

Significance of groundwater in the European environmental policy

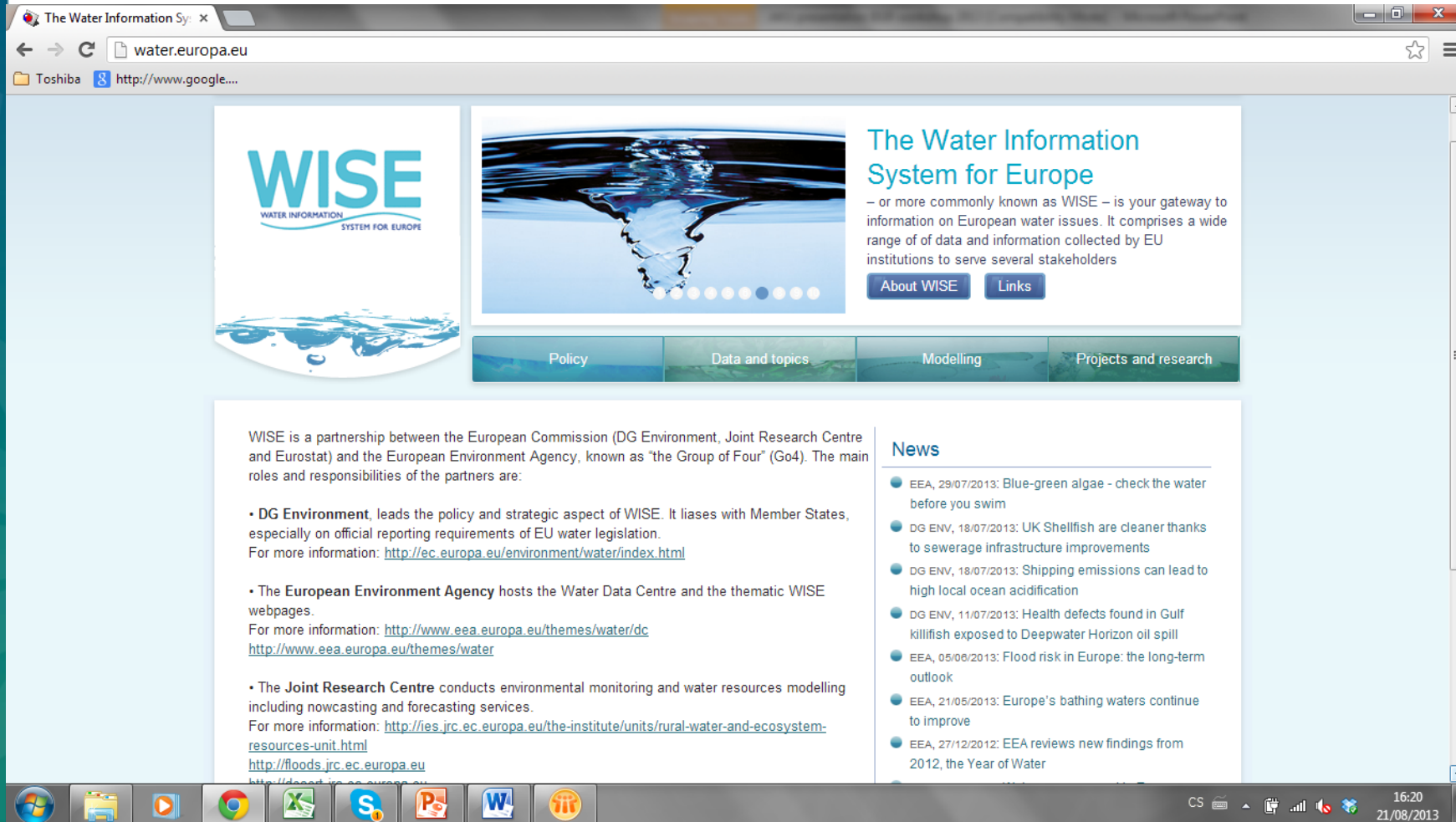
Anita Kunitzer

European Topic Centre on inland, coastal and marine waters (ETC/ICM)

anita.kuenitzer@cenia.cz

Water Information System for Europe (WISE)

<http://water.europa.eu/>



The screenshot shows a web browser window displaying the homepage of the Water Information System for Europe (WISE). The browser's address bar shows the URL <http://water.europa.eu/>. The page features a large header with the WISE logo on the left, a central image of water splashing, and a main title "The Water Information System for Europe" on the right. Below the header is a navigation menu with four items: "Policy", "Data and topics", "Modelling", and "Projects and research". The main content area is divided into two columns. The left column contains a paragraph describing WISE as a partnership between the European Commission, the European Environment Agency, and the Joint Research Centre, followed by three bullet points detailing the roles of each partner. The right column contains a "News" section with a list of recent articles, each with a date and a brief description.

WISE
WATER INFORMATION
SYSTEM FOR EUROPE

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://foods.jrc.ec.europa.eu>
<http://deast.jrc.ec.europa.eu>

News

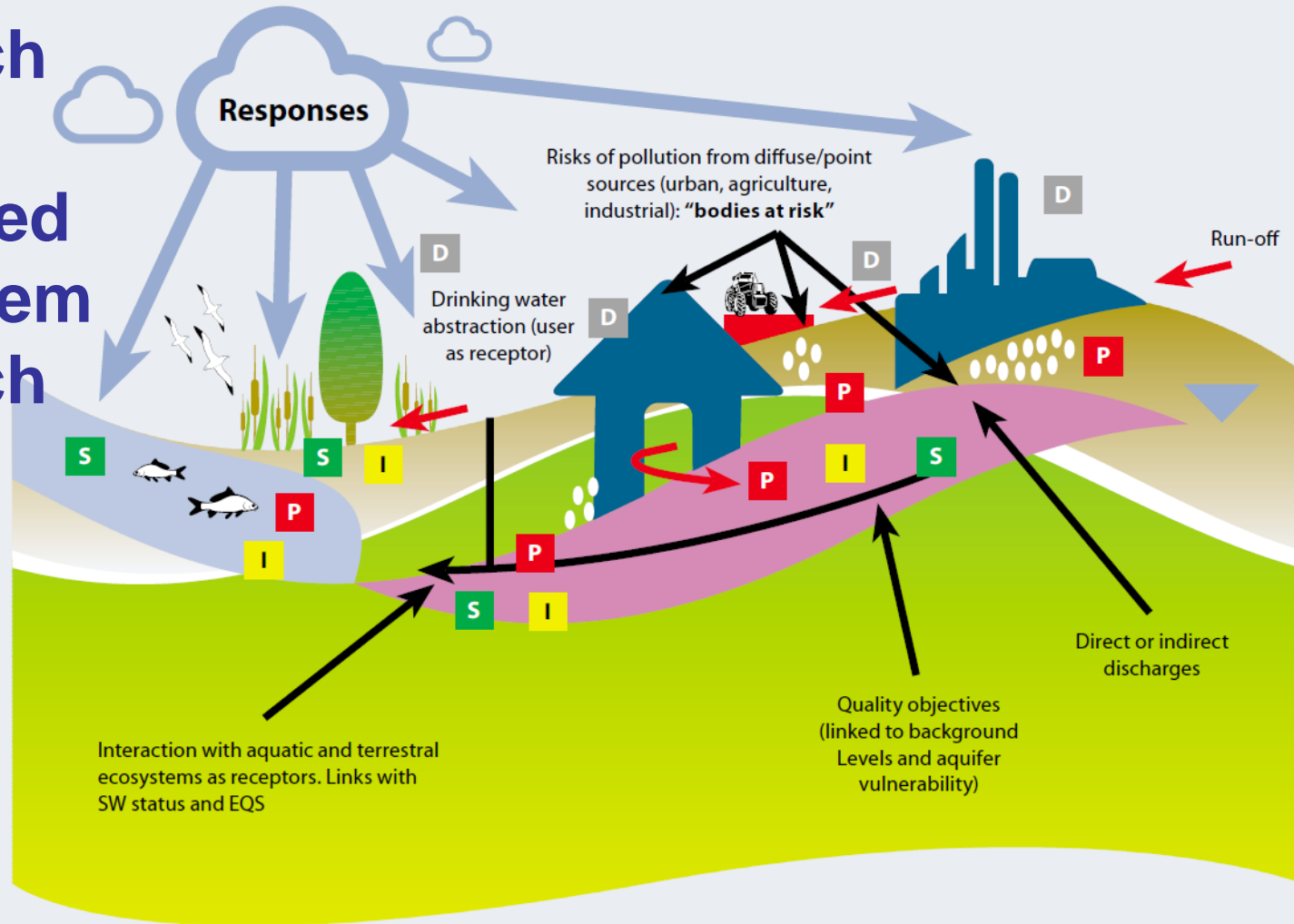
- EEA, 29/07/2013: Blue-green algae - check the water before you swim
- DG ENV, 18/07/2013: UK Shellfish are cleaner thanks to sewerage infrastructure improvements
- DG ENV, 18/07/2013: Shipping emissions can lead to high local ocean acidification
- DG ENV, 11/07/2013: Health defects found in Gulf killifish exposed to Deepwater Horizon oil spill
- EEA, 05/06/2013: Flood risk in Europe: the long-term outlook
- EEA, 21/05/2013: Europe's bathing waters continue to improve
- EEA, 27/12/2012: EEA reviews new findings from 2012, the Year of Water

European policy on groundwater

- The **Water Framework Directive (WFD, 2000/60/EC)** establishes the objective of reaching good groundwater chemical and quantitative status across Europe by 2015.
- In order to reach this aim the daughter directive **Groundwater Directive (GWD, 2006/118/EC)** lays down detailed quality criteria for the assessment of groundwater chemical status in Europe. These include groundwater quality standards set at Community level (Annex I of GWD) and threshold values.

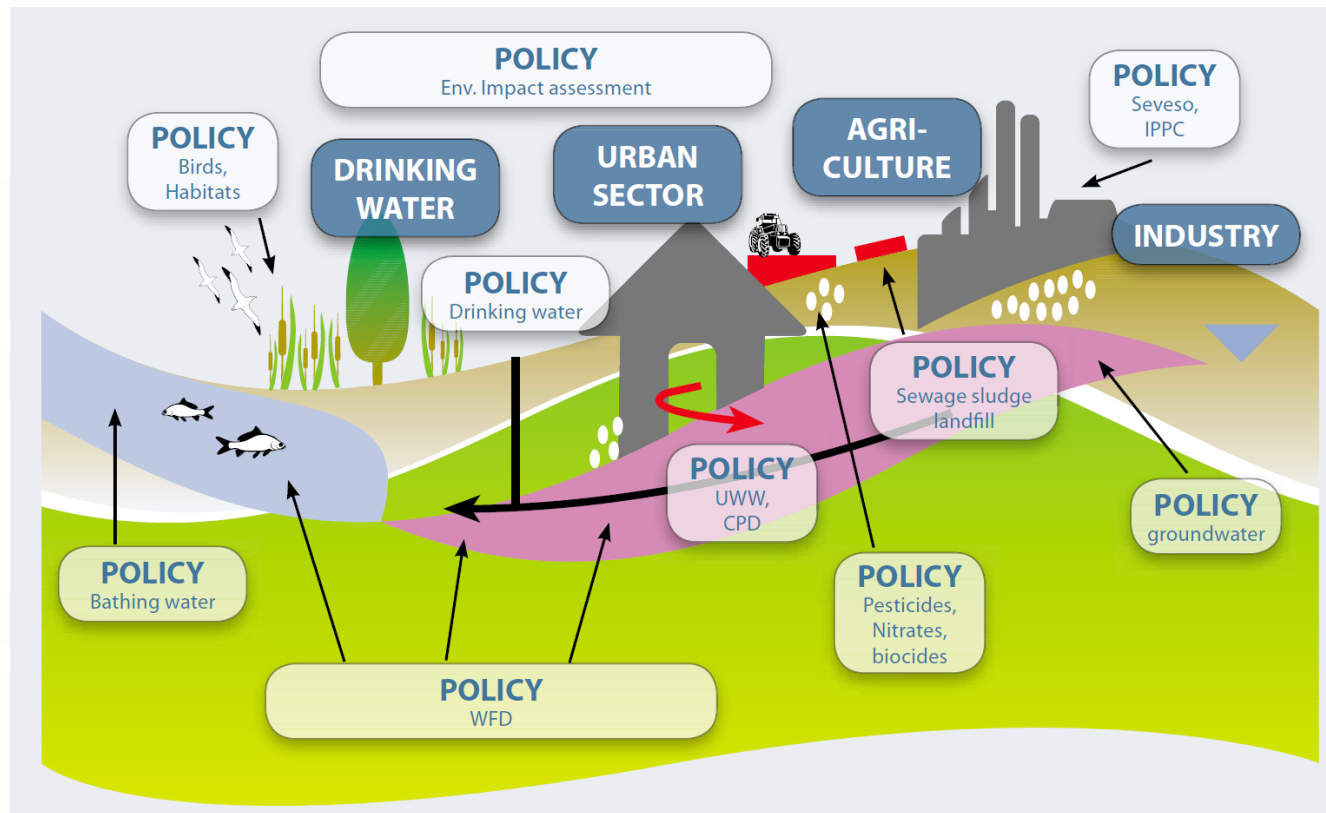
WFD DPSIR approach and integrated ecosystem approach

Figure 2. Main driving forces (D) and related pressures (P) affecting groundwater. The status (S) and impacts (I) concerns both the groundwater resource and the associated and dependent aquatic and terrestrial ecosystems. The responses (R) are the action programmes of relevant EU legislations (primarily the programme of measures of the Water Framework Directive)



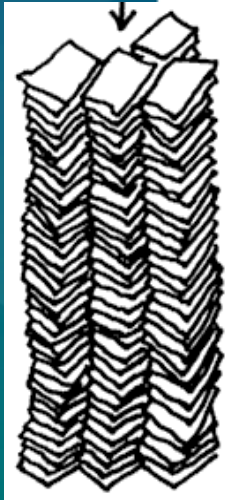
Policy integration to protect groundwater

Pieces of legislation designed to protect groundwater against pollution and deterioration are part of a larger regulatory framework that can be traced back to the 1990s. The concept of groundwater protection is now fully integrated into the basic measures of the Water Framework Directive.



River Basin Management Plans (RBMP)

- EU Member States had to produce River Basin Management Plans (RBMP) for each river basin district by the end of 2009 to be reviewed every 6 years. These include:
 - A summary of pressures and impacts of human activities on groundwater status;
 - A presentation in map form of monitoring results;
 - A summary of the economic analysis of water use;
 - A summary of protection programmes;
 - Control and remediation measures
- EU Member States had to report their data used for the RBMPs into WISE. These were compiled by a consultant into the WFD master database, analysed by the ETC/ICM and published by EEA and ETC/ICM in 2012.



REPORT FROM THE COMMISSION on the Implementation of the Water Framework Directive (2000/60/EC) River Basin Management Plans (Nov.2012)

	No of MS	No of water bodies	% Water bodies in good status or potential 2009	% Water bodies in good status or potential 2015	Progress 2009-2015 in %	Unknown status in 2009 in % ⁹
Ecological status of surface waters	21 ¹⁰	82684	43	53	10	15
Chemical status of surface waters	Information unclear to establish the 2009 baseline ¹¹					40
Quantitative status of groundwater ¹²	24	5197	85	92	7	6
Chemical status of groundwater ¹²	24	5197	68	77	9	3

Source: Information reported by Member States, 2012

The assessment of the RBMPs indicates that progress towards the objective is expected, but good status will not be reached in 2015 for a significant proportion of water bodies. Several reasons are behind this. The assessment of the RBMPs by the Commission identifies the main obstacles encountered in each Member State and stresses that hydromorphological pressures, pollution and over-abstraction remain the main pressures on the water environment.

Groundwater Threshold Values

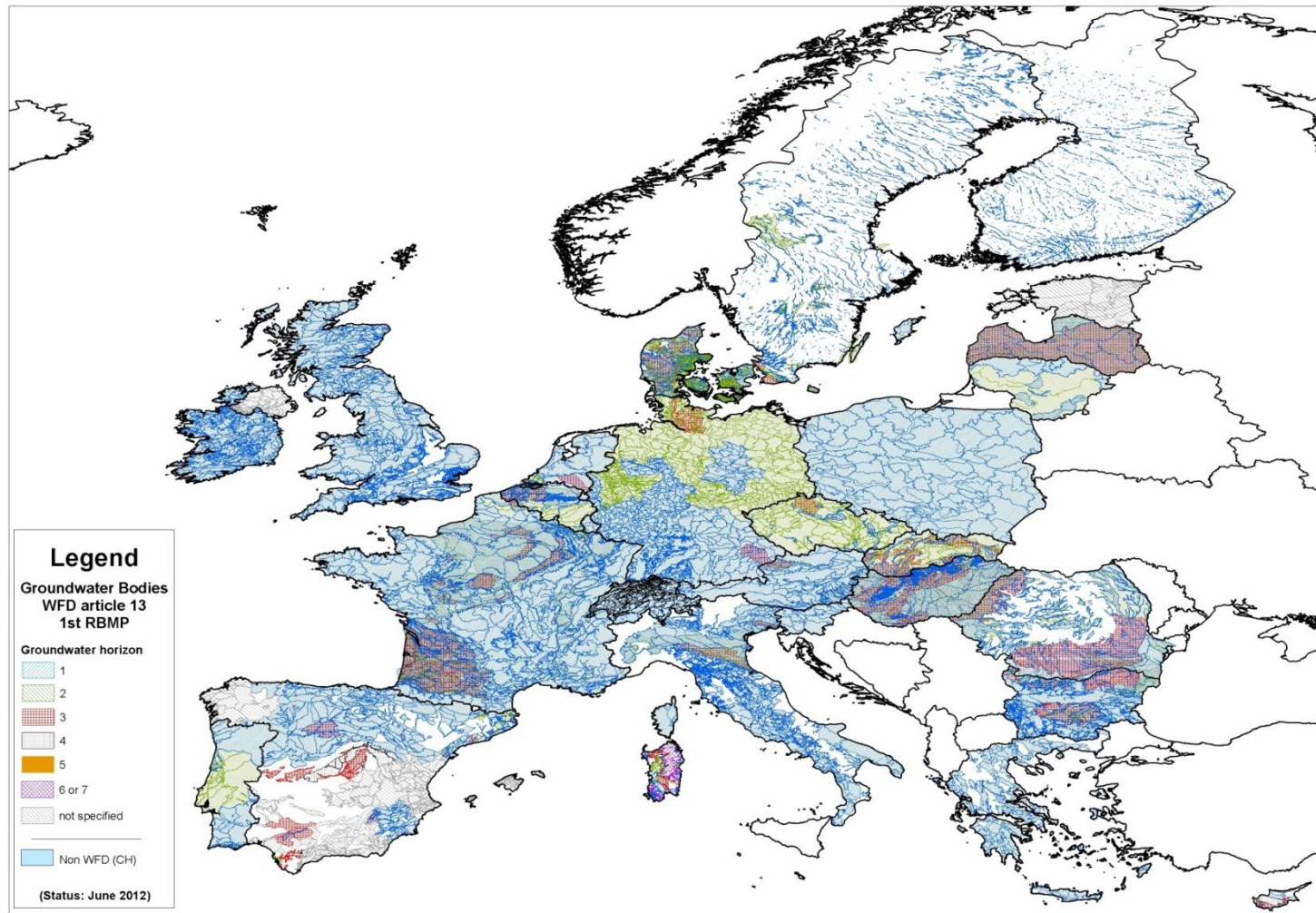
- Threshold values are quality standards that have to be set by Member States for pollutants causing a risk of not meeting WFD requirements, in accordance with Article 3 of GWD. Member States were obliged to publish them in the WFD River Basin Management Plans by 22 December 2009.
- The analysis of threshold values in RBMPs showed that:
 - Nitrates and total pesticides are covered by Annex I of the GWD giving common European quality standards for groundwater chemical status assessment – 50 mg/l for nitrates and 0.5 µg/l for total pesticides. If the objectives of the WFD cannot be met with the quality standards, Member States need to establish stricter threshold values.
 - 26 Member States reported that threshold values have been established for 158 different pollutants across Europe. The 10 pollutants listed in Annex II GWD are nearly comprehensively covered by threshold values.
 - There is a huge variability in the ranges of threshold values across Europe. The reasons for this could be many.

Groundwater body delineation

- 'Body of groundwater' means a distinct volume of groundwater within an aquifer or aquifers
- The flexibility in the delineation of groundwater bodies has led to considerable different sizes of groundwater bodies influencing both the establishment of natural background levels at groundwater body level and the weighting of the significance of compliance elements (e.g. absolute extents of acceptable exceedance of threshold values)
- The compilation of groundwater bodies into one European reference layer is difficult:



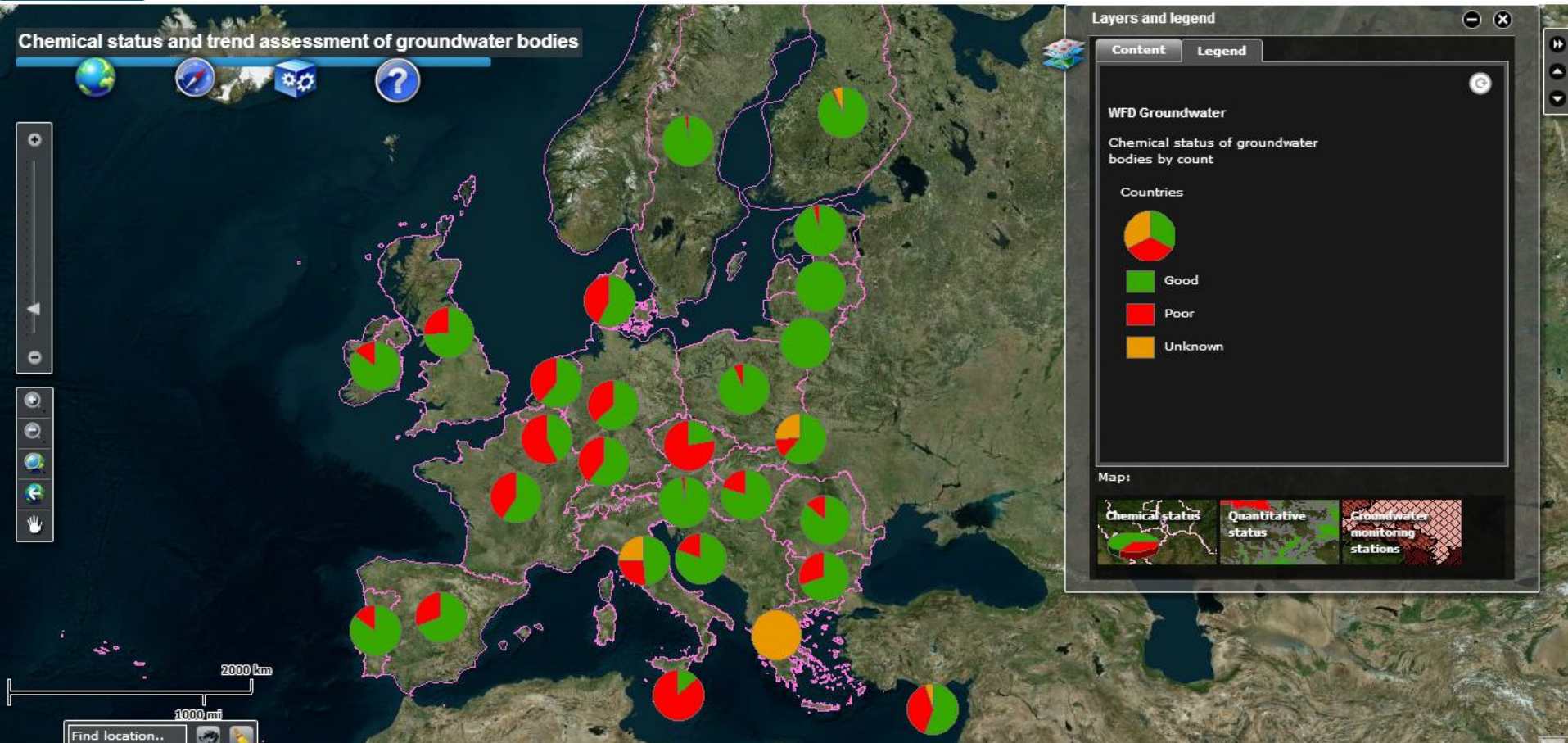
GWB Reference Layer – Survey Map



Progress: Data submitted according to WFD Art. 13 available for each of the 27 MS

WFD reporting on groundwater chemical status

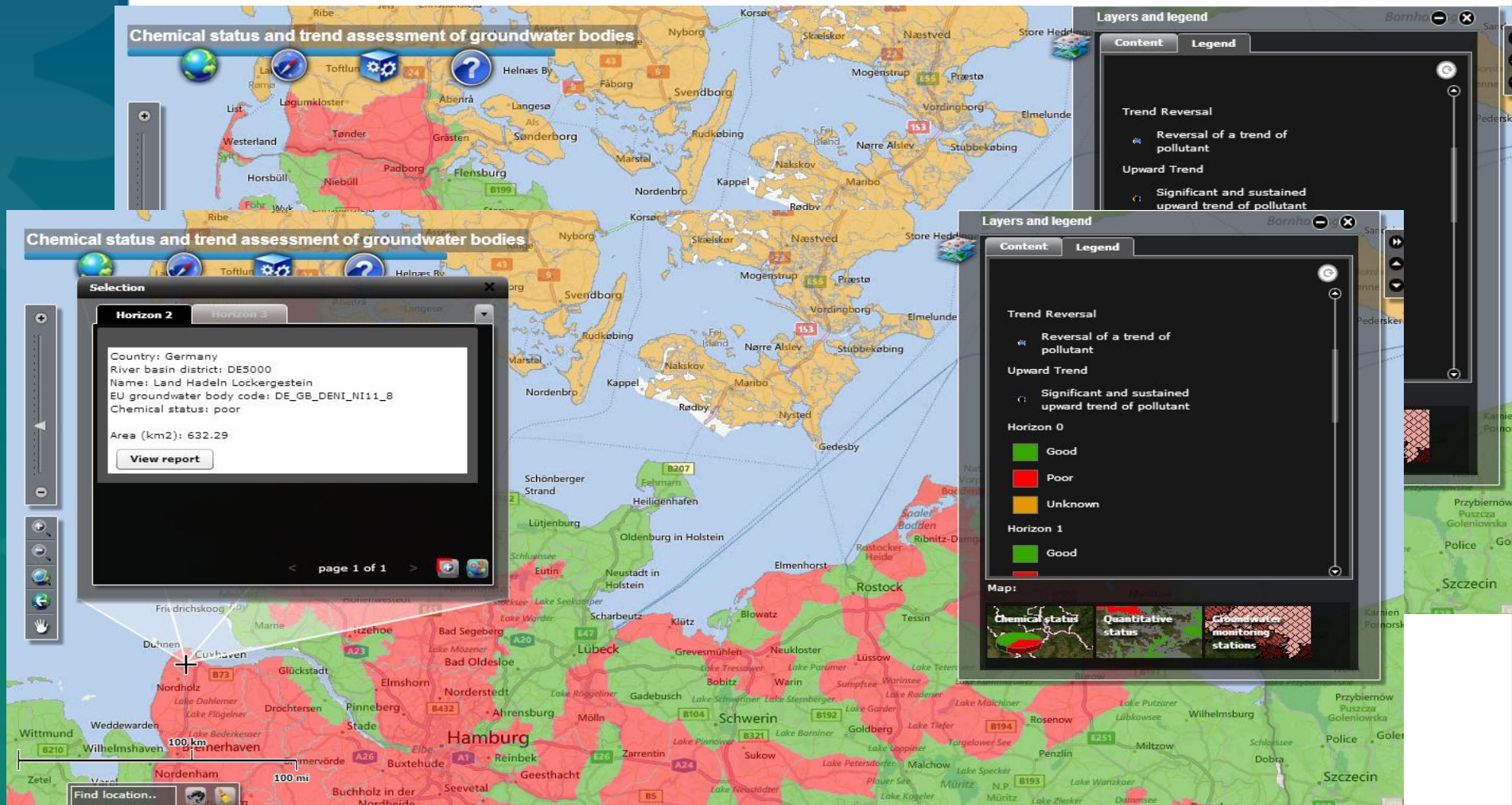
- WISE map on chemical status -



WISE map on groundwater chemical status - Zoom-in to water body and pop-up window-

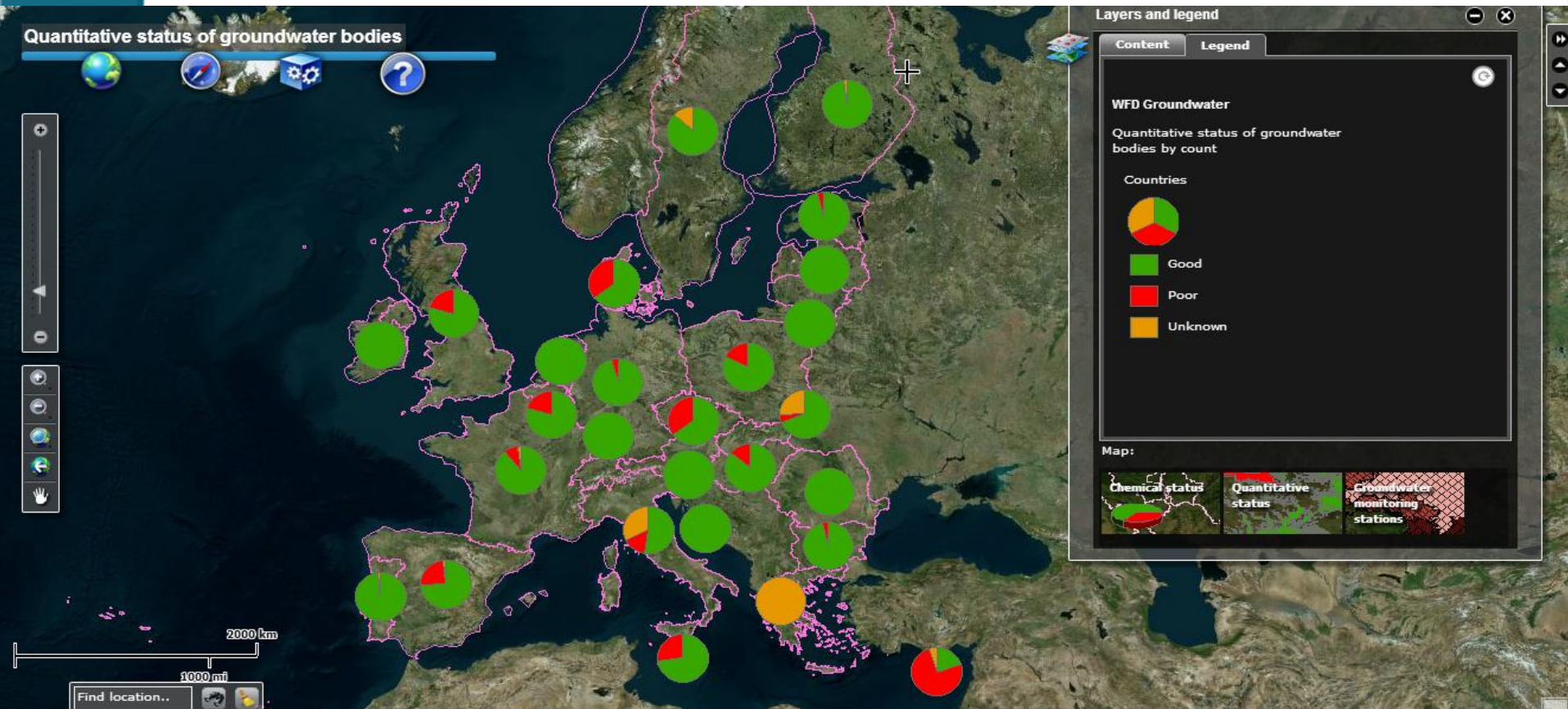


WISE map on groundwater chemical status - Zoom-in to water body and pop-up window-



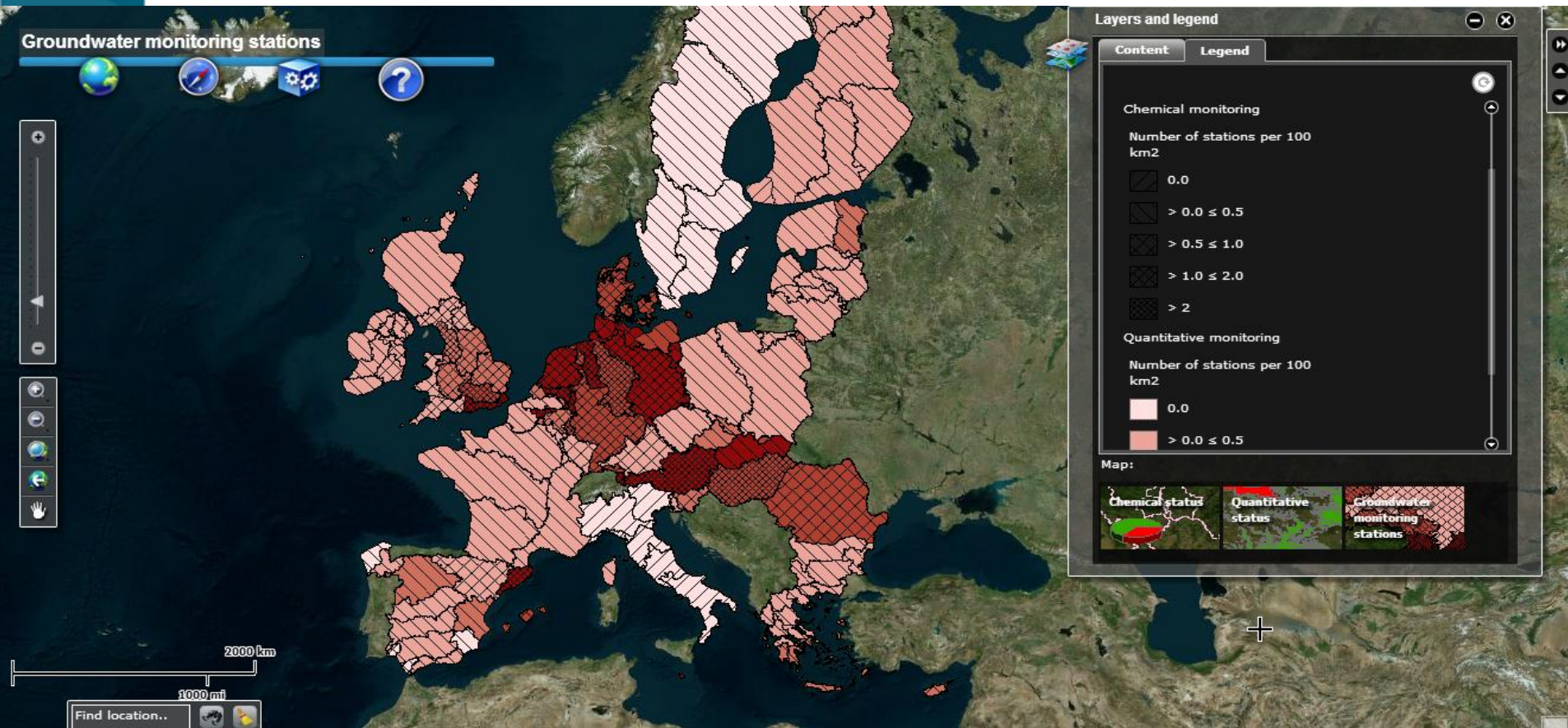
WFD reporting on groundwater quantitative status

- WISE map on quantitative status -



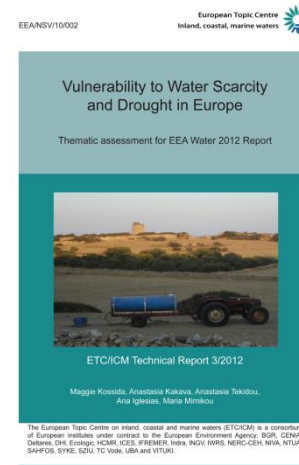
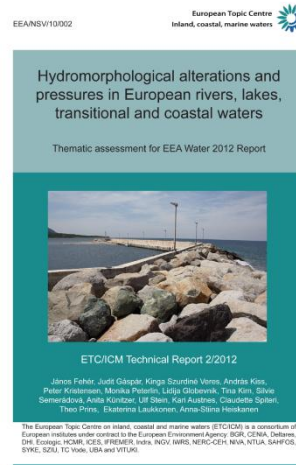
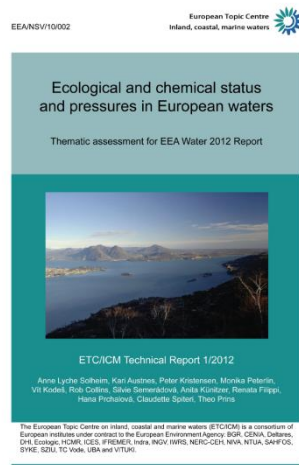
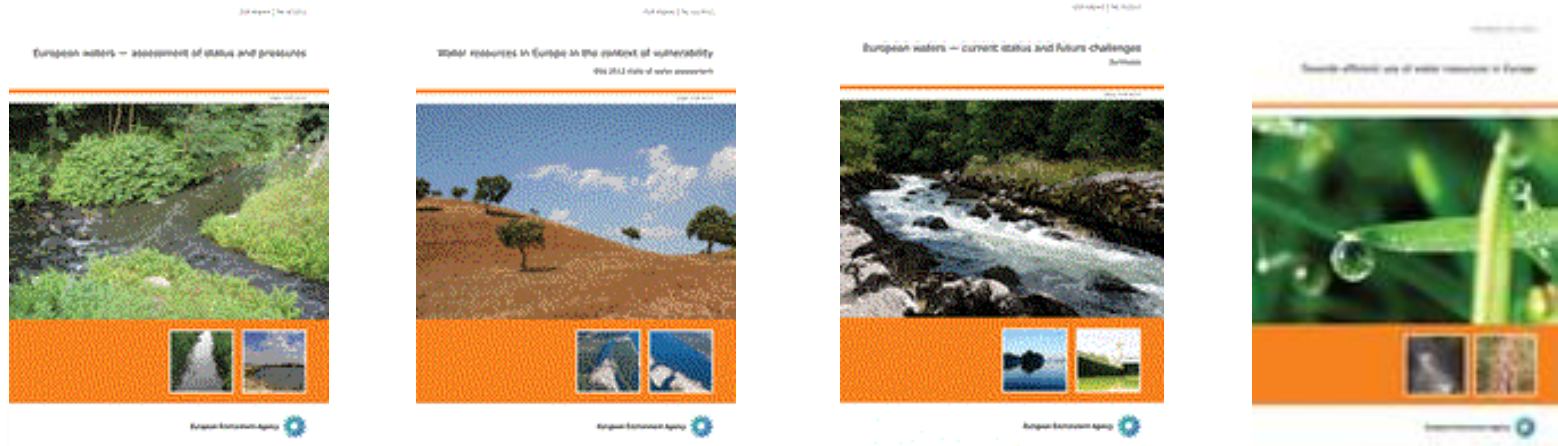
WFD reporting on groundwater chemical and quantitative status

– WISE map on monitoring stations –



EEA and ETC/ICM publications based on Water Framework Directive (WFD) Member State data analysis

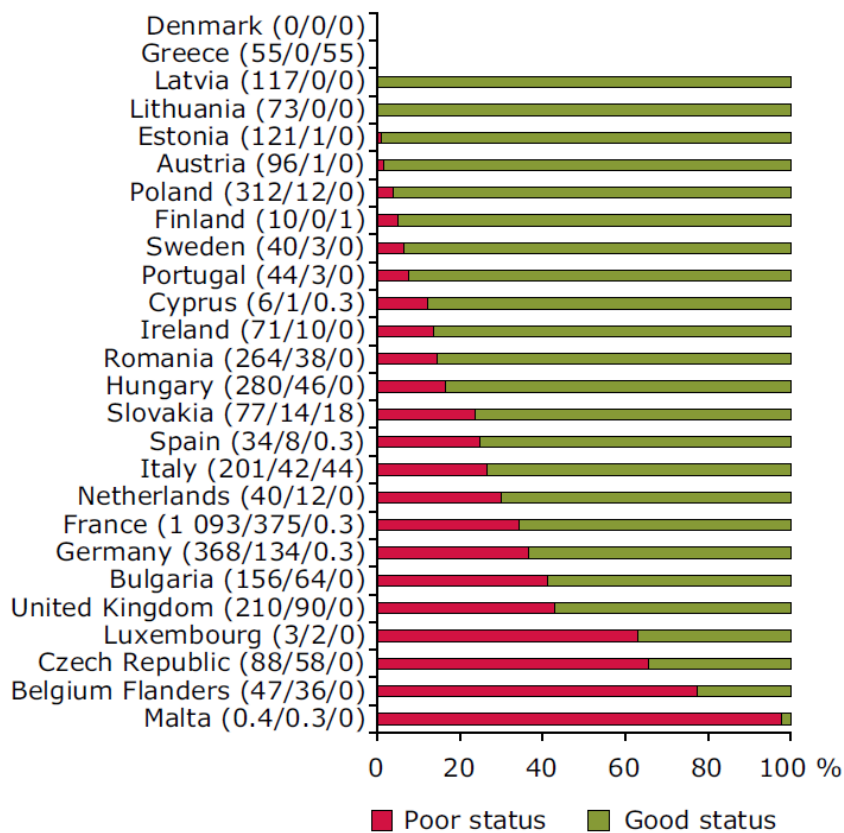
<http://www.eea.europa.eu/themes/water/water-assessments-2012/> and http://icm.eionet.europa.eu/ETC_Reports



Chemical status of groundwater bodies

Figure 5.2 Chemical status of groundwater bodies

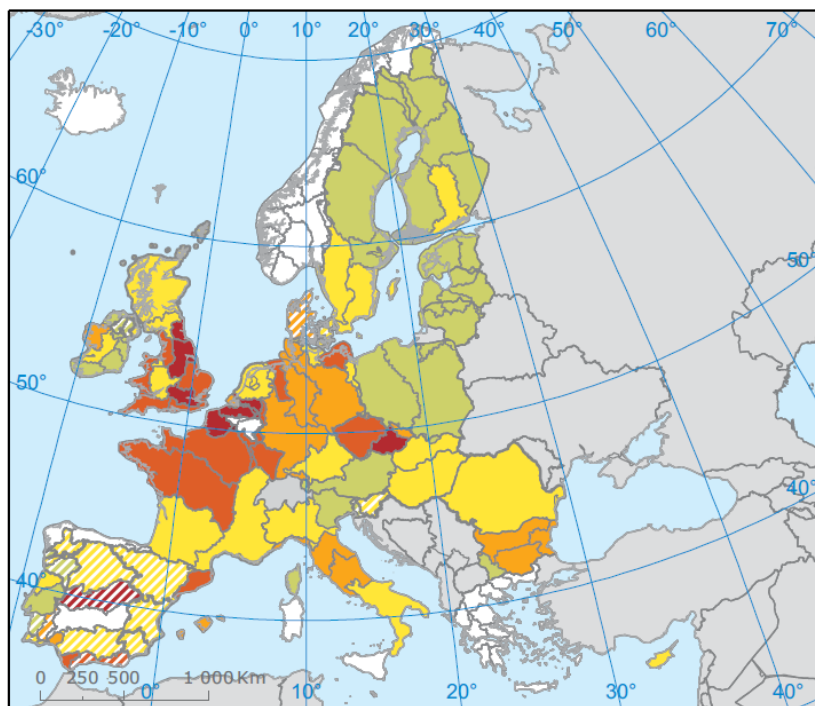
Percentage of groundwater bodies in poor and good status, by area



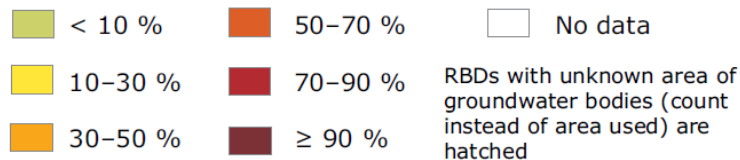
Note: Groundwater bodies in unknown status are not accounted for in the red and green bars that represent the percentage for poor and good status respectively. The reported total area covered by groundwater bodies/the area in poor status/the area in unknown status (in 1 000 km²) per Member State is shown in parentheses. Denmark and Slovenia did not report the area of groundwater bodies, whilst 164 of 385 (43 %) Danish groundwater bodies were reported as holding poor chemical status, and 4 of 21 (19 %) Slovenian groundwater bodies were reported as holding poor chemical status.

Source: EEA Report 8/2012

Map 5.1 Chemical status of groundwater bodies per RBD – percentage of groundwater body area not achieving good chemical status



Percent of classified groundwater bodies with poor chemical status



Source: EEA Report 8/2012

Number of groundwater bodies in poor chemical status due to chemical pollutants per Member State

Pollutants	AT	BE	BG	CY	CZ	DE	DK	EL	ES	FI	FR	HU	IE	IT	LU	MT	NL	PL	PT	RO	SE	SK	UK
Nitrates (23/1063)	3	18	37	4	94	259	98	2	154	2	120	38	2	103	2	13	2	7	14	17	2	7	65
Pesticides (13/332)		19			2	42	19		10	23	140	6		14	2		3				42		10
Alachlor (1/1)											1												
Atrazine (4/61)					12						38											4	7
Endosulfan (1/1)									1														
Isoproturon (2/14)											13												1
Hexachlorocyclohexane (2/3)									1		2												
Simazine (5/16)					2				1		9											2	2
Trifluralin (1/2)														2									
Annex II pollutants (4/147)						104				17							3						23
Arsenic (13/73)		4			12		3		4	4	2		2	23			3		1		11	3	1
Conductivity (11/68)		7	3	2					25		1	2		19		5		1	2		1		
Cadmium (7/50)					29					2				1					1		8	1	8
Lead (9/72)					34				1	6	1		4	15					1		9		1
Mercury (5/30)					16						1		2	7							4		
Ammonium (14/142)		12	7	1	27				14	7	2	1	3	38				6	3	14		7	
Chloride (16/212)		4	1	5	48		13	2	46	28	5			23			2	1	5		9	7	13
Sulphate (13/115)		7	3	3	50				15	2	1	3		11				3	1			8	8
Trichloroethylene (9/70)					3		31		3		5	2	2	19								1	4
Tetrachloroethylene (8/106)				1	53				5		7	1		33								1	5

Note: Number of Member States / number of groundwater bodies is shown in parenthesis.

Source: WISE-WFD database, May 2012. Detailed data are available at

http://discomap.eea.europa.eu/report/wfd/GWB_STATUS.

- Excessive nitrate concentration accounts for between 10% and 30% of poor groundwater status across much of Europe (by area). Groundwater nitrate is primarily attributable to agricultural sources.
- The Annex II pollutants are the most frequent cause of poor status in groundwater. Across all Member States, the Annex II pollutants most commonly identified are chlorides, ammonium, sulphates, tetrachloroethylene, trichloroethylene, arsenic and lead.

SoE indicators on groundwater quality

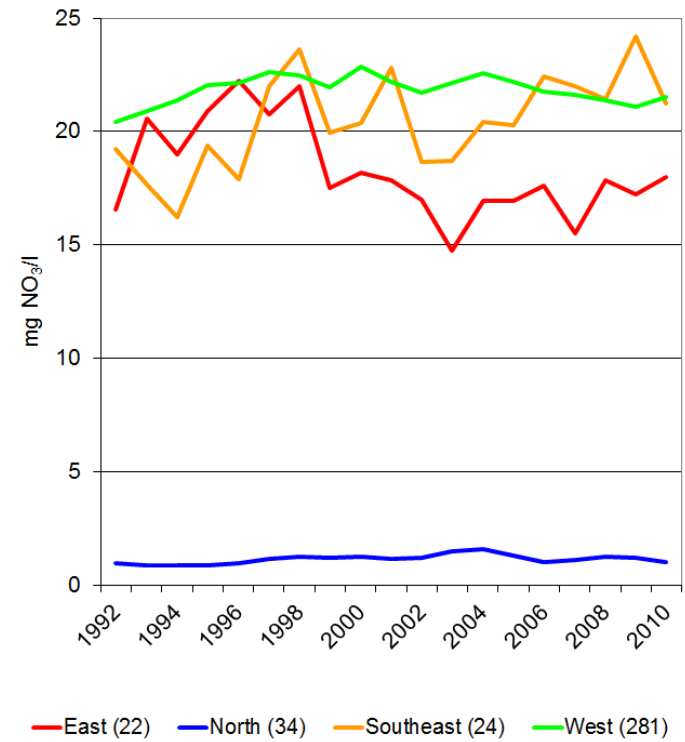
Nutrients in freshwater (CSI 020) - Nitrate concentrations in groundwater between 1992 and 2010 in different geographical regions of Europe.

Northern Europe has low concentrations with levels being fairly stable over time.

In **Western Europe** the concentrations are high, and the levels have been fairly stable over the whole period, with similar proportions of decreasing and increasing trends, and about half the GWBs with no trend. .

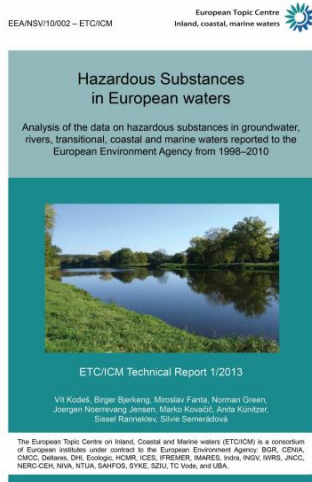
In **Eastern Europe** the average concentrations are slightly lower after 1998, currently 3-4 mg/l lower than in Western Europe.

In **South-eastern Europe** (only Bulgaria), average concentrations show a marked increase until 1998 and variable concentrations since then, currently around the same level as for Western Europe.



SoE data on hazardous substances in groundwater

http://icm.eionet.europa.eu/ETC_Reports/HazardousSubstancesInWater_2013/



SoE data on hazardous substances in groundwater

http://icm.eionet.europa.eu/ETC_Reports/HazardousSubstancesInWater_2013/

EEANSV10/002 – ETC/ICM

European Topic Centre
Inland, coastal, marine waters

Hazardous Substances in European waters

Analysis of the data on hazardous substances in groundwater, rivers, transitional, coastal and marine waters reported to the European Environment Agency from 1998–2010

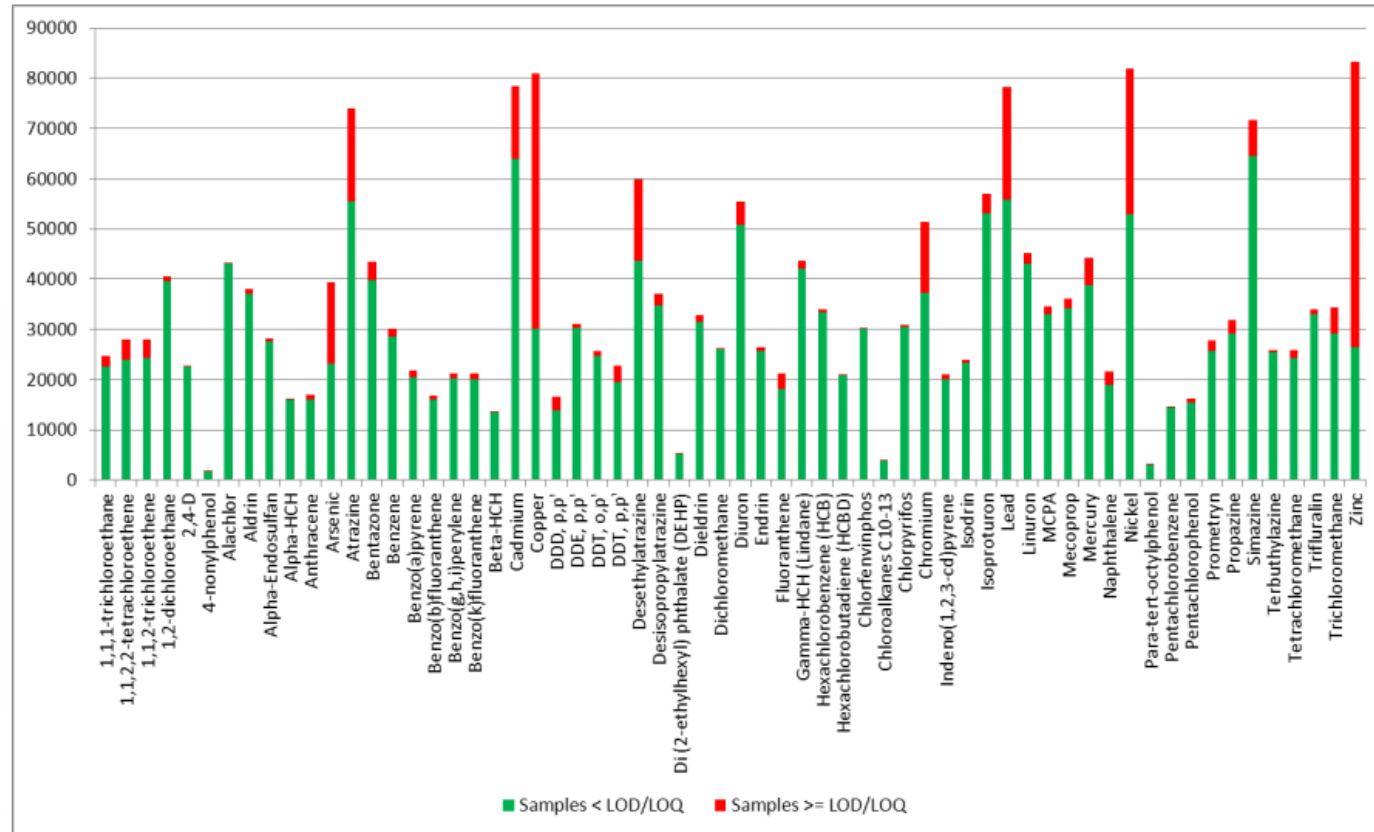


ETC/ICM Technical Report 1/2013

Vil Kodas, Birger Berking, Miralav Faris, Norman Green, Joergen Noerrevang Jensen, Marko Kovacic, Anita Kunitzer, Sisel Kinniklov, Silve Semelidova

The European Topic Centre on Inland, Coastal and Marine waters (ETC/ICM) is a consortium of European Institute under contract to the European Environment Agency. DGR, ICMA, CMO, Deltava, DHI, Ecologic, HCMR, ICES, IFREMER, IMARES, IUSA, INGV, IRWS, JACC, MRC-CER, NVA, NTUA, SAMPOS, SYKE, SZU, TG-Volk and USA.

Figure 4.1.1.1 Number of negative/positive samples in groundwater in 1999-2009



Thank you for your attention!

