figure B2.2 – (a) Reporting information with site code, (b) site location within the Natura2000 network, and (c) river basin district containing the site of interest

B.3 Finding regulation, management or reporting areas by regulation

Use Case Description*	
Name	Locating regulation, management or reporting areas mentioned in a legal/official document
Primary actor	Analyst, Contractor
Goal	Identifying areas which are covered by certain law or regulations and assessing corresponding implications
System under consideration*	Construction Auditing System (operated by the Ministry of Public Works of Country C3)
Importance	High
Description	An analyst from a central authority has the task of planning construction and performing an EIA for a port area project. From the relevant obligations, she/he basically knows about the rules and measures for protecting bathing water quality, but is not so sure about the name of the coastal water authorities, which will co-approve the construction permits, and their responsibility areas. The contractor, on the other hand, needs to organize a list of the quality stations from which he would need to report information to the administration during the entire construction period as explicitly stated in the tender specification. For this specific purpose, they will need to perform a spatial query to learn about the coastal authorities performing in the coastal water area and then an overlay operation to get the list of stations from which they will collect/report the periodical data.
Pre-condition	The analyst has necessary geo-referenced drawings or spatial layers of the project area, which will also be provided to the contractor winning the tender.
Post-condition	Bathing water quality stations as part of the port area project are adressed as well as the competent authorities.
Flow of Events – Basic Path	

Use Case Description*	
Step 1	By using the geographic extent of the project area (obtained from local data repositories) and the layer of WISE coastal waters (accessed through INSPIRE Geo-portal), analyst performs a spatial overlay operation to identify coastal water regions under potential impact of the project and relevant bathing water authorities.
Step 2	Analyst determines the reporting obligations specifically asked by coastal water authorities and places them in the tender specifications as special conditions.
Step 3	The contractor collects the project area extent from the authority and the spatial layer of bathing water stations through the INSPIRE Geo-portals data access and download services.
Step 4	The contractor performs an overlay operation to select a list of quality stations (based on their locations) from which she/he will need to compile data and fulfil reporting requirements asked in the tender specifications document.
Flow of Events – Alternative Paths	
	NONE
Data set: Project area coverage	
Description	Spatial boundaries of the construction site for the port construction project
Data provider	Ministry of Public Works of Country C3 (Analyst's organization)
Type	input
Geographic scope	Port project area (CAD drawings, GIS layer, etc.)
Thematic scope	As part of planning for port construction project
Scale, resolution	1:1.000
Delivery	For official use only
Documentation	Provided in annexes of the tender specification document
Data set: WISE coastal waters	
Description	Coastal waters are defined as one nautical mile from the coastline and extending, where appropriate, up to the outer limit of transitional waters. Coastal waters are included in RBDs, but this is not consistently reported by Member States.
Type	input
Data provider	National authorities in Member States, European Environment Agency (EEA) (Data available directly from WISE – Water Information System for Europe or via the INSPIRE Geo-portal's download services)
Geographic scope	EU27, Norway, Switzerland
Thematic scope	River basin districts are defined as the area of land and sea, made up of one or more neighboring river basins together with their associated groundwaters and coastal waters, which is identified under Article 3(1) as the main unit for management of river basins.
Scale, resolution	1:1.000.000
Delivery	Online
Documentation	http://www.eea.europa.eu/data-and-maps/data/wise-river-basin-districts-rbds
Data set: Bathing water stations	
Description	Bathing water stations dataset presents the latest information as reported by the Member States (EU27) for the 2009 bathing season, as well as some historical data since 1990.
Data provider	National responsible authorities of Member States, European Environment Agency (EEA)
Type	input
Geographic scope	EU27, Croatia, Switzerland

Use Case Description*	
Thematic scope	The EU Bathing Waters Directive *76/160/EEC* requires Member States to identify popular bathing places in fresh and coastal waters and monitor them for indicators of microbiological pollution (and other substances) throughout the bathing season which runs from May to September
Scale, resolution	Unknown
Delivery	Online
Documentation	http://www.eea.europa.eu/data-and-maps/data/bathing-water-directive-status-of-bathing-water-2
Data set: Special reporting obligations dataset	
Description	List and locations of spatially selected monitoring stations for periodically reporting water quality measurements to the contracting authority
Data provider	Contractor & analyst's organization
Type	output
Geographic scope	Port project area
Thematic scope	Tender specifications document
Scale, resolution	1:1.000
Delivery	For official use only
Documentation	Periodical reports to the contracting authority



(a) *(b)*

Figure B3.1 – (a) Example UML use case diagram; (b) Sample use case data flow diagram

(a) *(b)* *(c)*

Figure B3.2 – (a) WISE coastal waters, (b) bathing water quality monitoring stations, and (c) site codes of monitoring stations

B.4 Considering temporal variability in management / regulation / reporting rules and/or datasets

Use Case Description*	
Name	Performing an assessment on spatial objects dynamically changing due to their nature and/or questioning previous versions of spatial information
Primary actor	Researcher
Goal	*Generating temporal statistics (*Temporal variability of spatial information may also need to be considered in AM data model as the historical information on the managed, regulated, restricted and/or reported areas becomes more important in some cases for performing time-span (or periodical) assessments or settling disputes that may arise due to changes in an area. Such changes may result from timely-varying orientations in administrative definitions or legislations or from the dynamic nature of the phenomenon itself that characterizes the area (e.g. land cover). Any change in time could change borders of area or just the nature of restriction (through different restriction rules and preventive measures)).
System under consideration	Not available
Importance	High
Description	A researcher performing a graduate study on integrated coastal zone management needs to integrate data on urban morphological zones (UMZs) into her/hir analyses. However, she/he is only interested in the spatial statistics and observed changes within an inside buffer of 10 km from the coastline. For performing such an assessment, she/he does not own enough experience to perform spatial operations by using the original land cover data in GIS software, thus would like to import some CAD data about the changes in UMZs from the relevant databases in the AM data model, overlay it onto her/his own study area (i.e. the buffer area of 10km) again in CAD environment, and produce desired maps or generate statistics.

Use Case Description*	
Pre-condition	The study is focussed on a certain coastal region bordered within a buffer zone of 10 km from the coastline
Post-condition	Spatial display of UMZ changes in coastal region and associated statistics (i.e. the share of increases in the region)
Flow of Events – Basic Path	
Step 1	Researcher collects spatial data on coastal buffers from 0 to 10 km by NUTS3 through INSPIRE Geo-portal.
Step 2	She/he then downloads UMZ data for changes between the available years 1990, 2000 and 2006 again by using INSPIRE Geo-portal and displays them onto the coastal region.
Step 3	Finally she/he computes a set of spatial statistics (e.g. total amount of increases and/or decreases inside the region, the rates of changes to the total area, etc.)
Flow of Events – Alternative Paths	
Step 1a	Researcher collects spatial data on coastlines through INSPIRE Geo-portal.
Step 1b	She/he isolates the coastal area of her/his interest and generates a 10km inside buffer zone to define the coastal region.
Step 2a	She/he downloads UMZ data for the years 1990, 2000 and 2006 from the web pages of data-provider by using INSPIRE Geo-dataportal's download services.
Step 2b	Researcher spatially computes UMZ changes in the periods 1990-2000, 2000-2006 and 1990-2006 on her/his own desktop GIS application.
Data set: Europe's coastal buffer of 10km by NUTS3	
Description	Coastal zones
Data provider	European Environment Agency (EEA)
Type	input
Geographic scope	Europe
Thematic scope	Coastal zone assessments
Scale, resolution	1:1.000.000
Delivery	Online
Documentation	http://www.eea.europa.eu/data-and-maps
Data set: Urban morphological zones / changes (UMZ)	
Description	Urban morphological zones (UMZ) are defined by Corine land cover classes considered to contribute to the urban tissue and function
Data provider	European Environment Agency (EEA)
Type	input
Geographic scope	UMZ1990: Austria, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain UMZ2000: EU27, Albania, Bosnia and Herzegovina, Croatia, Iceland, Macedonia, the former Yugoslavian Republic of, Montenegro, Norway, Serbia, Turkey UMZ2006: EU27, Albania, Bosnia and Herzegovina, Croatia, Iceland, Macedonia, the former Yugoslavian Republic of, Montenegro, Norway, Serbia, Turkey
Thematic scope	Urbanization
Scale, resolution	1:100.000
Delivery	Online

Use Case Description*	
Documentation	http://www.eea.europa.eu/data-and-maps/data/urban-morphological-zones-changes-2000 http://www.eea.europa.eu/data-and-maps/data/urban-morphological-zones-changes-1990-2000-umz1990-2000-f1v0-1 http://www.eea.europa.eu/data-and-maps/data/urban-morphological-zones-2006-umz2006-f3v0 http://www.eea.europa.eu/data-and-maps/data/urban-morphological-zones-2000-umz2000-f1v0-1 http://www.eea.europa.eu/data-and-maps/data/urban-morphological-zones-1990-umz1990-f2v0-1
Data set: UMZ dynamics within the coastal zone of interest	
Description	UMZ coverage and shares to generate spatial statistics for the coastal zone of interest
Data provider	Researcher's institute/university
Type	output
Geographic scope	Study area
Thematic scope	Integrated coastal zone management
Scale, resolution	1:100.000
Delivery	For private use
Documentation	Research report

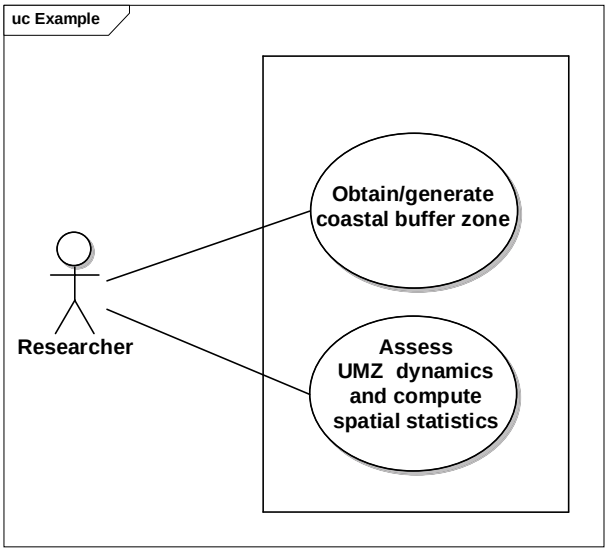
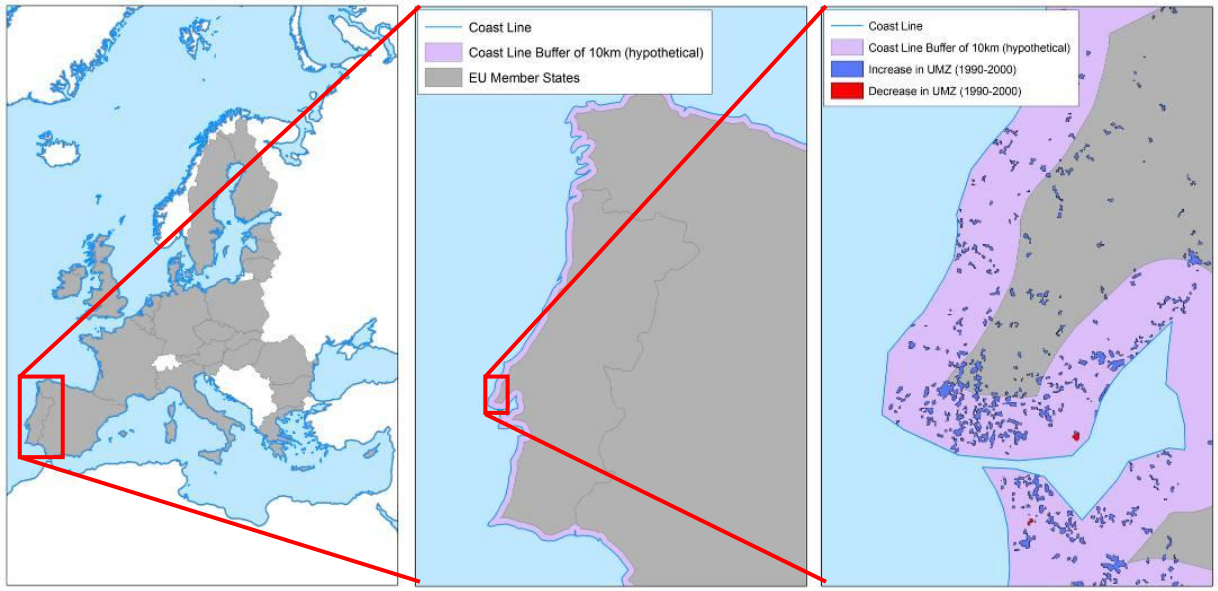


Figure B4.1 – Example UML use case diagram



(a) *(b)* *(c)*

Figure B4.2 – (a) Europe's territories and coastline, (b) coastal buffer zone of 10km, and (c) UMZ changes inside the coastal zone of interest

B.5 State of the environment assessment: Air Quality

Use Case Description	
Name	Air quality: Ambient air quality assessment
Primary actor	Policy Analyst from the Commission Services / European Environment Agency
Goal	Assessment of the state of EU-wide air quality to support re-defining measures to improve air quality for areas with records above EU air quality thresholds
System under consideration	AirBase: public air quality database
Importance	High
Description	The Clean Air for Europe (CAFÉ) Directive (2008/50/EC) requires Member States (MS) to divide their territory into air quality management zones. Within these zones, Member States should annually assess ambient air quality levels against air quality objectives for the protection of human health and the environment. Air Quality Management Zones may be delimited to define measures for different pollutants to optimize management of air quality due to differences in source and abatement strategies. Where levels are elevated, Member States should prepare an air quality management plan or action programme to ensure compliance with the regulatory objectives (e.g. exceedences of limit or threshold values) before the date when they enter into force. Once established, regular assessment shall be undertaken to identify whether MS are attaining the environmental objectives set within individual zones and whether the air quality management plan or action programme needs to be revised
Pre-condition	- A competent authority that is responsible for the management of air quality must be in place (2008/EC/50 Art. 3). - Inventory of relevant monitoring stations and relevant metadata must be in place. - Inventory of models if used must be in place. - Information on population must be in place in order to establish whether the zone should be identified as an agglomeration.

Use Case Description	
Post-condition	Air quality data viewer, air quality maps, air quality statistics at reporting stations, spatial display of the zones in relation to EU air quality thresholds
Flow of Events – Basic Path	
Step 1	*Defining management zones:* (For health, the entire territory must be covered (no gaps allowed; lakes included, seas excluded); while for environment/ecosystems, no continuity required) MS have to deliver the boundaries of the management zones. MS are allowed to provide either GIS files, or a set of administrative units that form the zones. Current reporting LAU2 is the requested level. (in order to avoid problems with overlaps, donut-structures etc…). MS are allowed to have different zones for different objectives, but no obligation to distinguish.
Step 2	*Considering resident population:* MS need to provide population figures for each zone as well as marking if the zone is an agglomeration (>250k inh. or <250k inh., but with a given (high) population density, to be decided upon by the MS) or non-agglomeration. This includes a distinction between "sensitive" and "non-sensitive" population (young → kindergarten; ill → hospitals; elderly → rest homes…) (question under discussion: can these data be provided through other datasets being provided to the EC?).
Step 3	*Defining the assessment regime within the zones (5-yearly cycle):* MS have to establish the assessment regime: investigate off-line air quality in order to know if additional measurement stations are needed, or if modelling is a valid approach, or expert judgement (indicative monitoring). The Directive sets out the rules for establishing the number and density of sampling points which must be in operation in order to provide the data for the assessment. Art 6,7 and 8. If there is a lack of stations, MS need to set up additional stations.
Step 4	*Making available preliminary information to EC (draft IR):* All information of steps 1 – 3 to be transmitted to the EC, including the list of stations. This has to be done before the actual monitoring starts (different as compared to the current situation in which info can be provided afterwards).
Step 5	*Starting the monitoring:* The NRT data for the appropriate pollutants is made available in NRT. Exceedances are made available as a warning to the public (min. point data, potentially extrapolated to zone data).
Step 6	*Validation of the monitored data (yearly basis):* MS have to validate their data according to the data quality objectives as set out by the directive. Statistics are to be calculated. Effects from natural events and winter sanding are allowed to be deducted from the statistics before comparison with the objective: without these, the objectives would have been met. Accounting of the values per pollutant, per limit value and per zone is to be made.
Step 7	*Reporting:* The accounting is reported to the EC, together with all the relevant primary data (by way of evidence underpinning the accounting). Explicit linkage of the data-series with zone, station, pollutant, instrument etc. has to be included.
Step 8	*Analysis and Planning:* Analysis and planning is undertaken to identify new measures or revisions to existing measures that will enable pollutant values to fall below regulatory maximum limits. Remark: the CAFE Directive foresees time extensions for certain zones under specific conditions. The EC grants these extensions, which then feed back into the system (steps 1 to 3). However, the time extensions are linked to the definition of the zones; so re-arranging zones entails that historic zoning need to be traceable, since linked with the time extensions on the pollutant values.

Use Case Description	
Flow of Events – Alternative Paths	
	NONE
Data set: Management Zones	
Description	Management zones/units (administrative boundaries (GISCO + MS-data)) defined by Member States
Data provider	MS and GISCO
Type	input
Geographic scope	Europe
Thematic scope	Administrative boundaries
Scale, resolution	1:1.000.000
Delivery	Online
Documentation	http://www.eea.europa.eu/data-and-maps
Data set: Population densities	
Description	Population densities computed within the management zones
Data provider	MS and/or Eurostat
Type	input
Geographic scope	Europe
Thematic scope	Population densities
Scale, resolution	1:1.000.000
Delivery	For official use
Documentation	Census statistics in MS/Eurostat
Data set: Air quality monitoring network	
Description	Localisation of the monitoring stations (fixed + mobile)
Data provider	MS
Type	Input
Geographic scope	MS
Thematic scope	Monitoring of air pollutants
Scale, resolution	1:1.000.000
Delivery	Online
Documentation	http://www.eea.europa.eu/themes/air/airbase/map-stations
Data set: Zones in relation to EU air quality thresholds	
Description	Annual assessment of air quality in comparison to EU air quality thresholds
Data provider	MS/European Environment Agency (EEA)
Type	Output
Geographic scope	Europe
Thematic scope	Assessment of air quality management zones w.r.t. air pollutants and EU air quality thresholds.
Scale, resolution	1:1.000.000
Delivery	Online
Documentation	http://www.eea.europa.eu/data-and-maps

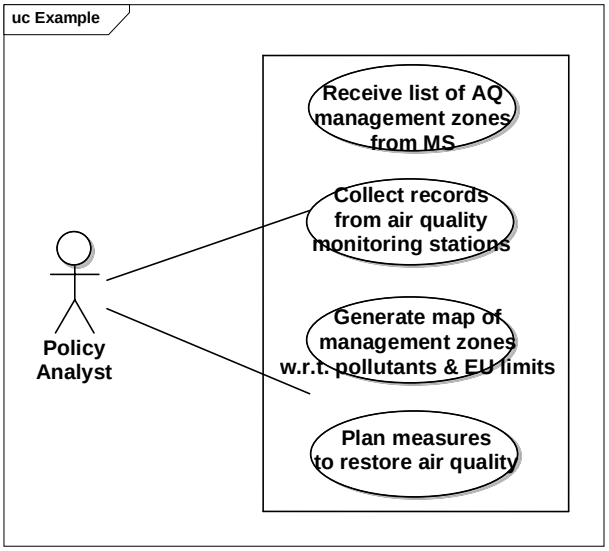


Figure B5.1 – Example UML use case diagram

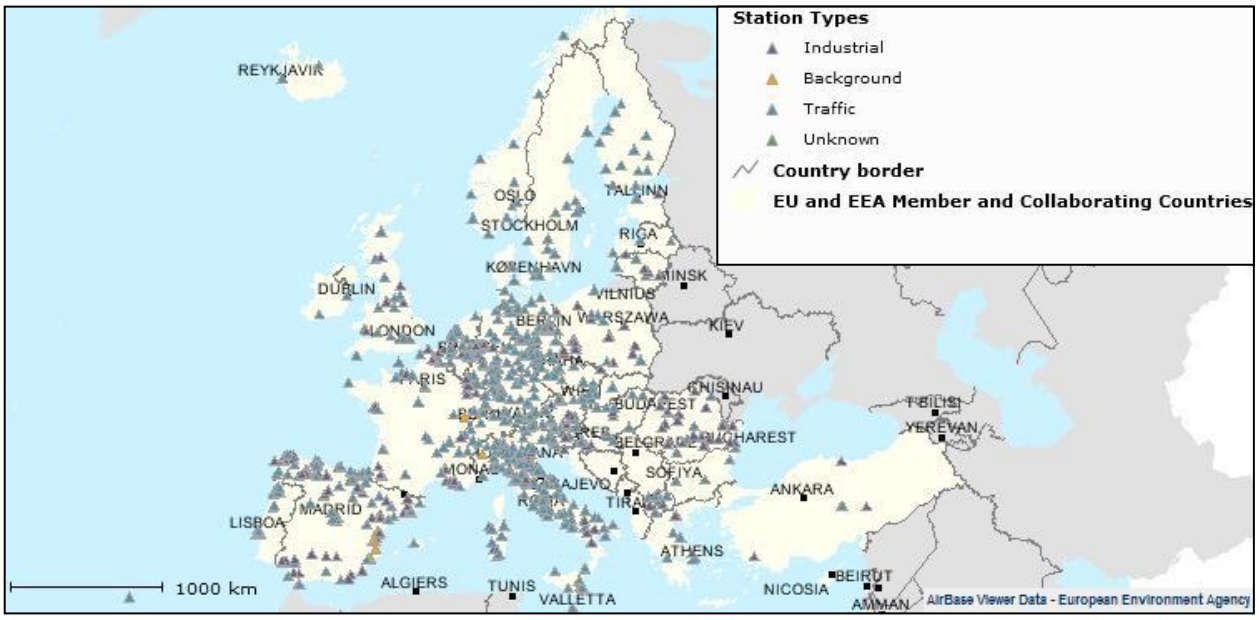


Figure B5.2 – Air quality reporting stations in EU and EEA Member & Collaborating Countries

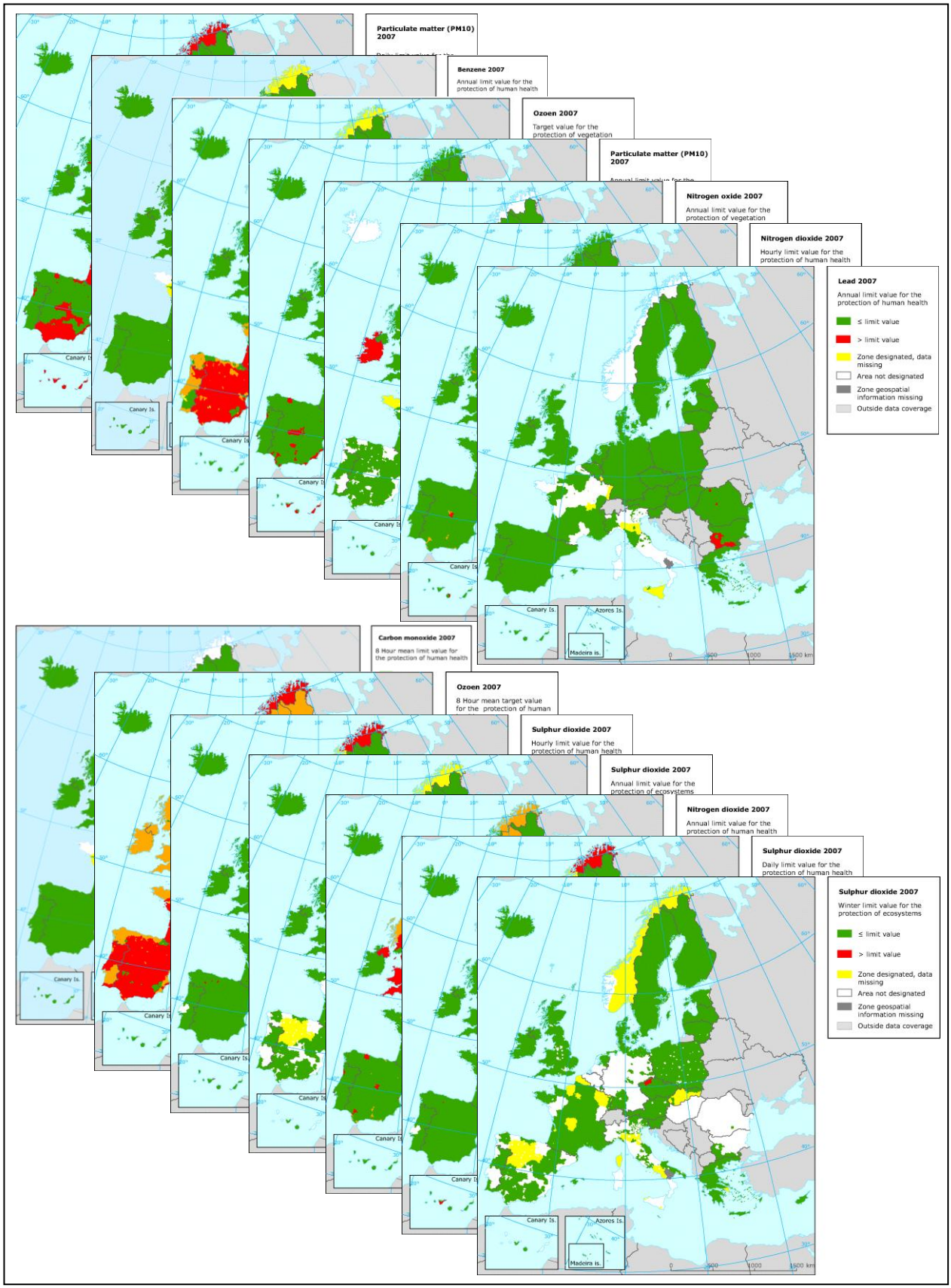


Figure B5.3 – EU-wide mapping of management/reporting zones with respect to air pollution levels (PM10, lead, etc.) as of the year 2007 against EU air quality thresholds.

Annex C
(informative)

Examples

C.1 Regulated fairways at sea or large inland waters

Example based on Norway and information available from the Norwegian Coastal Administration (*www.kystverket.no*)

C.1.1 Description of type of area

Fairways (or the equal term waterways) at sea are a term that has different types of meaning, depending on perspective and approach. The most common are:

a. Fairways as generic term for most appropriate way of navigation. The general rule for transportation on sea is that any ship may sail at any place, unless given restrictions are defined (e.g. related to type of goods, need for pilot, military areas, national boundaries, custom, etc) – and as long as the physical restrictions related to width and depth are met.

   Fairway in this context is related to routes which have been modified or supported for sea navigation, e.g. by lighthouses and buoys or by physical modification of the terrain (dredging or blasting rocks).

b. Fairways – as approved routes for navigating with or without pilot. A captain may be certified to navigate a certain fairway without a pilot. A dedicated fairway certificate is then issued.

c. Fairways, restricting navigation in a given area, e.g. traffic going in one direction in one area – and the other in the opposite area. Typically at large ports.

d. Fairways – given as areas reserved for sea navigation, implying a different type management and usage regime.

For the INSPIRE Area Management theme, it is only d) that is relevant (the others relate to navigation and transport).

Fairways under area management are hence defined as areas at sea or inland lakes that have defined certain restrictions or management regimes that are related to maintain navigation and transport on water.

C.1.2 Legal basis

The legal basis for fairways defined as d) above is based on Norwegian legislation and regulations;

- Law: LOV-2009-04-17-19-§9 and LOV-2009-04-17-19-§16
- Regulation (”forskrift”): FOR 2009-11-30 nr 1477: Forskrift om farleder

The Norwegian text may be found at *http://www.lovdata.no/for/sf/fi/xi-20091130-1477.html*

What is regulated, managed, restricted?

The regulation defines;

a. Fairways (main and secondary) line with fairway number
b. The area delimitation defined by the fairway, or by harbours defined through the regulation

A spatial dataset is given and is presented through a web-map portal and formally integrated in the regulation (the web-map portal is a part of the regulation – which is unique for a regulation in Norway) - *http://kart.kystverket.no/farledsforskrift*
The fairway ends at the entrance of a defined harbour area.

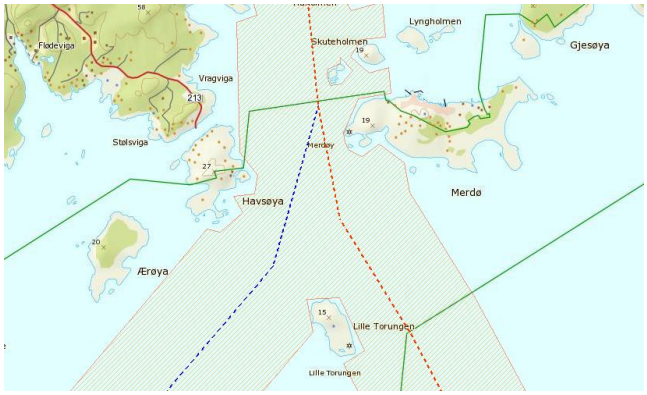
Within a fairway area, the Ministry of Fisheries and Coastal Affairs, or any department acting on their behalf that has regulation and management authority. For areas outside, areas are managed and regulated as per common Norwegian law by private owners, municipalities, counties and the state.

The purpose of the regulated fairway area is to secure that no physical or administrative interventions are imposed on these areas limiting their usage for maritime navigation.
Typically interventions that are hence limited are fishery farming and construction work.

C.1.3 Spatial structure

The spatial representation of the regulated fairway consists of the following spatial data:

- Line dataset – indicating the fairway itself
- Polygon dataset – delimiting the defined regulated fairway area
- Line dataset – indicates the entrance to a defined harbour area



The spatial data has been generated by creating buffers along the defined fairway lines and overlaying these with land or other constructions.

The data is available for download, or as WMS service from the Norwegian Coastal Administration through Norway Digital.

C.1.4 Description of tasks – questions that data can answer

The regulated fairway can be used for two main purposes:

- Defines clearly whom has authority to plan and approve and interventions within the defined area
- Indicates that the area is reserved for maritime navigation, and shall hence be restrictive for interventions.

C.1.5 Any specific data quality requirements

The data has been defined by regulations and is in this context correct (100% data quality) as per definition.

C.1.6 Illustrations – screen shots

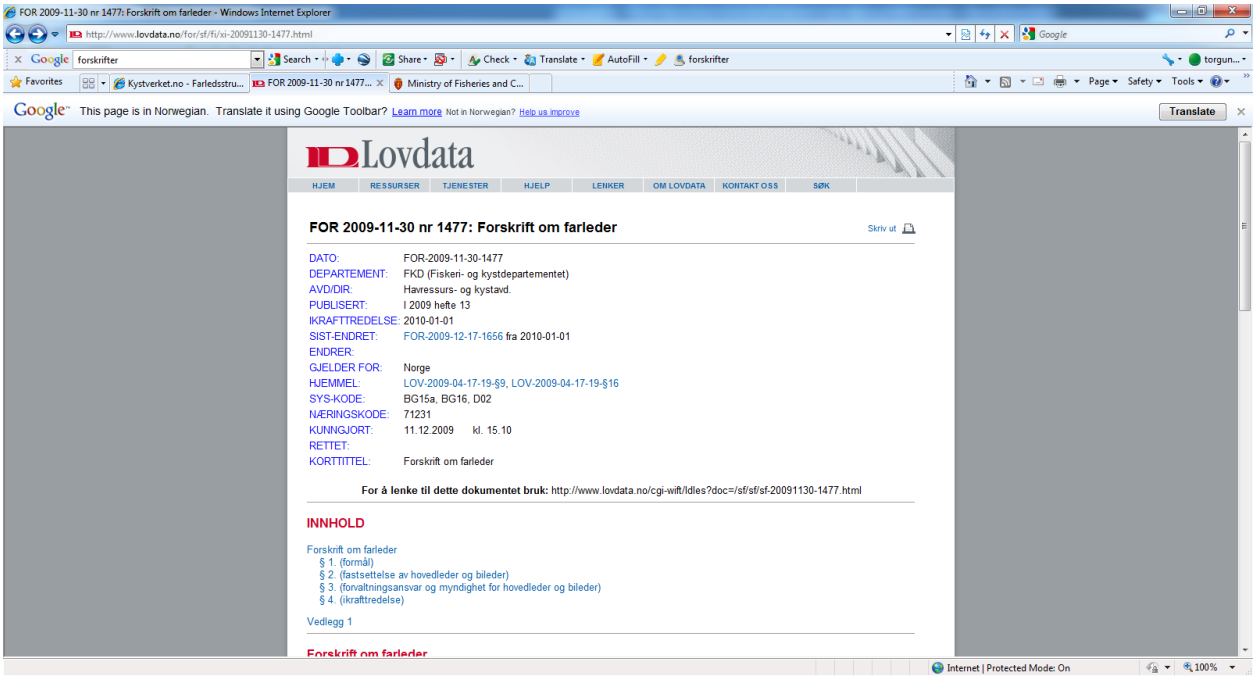


Figure C1.1 – The fairway regulation.

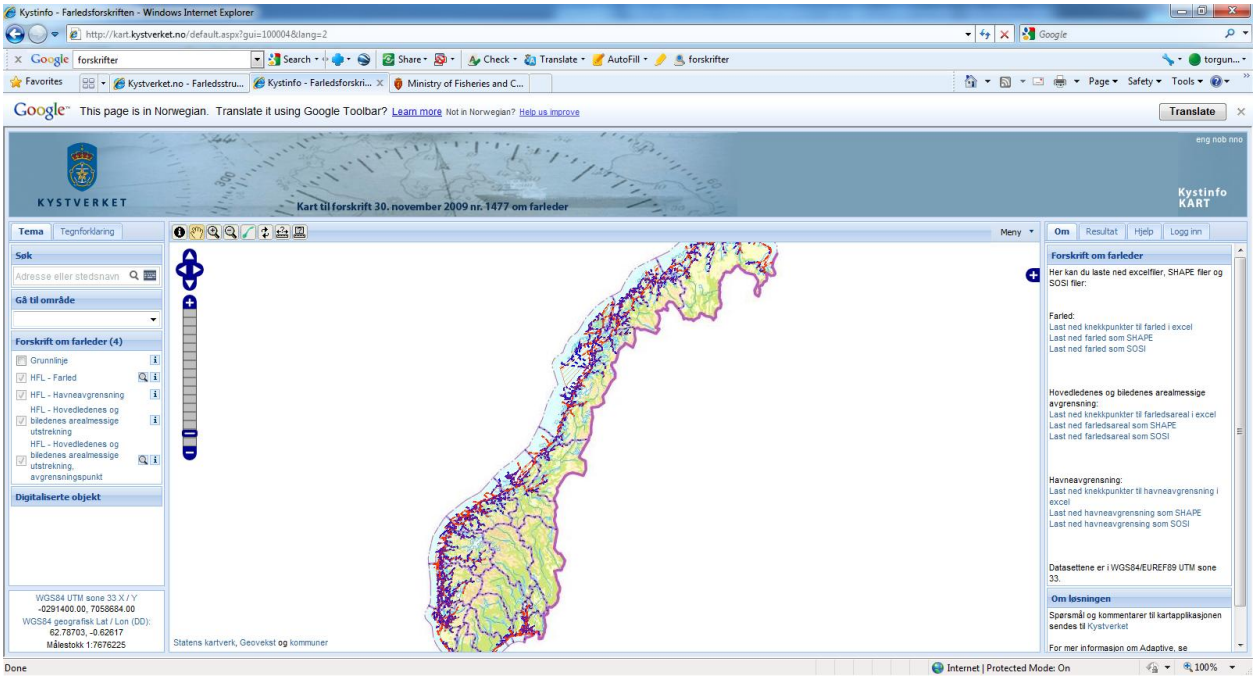


Figure C1.2 – Web map portal – integrated as part of the regulation. Through the interface, the data can be downloaded as excel file, shape file or SOSI (the Norwegian spatial data exchange format) – in WGS 84 / EUREF89, UTM 33.

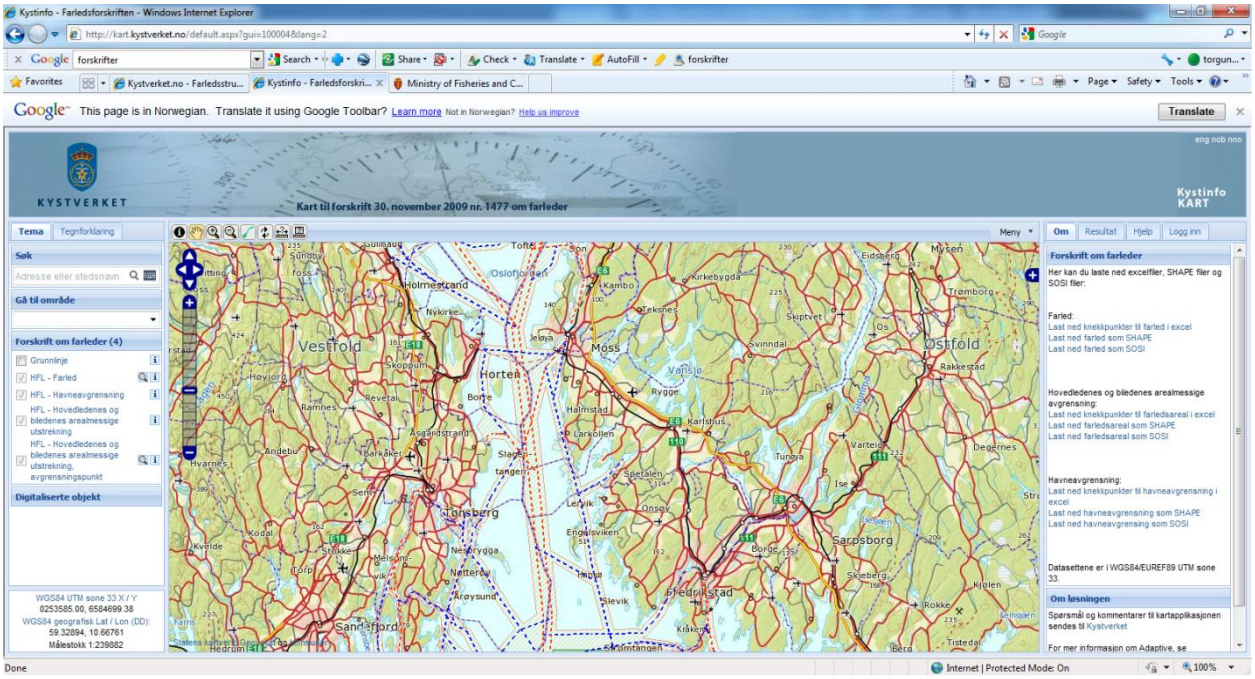


Figure C1.3 – Illustration of the data for the Oslo fjord.

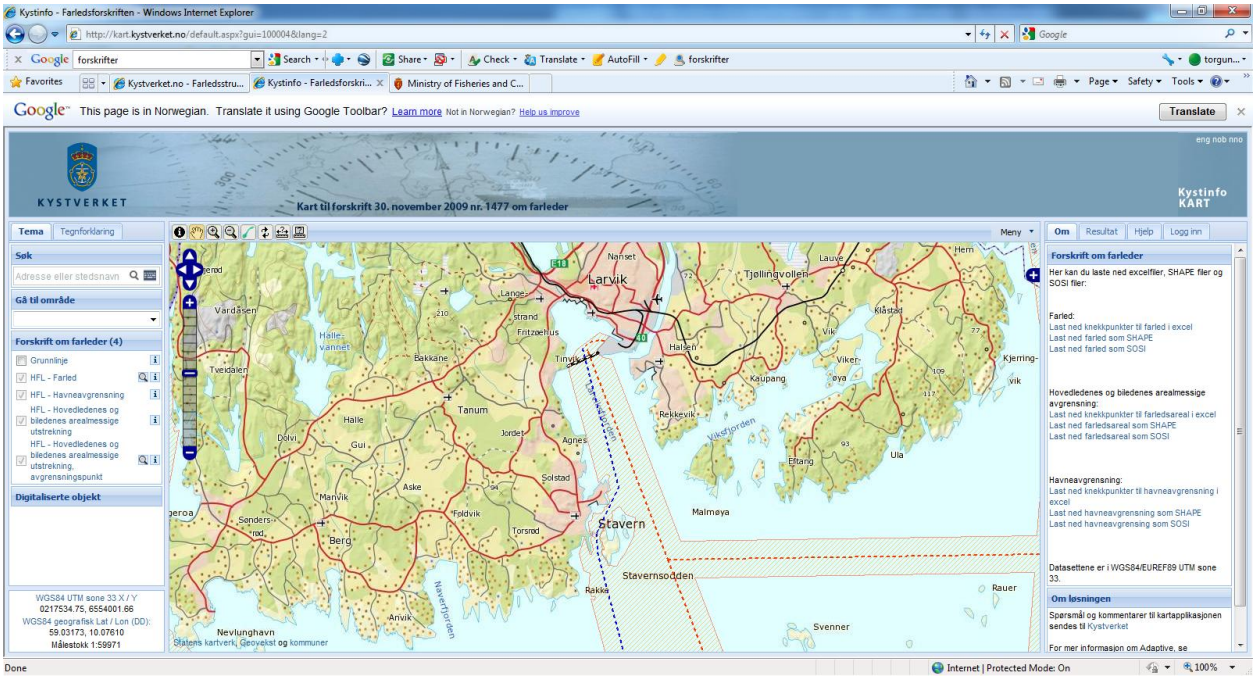


Figure C1.4 – Detailed illustration of Larvik harbor, including its delimitation of the harbor itself (black and white dashed line)

C.2 Data model support for restricted areas around drinking water source

C.2.1 Needs for allocating protection zones around drinking water bodies

The Water Framework Directive (WFD), which established a new, integrated approach to the protection, improvement and sustainable use of surface waters, gives Member States some requirements to take account of pressures on water quality from point and diffuse sources, and ensures that necessary measures to meet quality objectives are selected. One way of preventing the water bodies from being polluted by many different kinds of pollutants is to design certain protection zones adjacent to those indicated water bodies. In the broader sense, such conservation areas work environmentally as they do not only improve water quality by removing sediment, fertilizers, pesticides, pathogens, and other potential contaminants from runoff, but also control soil erosion by both wind and water, improve soil quality, enhance fish and wildlife habitat, reduce flooding, conserve energy, protect buildings, roads, and livestock, and conserve biodiversity.

C.2.2 Designing reservoir protection zones in various distances from the reservoir

While establishing zones around surface water bodies for protecting the quality of drinking water from potential pollution arising from their catchments, a variety of methods may be used. In “Time of Travel (TOT)” method, the protection zone is defined by a threshold travel time that is computed along drainage networks down to the reservoir and that is typically based on the response times for controlling point pollution or on times desired within the protection zone for rehabilitating the quality of polluted water originating from non-point sources. In fixed-distance method, setbacks from reservoir boundaries, tributaries, or the intake are established by assigning certain fixed distances.

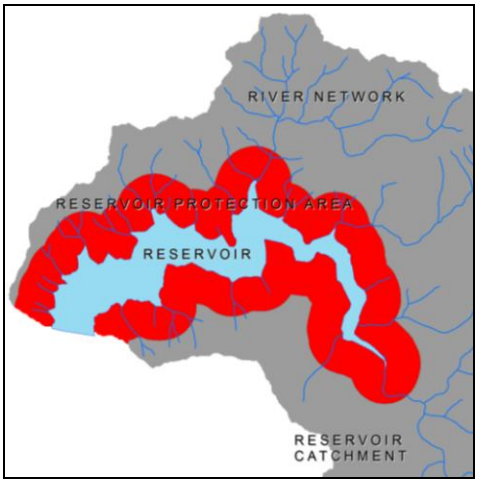


Figure C2.1 – Application of a fixed-distance protection zone around a reservoir *

Reservoir protection zones can be designed as a set of subsequent zones (e.g. absolute zone closest to the reservoir boundaries, proximate and mediate zones with bigger distances from the reservoir and remote zone covering the entire catchment) to secure overall water pollution prevention in catchments of drinking water sources. In such a case, the application of rules and restrictions assigned to the zones changes gradually between the zones, generally by increasing the protective measures (e.g. adapting proper vegetation types and densities for different ranges; sorting out of the restricted/prohibited activities, etc.) as the zone gets closer to the water body.

* The reservoir and protection zone are fictive and for demonstration purpose only.

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C.2.3 Modelling reservoir protection zones as spatial objects (based on the "Area management/restriction/regulation zones and reporting units (AM)" specification)

The below figure indicates how a reservoir protection zone is modelled as a spatial entity in the data model prepared for the INSPIRE spatial data theme "Area management/restriction/regulation zones and reporting units (AM)".

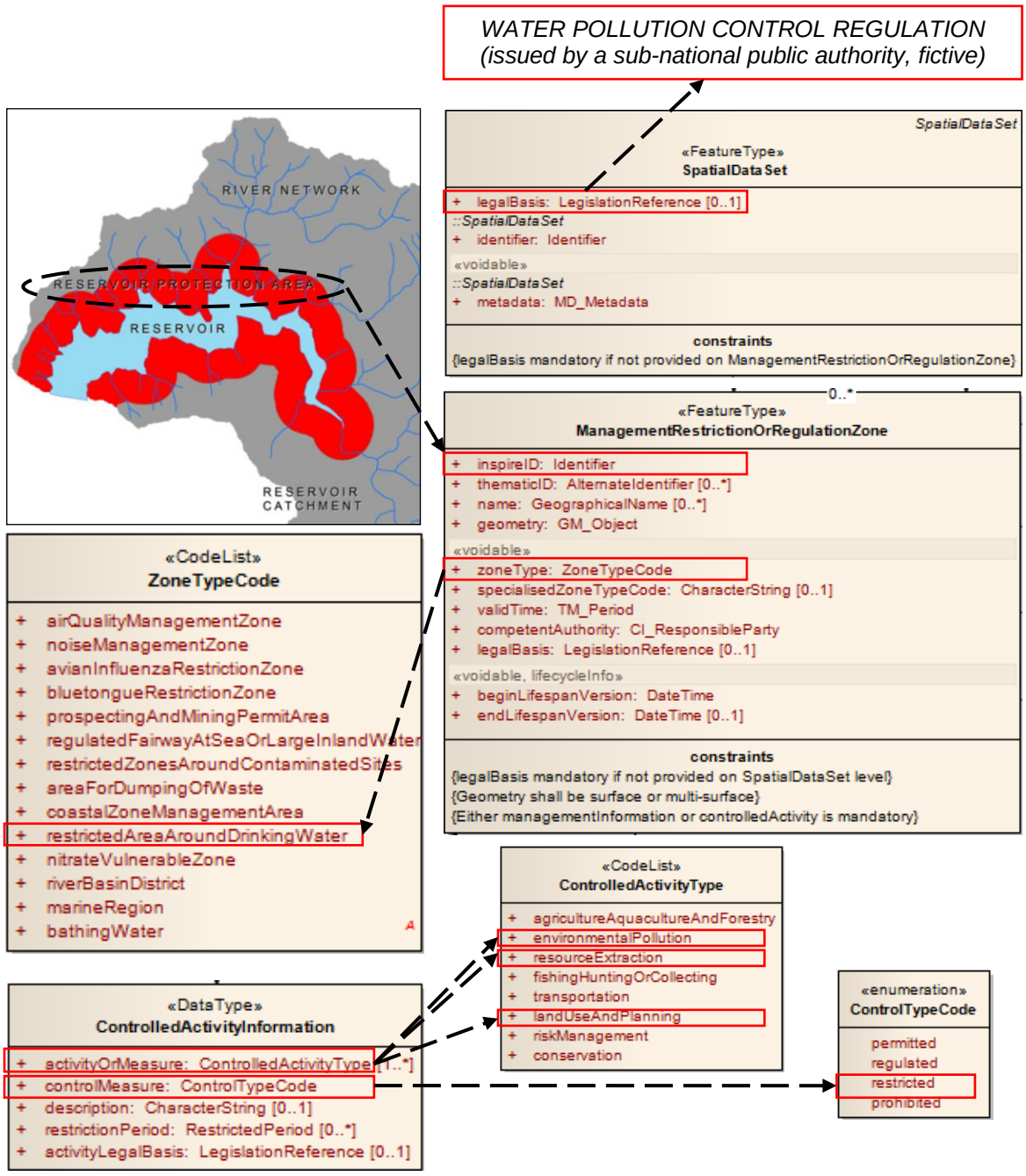

Figure C2.2 – Modelling restricted areas around drinking water sources in TWG-AM data model

* The reservoir and protection zone are fictive and for demonstration purpose only.