



Reference Information Specifications for Europe (RISE)

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Integrating and Strengthening the European Research Area – Priority 4: Aeronautics & Space

Use case document
‘Diffuse nutrient leakage reporting to the
Water Framework Directive’
Version 1.5

Annex

Content based on RISE Methodology & Guidelines V1.1 Checklist

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ANNEX 2 of the deliverable "RISE Methodology & Guidelines on Use Case & Schema Development"

The harmonisation process consists of several steps, each addressing the data harmonisation components documented in the RISE methodology document. This spreadsheet shall help to identify the questions to be addressed in each step for each component.

The important steps supported by the checklist are:

- * Requirements: the expected results as derived from the use case description
- * As-is analysis: situation with respect to the existing data sources
- * Gap analysis: identification of issues (gap between requirements and current situation)
- * Harmonisation approach: proposed approach for the harmonised data specification

Note that not all components are relevant in every step.

It is proposed to document at least summary information of the analysis in a matrix representation so that it is easy to get an overview per step (e.g. an overview of all requirements) or per data harmonisation component (e.g. spatial profile required and used in all existing data sources). additional information may be provided in separate documents that are linked to the spreadsheet.

Replace the checklist information in the individual cells by the use case specific information addressing the topics of the checklist and any other relevant information identified in the use case analysis.

Note that it may be required/helpful to add additional columns; for example, if the analysis of multiple data sources in the as-is analysis cannot be displayed in a single column in a clear way.

Overview

The harmonisation process consists of several steps, each addressing the data harmonisation components documented in the RISE methodology document. This spreadsheet shall help to identify the questions to be addressed in each step for each component.

The important steps supported by the checklist are:

- * Requirements: the expected results as derived from the use case description
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- * Harmonisation approach: proposed approach for the harmonised data specification

Note that not all components are relevant in every step.

Replace the checklist information in the individual cells by the use case specific information addressing the topics of the checklist and any other relevant information identified in the use case analysis.

Note that it may be required/helpful to add additional columns.

Note that it is helpful for the monitoring of the harmonisation process to indicate the status of the task as:

- * To be done
- * In Progress
- * Finalized
- * Not applicable

These options reflect the fact that the RISE methodology is a spiral engineering approach. In an iteration of the spiral the progress or finalising of the harmonisation process can be reflected in cases which are currently reported as 'To be done' or 'In progress'.

Data harmonisation component	Use case requirements	As-is analysis	Gap analysis	Harmonisation approach
0 Context	Describe the use case requirements in particular for (harmonised) input data sources in view of a harmonised product as described in the use case. The checklist may refer to a use case description by the domain experts (users), if one exists	Identify and describe the available data sources as good as possible for the use case. The checklist may refer to a use case description by the domain experts (users), if one exists	Check the data harmonisation components for differences between the available data sources (As-is analysis) and the target specification (Use case requirements)	If differences have been identified in the Gap analysis, investigate on suitable harmonisation methods
1.1 INSPIRE Principles	Nothing to be added here as it is assumed that all GMES/INSPIRE data specifications will adhere to the INSPIRE principles. However, if a deviation from these principles has been identified as required, it shall be documented here.	How does the context in which the data source has been designed and created align with the INSPIRE principles ?		Potential conflicts with INSPIRE principles? For instance: is it required to improve the data specification of the input data source, or to create new data to fill gaps?
1.2 Reference Model	Has a reference model been defined for the application ? If yes: - Is it based on ISO 19101 ? On the OpenGIS Reference Model (ORM) ? Anything else ? - What methodology has been used in the reference model (e.g. RM-ODP) ?	Is a reference model available for the application providing source data ? If yes: - Is it based on ISO 19101 ? On the OpenGIS Reference Model (ORM) ? Anything else ? - What methodology has been used in the reference model (e.g. RM-ODP) ?		

<p>1.3 Application Schemas (Rules)</p>	<p>Is there already a data specification for the use case result available (from which the requirements for a harmonised data specification for the required data sources can be derived) ?</p> <p>Is there already an Application Schema for its content ?</p> <p>If yes:</p> <ul style="list-style-type: none"> - Is it ISO 19100 conformant ? - Which conceptual schema language does it use ? - Is it conformant with ISO 19109 (rules for application schemas) ? <p>Is the description detailed enough so that the results of the use case be specified by one or more data product specifications?</p> <p>Add a flowchart to illustrate the process, if appropriate</p> <p>Can the relevant feature types (i.e. important concepts) be identified from the description ?</p> <p>Are feature type associations required ?</p> <p>Are operations required ?</p>	<p>Is there already an Application Schema for the content of a data source ?</p> <p>If yes:</p> <ul style="list-style-type: none"> - Is it ISO 19100 conformant ? - Which conceptual schema language does it use ? - Is it conformant with ISO 19109 (rules for application schemas) ? <p>Is the description detailed enough so that it can be determined how the data source can be used in the use case?</p>		
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1.4 ISO 19100 Profile (Vector geometry)	Geometries of these feature types: - Dimensionality of the geometries (0D, 1D, 2D, 3D)? - Interpolation types for curves and surfaces ? - Sharing of geometry objects required ? For which features and in which cases ?	Geometries used: - Dimensionality of the geometries (0D, 1D, 2D, 3D)? - Interpolation types for curves and surfaces ? - Sharing of geometry objects required ? For which features and in which cases ?	Does the data source differ from the use case requirements with respect to Geometry (e.g. curve interpolation) ?	Processing of Geometry?
1.4 ISO 19100 Profile (Topology)	Topology required? If yes: - Which requirements (e.g need for continuous network ? Initial and final nodes ?) ? - Is it only required for internal processing or data consistency? Or is it of interest to the user ? - How is topology related to geometry?	Topology used? If yes: - Which rules (e.g need for continuous network ? Initial and final nodes ?) ? - How is topology related to geometry?	Does the data source differ from the use case requirements with respect to Topology (e.g. implicit/explicit topology) ?	Processing of Topology ?

<p>1.4 ISO 19100 Profile (Coverages)</p>	<p>Are Coverages required? If yes: - Which types (raster, triangulated irregular networks, point coverages, polygon coverages, etc.) ? For grids : - type of grid (DTM, TIN, ...) ? - Resolution of grids, etc. ? - [consistency and differences between the data sources] For images : - source (aerial photo, satellite image, ...) ? - type of geometric rectification, correction level (e.g. orthophoto) ? - pixel size ? - radiometry (black and white, colour, infrared, ...) ?</p>	<p>Are Coverages used? If yes: - Which types (raster, triangulated irregular networks, point coverages, polygon coverages, etc.) ? For grids : - type of grid (DTM, TIN, ...) ? - Resolution of grids, etc. ? - which applications ? - [consistency and differences between the data sources] For images : - Which source (aerial photo, satellite image, ...) ? Which date ? - type of geometric rectification, correction level (e.g. orthophoto) ? - pixel size ? - radiometry (black and white, colour, infrared, ...) ? - which applications ?</p>	<p>If coverages are used, does the data source differ from the use case requirements with respect to resolution, type of grid etc. ? Which problems do you have when working with heterogeneous coverage data ?</p>	<p>Which processings do you carry out to work with different grids ? Which processings do you carry out to work with different types of images ? (e.g. resampling, radiometric equalization, ...) ?</p>
<p>1.4 ISO 19100 Profile (Temporal profile)</p>	<p>Temporal model - Support for features that move or change geometry with time? - Support for multiple versions of a feature (historic data)? Or even versioning of properties?</p>	<p>Temporal model - Support for features that move or change geometry with time? - Support for multiple versions of a feature (historic data)? Or even versioning of properties?</p>		
<p>1.5 Multi-lingual text and cultural adaptability</p>	<p>Is support for multilingual aspects required (e.g. multipligual thesauri, multilingual texts)? If yes – which languages? And which aspects ?</p>	<p>Are multilingual aspects supported (e.g. multipligual thesauri, multilingual texts)? If yes – which languages? And which aspects ?</p>		<p>What solution have you adopted (or are you envisaging) ?</p>

<p>1.6 Coordinate referencing and units model</p>	<p>Reference systems - Coordinate Reference Systems (horizontal, vertical) - Temporal Reference Systems - Units of measurement</p>	<p>Reference systems - Coordinate Reference Systems (horizontal, vertical) - Temporal Reference Systems - Units of measurement</p>	<p>Does the data source differ from the use case requirements with respect to Coordinate Reference Systems and/or Units (e.g. different geodetic datum, map projection, units of measurement) ?</p> <p>Does the data source differ from the use case requirements with respect to temporal reference (datasets refer to different situations in time, different time intervals etc.) ?</p>	<p>Coordinate transformation (Datum transformation, map projection) ? For Coordinate reference system transformation : - method used for horizontal datum transformation? - if image data, is there resampling ? Which method (nearest neighbour, bilinear, bicubic, ...) ? Is there "retiling" ? - method used for vertical datum ? - Assessment of the results ?</p> <p>Transformation of source data forth/back in time?</p>
<p>1.7 Object referencing model</p>	<p>Object referencing methods applied ? If yes – methods: - by name ? - by code (e.g. administrative unit code) ? - by identifier ? - by geometry ? - other (e.g. linear referencing, by address) ? - requirements for identifiers and object referencing in general</p>	<p>Object referencing methods applied ? If yes – methods: - by name ? - by code (e.g. administrative unit code) ? - by identifier ? - by geometry ? - other (e.g. linear referencing, by address)? - requirements for identifiers and object referencing in general : is the question relevant for existing data ?</p>	<p>If the use case requires object referencing methods: does the data source meet the requirements of the object referencing methods?</p>	

1.8 Data translation / guidelines	n/a			To be investigated for all translation methods applied in the process of harmonisation: - What efforts need to be taken ? (Feasibility!) - Is the translation performed on-the-fly ? - Is the data translation model driven? - Are the results put into a redundant secondary data repository ? - For methods performed on-the-fly: how are errors and conflicts treated ?
1.9 Portrayal model	Portrayal - standardised portrayal catalogues ? - map service and/or feature portrayal service ?.	Portrayal - standardised portrayal catalogues ? - map service and/or feature portrayal service ?	If the use case requires portrayal: does the data source provide the necessary input to the portrayal methods?	Is portrayal catalogue to be created new? Is existing portrayal catalogue adopted ? If yes, does it need to be modified?
2.1 Identifier Management	Are identifiers required ? For which features ? Which roles do identifiers for entities play? Which are the required characteristics of identifiers (e.g. unique, stable, ..) ? Is there a management for such identifier specified?	Are there identifiers in existing datasets ? What do you know about them ? (Which roles do identifiers for entities play? Is there a management for such identifier specified? : relevant for existing data ?)	Is identifier definition and management consistent?	Which solution have you adopted (or are you envisaging) if existing data does not have the appropriate identifiers ?
2.2 Terminology			Is Terminology consistent ?	Have you defined (or are you envisaging to define) a glossary ?

<p>2.3 Feature catalogues</p>	<p>Is a (or several) Feature Catalogue(s) available ? If yes: - Is an existing feature catalogue (e.g. S57) being used ? Was it amended ? - Is a new data catalogue required ? - Does the catalogue/ follow ISO 19110 ? - What is the architecture of Feature(s) Catalogue(s)? - How many Feature Catalogues are there ? (e.g. per theme ? per scale ?). - What is described in the Feature Catalogue ? (e.g. geometry ? requirements (mandatory/optional) ? rules of instantiation ?).? How shall it be maintained ? Derived from application schema ? Or maintained as a seperate database / spreadsheet / textfile ?</p>	<p>Is a (or several) Feature catalogue(s) available ? If yes: - Is an existing feature catalogue (e.g. S57) being used ? Was it amended ? - Is a new data catalogue required ? - Does the catalogue follow ISO 19110 ? - What is the architecture of Feature(s) Catalogue(s)? - How many Feature Catalogues are there ? (e.g. per theme ? per scale ?). - What is described in the Feature Catalogue ? (e.g. geometry ? requirements (mandatory/optional) ? rules of instantiation ?).? If not: - is the structure sufficient to determine the content and structure of the data product(s) ?</p>	<p>Does the data source differ from the use case requirements with respect to semantics (.e.g. different feature catalogues) ?</p>	<p>Is feature catalogue to be created new? Is existing feature catalogue adopted ? If yes, does it need to be modified? Does the data source differ from the use case requirements with respect to semantics (.e.g. different feature catalogues) ? Are options (different ways to model a real world phenomena) allowed in the Feature Catalogue ?</p>
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<p>2.4 Dictionaries (Data dictionary)</p>	<p>Is a data dictionary available ?</p> <p>If yes:</p> <ul style="list-style-type: none"> - Is an existing feature data dictionary (e.g. FACC/DFDD) being used ? Was it amended ? - Is a new data dictionary required ? - Does the feature data dictionary follow the draft of ISO 19126 ? <p>How shall it be maintained ? Derived from application schema ? Or maintained as a seperate database / spreadsheet / textfile ?</p>	<p>Is a (or several) Feature data dictionary available ?</p> <p>If yes:</p> <ul style="list-style-type: none"> - Is an existing feature data dictionary (e.g. FACC/DFDD) being used ? Was it amended ? - Is a new data dictionary required ? - Does the feature data dictionary follow the draft of ISO 19126 ? 		<p>Are dictionaries to be created new? Are existing dictionaries adopted ? If yes, do they need to be modified?</p>
<p>2.4 Dictionaries</p>	<p>Do the different dictionaries already exist and how is their relationship to the relevant standards and specifications?</p> <ul style="list-style-type: none"> - code lists - coordinate reference systems (ISO 19111 and ISO 19136) - units of measurements (ISO 19103 and ISO 19136) - symbols - potrayal rules (ISO 19117, SLD) - usw. 	<p>Do the different dictionaries already exist and how is their relationship to the relevant standards and specifications?</p> <ul style="list-style-type: none"> - code lists - coordinate reference systems (ISO 19111 and ISO 19136) - units of measurements (ISO 19103 and ISO 19136) - symbols - potrayal rules (ISO 19117, SLD) - usw. 		<p>Are dictionaries to be created new? Are existing dictionaries adopted ? If yes, do they need to be modified?</p>

2.5 Conformance	<p>Do conformance rules exist or can they be derived from the descriptions ?</p> <p>Is it required to specify conformance rules for the data specification ?</p> <p>Is conformance with the INSPIRE implementing rules required (which are not yet known/defined) ?</p> <p>With any other conformance rules ?</p>	Does the data source explicitly conform to any specifications ?		
3.1 Metadata	<p>Metadata</p> <ul style="list-style-type: none"> - Discovery level / Exploration level /Exploitation level ? - ISO 19115 compliant? - Language? 	<p>Metadata</p> <ul style="list-style-type: none"> - Discovery level / Exploration level /Exploitation level ? - ISO 19115 compliant? - Language? 	Does the data source differ from the use case requirements with respect to metadata ? (level of detail, language etc.)	Is the metadata transformed in the process of data harmonisation ? (at dataset level, at feature level ?)
3.2 Maintenance	Requirements to maintenance of data (update cycle? Incremental update?)	Update procedures of data sources ?	Does the data source meet the use case requirements with respect to update procedures ?	How will harmonisation work with future updates?

<p>3.3 Data quality</p>	<p>Data quality requirements ? If yes:– - Positional accuracy ? - Other aspects - completeness, thematic accuracy, logical consistency, temporal accuracy ?</p> <p>Data quality management: - Interaction with user on quality requirements, e.g. published quality levels ? - Quality evaluation / conformance testing ?</p>	<p>Data quality requirements ? If yes:– - Positional accuracy ? - Other aspects - completeness, thematic accuracy, logical consistency, temporal accuracy ?</p>	<p>Does the data source meet the use case requirements with respect to data quality ?</p>	<p>Does the harmonisation method have an impact on data quality, e.g. positional accuracy ?</p>
<p>3.4 Data transfer</p>	<p>Data transfer: - methods for encoding application and reference data ? - support for access to and update of data ? - change-only updates ? If yes – why and for which purpose ? - model-driven encoding, i.e. fully determined by the application schema in UML ?</p> <p>Have delivery methods (formats, etc) been specified ? If yes, same questions as for existing data ? If yes – has the service aspect been considered ? Can the required services be determined from the use case descriptions? Are existing services / service types taken into account?</p>	<p>How is the source data available : -formats, versions -service interfaces - usage constraints</p> <p>How is vector data supplied ? Which media ? Which format ?</p> <p>How is image data supplied ? Which image format ? If compressed format, which method ? Which factor ? How is image georeferencing provided ? Volume of image data to handle ? (e.g. how many tiles ?) Is there any tool (e.g. image index) to help the handling of data ? How is other coverage data supplied ?</p>	<p>Does the data source differ from the use case requirements with respect to the data format (required - provided) ?</p>	<p>Is format conversion required ? Do service interfaces need to modified?</p>

<p>3.5 Derived reporting & multiple representations</p>	<p>For products/services that deal with data at multiple scales / resolutions</p> <ul style="list-style-type: none"> - Which applications require data at multiple scales / resolutions ? Which features are involved ? Which scales /resolutions are required ? - What are the requirements for consistency between the representation of the same entity in different scales / resolutions ? - Are requirements known how data is supposed to be aggregated/linked across different resolutions (“generaliation” of data) ? 			<p>How is Data aggregated/linked across different resolutions (“generaliation” of data) ?</p>
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<p>3.6 Consistency between data</p>	<p>For products/services that deal with datasets cross sector and/or cross boundary: Have requirements for consistency between the features in different datasets representing the same real-world entity been identified and what are the rules - along or across borders? - across business domains? - across scales/resolutions? already in 3.5 ? Do you need edge-matching between different areas ? Which areas ? which boundaries (e.g. between regions, between countries, between sea and land) ? For which applications (e.g. cartography, navigation, ...) ? For which features ? Which kind of edge-matching do you need ? -Is geometric edge-matching required ? If yes, is an accurate knowledge of the boundary required ? -Is an association between 2 border nodes enough ? - Other requirement ? Have requirements for consistency between the features in different datasets representing different real-</p>		<p>For edge-matching , which problems have you met and what are their reasons ? - related to different positional accuracy. - related to different currency : some features may be just missing on one side - related to different interpolation type. For example: feature type with linear interpolation does not intersect with a feature type using arc by bulge interpolation. - related to different datums and/or projections. - related to accuracy of the transformation applied. For example using theoretic transformation (7 parameters transformation) instead of empiric transformation taking into account errors in the original reference frame.</p>	<p>Which solutions have you implemented or are you envisaging, for edge-matching ?</p>
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3.7 Data capturing	Have data capturing rules defined ? Where are they defined ? If yes – imposed on data providers ? Or applied on filters in the use case data processing ?	- is the structure sufficient to determine the content and structure of the data product ?		
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Data harmonisation component	Use case requirements	As-is analysis	Gap analysis	Harmonisation approach
0 Context	Vogt, J. (ed.) December 2002: Implementing the GIS elements of the Water Framework Directive. Guidance Document. JRC Publication EUR20544 EN. www.ec-gis.org/docs/F2305/GIS_GD.pdf EC-DG Environment D.2: 2005 Reporting guidance, 19 November 2004; EC-DG Environment D.2: 2010 Reporting guidance (draft), June 2006.	As-is analysis reflected in documents submitted by Sweden to the EU-WFD portal: http://forum.europa.eu.int/Public/irc/env/wfd/library?l=/framework_directive/implementation_documents_1/wfd_reports/member_states/sweden&vm=detailed&sb=Title . Use case description in RISE Use case document 'Diffuse nutrient leakage reporting to the WFD', Deliverable Number [18] 3.2.1, Draft Version 4, January 2007. Reference to datasources used: Lantmäteriet: General Description of GSD-the General Map, version 3.0, 09-09-2004, SMHI: The Swedish Inland Waters database (SVAR) (document containing point coordinates), SMHI: The Baltic sea database "Djupdata för havsområden 2003" (in Swedish). SMHI: In-house catchment database, no reference material.		
1.1 INSPIRE Principles	EC-DG Environment D.2: 2010 Reporting guidance (draft), June 2006. Reference material INSPIRE.	The hydrography data used stems from different data sources compiled at different levels and by different institutions (see As-is 'Context')		To be done
1.2 Reference Model	Not applicable	Not applicable		

1.3 Application Schemas (Rules)	Data model is given (chapter 3.3.3 GIS Guidance document), specifying the feature classes. Data dictionary available (See Appendix III GIS Guidance document) GIS Guidance document defines consistency rules as part of the quality description (see chapter 3.5 GIS Guidance document). Also, consistency rules apply for crossborder data (GIS Guidance Document, p 74ff .	Feature classes have been 'collected' from different hydro data sources or created as required by the WFD.
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To be done

<p>1.4 ISO 19100 Profile (Vector geometry)</p>	<p>Line and polygons; no mixed geometry allowed. Requirements in the GIS Guidance document specify the following 'Layers' (Chapter 3.2 and Appendix II): River basin Districts and catchments (polygons) with associated attributes, Rivers (lines), lakes (Polygons), Coastal waters (polygons), transitional waters (polygons). Features to be represented are lakes > 0.5 km² and catchments > 10 km². The reporting scale for surface water bodies is at least 1: 1 000 000 (short term), recommended is 1: 250 000 (long term), with a positional accuracy of 1000 m in the long term. For the River Basin District and catchments, the recommended reporting scale is 1: 4 000 000.</p>	<p>Catchment data size present in Swedish coverage submitted is > 40 km², lakes > 1 km². Scale for surface water bodies is 1: 250 000. Scale for River Basin districts and catchments 1: 50 000. Crossborder alignment of River Basin districts and catchments with Norway through reprojection to Norwegian system and manual retouching of polygon nodes take place. Points (reference: SMHI: The Swedish Inland Waters database (SVAR)), lines and polygons (References: Lantmäteriet: General Description of GSD-the General Map, version 3.0, 09-09-2004, SMHI: The Baltic sea database "Djupdata för havsområden 2003" (in Swedish)).</p>	<p>Lake and catchment size reported is not according to the requirements. Networks and catchments are not aligned with the ones of neighbouring countries. Crossborder catchment and River Basin district data is not connected.</p>	<p>Not applicable</p>
<p>1.4 ISO 19100 Profile (Topology)</p>	<p>Topology rules for hydrography features are spelled out in Appendix V of the GIS Guidance document.</p>	<p>Surface water bodies and Catchment data are derived from different data sources with different scale. Manual correction (i.e. Editing through snapping nodes or 'cutting' lines and polygons) takes place.</p>	<p>The as-is does not meet the requirements in that various hydro features are overlapping. River networks and lakes with neighbouring countries are not connected. Rivers do not possess network topology.</p>	<p>In progress</p>
<p>1.4 ISO 19100 Profile (Coverages)</p>	<p>Not applicable</p>	<p>Not applicable</p>		<p>Not applicable</p>
<p>1.4 ISO 19100 Profile (Temporal profile)</p>	<p>Not applicable</p>	<p>Not applicable</p>		

1.5 Multi-lingual text and cultural adaptability	The Metadata profile to be developed by the WFD GIS Guidance document shall cover multilingual aspects (GIS Guidance document, chapter 3.7.3)	Attribute names have been created in English as requested for WFD reporting (Reference: Naturvardsverket, Rapportering: GIS (rapportering), Version 1.0, 17-12-2004 (in Swedish), Swedish (and Saami where applicable) names are preserved as actual attribute values. Naming of crossborder Hydro features not tackled yet by Sweden.		In progress
1.6 Coordinate referencing and units model	Reference systems: GIS Guidance document Chapter 3.6 and Appendix VI: - Coordinate Reference Systems (horizontal, vertical): ETRS89, in ellipsoidal coordinates, three map projections proposed, based on scale and application (p. 64 GIS Guidance Document) - Temporal Reference Systems for hydrological data and units of measurement not applicable	Reference systems (see www.lantmateriet.se): - Coordinate Reference Systems: RT90 (Transverse Mercator, Gauss Krueger), 2.5 gon V 0:-15, ellipsoid Bessel 1841; all data in Sweden will have to be converted to SwedRef99 by January 2007; SwedRef99 ellipsoid is GRS 80. Coordinate transformation from current Swedish system to the one obligatory from 2007 onwards (and compatible with the one required for WFD) via seven parameter formula (available from Landmäteriet) is automated. - Units of measurement: metric		In progress
1.7 Object referencing model	Not applicable	Not applicable		
1.8 Data translation / guidelines	Not given, anticipated European harmonisation outlined in chapter 4 of the GIS Guidance document.	Not applicable		
1.9 Portrayal model	Not applicable	Not applicable		

2.1 Identifier Management	Coding rules GIS Guidance document chapter 3.4.	All features in the various datasets carry a code which is converted according to the WFD requirements. Those features to be reported but not captured yet in the catchment database (3000-4000 catchments) will have to carry unique national code as well.		In progress
2.2 Terminology	Definition of the terms River Basin District, River basins, catchments and surface water bodies, GIS Guidance document chapter 3.2.1			
2.3 Feature catalogues	Feature classes defined in GIS Guidance document chapter 3.3.4	Not applicable		
2.4 Dictionaries (Data dictionary)	Definition of the terms River Basin District, River basins, catchments and surface water bodies, GIS Guidance document chapter 3.2.1. Classes and recommended filenames see Appendix III (Data dictionary) of the GIS Guidance document	The Hydrology data provided by Landmätet (used for the surface water body extraction) has a data dictionary (Reference: General description of the GSD-The general Map, Document version 3.0, 9-9-2004). Existing dictionaries for surface water bodies receive additional attributes as requested by the WFD. Attributes are typed in manually, or produced automatically through attribute processing.		In progress
2.5 Conformance				
3.1 Metadata	A specific profile for WFD metadata is anticipated by the WFD-GIS working group, following the ISO 19 115 (GIS guidance document chapter 3.7).	Metadata (in Swedish and English) is available for hydrology data (surface water bodies) provided by Landmätet. Reference: www.lantmateriet.se (in Swedish)		

3.2 Maintenance	Not applicable	Catchment data are in the continuous process of completion, as not for all surface water bodies to be reported, catchments are delineated yet. The same holds true on the Swedish side for the alignment with Norwegian catchments and River Basin Districts which is still processed. Data provided by Lantmäteriet is updated on a regular basis (reference: General description of the GSD-The general Map, Version 3.0, issued 09-09-2004)		
3.3 Data quality	GIS Guidance Document, chapter 3.5.2 and Appendix 5	Data quality requirements for Hydrological data produced by Landmäteriet present (General description of the GSD-The general Map, Document version 3.0, 9-9-2004).		
3.4 Data transfer	Data transfer requirements spelled out refer to the delivery of the actual final report. In 2005, accompanying maps showing the hydrological data requested had to be delivered to the WISE portal in ESRI .shp format with XML encoded attributes (Reference: WISE Implementation Plan, Version 5, 22 Mrch 2006). RISE specifies a WFS 1.1 with GML 3.1 encoding.			
3.5 Derived reporting & multiple representations	Not applicable			

3.6 Consistency between data	Crossborder geometry is to be established, fully connected network. Tolerance level for connection of features at borders are given (see chapter 4.1.1 GIS Guidance Document). Consistency rules in general are spelled out in GIS Guidance document chapter 3.5.2	Catchment and River Basin data are derived from data which is not consistent in itself (different scale of input data used for production in mountainous areas of Sweden; pers. communication). Topological consistency between surface water body features and catchment areas is not given. Crossborder geometry for River Basin districts and catchments has been started but not completed. For edgematching with Norwegian data, reprojection had to be applied. Edgematching with data is carried out through manual editing.	Data from the different datasources for Swedish Hydrographical data is not matching. Crossborder networking has not been obtained yet. In general, Surface water bodies in general are not matched. Naming/Coding of crossborder features is not solved. Crossborder features in Norwegin dataset have not been found in Swedish dataset. Data from Norway has been produced on a different scale. Norwegian data has a different projection.	In progress
3.7 Data capturing	Not applicable	Catchment data are captured through digitizing to complete catchment data for all of Sweden.		

Data harmonisation component	Use case requirements	As-is analysis	Gap analysis	Harmonisation approach
0 Context	Discussions of RISE with domain experts on landcover in Sweden and Norway have resulted in a harmonised set of landcover classes for the nutrient leakage modelling. These landcover classes are: meadows, other landcover classes, Forest, No or sparse vegetation/Mountains, Inland waters, Arable land, Covered surfaces. Reference: 'Matching table', Annex to RISE document 4.3.1 version 9 January 2007.	<p>In Sweden, the TRK model has been used for the diffuse Nutrient leakage calculation for the WFD reporting. The percentage of land cover as per catchment aggregations is compiled in table format for the Swedish Nutrient Leakage model TRK. Also, the cropland area as per agricultural land needs to be indicated by size/percentage in an ASCII table. The landcover classes required for the TRK modelling are: Urban areas, Other concentrated built-up area, Forest, Open Land, Open Land on the island of Öland, Mountainous area above the treeline, Glaciers, Water areas (Lakes and large Rivers), Wetland, International Sea, National Sea, Agricultural areas, Forest Clearcut areas.</p> <p>In the Swedish Use Case, the land cover theme is created from five sources:</p> <ol style="list-style-type: none"> 1.) The General Map, 1:250.000, vector data 2.) The Blockdatabase, agricultural land determination, 1:10.000, vector data combined with the IAKS cropland lookup table 3.) Data on forest clearcuts, vector data, 1: 250 000 4.) Baltic Sea Region GIS Landcover data from UNEP/GRID, raster data, for areas outside the Swedish territory 5.) Catchment aggregation (TRK area) map, vector data, based on the TRK model <p>Reference documents: RISE WP 3.2 Use case 'Diffuse nutrient leakage reporting to the WFD'</p>		
1.1 INSPIRE Principles	EC-DG Environment D.2: 2010 Reporting guidance (draft), June 2006. Reference material INSPIRE.			

1.2 Reference Model	Not applicable	Not applicable		
1.3 Application Schemas (Rules)	Not applicable	Not applicable		
1.4 ISO 19100 Profile (Vector geometry)	To be done	Vector data with polygon geometry stem from: Lantmäteriet General map, Reference: Description of GSD-the General Map, version 3.0, 09-09-2004 TRK data, see document http://www-nrciws.slu.se/TRK	General map, blockdata, Forest clearcut map have been rasterized for processing. UNEP GRID data has yet another pixel size. All raster coverages stem from input data with different scale respectively.	
1.4 ISO 19100 Profile (Topology)	Not applicable		needs to be investigated	To be done
1.4 ISO 19100 Profile (Coverages)	To be done	Swedish Use case: UNEP/GRID Landcover data. For details, see document: http://maps.grida.no/baltic/description.htm		
1.4 ISO 19100 Profile (Temporal profile)	Not applicable			
1.5 Multi-lingual text and cultural adaptability	To be done	GRID Arendal data is in English, IAKS cropdata and General map in Swedish. Language adopted for attributes and their values is Swedish		
1.6 Coordinate referencing and units model	Reference system as spelled out in GIS Guidance document Chapter 3.6 and Appendix VI assumed: - Coordinate Reference Systems (horizontal, vertical): ETRS89, in ellipsoidal coordinates, three map projections proposed, based on scale and application (p. 64 GIS Guidance Document)	All Swedish information is in RT90 (Transverse Mercator, Gauss Krueger), 2.5 gon V 0:-15, ellipsoid Bessel 1841; UNEP GRID data to be investigated		

1.7 Object referencing model	Not applicable	No		
1.8 Data translation / guidelines	Not applicable			
1.9 Portrayal model	Not applicable	Not applicable		
2.1 Identifier Management	To be done	Identifier management indicated for Blockdatabase, in order to link Block polygons with IAKS cropdata table.		
2.2 Terminology				
2.3 Feature catalogues	To be done			
2.4 Dictionaries (Data dictionary)	To be done			
2.4 Dictionaries				
2.5 Conformance	Not applicable			
3.1 Metadata	To be done	Metadata does exist for the General Map (1: 250 000), reference: Landmateriet: www.lantmateriet.se .		To be done
3.2 Maintenance	To be done	IAKS cropdata and Forest clearcut data are updated yearly. The update is not reflected in the TRK modelling. Forest clearcuts are updated yearly, this update is not reflected in the TRK modelling. landcover area information for clearcuts and agricultural land is being processed with landcover information from General Map, for which an update on landcover classes is not obtained.		To be done
3.3 Data quality	To be done	Data quality requirements for General map produced by Landmateriet present (General description of the GSD-The general Map, Document version 3.0, 9-9-2004), Forest Clearcut data are known to be incomplete (no documentation available), UNEP GRID data in Balans project documentation? To be investigated.		To be done

3.4 Data transfer	Encoding in GML to be investigated.	Swedish Use case: IAKS crop data as tables on CD. Blockdatabase on CD, Forest Clearcut data on CD, and Sub-catchment map: ESRI shape file via email attachment General Map: coverage format originally obtained on CDs. UNEP GRID data downloaded from Internet site.		To be done
3.5 Derived reporting & multiple representations	Not applicable			
3.6 Consistency between data	To be done	Merging is performed between UNEP-GRID data and General map. landcover information for two landcover classes from the general map is refined with other datasources.	No temporal consistency, as data the landcover class establishment refers to come from different years. Actual 'shape' of landcover might vary over the years, but is not captured. Temporal differences of landcover information from various sources is not considered. Merging with data covering areas bordering Sweden has to be performed including reprojection, and accepting that datasources have different spatial and temporal resolution.	To be done
3.7 Data capturing	Not applicable	IAKS cropdata is updated yearly, the Blockshapes themselves are not corrected. Capturing of forest Clearcuts unknown.		

Data harmonisation component	Use case requirements	As-is analysis	Gap analysis	Harmonisation approach
0 Context	Vogt, J. (ed.) December 2002: Implementing the GIS elements of the Water Framework Directive. Guidance Document. JRC Publication EUR20544 EN. www.ec-gis.org/docs/F2305/GIS_GD.pdf EC-DG Environment D.2: 2005 Reporting guidance, 19 November 2004; EC-DG Environment D.2: 2010 Reporting guidance (draft), June 2006.	Use case description in RISE Use case document 'Diffuse nutrient leakage reporting to the WFD', Deliverable Number [18] 3.2.1, Draft Version 4, January 2007. Datasources used: The National hydrometric System (REGINE); http://www.statkart.no/standard/osi/html/div/hoeringsdokumenter/hoeringsdokument_site.htm (in Norwegian)		
1.1 INSPIRE Principles				
1.2 Reference Model	Not applicable	ISO 19100		
1.3 Application Schemas (Rules)	Data model is given (chapter 3.3.3 GIS Guidance document), specifying the feature classes. Data dictionary available (See Appendix III GIS Guidance document) GIS Guidance document defines consistency rules as part of the quality description (see chapter 3.5 GIS Guidance document). Also, consistency rules apply for crossborder data (GIS Guidance Document, p 74ff .	A feature catalogue and UML application schema is available in the Norwegian standard SOSI, Reference: http://www.statkart.no/standard/osi . Some additional information is added in NVE's data, an application schema exists in Visio. A product specification is existent, but not formulated in UML yet.		In Progress

1.4 ISO 19100 Profile (Vector geometry)	Line and polygons; no mixed geometry allowed. Requirements in the GIS Guidance document specify the following 'Layers' (Chapter 3.2 and Appendix II): River basin Districts and catchments (polygons) with associated attributes, Rivers (lines), lakes (Polygons), Coastal waters (polygons), transitional waters (polygons). Features to be represented are lakes > 0.5 km ² and catchments > 10 km ² . The reporting scale for surface water bodies is at least 1: 1 000 000 (short term), recommended is 1: 250 000 (long term), with a positional accuracy of 1000 m in the long term. For the River Basin District and catchments, the recommended reporting scale is 1: 4 000 000.	Reporting scale for Norway is 1:250000. Coastal waters, lakes: polygons; river widenings (polygons) as centerlines, rivers: lines. Norwegian ISO profile existent. Reference: http://www.statkart.no/standard/osi/html/div/hoeringsdokumenter/Versjon%2040/del1_1_GenerelleKonsepter.doc , clause 9. (In Norwegian only)	The 1:250 000 layer is not yet produced.	In Progress
1.4 ISO 19100 Profile (Topology)	Topology rules for hydrography features are spelled out in Appendix V of the GIS Guidance document.	Rivers are available from line layers connected to lakes, widening rivers and coastal polygons by common nodes. Norway is working with connection of the Norwegian network to it's neighbouring countries network.		
1.4 ISO 19100 Profile (Coverages)	Not applicable	Not applicable		Not applicable
1.4 ISO 19100 Profile (Temporal profile)	Not applicable	Updates are logged in the feature attribute table with actual date and the signature of the operator.		

1.5 Multi-lingual text and cultural adaptability	The Metadata profile to be developed by the WFD GIS Guidance document shall cover multilingual aspects (GIS Guidance document, chapter 3.7.3)	Column names in feature tables in English. Code table for both English and Norwegian names, feature types, feature attributes, feature codes with their definitions for all attribute tables.		
1.6 Coordinate referencing and units model	Reference systems: GIS Guidance document Chapter 3.6 and Appendix VI: - Coordinate Reference Systems (horizontal, vertical): ETRS89, in ellipsoidal coordinates, three map projections proposed, based on scale and application (p. 64 GIS Guidance Document) - Temporal Reference Systems for hydrological data and units of measurement not applicable	UTM33, EUREF 89 (= ETRF 89). Heights based upon national datum NN54, which is up to 45-46 meter different from GRS80 (ellipsoidal heights)		In Progress
1.7 Object referencing model	Not applicable	By a unique identifier for each feature for all feature classes.		
1.8 Data translation / guidelines	Not given, anticipated European harmonisation outlined in chapter 4 of the GIS Guidance document.	Norway uses terminology as it is in the GIS guidance.		
1.9 Portrayal model	Not applicable	Not applicable		
2.1 Identifier Management	Coding rules GIS Guidance document chapter 3.4.	Unique national codes (MS_CD) exists for all WFD features. The MS_CD is set manually for the RBDs and the CA. For all water bodies an application gives a new MS_CD automatically when a waterbody is split or merged. The EU code (EU_CD) column in all attribute tables will be filled in when the Internet based GIS tool for the WFD autumn 2006 and for the reporting to WISE autumn 2006. Norwegian/Swedish RBDs have a common EU_CD.	Harmonisation of EU_CD with Sweden and Finland is needed for cross border Competent Authorities (CA), River Basins and water bodies.	To be Done

2.2 Terminology	Definition of the terms River Basin District, River basins, catchments and surface water bodies, GIS Guidance document chapter 3.2.1	ISO 19100 terminology is being followed in the sense that the English terms and definitions are translated to Norwegian or that existing norwegian terms and definitions are modified according to ISO terminology. However, this is not applied for all terms. A terminology database is available, see http://decentius.hit.uib.no/kartverket/search.xml?ua=explorer , but is not fully updated. (Username Gjest, password Gjest.)		
2.3 Feature catalogues	Feature classes defined in GIS Guidance document chapter 3.3.4	A feature catalogue including a UML application schema is available as part of SOSI. SOSI version 4.0 is underway to be approved. See http://www.statkart.no/standard/sosi/html/div/hoeringsdokumenter/hoeringsdokument_site.htm . Previous versions are available at http://www.statkart.no/standard/sosi/html_34/del2.htm		In Progress
2.4 Dictionaries (Data dictionary)	Definition of the terms River Basin District, River basins, catchments and surface water bodies, GIS Guidance document chapter 3.2.1. Classes and recommended filenames see Appendix III (Data dictionary) of the GIS Guidance document	From the Appendix III of the GIS Guidance document names for classes are used, also as filenames. The recommended filenames are not used. Field names are in accordance with Appendix III of the GIS Guidance document. The name field is not populated for river water bodies, coastal water bodies and small lakes without a name in the 1:50 000 topographic layer.	Filenames to be updated in next version of WFD management tool (ArcGIS Server based). For reporting autumn 2005 recommended filenames will be applied before uploading to WISE. Names, where missing, will be added by user when updating water body information from autumn 2006.	In Progress
2.4 Dictionaries				

2.5 Conformance		Application which checks conformance according to specification is in place e.g. domain defined for codes so only valid codes can be used. Reference?		
3.1 Metadata	A specific profile for WFD metadata is anticipated by the WFD-GIS working group, following the ISO 19 115 (GIS guidance document chapter 3.7).	Metadata schemas exist which is conform with ISO.		
3.2 Maintenance	Not applicable	No update cycle in place. Catchment data updated continuously when need identified. All lakes are revisited on yearly basis.		
3.3 Data quality	GIS Guidance Document, chapter 3.5.2 and Appendix 5	The requirements for 1:50 000 topographic data set by Statens Kartverk are followed.		
3.4 Data transfer	Data transfer requirements spelled out refer to the delivery of the actual final report. In 2005, accompanying maps showing the hydrological data requested had to be delivered to the WISE portal in ESRI .shp format with XML encoded attributes (Reference: WISE Implementation Plan, Version 5, 22 Mrch 2006). RISE specifies a WFS 1.1 with GML 3.1 encoding.			
3.5 Derived reporting & multiple representations	Not applicable	Crystal Reports will be used for deriving reports from WFD data through an Internet portal and served from ArcSDE via an ArcGIS Server. There will be possible to export WFD feature and attribute data via Internet in several formats; maps, tables and reports. Ready for use by the public autumn 2006.		

3.6 Consistency between data	Crossborder geometry is to be established, fully connected network. Tolerance level for connection of features at borders are given (see chapter 4.1.1 GIS Guidance Document). Consistency rules in general are spelled out in GIS Guidance document chapter 3.5.2	Crossborder alignment Sweden/Norway has been carried out for test area in case of rivers and lakes; in general, river network in Norway along borders is partly erroneous, as river network and lakes are 'cut' at borders. River network, Strahler order etc. thous not consistent. Continuous updating of RBDs due to changing watershedlines is carried out when needed.	Possible mismatch between the two data sources for water bodies and RBDs and RBs within Norway. Crossborder geometry is not complete: Lakes crossed by national borders might result in features to be reported due to their size when merged. Lakes larger than 0.5 km ² are to be reported as a water body according to the directive. Lakes that are smaller than 0.5 km ² on the Norwegian side may be due for reporting when the Swedish/Finnish half is added with the feature coding to be discussed. Border lake water bodies smaller than 1.0 km ² are defined as a water body on the Norwegian side, but not on the Swedish/Finnish side. Rivers running to and from Sweden and Finland have to be connected to the Norwegian river network to be able to delineate complete river water bodies within common catchments and to run correct hydrological analysis needed for the assessment of impact/pressure.	RBD and catchment layers from Sweden have to be reprojected from RT90 to UTM33, Euref89 via geographical coordinates. Mismatches due to scale differences between Swedish and Norwegian dataset (1:100 000 (in north Sweden) vs 1: 50 000). The Norwegian and the Swedish rivers never match along the border. Some times rivers just stop at the border with no corresponding rivers on the other side. In process.
3.7 Data capturing	Not applicable	Not applicable		

Data harmonisation component	Use case requirements	As-is analysis	Gap analysis	Harmonisation approach
0 Context	Discussions of RISE with domain experts on landcover in Sweden and Norway have resulted in a harmonised set of landcover classes for the nutrient leakage modelling. These landcover classes are: meadows, other landcover classes, Forest, No or sparse vegetation/Mountains, Inland waters, Arable land, Covered surfaces. Reference: 'Matching table', Annex to RISE document 4.3.1 version 9 January 2007.	Norway uses the Teotil2 model for the determination of diffuse nutrient leakage pollution. The two basic landcover parameters involved as input in Teotil2 are: <ul style="list-style-type: none"> • the sum of landcover classes obtained per catchment • the diffuse nutrient leakage coefficient calculated for each land cover class Teotil2 forms the basis for the diffuse nutrient leakage determination; landcover classes for the WFD reporting shall be derived from the ones spelled out for Teotil2. The land cover theme is created from the following sources: <ol style="list-style-type: none"> 1.) Markslag (Crop land, wet land, forests and soil information) , 1:5000 and generalized 2.) Soil information (more specific information about crop land and capability information), vector and point data. 		
1.1 INSPIRE Principles	EC-DG Environment D.2: 2010 Reporting guidance (draft), June 2006. Reference material INSPIRE.			
1.2 Reference Model	Not applicable			Probably, the ISO 19101 reference model will also be applied in INSPIRE
1.3 Application Schemas (Rules)	Not applicable		define mapping from the existing application schemas to the 'new' application schema.	Implement the result of the GAP analyses

1.4 ISO 19100 Profile (Vector geometry)	To be done	There is a vector profile in SOSI 4.0 applicable to the vector land cover data. The vector profile is based upon ISO 19107 subtyping GM_CompositeCurve, GM_Surface and GM_Point, including some curve interpolations. Reference: http://www.statkart.no/standard/sosi/html/div/hoeringsdokumenter/Versjon%2040/del1_1_GenerelleKonsepter.doc , clause 9 (In Norwegian).	This geometry model can easily be mapped to geometry elements applied in GML.	In progress
1.4 ISO 19100 Profile (Topology)	Not applicable	No topology applied	Not applicable	
1.4 ISO 19100 Profile (Coverages)	To be done	All landcover data is vector data.	Not applicable	
1.4 ISO 19100 Profile (Temporal profile)	Not applicable	Data have some temporal information, like verification date.		To be done
1.5 Multi-lingual text and cultural adaptability	To be done	The feature catalogue and application schema is only documented in Norwegian. Some english translation is in place, but needs to be referenced.	Translation required	To be done
1.6 Coordinate referencing and units model	Reference system as spelled out in GIS Guidance document Chapter 3.6 and Appendix VI assumed: - Coordinate Reference Systems (horizontal, vertical): ETRS89, in ellipsoidal coordinates, three map projections proposed, based on scale and application (p. 64 GIS Guidance Document)	NGO 48 (national datum of 1948) in UTM projection. Some data available in UTM33, EUREF 89 (= ETRF 89). Heights based upon national datum NN54, which is up to 45-46 meter different from GRS80 (ellipsoidal heights). All data can be transformed to EUREF 89	Datum transformation is required.	To be done
1.7 Object referencing model	Not applicable	Not available		
1.8 Data translation / guidelines	Not applicable	Some english translation is in place, but needs to be referenced.		
1.9 Portrayal model	Not applicable	Not applicable		
2.1 Identifier Management	To be done	UUID is implemented in the Norwegian standards, but not yet applied. The identifier used on classes are those derived from the datasets, N50_Areal and DMK_FREG.		

2.2 Terminology		ISO 19104 terms are applied, but translated into Norwegian wherever applicable	Translation of important concepts	To be done
2.3 Feature catalogues	To be done	Feature catalogue for land use data is available at http://www.statkart.no/standard/sosi/html/div/hoeringsdokumenter/hoeringsdokument_sitse_f%C3%B8frist.htm . Only in Norwegian		
2.4 Dictionaries (Data dictionary)	To be done	The Norwegian Feature Catalogue is available in an ACCESS data base (SOSI-DB). This database also contains feature concept and dictionaries.		
2.4 Dictionaries				
2.5 Conformance	Not applicable	There are specific conformance rules for the feature catalogue, as a subset of the conformance classes in ISO 19110.		
3.1 Metadata	To be done	Metadata exists at feature type level, dataset and dataset series. Metadata at feature type level are scarce, containing some dates and some quality. Metadata at dataset and dataset series are under preparation and will in the future follow ISO 19139 Metadata XML implementation specification, but is mostly not available.	Requires mapping to INSPIRE metadata when these are finalized.	To be done
3.2 Maintenance	To be done	Markslag has various levels of maintenance, soil has no routine maintenance.	Not applicable	
3.3 Data quality	To be done	Quality is given as lineage and positional accuracy and the level of visibility when production is based on aerial photographs.	Lineage and positional accuracy is easily mapped to the quality model in ISO 19115. Visibility is not easily mapped to 19115	To be done
3.4 Data transfer	Encoding in GML to be investigated.	National standard SOSI exchange format. Other formats on request, like SHAPE.	SOSI -> SHAPE	
3.5 Derived reporting & multiple representations	Not applicable	Not applicable		
3.6 Consistency between data	To be done	Data in different regions may be conformant to different versions of SOSI. Norway has an official version of SOSI since 1990.	Land Cover data from different national providers along international borders do not match with data from neighbouring countries. Mismatch of information content and shape of data within Norway at different scales.	To be done
3.7 Data capturing	Not applicable	Markslag is based upon photogrammetric processes and field work. Soil is based upon field work.	Not applicable	

Data harmonisation component	Use case requirements	As-is analysis	Gap analysis	Harmonisation approach
0 Context	Use case description in RISE Use case document 'Diffuse nutrient leakage reporting to the WFD', Deliverable Number [18] 3.2.1, Draft Version 4, January 2007.	Use case description in RISE Use case document 'Diffuse nutrient leakage reporting to the WFD', Deliverable Number [18] 3.2.1, Draft Version 4, January 2007. Datasources used: DTM BD ALTI from IGN France, reference: http://www.ign.fr/rubrique.asp?rbr_id=1622 (in French). River Network map BD CARTHAGE, reference: http://www.ign.fr/rubrique.asp?rbr_id=1960&lng_id=EN (in French).		
1.1 INSPIRE Principles				
1.2 Reference Model	The WFD gives the objectives to achieve but does not describes how to process. The Ministry of Sustainable Development in France has designed national terms of reference (more detailed than WFD) Each River Basin District (6 in France) adapts them to the local context.	In France, a common model called SANDRE exists but is only for final data i.e. data used for WFD reporting. As elevation is not directly required for reporting, elevation is not included in this common model.		
1.3 Application Schemas (Rules)	Elevation is required as DTM for IDPR.	DTM is available.		

1.4 ISO 19100 Profile (Vector geometry)				
1.4 ISO 19100 Profile (Topology)	The DTM is used to compute the network of talwegs (theoretical hydro) which should be continuous (in order to compute later IDPR)	The network of talwegs computed directly from DTM BD ALTI is not continuous. Automatic programs detect the "holes" and then fill them.	There are "holes" in the DTM, due to real world conditions (e.g. karst) where the water stays .	
1.4 ISO 19100 Profile (Coverages)	Rectified Grid Coverage (DTM) required	Rectified Grid Coverage (DTM) available: BD ALTI		Finalized.
1.4 ISO 19100 Profile (Temporal profile)	Not applicable	Not applicable		
1.5 Multi-lingual text and cultural adaptibility	Reporting for WFD may be done in French and is done in French.	BD ALTI specifications are in French.		

1.6 Coordinate referencing and units model	<p><i>Required by the WFD:</i> <i>Reference systems: GIS Guidance document Chapter 3.6 and Appendix VI:</i> - Coordinate Reference Systems (horizontal, vertical): ETRS89, in ellipsoidal coordinates, three map projections proposed, based on scale and application (p. 64 GIS Guidance Document) Horizontal CRS for the IDPR calculation: -datum : NTF - projection : Lambert II étendu Vertical CRS : IGN 1969 (comes from common model SANDRE used in all River Basin Districts in France). Units of measure : meter</p>	<p>Horizontal CRS : -datum : NTF - projection : Lambert II étendu Vertical CRS : IGN 1969</p> <p>Units of measure : meter</p>		To be done.
1.7 Object referencing model				
1.8 Data translation / guidelines	Not applicable			
1.9 Portrayal model	Not applicable			
2.1 Identifier Management		DTM BD ALTI is supplied by tiles, named mnt_xx. A mosaic is also supplied to show how the tiles are located.	Computation gives wrong results if done by tiles.	Tiles are gathered by GIS in order to have only one file, before launching computation of theoretical hydro network.
2.2 Terminology				

2.3 Feature catalogues	SANDRE contains a Feature Catalogue but elevation is not included in it (as it is not data directly used for WFD reporting).	I guess yes, but a very simple one : grid points with attribute "elevation".		
2.4 Dictionaries (Data dictionary)				
2.4 Dictionaries				
2.5 Conformance				
3.1 Metadata	CRS should be included in the data.	DTM BD ALTI is supplied with documentation describing its specifications.	The CRS information is just provided as documentary metadata, not included in the data. The data is not self-sufficient. May be an issue.	
3.2 Maintenance	Maintenance of IDPR has not been yet considered.	DTM BD ALTI does not have regular updates, as elevation is rather stable.		
3.3 Data quality		Vulnerability maps are produced as scale 1/100 000 (or smaller scale for national map). The real hydro network comes from data at 1: 50 000. Spacing size : 50 m Vertical accuracy : between 2 m (flat areas) to 20 m (mountains)		
3.4 Data transfer	.GRD (Arc GIS) with georeferencement included.	DTM BD ALTI is supplied as .ASC file (no georeferencement included)		The change of format is done during the integration in the GIS

3.5 Derived reporting & multiple representations	Not applicable. Some maps are done for a River Basin District, a national map is also done. But the first steps are done directly from the DTM, the national map is not derived from the local ones. National map is created from the same DTM : BD ALTI with spacing size 50 m.			
3.6 Consistency between data	Generally, water runs in thalwegs. However : -There may be talwegs without water, when the run-off is strong. - There may be also water areas without talweg e. g. marsh, when the run-off is weak. All theses cases may be explained by geology. No cross-border consistency issues between River Basin Districts as the DTM used is a national one.	National DTM (but with an accuracy varying according to the relief of the area).		
3.7 Data capturing	Catchment areas (computed from DTM) are considered only if their area is more than 62,5 ha			

Data harmonisation component	Use case requirements	As-is analysis	Gap analysis	Harmonisation approach
0 Context	WFD reporting for 2005, for Garonne and Ebro River basins	Reference hydrographic data (from topographic DB), supplied by NMAs (France and Spain) Thematic hydrographic data, supplied by River Basins Agencies (France and Spain). This thematic hydrographic data was already designed and produced, according more or less to the WFD requirements.		
1.1 INSPIRE Principles	SDIGER is a pilot project to INSPIRE. One of its main goal is to show the feasibility of INSPIRE principles. The SDIGER application scenario is following (and contributing to) the INSPIRE principles.			
1.2 Reference Model	The context and objectives of the SDIGER project are described in the Application Scenario document. May be considered more or less as a "Reference Model" ?	Data for "thematic hydrography" have been designed and produced following the recommendations of the document "Implementing the GIS elements of the WFD". This might be considered more or less as a "Reference Model".		

1.3 Application Schemas (Rules)	The requirements are defined by the WFD itself and by the "Implementing the GIS elements of the WFD" document. UML is required ISO standards are not required (except for metadata and quality parameters). Features and attributes are identified (except for the "pressures"). The application schema does not involve neither associations nor operations	French data : - application schema in EXPRESS IDEF1X - data product specification (with the link between elements in the local or national database and the elements of WFD) Spanish data : - UML model - definitions not provided, but according to the WFD GIS guidance document	Definitions missing for features, attributes and attribute possible values in existing data.	Common application schema in UML. More information (definitions) was asked to the data providers (possible because they were partners of the project). Some associations are present in the common application schema. No operations in the common application schema.
1.4 ISO 19100 Profile (Vector geometry)	WFD requires simple features : points, lines, polygons. No mix geometry in one feature. 2D data	Simple features : points, lines, polygons. 2D data		
1.4 ISO 19100 Profile (Topology)	WFD requires a continuous hydrographic network. Two attributes are related to topology - "continua" to indicate if it is a true river or a fictitious one, created to ensure connectivity - Flow direction.	Continuous hydrographic network in existing data. "continua" and "flow direction" information were present (even if in a lightly different form).		Nothing done on existing data (except translation to the common application schema, if required)
1.4 ISO 19100 Profile (Coverages)	No coverage required	SDIGER has used some raster data for viewing services, without any harmonisation processing (just display images).		

1.4 ISO 19100 Profile (Temporal profile)	Some temporal attributes (e.g. status year). Nothing about life-cycle of data.	Thematic data : produced once, for the 2005 WFD reporting, no information about update. Reference data : some update but no temporal model.		
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1.6 Coordinate referencing and units model	<p>CRS : WFD recommends :</p> <ul style="list-style-type: none"> - use of geographic coordinates in ETRS89. - use official formulae provided by NMAs for coordinate transformation to ETRS89 - document national CRS according to ISO19111 - further adopt EVRF2000 for expressing heights. - use of ETRS-LCC (Lambert Conic Conformal) if a projection is needed. <p>Units of measurements :</p> <ul style="list-style-type: none"> - use of metric system (e.g. depth in m, area in km²) - nothing defined for units of pressures 	<p>CRS :</p> <ul style="list-style-type: none"> - thematic data: WGS84 - French reference data: NTF - Lambert II étendu - Spanish reference data: EPSG:4230 <p>Units of measurements :</p> <ul style="list-style-type: none"> - use of metric system - units for pressure (e.g. emitted amount of the pollutant, quantity of substances lixiviated) defined in French data but not in Spanish data 		<p>Translation on-the-fly in a common reference system (ED50) by a Molodenski transformation (not very accurate but rather quick).</p> <p>Units of measurement :</p> <ul style="list-style-type: none"> - metric system - for pressures, adoption of the units used by French data
1.7 Object referencing model	<p>The "Implementing the GIS elements of WFD" document has the following position about linear referencing :</p> <ul style="list-style-type: none"> - not for short-term - has to be considered later. 	<p>No linear referencing in existing data, the network is cut where there is an attribute changing of value.</p>		<p>The SDIGER project offers gazetteer services to search data:</p> <ul style="list-style-type: none"> - with a thesaurus of administrative units in France and Spain - with geographical names (but harmonisation of the classification has been difficult and not really achieved)

1.8 Data translation / guidelines				<p>3 approaches have been investigated :</p> <ul style="list-style-type: none"> - data reorganisation (off-line data conversions) - using views : creation of database views of the local model, compliant with the common model - reorganise the data in real time : by adapting the tool developed for the GiModig project, based on the use of XSLT documents. Has been tested only on 3 feature types. Not very efficient (slow). The most pragmatic approach is "using views".
1.9 Portrayal model	<p>No requirement on this topic in WFD. EuroStat expressed some concern on this topic.</p>	<p>Each data provider has supplied his own portrayal.</p>		<p>No harmonisation done for portrayal. Furthermore, some problems on the SDIGER website about the order of layers display (surfacic features may hide other features) and the querying</p>

2.1 Identifier Management	<p>No requirement about external identifiers.</p> <p>Some thematic identifiers are required, specially the European code for most of feature types.</p> <p>This European code begins with a 2 letters prefix for the country code, the 22 remaining characters are for the national code. The national code is up to each MS. Nevertheless, the WFD recommends to use the Pfafstetter system (based on a hierarchical classification of river basins).</p> <p>No requirement on pressures.</p>	<p>French data : existence of the European code respecting the Pfafstetter system.</p> <p>Spanish data : existence of the European code. (the prefix was already present in both cases).</p> <p>Codes were also existing for pressures ; they have been kept in the common application schema.</p>		<p>Use of the existing codes.</p> <p>For the data translation prototype, an identifier has been attributed, based on the following principle :</p> <ul style="list-style-type: none"> - prefix to identify the data source <ul style="list-style-type: none"> - name of feature type in common model - name of feature type in national model - national identifier.
2.2 Terminology	<p>The appendix IX of the "Implementing the GIS elements of WFD" document offers a glossary including concepts (e.g. feature, attribute, grid) and feature types (e.g. lake, groundwater)</p>	<p>Implicit use of the ISO terminology ; all project members had an ISO background</p>		<p>Nothing formalised about terminology.</p>

<p>2.3 Feature catalogues</p>	<p>Thematic hydrographic data : - includes managements units, water bodies, status, protected areas and pressures. - the "Implementing the GIS elements of WFD" documents provides a FC for the 4 first layers - this FC gives for each feature type, the list of its attributes with the attribute name, acronym, type (string, number, ...), definition, requirement (M/O) and list of possible values when required . No detailed requirement neither on pressure nor on reference hydrographic data.</p>	<p>French data : were provided with their specifications (including a FC with the same kind of information as the WFD one). Spanish data : data were supplied with the list of features and attributes (definitions were missing). Thematic data : was already more or less in the common application schema required by the WFD (except for pressure as requirements were not really specified)</p>	<p>Definitions were missing in some existing data. Main issue was on pressures : no detailed requirements, definitions missing in existing data, very specialised data (need for domain expertise), different languages. There may be mistakes in the common FC for pressures, specially about possible values of attributes. This is a theoretic common FC ; the translation has not been done for all feature types.</p>	<p>2 common Features Catalogues have been created (one for thematic hydrography, one for reference hydrography). Before creating the common FC, a FC for national data had been created (in the form described below) and filled from the existing data specifications. The FC form is the following : Word document with minimum information (features name and definition, attributes name, type, definition and possible values, if enumerated attribute). For Reference hydrographic data, FACC has been used to help to compare the French data and the Spanish one.</p>
<p>2.4 Dictionaries (Data dictionary)</p>	<p>Appendix III of the "Implementing the GIS elements of WFD" document is called "data dictionary" but in fact, it is a Feature Catalogue (as the attributes are linked with the features).</p>	<p>No data dictionary for existing data (definitions, if any, were included in the Feature Catalogue).</p>		<p>Use of the DGIWG data dictionary (FACC) to design the common application schema for reference hydrographic data.</p>

2.4 Dictionaries	No	No		The metadata edition tool developed for the SDIGER project enables the documentation of Spatial Reference Systems by means of the CRS encodings provided by EPSG (European Petroleum Survey Group). Multi-lingual thesauri have been used to help in metadata translation.
2.5 Conformance	Nothing on this topic	Nothing on this topic		Nothing on this topic
3.1 Metadata	The "Implementing the GIS elements of WFD" document recommends : - short term : adopt ISO 19115 (when official standard available) ; appendix VII describes some quality elements and legal aspects that have to be described in the metadata - middle term : a metadata profile will be developed under the INSPIRE initiative. Some multi-lingual requirements (e.g. codelists defined in all official languages of the European Union).			The SDIGER project has defined 3 profiles of metadata, included one specific for WFD. The multi-lingual requirements have been taken in account by the use of automatic translation (with SYSTRAN) and with the help of multi-lingual thesauri (GEMET, UNESCO, EUROVOC, AGROVOC, GCMD and INSPIRE spatial terms).

3.2 Maintenance	The "Implementing the GIS elements of WFD" document gives a calendar from 2003 to 2015 about the maps which need to be supplied for WFD reporting (requirements increase at middle and long term)	Thematic data: produced for the 2005 WFD reporting. No update planned for 2005 reporting, but updates to the data necessary to fulfill WFD reporting schedule. Reference data: regular update for French and Spanish data		SDIGER was only about the 2005 WFD reporting. Data maintenance was out of its scope.
3.3 Data quality	The "Implementing the GIS elements of WFD" document ask to publish quality parameters (geometric accuracy, thematic accuracy, completeness, ...). The geometric accuracy must be better than 1 000 m . It is recommended to be 125 m. These quality criteria are based on available data (EGM)	Quality parameters were more or less available (e.g. accuracy defined for the whole database, not by feature type). As existing data was at scales 1: 50 000 or 1: 100 000, the required geometric accuracy was achieved.		Available quality parameters have been published.
3.4 Data transfer	The "Implementing the GIS elements of WFD" document recommends use of shapefile for vector data.	A lot of existing data already in shapefile. Some data from France in PostGreSQL. Reference and thematic data from Spain in Oracle Spatial		SDIGER offers both viewing and download services. GML has been used for the WFS and downloading
3.5 Derived reporting & multiple representations	The "Implementing the GIS elements of WFD" document recommends to represent data at scale 1 / 250 000 (1: 1 000 000 is accepted at short term)	Existing data at scale 1: 50 000 or 1/ 100 000.		Use of existing data. No generalisation.

3.6 Consistency between data	<p>The "Implementing the GIS elements of WFD" document gives some rules for edge-matching at international boundaries :</p> <ul style="list-style-type: none"> - geometriy matching - semantic matching (same value of attribute) - topology matching : check Direction of flow. <p>Consistency between themes :</p> <ul style="list-style-type: none"> - short term : use only layers relevant for WFD (avoid background layers) - middle term : INSPIRE should consider the background layers of WFD as priority for short - term implementation 		Some rivers do not match at international boundaries.	Use of existing data. Edge-matching out of the project scope.
3.7 Data capturing	<p>minimum area for lakes : 0,5 km² minimum area for catchment areas : 10 km²</p>	Unknown ; no checking has been done.		Use of existing data