

BGR-Eurogesurveys workshop on groundwater bodies in Europe  
15-16 December 2011, Berlin, Germany

# Groundwater bodies in the Water Information System for Europe (WISE)



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EEA

# Outline

- Overview of WISE
  - Web entry portal
  - Water Data Centre
- SoE and WFD interactive maps
  - Surface water quality
  - Groundwater quality and quantity
- Use of spatial data
  - Reference GIS data set

## - gateway to information on European water issues

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### The Water Information System for Europe

– or more commonly known as WISE – is your gateway to information on European water issues. It comprises a wide range of data and information collected by EU institutions to serve several stakeholders

About WISE Links

Policy Data and topics Modelling Projects and research

WISE is a partnership between the European Commission (DG Environment, Joint Research Centre and Eurostat) and the European Environment Agency, known as "the Group of Four" (Go4). The main roles and responsibilities of the partners are:

- **DG Environment**, leads the policy and strategic aspect of WISE. It liaises with Member States, especially on official reporting requirements of EU water legislation.  
For more information: <http://ec.europa.eu/environment/water/index.htm>
- **The European Environment Agency** hosts the Water Data Centre and the thematic WISE webpages.  
For more information: <http://www.eea.europa.eu/themes/water/dc>  
<http://www.eea.europa.eu/themes/water>
- **The Joint Research Centre** conducts environmental monitoring and water resources modelling including nowcasting and forecasting services.  
For more information: <http://ies.jrc.ec.europa.eu/the-institute/units/rural-water-and-ecosystem-resources-unit.html>  
<http://floods.jrc.ec.europa.eu>  
<http://desert.jrc.ec.europa.eu>  
<http://fate.jrc.ec.europa.eu>
- **Eurostat** is collecting and disseminating water statistics, also as a part of WISE data and themes, and provides significant input in the development of the GIS part of WISE and in particular ensuring the link to INSPIRE.  
For more information: <http://epp.eurostat.ec.europa.eu/>

#### News

- DG ENV, 21/10/2011: Natural fertilisation of sea hints at effects of geoengineering projects
- DG ENV, 21/10/2011: Deepwater drilling: Improve safety indicators to help prevent disasters
- DG ENV, 07/10/2011: Bio-monitoring of produced water from an oil field
- EEA, 23/09/2011: Environmental information network extends across Europe, Central Asia and Russian Federation
- EEA, 21/09/2011: Pan-European assessment asks: "What do we know about water and green economy?"
- EEA, 25/07/2011: Water quality and wastewater treatment — WISE Interactive maps updated
- EEA, 14/07/2011: Hazardous substances in Europe's fresh and marine waters — an overview
- EEA, 16/06/2011: Bathing water quality remains high around the EU

European Commission

European Environment Agency

# European institutions responsible for WISE

## PARTNERS

WISE is a partnership between the European Commission (DG Environment, Joint Research Centre and Eurostat) and the European Environment Agency. The main roles and responsibilities of the partners are:

- **DG Environment**, leads the policy and strategic aspect of WISE. It liaises with Member States, especially on official reporting requirements of EU water legislation.

For more information:

<http://ec.europa.eu/environment/water/index.html>

- **The European Environment Agency** is the water data centre and hosts the public WISE webpage and the section on themes and data.

For more information:

[http://themes.eea.europa.eu/Specific\\_media/water](http://themes.eea.europa.eu/Specific_media/water)

- **The Joint Research Centre** (Institute for Environment and Sustainability) is responsible for data synchronisation and has developed a number of useful tools.

For more information:

<http://agrienv.jrc.ec.europa.eu/>

- **Eurostat** is collecting water statistics and provides significant input in the development of the GIS part of WISE and in particular ensuring the link to INSPIRE.

For more information:

<http://epp.eurostat.ec.europa.eu/>

# EU Water directives entry point



- Home
- River Basin Management
- Marine Environment and Coasts
- Flood Risk Management
- Water Scarcity and Droughts
- Drinking Water
- Bathing Water
- Water Pollution
- EU Water Initiative
- Blueprint
- Adaptation to Global Change



Your gateway to European water information.

Data & Topics | Policy | Modelling | Projects

## What's new ?

- > [Guidance for administrations on making WFD agricultural measures clear and transparent at farm level](#)

## News Archive

## Events

## WATER

**Water is life ! It is a precondition for human, animal and plant life as well as an indispensable resource for the economy. Water also plays a fundamental role in the climate regulation cycle.**

**Protection of water resources, of fresh and salt water ecosystems and of the water we drink and bathe in is therefore one of the cornerstones of environmental protection in Europe. The stakes are high and the issues transcend national boundaries and concerted action at the level of the EU is necessary to ensure an effective protection.**

### The work towards the 2012 Blueprint to Safeguard Europe's Waters is on-going!

The [Blueprint to Safeguard Europe's Water](#) will be the EU policy response to old and emerging challenges on our water resources. It will aim to ensure good quality water in sufficient quantities for all legitimate uses. It will be based on an evaluation of the implementation and achievements of the current EU water policy, in particular a [Fitness Check of EU water policy](#) in the framework of the Commission Smart Regulation approach.

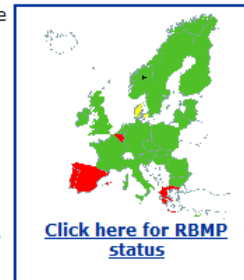
[Read more about the Blueprint...](#)

### The 1st River Basin Management Plans for 2009-2015 are here !

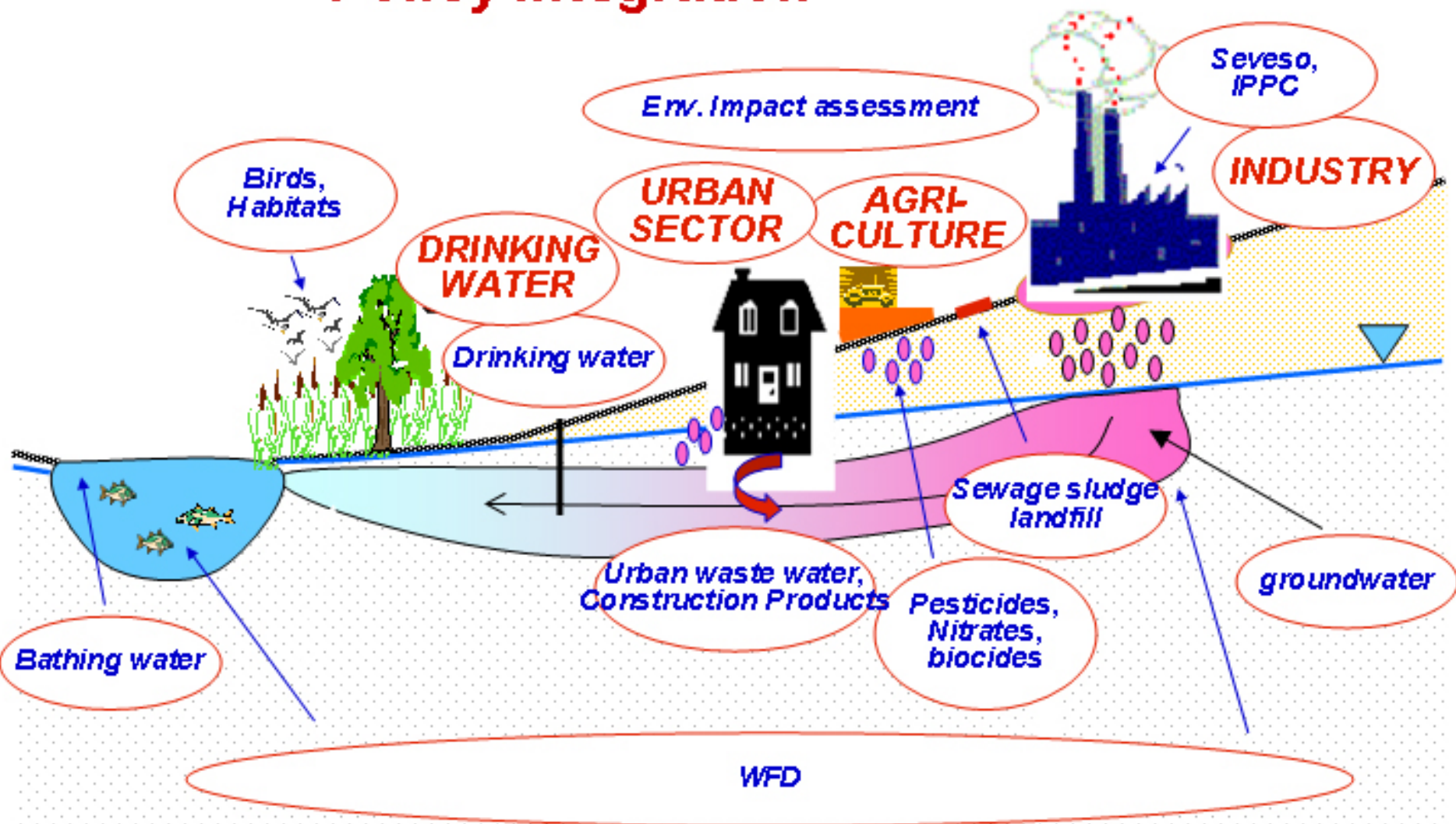
Following extensive consultations on Water Framework Directive River Basin Management Plans should since 22.12.2009 be available in all River Basin Districts across the EU. [Read more about these plans!](#)

Follow this [link](#) to see the current status of adoption of plans in the different Member States. Links to webpages where final plans can be downloaded can be found by clicking on each Member State !

There are however serious delays in some parts of the EU, and in several countries consultations are still ongoing. You can also find out more about if consultations are still going on in your river basin district. If they are, seize the opportunity and [Read more about consultations on draft River Basin Management Plans in river basin districts across the EU !](#)



# Policy integration



## Data centre overview

Last modified: Nov 30, 2011

The Water Data Centre provides the European entry point for water related data as part of the Water Information System for Europe (WISE). It contains downloadable European datasets, interactive data- and map viewers and more..The data are typically reported by countries according to EU water directives or under the EEA regulation through the Eionet. The data are further compiled and used in indicators, assessments and policy developments that are accessible through the thematic links in WISE.

### Search

[Advanced search](#)

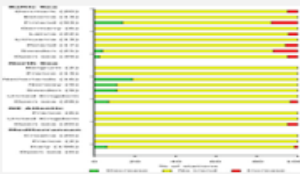
Search



Water homepage

### Featured indicator

[See all](#)

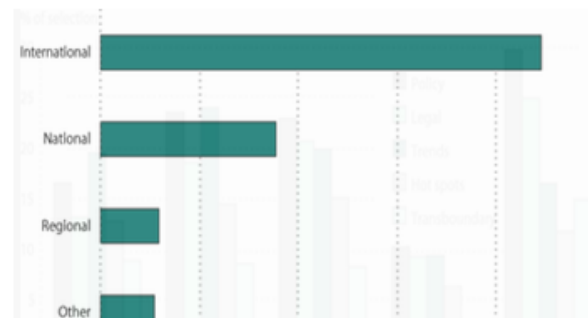


Chlorophyll in transitional, coastal and marine waters (CSI 023) - Assessment published Jul 2011

In 2008, the highest summer chlorophyll-a concentrations were observed in coastal areas and estuaries where nutrient concentrations are high, namely in the Gulf of Riga, the Gulf of Finland and ...

[Read more](#)

### In the spotlight



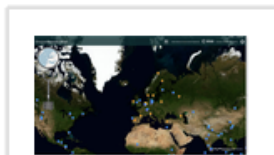
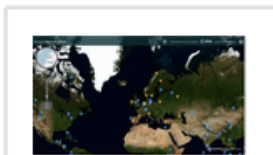
Overview of the origin of standards and/or methodologies for indicators used in ...



Pause

## Browse catalogue

All data products   Datasets   Maps   Interactive maps   Indicators   Graphs



# Experiences from ongoing or completed EU-projects: WISE-RTD (research and technical Development)

<http://www.wise-rtd.info/wpis/wise.html>

**WISE-RTD** CONSOLIDATED EXPERIENCES IN WATER MANAGEMENT

Policy | Themes and data | Projects | Links

Home Contact us Help Select your language

### Information available in the system

- Policies (81)
- Policy implementation projects (29)
- Policy implementation guidances (827)
- RTD Projects (423)
- Tools (152)
- RTD experiences (551)
- Technical guidances (120)

[Click here for the latest newsletter](#)

### News

- At October 31, the WISE-RTD Association was launched, more info on <http://www.wise-rtd.org>
- At Octobre 30 and 31, 2008 the Final Conference of SPI-Water was held in Brussels.

### Web Portal Input System

We welcome you to provide the WISE-RTD system with information on projects, tools, documents or any other information you know that is relevant for the WFD implementation. [Click here](#)

Register here to be informed concerning updates

[Introduction on the European Water Framework Directive](#)

[How the portal serves the European Water Framework Directive](#)

[Press here for a demo](#)

### Welcome to the WISE-RTD web portal

Guided search Available information Free search

As a policy implementer or manager

As a researcher or consultant

As a stakeholder

Policy related information

Experience related information

This webportal forwards to websites with focus on information relevant for the implementation of the European Water Framework Directive (WFD).

Information is presented from all over Europe (and even beyond), at European, national and regional level as well as for river(sub)-basins.

© 2008 WISE-RTD | About WISE-RTD | Disclaimer



[Home](#) | [Search](#) |

**● Search results**

Searchresults for : **groundwater**

**Policy implementations**

▶ Policy implementation projects (5)

▶ (\*) Policy projects (7)

▶ Policy implementation guidances (90)

▶ Policies (13)

▶ Policy implementation cases and reports (33)

▶ (\*) Policy cases and reports (1)

**RTD Projects & Results**

▶ RTD projects (55)

▼ (\*) RTD projects (4)

- [CLIMWAT Assessing and managing the impact of climate change on ...](#)
- [GENESIS Groundwater and Dependent Ecosystems: New Scientific an...](#)
- [WATERKNOW Integrated Water Management in Coastal Drainage Basins:...](#)
- [AQUIMED Participatory design of adaptive groundwater management...](#)

▼ **Guidances (6)**

- [NeWater Buffering Capacity Assessment as a mean to Promote Adap...](#)
- [DAA Synthesis report - Data availability and accessibility](#)
- [Eurowet Guidance on the role of wetlands in the river basin man...](#)
- [Eurowet Significance of wetlands in the water cycle](#)
- [HarmoniRIB 3. Uncertainty in geological and hydrogeological data](#)
- [EAMN Good Modelling Practice handbook](#)

▶ (\*) **Guidances (6)**

▶ RTD experiences (32)

▶ Tools (17)

(\*) information that still needs to be checked

Information types  **Guidances**  Reports  Tools  Projects

Narrow

Widen



# Nitrites in groundwater by country



Find location..

Layers and legend

Content Legend

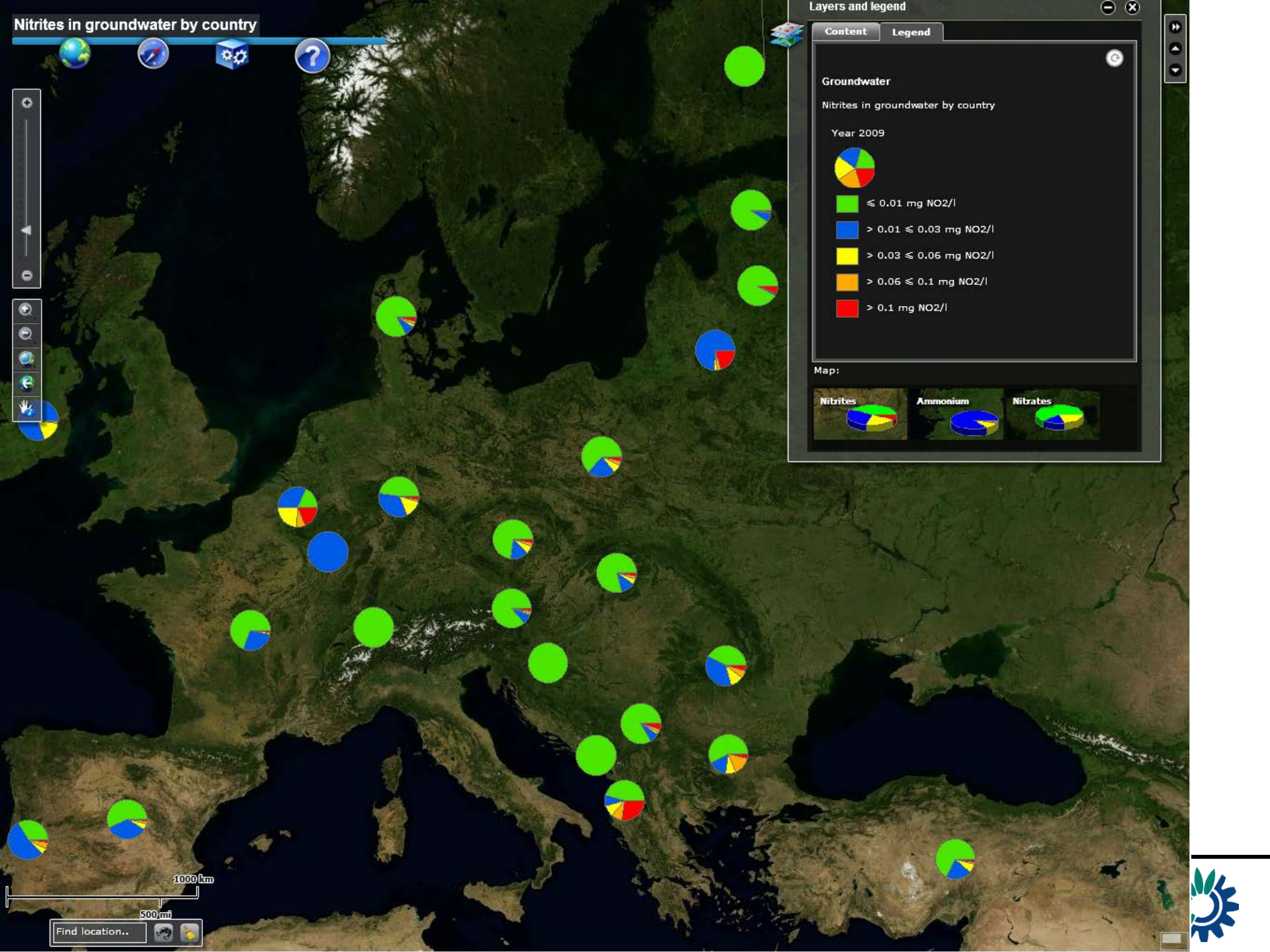
Groundwater

Nitrites in groundwater by country

Year 2009

- ≤ 0.01 mg NO<sub>2</sub>/l
- > 0.01 ≤ 0.03 mg NO<sub>2</sub>/l
- > 0.03 ≤ 0.06 mg NO<sub>2</sub>/l
- > 0.06 ≤ 0.1 mg NO<sub>2</sub>/l
- > 0.1 mg NO<sub>2</sub>/l

Map:



## Waterbase - Groundwater

Topics: [Water](#)

**Waterbase is the generic name given to the EEA's databases on the status and quality of Europe's rivers, lakes, groundwater bodies and transitional, coastal and marine waters, and on the quantity of Europe's water resources**

This is the latest published version. [See older versions.](#)

### European data set

#### Waterbase - Groundwater (4 tables)

Dataset contains data selected from reporting of member and collaborating countries on chemical quality of groundwater, characteristics of groundwater bodies and sampling sites. Reported data have been assessed and processed by the ETC-Water and the EEA. Disaggregated records were annually aggregated by groundwater body, substance and year, and statistic value calculated. Results of quality assessment have been incorporated into the individual data tables.



[+] [Show table definition](#)

-  [Waterbase\\_Groundwater\\_v11\\_csv.zip](#) (ZIP archive)  
6.57 MB [Download file](#)
-  [Waterbase\\_Groundwater\\_v11\\_mdb.zip](#) (ZIP archive)  
11.72 MB [Download file](#)

### Additional information

#### Code lists

Lists and description of codes of selected fields present in the Waterbase-Groundwater data tables. Table "Drinking water threshold" is included.

-  [Waterbase\\_Groudwater\\_v11\\_codelists.xls](#) (Microsoft Excel spreadsheet)  
162.50 KB [Download file](#)
-  [Waterbase\\_Groudwater\\_v11\\_codelists\\_csv.zip](#) (ZIP archive)  
19.37 KB [Download file](#)

#### QA documentation

Quality control documentation briefly presents ETC-ICM and EEA activities focused on quality of Waterbase-Groundwater dataset and results of these activities. In addition warning is given on the use of certain records for analytical purposes.

# Waterbase - [link](#)



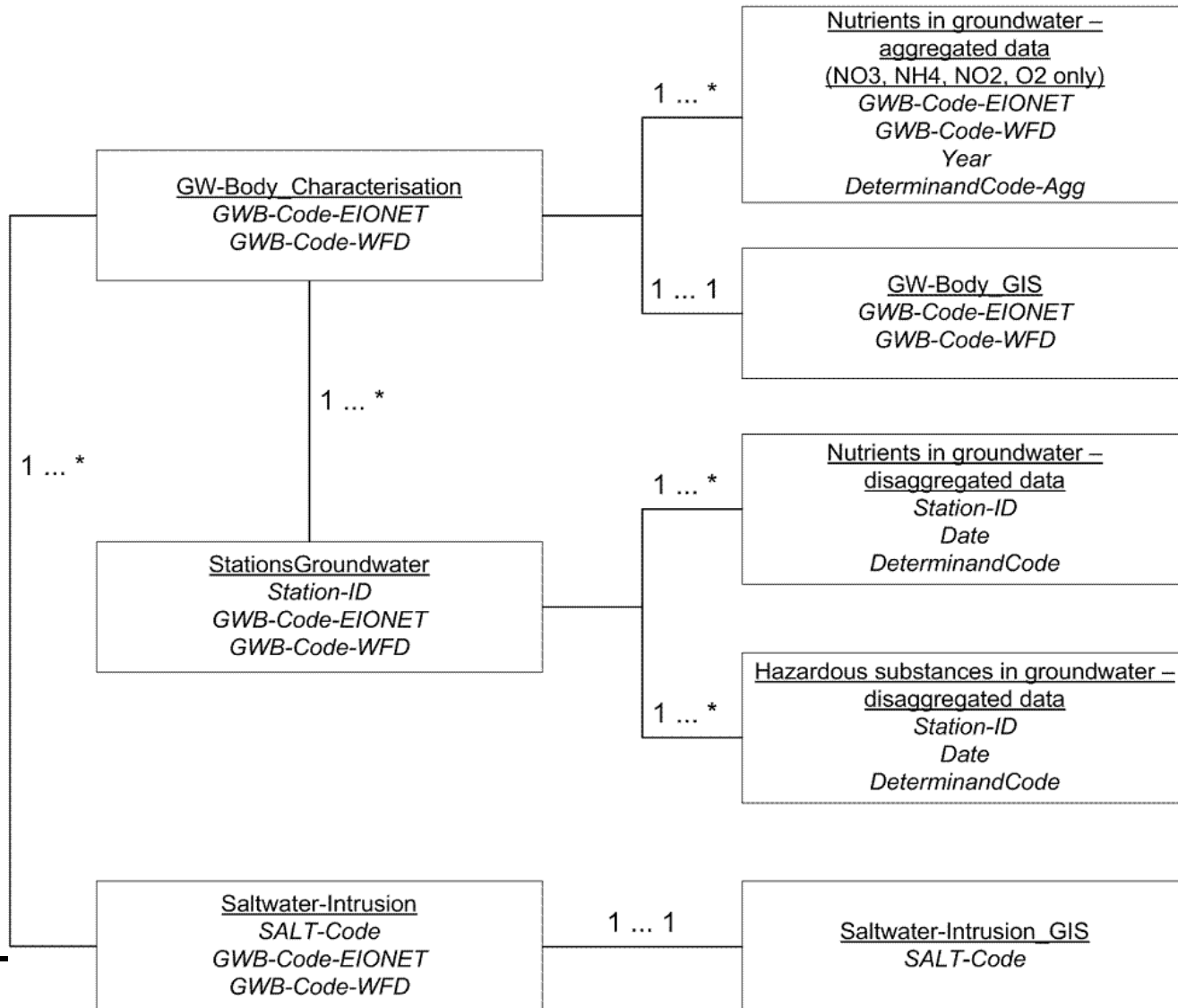
## Waterbase – Groundwater Version 11

Quality control documentation

13 May 2011



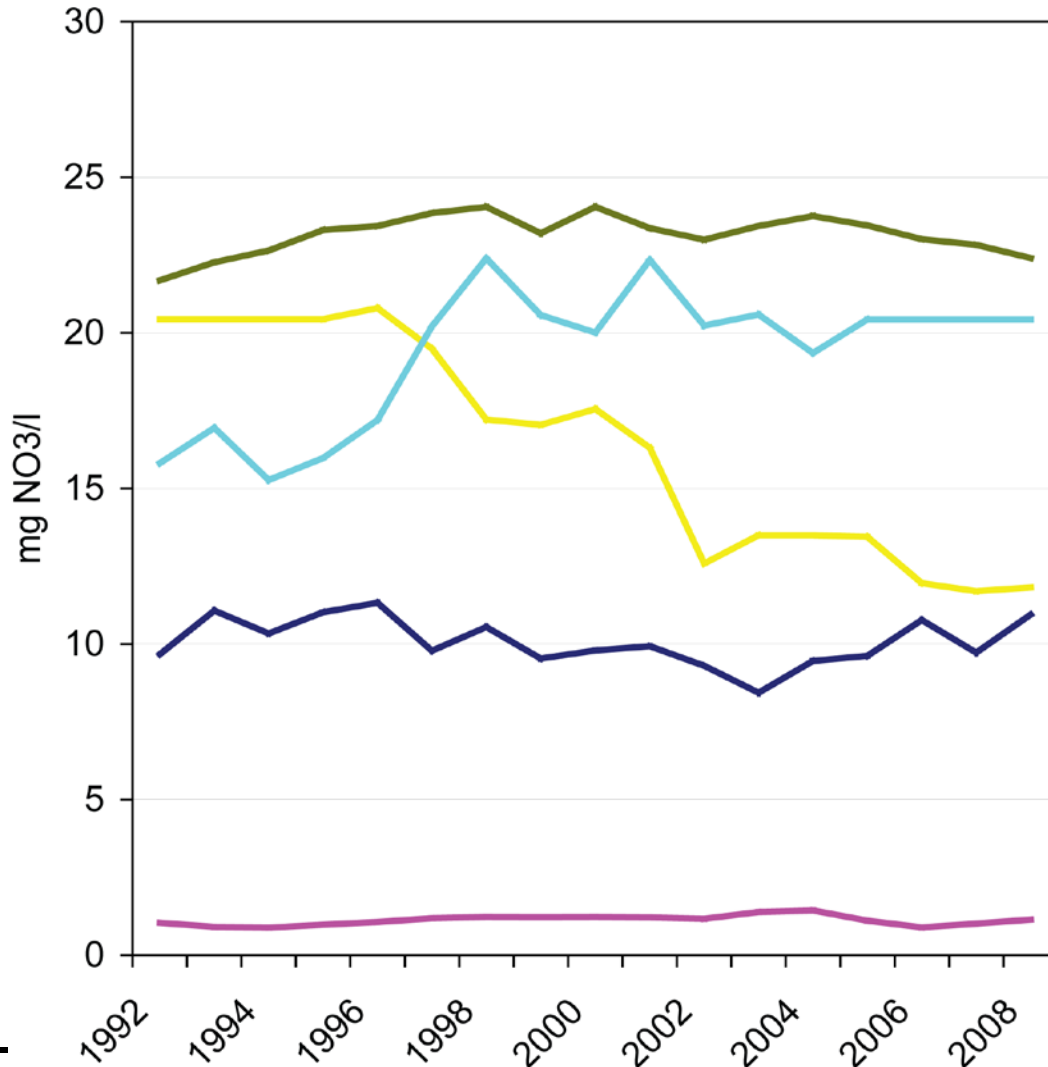
# WISE-SOE Reporting: Groundwater data model



# Example of data evaluation report

B50 StationsGroundwater											
Country Code	Number of records										Note/Explanation why data were working db or EU dataset (number reason code)
	in the working DB (after processing the last delivery)										
	as delivered		ETC aggregation		after aggregation		exported to the EU dataset	excluded from the EU dataset			
	total	QA issue**)	in	out	total	QA issue**)		number	reason		
i	j	k	l	m	n	o	p	***			
AL	15	0	0	0	15	0	15	0			
AL	11	0	0	0	11	0	11	0			
AL	34	1	0	0	34	1	34	0			
AL	44	0	44	44	44	0	44	0			
AL	139	0	99	50	90	0	50	40	Preferred SoE hazardous substances exported to EU dataset only		
AL	0	0	0	0	0	0	0	0			
AT	28	0	0	0	28	0	28	0			
AT	787	22	0	0	787	22	787	0			
AT	0	0	0	0	0	0	0	0			
AT	117925	93	117925	1972	1972	17	1972	0			
AT	310951	366	304559	6276	12668	190	6276	6392	Preferred SoE hazardous substances exported to EU dataset only		
AT	0	0	0	0	0	0	0	0			
BA	12	0	0	0	12	0	12	0			
BA	46	14	0	0	46	14	46	0			
BA	0	0	0	0	0	0	0	0			
BA	1521	0	604	77	994	0	77	917	4 main nutrients (NO3, NO2, NH4, O2) exported to EU dataset only		
BA	1027	0	758	95	364	0	95	269	Preferred SoE hazardous substances exported to EU dataset only		
BA	0	0	0	0	0	0	0	0			
BE	55	0	0	0	55	0	55	0			
BE	449	48	0	0	449	48	449	0			
BE	1420	2	0	0	1420	2	1420	0			
BE	11387	7	5012	609	6984	11	609	6375	4 main nutrients (NO3, NO2, NH4, O2) exported to EU dataset only		
BE	138099	214	86536	7533	59096	49	7533	51563	Preferred SoE hazardous substances exported to EU dataset only		
BE	0	0	0	0	0	0	0	0			
BG	148	0	0	0	148	0	148	0			
BG	394	43	0	0	394	43	394	0			
BG	2918	17	0	0	2918	17	2678	240	agg. and disagg. data reported in the past for identical gw body, determinand and year - disagg. data are preferred		
BG	10730	0	6523	1398	5605	3	1398	4207	4 main nutrients (NO3, NO2, NH4, O2) exported to EU dataset only		
BG	18569	0	9040	5875	15404	239	5875	9529	Preferred SoE hazardous substances exported to EU dataset only		
BG	1	0	0	0	1	0	1	0			
CY	19	0	0	0	19	0	19	0			
CY	440	208	0	0	440	208	440	0			
CY	1	1	0	0	1	1	1	0			
CY	3940	0	2701	153	1392	0	153	1239	4 main nutrients (NO3, NO2, NH4, O2) exported to EU dataset only		
CY	7367	0	4654	618	3331	0	618	2713	Preferred SoE hazardous substances exported to EU dataset only		
CY	9	0	0	0	9	0	9	0			

# Nitrate concentrations in groundwater between 1992 and 2008 in different geographical regions of Europe.



**Specific policy question:  
Are nitrate concentrations in  
our groundwater decreasing?**

- data series per region are calculated as the average of the annual mean for groundwater bodies (GWBs) in the region.

- Only complete series after inter/extrapolation are included (see indicator specification).

- The number of groundwater bodies included per geographical region is given in parentheses.

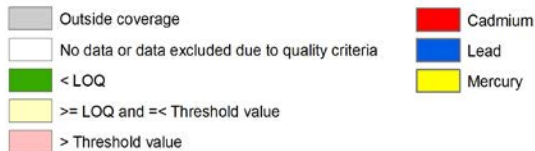
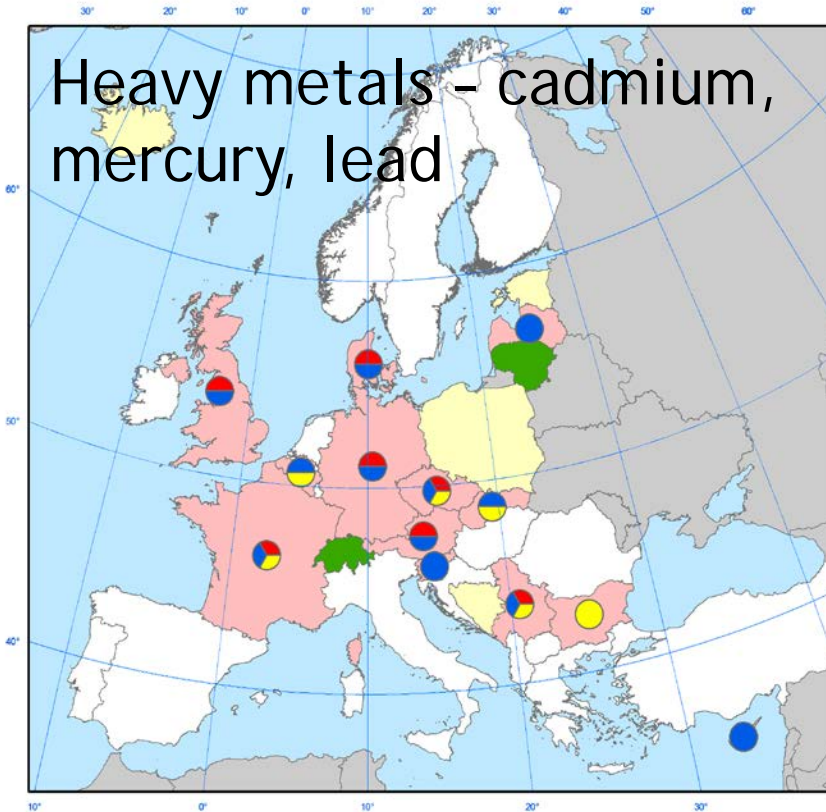
Source: [CSI-020](#)

East (48)      North (36)      South (4)  
Southeast (53)      West (285)

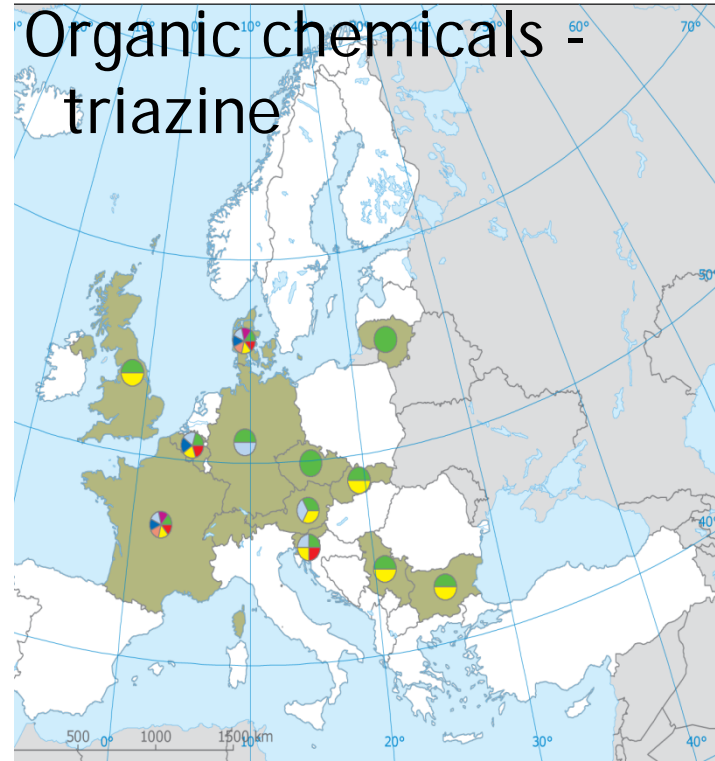


# Chemicals in groundwater - examples

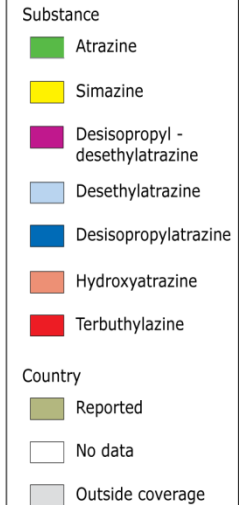
Heavy metals - cadmium, mercury, lead



Organic chemicals - triazine



Triazine pesticides found in groundwater between 2003 and 2007 at concentrations above 0.1 µg/L



# Groundwater status – Germany

UBA 2010: Water resource management in Germany, part 2 water quality

## Chemical status

Figure 4: Chemical status of groundwater bodies in Germany



Source: Federal Environmental Agency (UBA), data supplied by LfWA, data source: Berichtportal Wasser/ÜC/ÜC/ÜC, as at 22 March 2018

## Quantitative status

Figure 3: Quantitative status of groundwater bodies in Germany

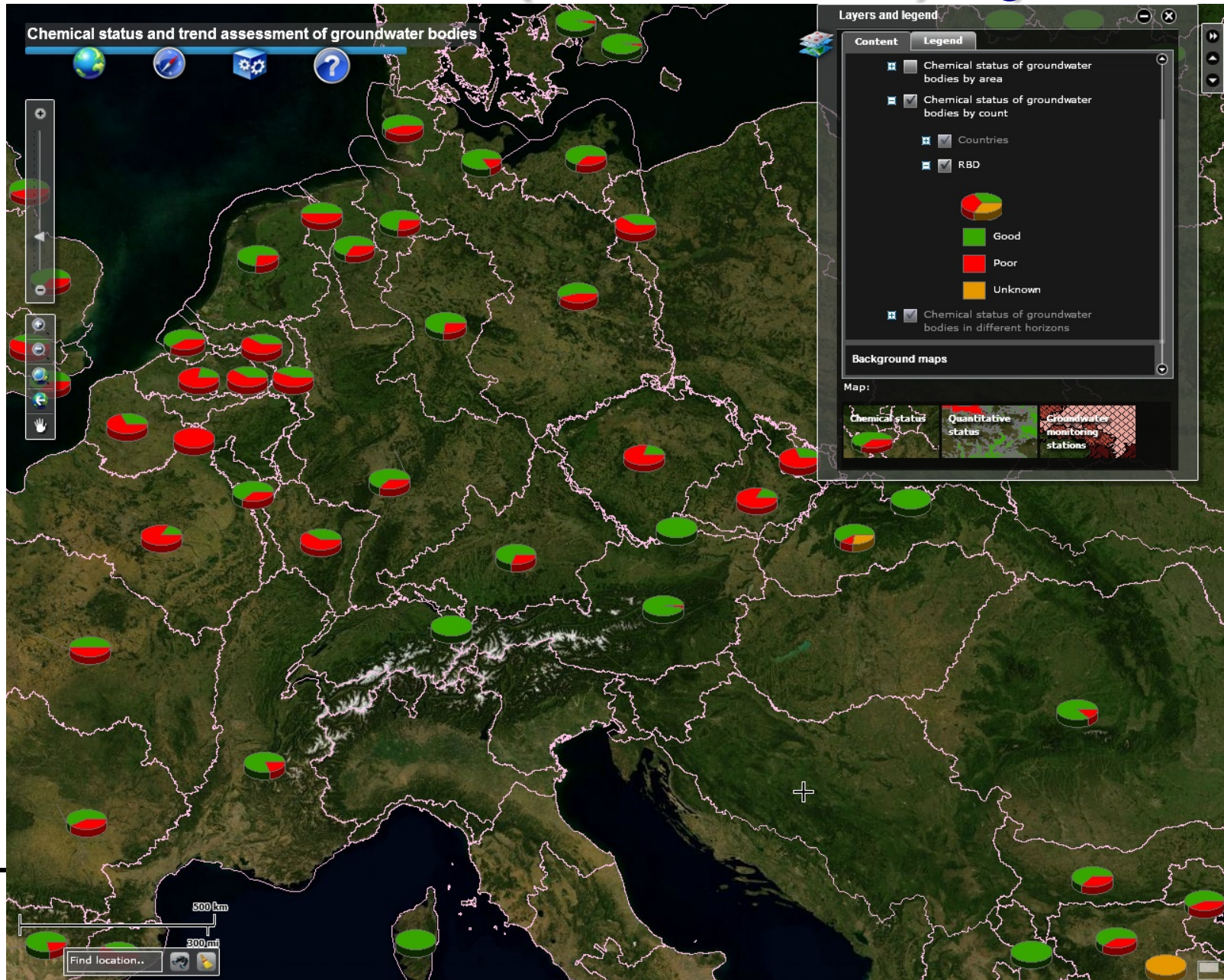


Source: Federal Environmental Agency (UBA), data supplied by LfWA, data source: Berichtportal Wasser/ÜC/ÜC/ÜC, as at 22 March 2018

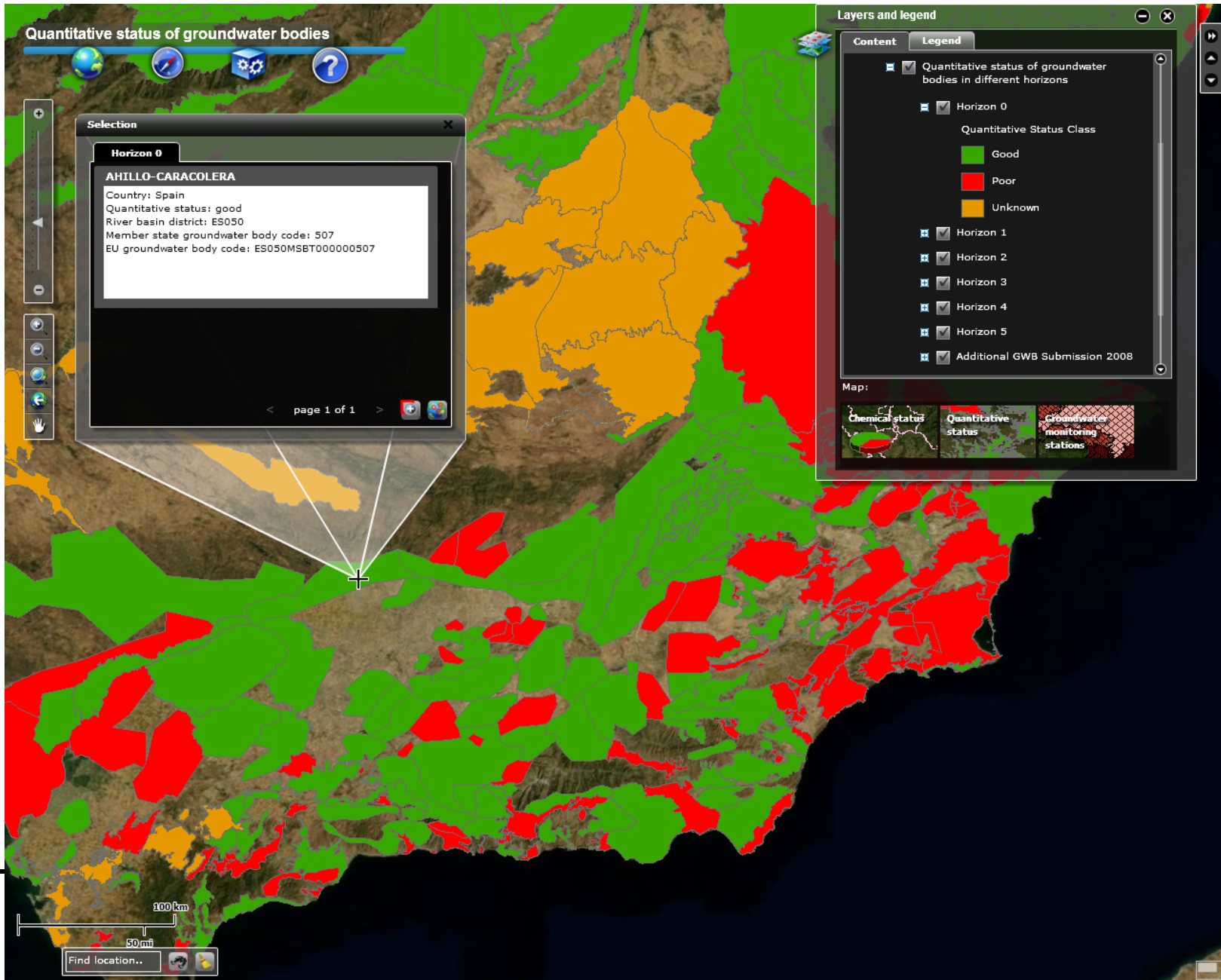




# Chemical status (no. of GRW) by RBD



# Quantitative status by GWB in different horizons



# Detailed zoom view on interactive map (monitoring stations)

Pop-up windows  
give some details  
on individual  
stations

The screenshot displays a web-based interactive map titled "Groundwater monitoring stations". The map is densely populated with small colored markers (red, blue, and purple) representing individual monitoring stations. A pop-up window titled "Selection" is open, showing details for a station named "Sickerode". The details include:

- Country: Germany
- River Basin District code: DE4000
- Quantitative: Yes
- Chemical: Yes
- Type: Well
- Drinking water: No
- Station code: 4726230754
- EU station code: DE\_GM\_4726230754

The pop-up window also indicates "page 1 of 1". To the right of the map, a "Layers and legend" panel is visible, showing the following settings:

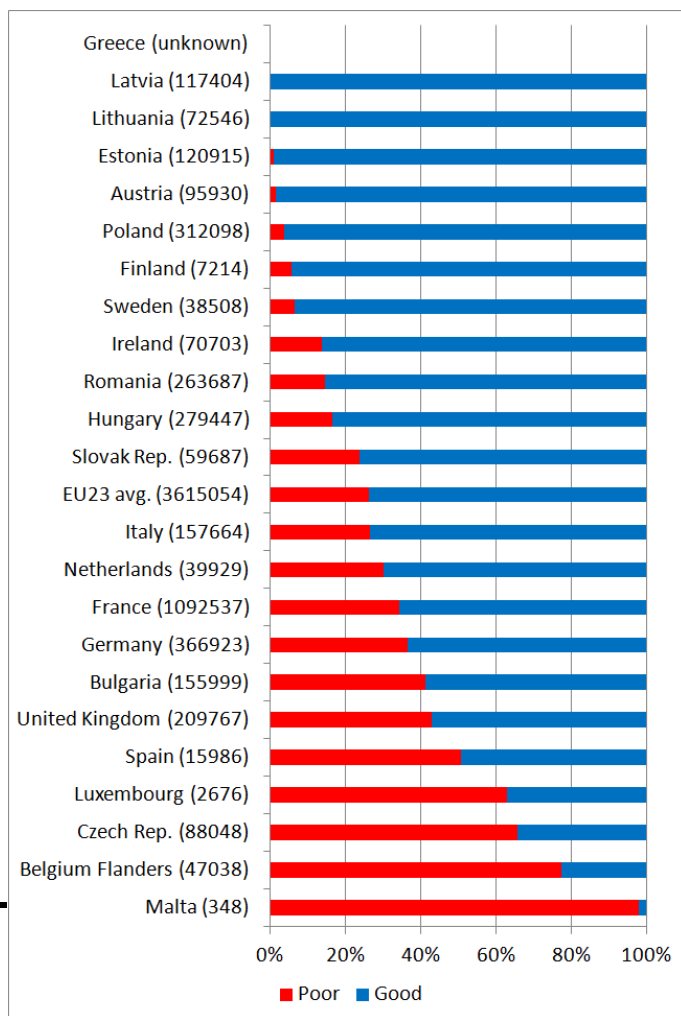
- Live maps:**
  - WFD Groundwater
  - Chemical and quantitative monitoring
    - Chemical monitoring
    - Quantitative monitoring
  - Type of monitoring
    - Quantitative and chemical
    - Quantitative only
    - Chemical only
- Background maps:**
  - Background Map

The "Map:" section at the bottom of the legend panel shows three thumbnails: "Chemical status", "Quantitative status", and "Groundwater monitoring stations". At the bottom of the map, there is a scale bar (0 to 100 km and 0 to 50 miles) and a "Find location..." search box.

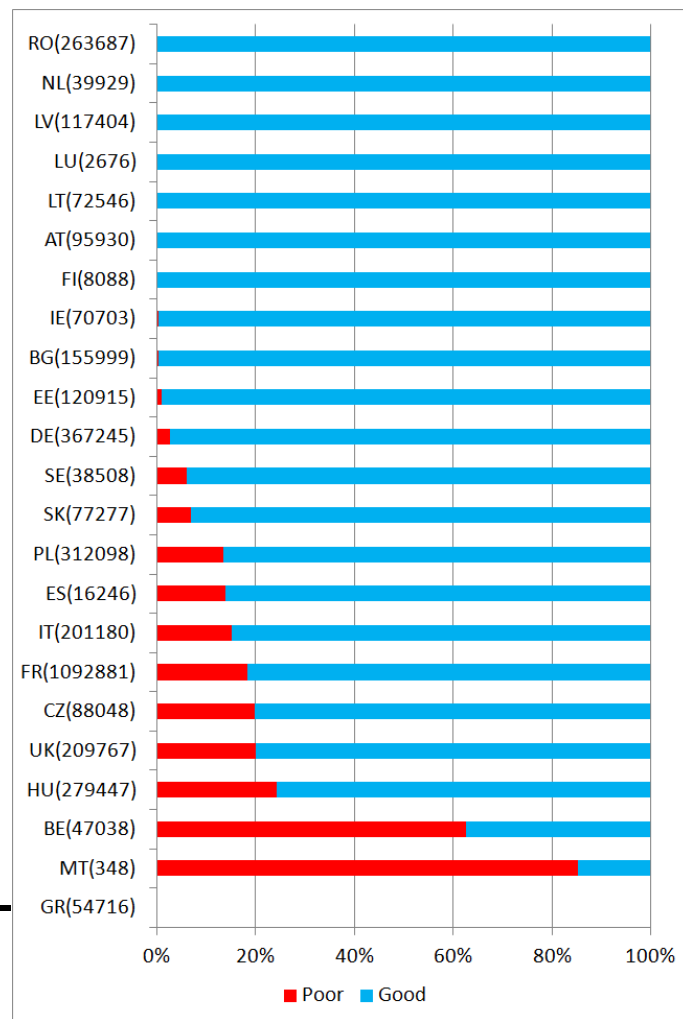
# Groundwater (by area)

Source: Ongoing assessment of RBMPs – preliminary results

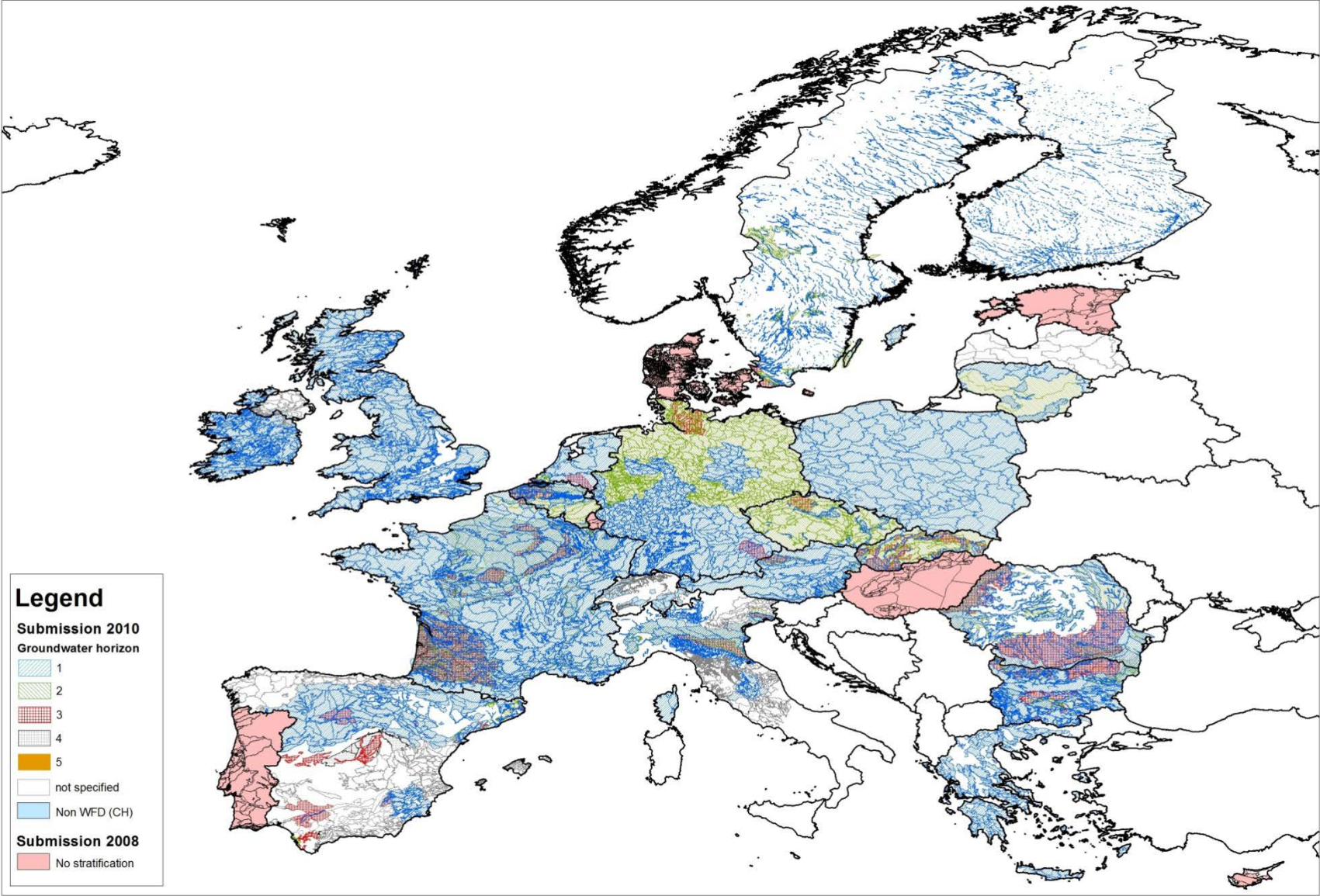
## Chemical status



## Quantitative status

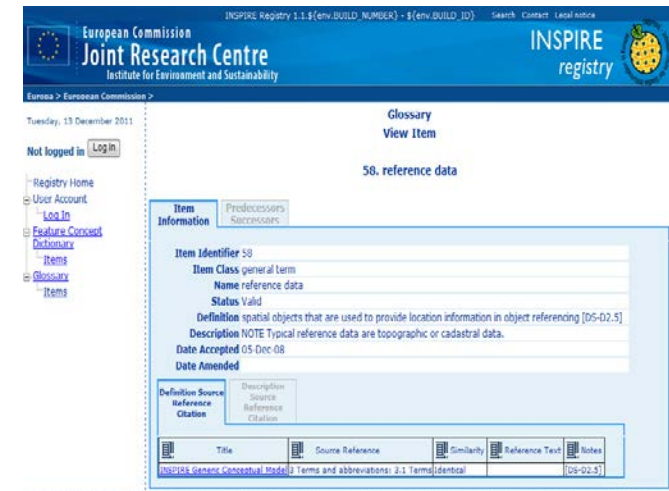


# European GWB map based on WFD submissions



# Some definitions

- **Reference data** (in Sp.Da.In., GIS)
  - **INSPIRE**: Spatial objects that are used to provide location information in object referencing
  - Synonym: Geospatial reference data
  - Characteristics
    - It provides an unambiguous location for a user's information. It is used as a common base to which thematic data may be referenced.
  - Examples: *river system, transport networks, addresses, elevation, geographical names*
- **Reference versions of thematic data** (early INSPIRE)
  - specific spatial data sets that are used as basis to which other data could be referenced within individual thematic area = **thematic subset of reference data**
  - Terminology in WISE: *Reference GIS dataset (CIS guidance doc. 22)*
  - Terminology used in EEA: GIS reference layer
  - Examples: *RBD, groundwater bodies for reporting at EU level*



[Link](#)

[Link](#)



# Use of spatial data (Reference GIS dataset)

- General guidance in CIS guidance document 22 on Implementing the GIS elements of the EU Water Policy

[Link](#)

- Special emphasis on groundwater in appendix 13.3



*Slide modified during workshop*

# WFD reporting of Groundwater bodies (GWB)

Guidance docs at Reportnet – [link](#)

- Following spatial datasets submitted by MS are related to GWBs:
  - River basin districts (RBD) / sub-units
  - GW monitoring stations
  - Protected areas
- Logical consistency:
  - GWBs must be assigned to only one RBD (even if they have parts outside the respective RBD)
  - Associated monitoring stations must be located within the boundaries of the respective GWB
- Topological consistency:
  - GWB need not to cover the entire territory of a country
  - GWB can overlay one another (if at different depth ranges)
  - Overlaying GWBs must not intersect if GWB laying upon each other are delivered within one file (but it is recommended to provide overlaying GWBs in separate files)

• .....

ATKINS

Tools and services for reporting under RBMP within WISE

Guidance on reporting of spatial data for the WFD (RBMP)

Version 3.0  
December 21 2009

Notice

This report was produced for the European Commission for the specific purpose of creating a guidance document on reporting of spatial data in Article 13 of the Water Framework Directive. This report may not be used by any person other than the European Commission without the European Commission's express permission. In any event, Atkins accepts no liability for any costs, liabilities or losses arising as a result of the use of or reliance upon the contents of this report by any person other than the European Commission.

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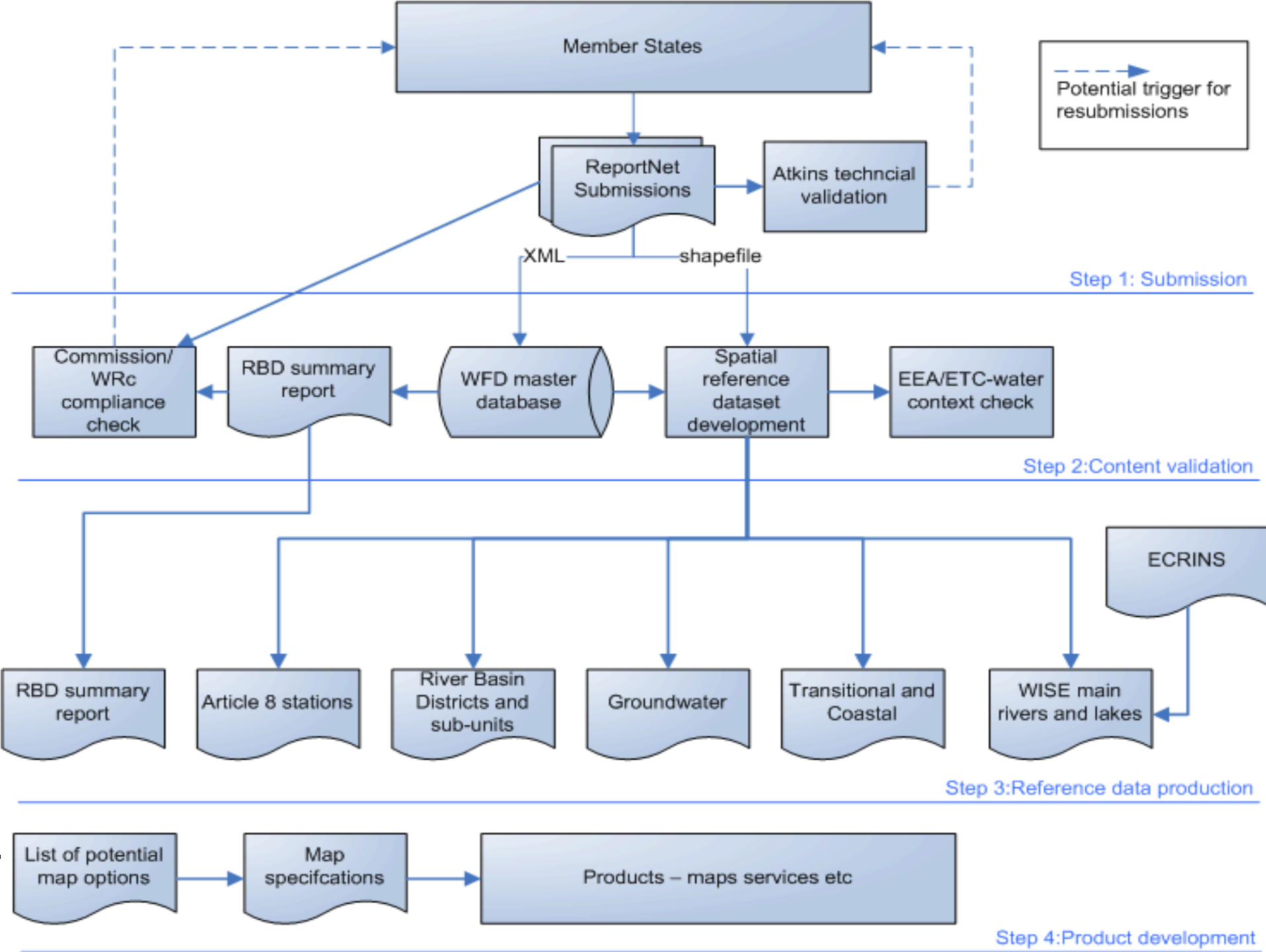
Document History

JOB NUMBER:		DOCUMENT REF: WFD_Art 13 010 Guidance.doc				
0.1	Pre-work	Malden Woitrop		ETCW		
1.0	First draft	Malden	Vinciguerra			11-06-09
2.0	Updates after test period	Malden				
3.0	See log after Contents	Malden				
Revision	Purpose Description	Originated	Checked	Reviewed	Authorised	Date

Plan Design Enable

WFD Guidance on reporting spatial data v3.0.doc





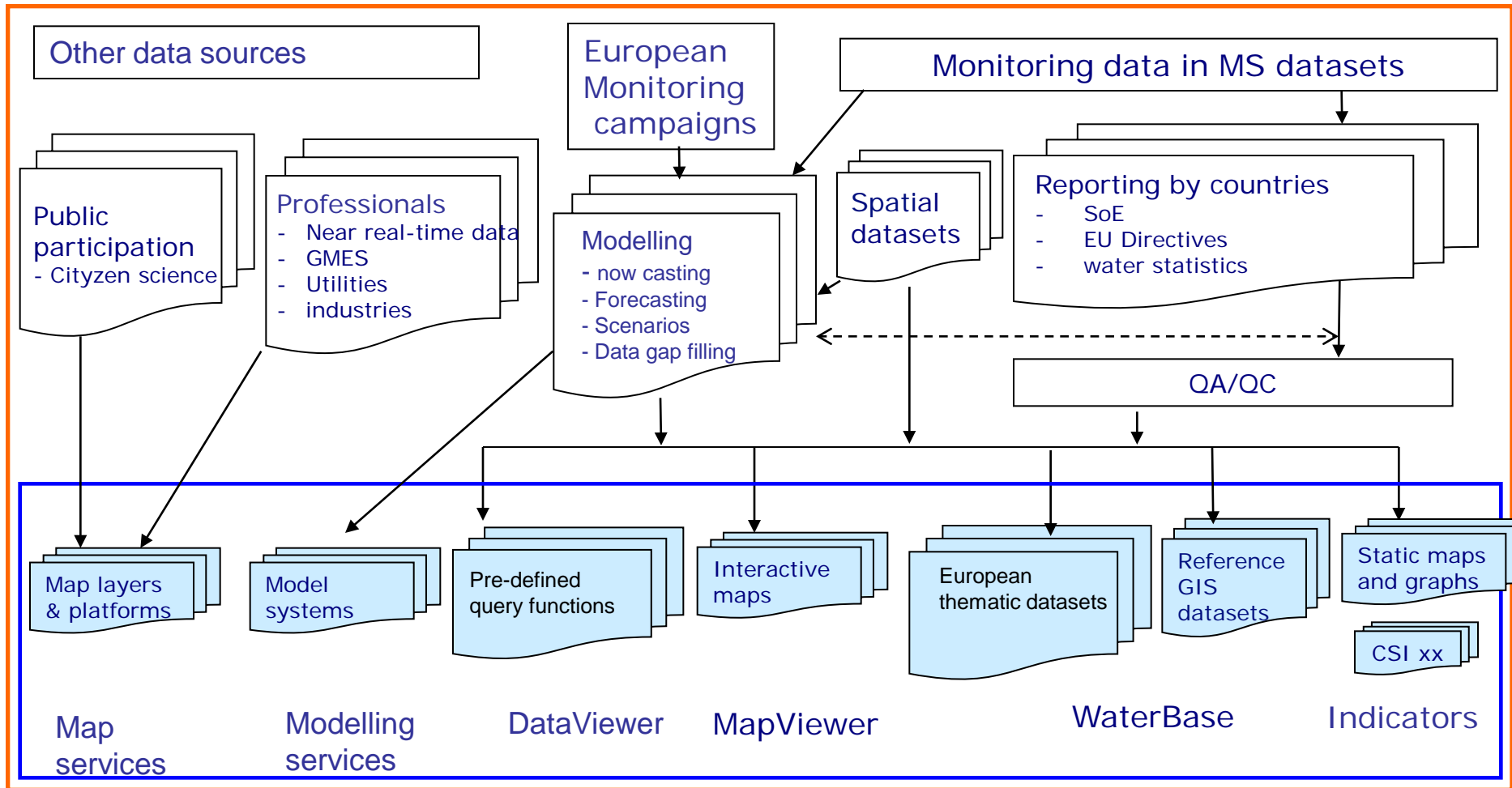
# Different pathways leading to production of reference GIS dataset

- Via MS reporters to EU directives (DG ENV)
- Via Eionet State of the Environment (SoE) reporting to EEA
- Via other data sources

Requirements related to reference GIS datasets:

- In-line with INSPIRE Directive

# Data flows and web services in WISE



Web services

# Proposed data specification document for reference GIS datasets

Basis: INSPIRE data specifications document

- Scope and overview
  - Scope and definition
  - Informal description of the dataset to be produced [max ½ page]
  - Definition of the terms being used in the document when relevant.
  - Normative references used when relevant (e.g. Inspire data specification)
  - Symbols and abbreviations
- Data product identification table (for metadata)
- Data content and structure (including conceptual rules)
- Reference systems (spatial and temporal (if applic.))
- Data quality at the dataset level
  - (derived from ISO19113)
  - Completeness, logical consistency, ...
- Metadata – according to [online](#) specifications
- Delivery – format, medium (ftp, Circa, Forum, ...)



# EEA-SDI Levels of Metadata Catalogue

All spatial data sets used in EEA

Internal metadata catalogue  
(full metadata records)

Part of spatial data sets

Public metadata catalogue

WWW

INSPIRE  
spatial datasets

INSPIRE related spatial data sets  
(conformant in the future)

Catalogue  
harvesting

INSPIRE@EC



# Comments forwarded in INSPIRE consultation on Annex II & III data specifications (Oct. 2011)

- Attributes reported with the groundwater bodies for implementing WFD should be fully considered in INSPIRE.
  - Therefore 18 attributes have to be added.
  - Data specifications have to follow WFD reporting specifications.
- Following attributes have to be added to the Type WFD\_GroundWaterBody:
  - Area; Layered; Geological Formation; Scale; Link Surface-Water Bodies; Link Terrestrial-Ecosystems; Depth Range Code; Average Thickness; Average Depth; Vertical Orientation;



# Questions for this workshop:

Can consensus be reached on:

- Selection and definition of attributes ?
  - maybe dependant on geological regions
- Provision of the data from national sources to the European level ?
  - EuroGeoSurvey as data provider ?
- How to proceed in alignment with reporting to EU-directives (via CIS Working Group C on groundwater) ?

# Thank you for your attention

## Time for questions ...?

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