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**COMMISSION STAFF WORKING DOCUMENT**

*accompanying*

**the Report from the Commission to the European Parliament and the Council in  
accordance with article 18.3 of the Water Framework Directive 2000/60/EC on  
programmes for monitoring of water status**

**[COM(2009)156]**



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Annex 1: Questionnaires for Compliance Checking of Monitoring Reports for Surface Waters and Groundwater

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accompanying

### **the Report from the Commission to the Council and the European Parliament in accordance with article 18.3 of the Water Framework Directive 2000/60/EC on programmes for monitoring of water status**

#### **1. INTRODUCTION**

##### **Current status in the implementation of the Water Framework Directive**

The EU Water Framework Directive (WFD)<sup>1</sup>, adopted in 2000, lays the foundation for a modern, holistic and ambitious water policy for the European Union and defines clear deadlines for the achievement of specific tasks.

The first step in implementation was the legal transposition of the WFD into national legislation by the end of 2003, as required by Article 24 WFD.

Article 3 WFD requested the Member States to define the geographical coverage of their river basin districts, to identify the competent authority or authorities for implementation and to put the necessary administrative arrangements for coordination of river basin management into place at the national and where appropriate international level.

A major milestone in implementation was the environmental and economic analysis of the river basin districts requested under Article 5(1) WFD which were due by December 2004. The analysis should provide a systematic and comprehensive overview on existing pressures and impacts on water and on the economics of water uses in the European Union, serving as a starting point for the preparation of the river basin management plans.

The first Communication from the Commission to the European Parliament and the Council and the accompanying Staff Working Document<sup>2</sup> (dated 22.03.2007) gave an overview of the aims of the Directive and summarised the results of the first analysis of the river basin districts as required by Article 5(1) WFD.

This Commission Staff Working Document responds to Article 18(3) of the Directive which requires the Commission to publish a report on the progress of implementation of the WFD related to Article 8 on monitoring of surface water, groundwater and protected areas, and to submit it to the European Parliament as well as the Member States. The report is based on the reports sent by Member States in accordance with WFD Article 15(2), which were due on 22 March 2007.

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<sup>1</sup> Directive 2000/60/EC, OJ L327 of 22.12.2000, as amended

<sup>2</sup> COM(2007)128 final and the accompanying document SEC(2007) 362

## **The role of monitoring for the development of the river basin management plans**

The environmental objectives laid down in Article 4(1) WFD require Member States to prevent deterioration of the status of all bodies of surface water and groundwater and to protect, enhance and restore all waters with the aim of achieving good ecological status or good ecological potential and good chemical status for surface waters and good groundwater status as a rule by 2015. In addition, pollution from priority substances has to progressively be reduced and emissions of hazardous substances have to cease or be phased out. Any significant and sustained upward trend in the concentration of any pollutant in groundwater generated by human activity has to be reversed by appropriate measures.

The first Commission report on the analysis of the river basin districts published in 2007 showed that many water bodies across the European Union were at risk of reaching these new and ambitious objectives by 2015. The next step is now to assess the status of the water bodies in line with provisions established in Annex V of the Directive. In accordance with Article 8(1) WFD Member States need to establish monitoring programmes for the assessment of the status of surface water and of groundwater in order to establish a coherent and comprehensive overview of water status within each river basin district. These requirements include monitoring of protected areas as far as the status of surface water or groundwater is concerned. Based on Article 8(2) WFD the monitoring programmes were to be operational by 22 December 2006 and reported to the European Commission by 22 March 2007 as specified in Article 15(2) WFD.

The results of surface water and groundwater monitoring will determine whether the water bodies are in good status and whether appropriate measures need to be undertaken in order to reach good status as a rule by 2015. The core element of the river basin management plans is the programme of measures. Member States were to publish the draft river basin management plans by December 2008. These shall be consulted with the public and finalised by December 2009. The programme of measures shall be operational by 2012. The river basin management plans shall be reviewed and updated in 2015 and every six years thereafter.

## **The role of intercalibration to ensure comparability of good ecological status**

New methods for assessing ecological status have been developed or are being developed in practically all Member States. Each Member State should have developed by the end of 2006 methods to assess ecological status that fulfil the requirements of WFD Annex V. Intercalibration ensures that the understanding of good ecological status is the same across the European Union. The intercalibration exercise, facilitated by the Commission's Joint Research Centre, is therefore an essential part of assessing ecological status and is an obligation of the Member States.

The Commission Decision of 17 August 2005<sup>3</sup> established the register of sites to form the intercalibration network. Commission Decision of 30 October 2008<sup>4</sup> established the values of the Member State monitoring system classifications as a result of the intercalibration exercise. As established in section 1.4.1 (iii) of Annex V WFD, Member States have to translate the results of the intercalibration exercise into their national classification systems in order to set the boundaries between high and good status and between good and moderate status for all their national types. Intercalibration has not been accomplished for a number of biological

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<sup>3</sup> Commission Decision 2005/646/EC of 17 August 2005, OJ L 243, 19.9.2005

<sup>4</sup> Commission Decision 2008/915/EC of 30 October 2008, OJ L 332, 10.12.2008

quality elements, and therefore further intercalibration will need to be completed in the period 2008-2011, as agreed by the WFD Article 21 Regulatory Committee. With the reports on the monitoring programmes under Article 8 the Commission has received updated information on the status of the development of the biological assessment methods in the Member States.

### **Guidance on the establishment of monitoring programmes**

Given the complexities and challenges of WFD implementation, the Commission together with the Member States, agreed in May 2001 upon an informal programme of co-operation in order to develop a common approach to the technical challenges for implementing the WFD. The informal programme of co-operation is known as the Common Implementation Strategy (CIS)<sup>5</sup>. The Commission, the Member States, candidate countries and all relevant stakeholders take part in the CIS. The aim of this strategy is to allow, as far as possible, a coherent and harmonious implementation of the Water Framework Directive.

Since 2001, a considerable number of technical guidance documents and other supporting documents have been produced<sup>6</sup>. Related to monitoring the following guidance documents are relevant:

- Guidance Document No 7: Monitoring under the Water Framework Directive (2004)
- Guidance Document No. 15: Guidance on Groundwater Monitoring (2006)

### **Reporting into the Water Information System for Europe (WISE)**

This Commission Staff Working Document is based on the summary reports that Member States have submitted under Article 15(2) WFD. For the first time ever, it was possible for Member States to report only in electronic format through WISE, the Water Information System for Europe<sup>7</sup>, i.e. no paper reports were required. The reporting was based on a common format which was jointly developed between the Commission and the Member States and endorsed by the Water Directors in November 2005. To date, almost all Member States have reported through WISE which shows the great success of this electronic reporting tool. Only two Member States have sent paper reports (see section 4.1).

## **2. MONITORING REQUIREMENTS OF THE WATER FRAMEWORK DIRECTIVE**

Member States shall ensure the establishment of monitoring programmes of surface water, groundwater and protected areas in order to establish a coherent and comprehensive overview of water status within each river basin district (Article 8 WFD).

In the following, the basic monitoring requirements of the Directive<sup>8</sup> will be described. Some more specific details may be addressed in Chapter 4, where appropriate.

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<sup>5</sup> available under: <http://ec.europa.eu/environment/water/water-framework/objectives/pdf/strategy.pdf>

<sup>6</sup> see <http://europa.eu.int/comm/environment/water/water-framework/> and <http://forum.europa.eu.int/Public/irc/env/wfd/library>

<sup>7</sup> see <http://water.europa.eu/>

<sup>8</sup> see WFD Annex V, 1.3 Monitoring of ecological status and chemical status for surface waters; 2.2 Monitoring of groundwater quantitative status, 2.4 Monitoring of groundwater chemical status

## **Monitoring requirements for surface waters**

The Directive differentiates between four different water categories: rivers, lakes, transitional waters (estuaries), and coastal waters. In addition, there are the so-called 'heavily modified water bodies' (waters that have been heavily modified by human intervention, e.g. reservoirs or harbours) and the artificial water bodies (that have been created by man in a place where there was no water before, e.g. ditches and canals)<sup>9</sup>. The WFD Article 4 sets good status as the general objective for natural water bodies, which comprises good ecological status and good chemical status. For heavily modified and artificial water bodies, the objectives are to achieve good ecological potential and good chemical status. These objectives are to be achieved as a rule by 2015.

The monitoring programmes for surface waters should cover the ecological and chemical status of natural water bodies, and the ecological potential and the chemical status for heavily modified and artificial water bodies. The assessment of *ecological status* is based on biological quality elements as well as supporting hydromorphological, chemical and physico-chemical quality elements (see **Table 1**). Good ecological status is generally based on the composition and abundance of the species and it is defined for each water category and each biological quality element individually<sup>10</sup>. Estimates of the level of confidence and precision of the results provided by the monitoring programmes need to be given in the river basin management plans<sup>11</sup>. The assessment of *chemical status* is dependent on achieving the environmental quality standards established in Annex IX of the Directive, under Article 16 WFD and under other relevant Community legislation setting environmental standards at Community level<sup>12</sup>.

**Table 1 Quality elements to be monitored in rivers, lakes, transitional and coastal waters**

Elements	rivers	lakes	transitional waters	coastal waters
<b>Biological elements</b>				
Phytoplankton	Composition and abundance	Composition, abundance and biomass	Composition, abundance and biomass	Composition, abundance and biomass
Other aquatic flora	Composition and abundance of macrophytes and phytobenthos	Composition and abundance of macrophytes and phytobenthos	Composition and abundance of macro-algae and angiosperms	Composition and abundance of macro-algae and angiosperms
Benthic invertebrate fauna	Composition and abundance	Composition and abundance	Composition and abundance	Composition and abundance
Fish fauna	Composition, abundance and age structure	Composition, abundance and age structure	Composition and abundance	-

<sup>9</sup> See

[http://circa.europa.eu/Public/irc/env/wfd/library?l=/framework\\_directive/guidance\\_documents/guidancesnos4sheavilysmo/EN\\_1.0\\_&a=d](http://circa.europa.eu/Public/irc/env/wfd/library?l=/framework_directive/guidance_documents/guidancesnos4sheavilysmo/EN_1.0_&a=d)

<sup>10</sup> See WFD Annex V, 1.2 Normative definitions of ecological status classification

<sup>11</sup> See WFD Annex V, 1.3 and 2.4.1

<sup>12</sup> See WFD Article 2(24).



Elements	rivers	lakes	transitional waters	coastal waters
<b>Hydromorphological elements supporting the biological elements</b>				
Hydrological regime	Quantity and dynamics of water flow	Quantity and dynamics of water flow	-	-
	-	Residence time	-	-
	Connection to groundwater bodies	Connection to the groundwater body	-	-
River continuity	River continuity	-	-	-
Morphological conditions	River depth and width variation	Lake depth variation	Depth variation	Depth variation
	Structure and substrate of the river bed	Quantity, structure and substrate of the lake bed	Quantity, structure and substrate of the bed	Structure and substrate of the coastal bed
	Structure of the riparian zone	Structure of the lake shore	Structure of the intertidal zone	Structure of the intertidal zone
Tidal regime	-	-	Freshwater flow	Direction of dominant currents
	-	-	Wave exposure	Wave exposure
<b>Chemical and physico-chemical elements supporting the biological elements</b>				
General	-	Transparency	Transparency	Transparency
	Thermal conditions	Thermal conditions	Thermal conditions	Thermal conditions
	Oxygenation conditions	Oxygenation conditions	Oxygenation conditions	Oxygenation conditions
	Salinity	Salinity	Salinity	Salinity
	Acidification status	Acidification status	-	-
	Nutrient conditions	Nutrient conditions	Nutrient conditions	Nutrient conditions
Specific pollutants	Pollution by all priority substances identified as being discharged into the body of water	Pollution by all priority substances identified as being discharged into the body of water	Pollution by all priority substances identified as being discharged into the body of water	Pollution by all priority substances identified as being discharged into the body of water
	Pollution by other substances identified as being discharged in significant quantities in to the body of water	Pollution by other substances identified as being discharged in significant quantities in to the body of water	Pollution by other substances identified as being discharged in significant quantities in to the body of water	Pollution by other substances identified as being discharged in significant quantities in to the body of water

The quality elements applicable to artificial and heavily modified surface water bodies are those applicable to whichever of the four natural surface water categories most closely resembles the heavily modified or artificial water body concerned<sup>13</sup>.

The surface water monitoring network needs to be designed as to provide a coherent and comprehensive overview of ecological and chemical status within each river basin and should allow the classification of water bodies into five quality classes for ecological status, four classes for ecological potential, and two classes for chemical status. The monitoring programmes should be based on the results of the pressure and impact analysis carried out under Article 5 and Annex II WFD. The Directive foresees three different kinds of monitoring programmes for surface waters: surveillance monitoring, operational monitoring, and investigative monitoring.

*Surveillance monitoring* is established to provide an assessment of the overall surface water status within a catchment or sub-catchment in a river basin district, thereby taking into account the results of the risk analysis carried out under Article 5 WFD in 2004 and supplementing and validating it. It should also monitor long-term changes in natural conditions as well as long-term changes in human activities.

The selection of monitoring sites needs to be based on the criteria given in the Directive which are related to the importance of the water bodies, e.g. due to the size of the basin, the rate of flow, the volume of water, the transboundary character, the international importance, or their importance for pollutants transferred into the marine environment.

Generally, surveillance monitoring needs to be carried out for each monitoring site for at least a period of one year during the 6-year river basin management cycle and monitoring should include all biological quality elements, all hydromorphological and all general physico-chemical quality elements as well as the priority list pollutants which are discharged into the river basin or sub-basin, and other pollutants discharged in significant quantities.

*Operational monitoring* is established to follow a targeted approach in order to assess the ecological and chemical status of those water bodies that have been identified as being at risk of failing to meet the environmental objectives. This can be the case either due the results of the Article 5 pressure and impact analysis or due to the results of surveillance monitoring. In addition, water bodies into which priority list substances are discharged have to be monitored. The quality elements to be monitored need to be selected to be indicative of the pressures exerted on the water body and sensitive to the impacts.

Monitoring frequency for operational monitoring needs to be chosen by Member States to provide sufficient data for a reliable assessment of the status of the relevant quality elements. As a guideline, the following minimum frequencies of monitoring are prescribed in WFD Annex V, 1.3.4 (see **Table 2**).

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<sup>13</sup> See WFD Annex V, 1.1.5.

**Table 2 Minimum monitoring intervals for operational monitoring**

Quality element	rivers	lakes	transitional waters	coastal waters
<b>Biological</b>				
– phytoplankton	6 months	6 months	6 months	6 months
– other aquatic flora	3 years	3 years	3 years	3 years
– macroinvertebrates	3 years	3 years	3 years	3 years
– fish	3 years	3 years	3 years	
<b>Hydromorphological</b>				
– continuity	6 years			
– hydrology	continuous	1 month		
– morphology	6 years	6 years	6 years	6 years
<b>Physico-chemical</b>				
– thermal conditions	3 months	3 months	3 months	3 months
– oxygenation	3 months	3 months	3 months	3 months
– salinity	3 months	3 months	3 months	
– nutrient status	3 months	3 months	3 months	3 months
– acidification status	3 months	3 months		
– other pollutants	3 months	3 months	3 months	3 months
– priority substances	1 month	1 month	1 month	1 month

In addition, *investigative monitoring* has to be carried out where the reason for failing to reach good status is unknown or in order to determine the magnitude and impacts of accidental pollution.

### **Monitoring requirements for groundwater**

For groundwater the monitoring programmes should cover monitoring of the quantitative and the chemical status. The environmental objectives set in WFD Article 4 for groundwater include the achievement of good quantitative status and good chemical status, both to be achieved as a rule by 2015.

The assessment of *quantitative status* is based on groundwater level measurements. The abstraction in each groundwater body will be such that the available groundwater resource is not exceeded by the long-term annual average rate of abstraction. This means that there is no significant reduction of groundwater status, there is no significant damage to terrestrial ecosystems which depend directly on that groundwater body, and there is no intrusion of saltwater or other intrusions due to changes in groundwater level or direction of flow<sup>14</sup>.

<sup>14</sup> See WFD Annex V, 2.1.2.

The assessment of *chemical status* is based on measurements of conductivity and concentrations of pollutants. The good chemical status is defined such that the concentrations of pollutants do not exceed the quality standards applicable under other relevant Community legislation, and these together with the values for conductivity do not indicate any intrusions of saltwater or any other harmful substances. As for quantitative status, chemical status shall not lead to the deterioration of associated surface waters or terrestrial ecosystems dependent on the groundwater body<sup>15</sup>.

The *groundwater level monitoring* network should be designed so as to provide a reliable assessment of the quantitative status. The density of the monitoring network should provide sufficient data for the assessment of impacts of abstraction and discharges as well as estimates of the direction and rate of groundwater flow across the Member States boundaries. The frequency of monitoring should be sufficient to achieve these goals.

The *chemical monitoring* network should provide a comprehensive overview of groundwater chemical status and detect the presence of long-term anthropogenically induced upward trends in pollution. Estimates of the level of confidence and precision of the results provided should be given in the river basin management plan.

Based on the results of the pressure and impact analysis carried out under Article 5 and Annex II WFD Member States need to establish a *surveillance monitoring* programme which should monitor at least a number of core parameters (see **Table 3**).

**Table 3 Core parameters to be monitored in all the selected groundwater bodies for surveillance monitoring**

Core parameter	Frequency of monitoring
oxygen content	At least once during the 6-year planning cycle
pH value	At least once during the 6-year planning cycle
conductivity	At least once during the 6-year planning cycle
nitrate	At least once during the 6-year planning cycle
ammonium	At least once during the 6-year planning cycle

Groundwater bodies identified as being at risk of meeting the environmental objectives need also to be monitored for those parameters indicating the relevant impacts. Transboundary water bodies need also to be monitored for those parameters relevant for the protection of the water uses of that groundwater body.

In general, the WFD stipulates that chemical surveillance monitoring shall be carried out during each 6 year planning cycle<sup>16</sup>.

The results of the surveillance monitoring programme shall be used to establish an *operational monitoring* programme. The aim is to establish the chemical status of all groundwater bodies being at risk of failing to meet the environmental objectives and to establish any long-term upward trend in any pollutant concentration which has been induced by human activities. Monitoring has to be carried out during the periods between surveillance

<sup>15</sup> See WFD Annex V, 2.3.2.

<sup>16</sup> See WFD Annex V, 2.4.1

monitoring at an appropriate frequency for the kind of pollution concerned but at least once per year.

### **Additional monitoring requirements for protected areas**

The surface and groundwater monitoring programmes described above must be supplemented by those specifications contained in Community legislation under which the individual protected areas have been established. The purpose of this additional monitoring is to assess the compliance with the environmental objectives for protected areas.

*Additional monitoring* is required for surface waters in protected areas for drinking water abstraction which provide more than 100 m<sup>3</sup>/day<sup>17</sup>. Such water bodies have to be monitored for all priority substances discharged and all other substances discharged in significant quantities which could affect the status and are controlled under the EU Drinking Water Directive<sup>18</sup>. The minimum frequency of monitoring is set in WFD Annex V (see **Table 4**). Water bodies in habitat and species protection areas have also to be included in the operational monitoring schemes if their status is less than good, and this monitoring needs to be maintained until the protected areas satisfy the water-related requirements on the nature legislation under which they have been designed<sup>19</sup>.

**Table 4 Monitoring frequencies on drinking water abstraction points**

Community served	Frequency of monitoring
< 10.000 people	4 times per year
10.000 to 30.000 people	8 times per year
> 30.000 people	12 times per year

Results on additional monitoring in protected areas will be addressed in Chapter 4.3.1 for surface waters and in Chapter 4.4.3 for groundwater.

## **3. METHODOLOGY FOR THE COMPLIANCE CHECK**

The Commission has developed the following *general stepwise approach* for compliance checking of Member States reports on the implementation of the WFD (see **Figure 1**). This approach was discussed with the Member States in the framework of the Common Implementation Strategy in Working Group D Reporting and in the Strategic Coordination Group.

This report covers the first three steps indicated in **Figure 1** for the assessment of the reports of the Member States on the monitoring programmes. For the purpose of the assessment, the Commission has used selected compliance indicators<sup>20</sup> that were presented and discussed with the Member States.

<sup>17</sup> see Article 7 WFD and Annex V, 1.3.5.

<sup>18</sup> Council Directive 98/83/EC of 3 November 1998 on the quality of water intended for human consumption

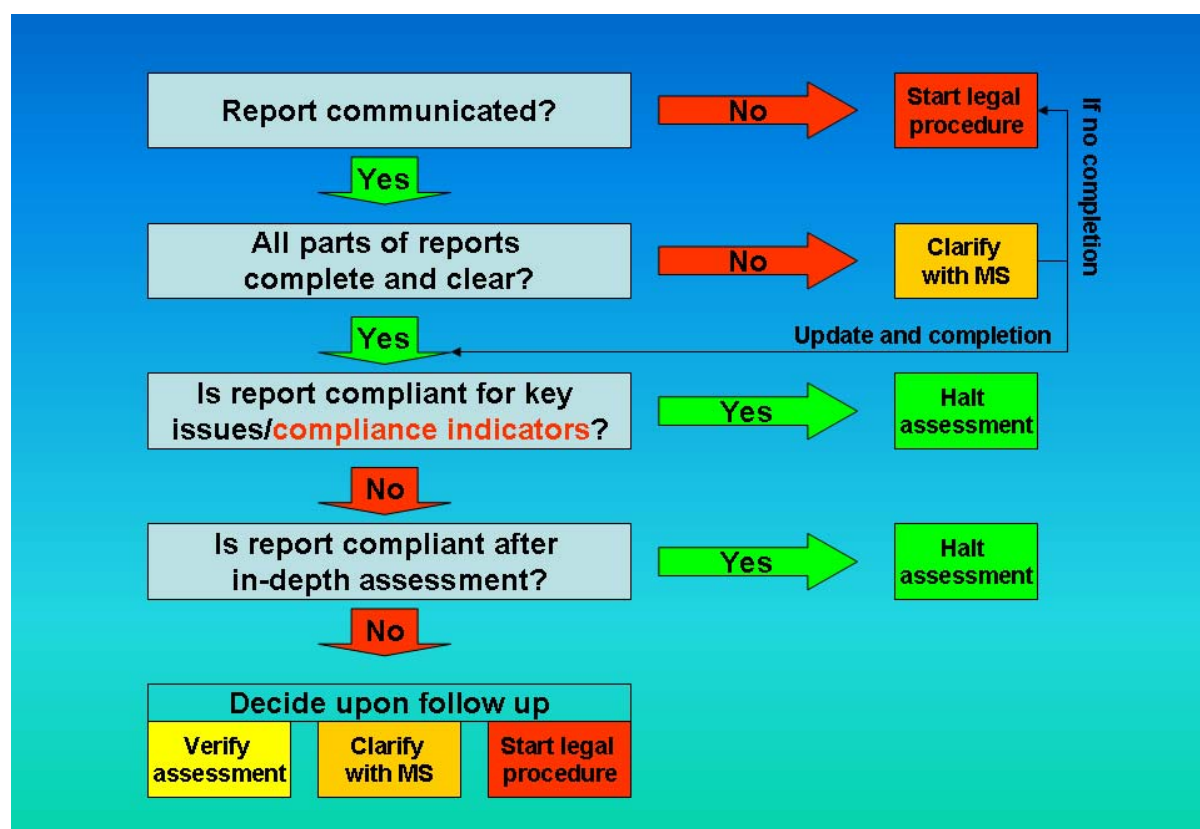
<sup>19</sup> See WFD Annex V, 2.4.3.

<sup>20</sup> Please note that these compliance indicators are not indicators of legal compliance, but rather serve as benchmarks to compare the implementation across the Member States.

The incorporation of informal feedback mechanisms follows the recommendations of the Commission Communication “A Europe of results – Applying Community law”<sup>21</sup> which promotes a closer cooperation between European Institutions and Member States in the implementation of EU policies – from the design of laws through the adoption process to the evaluation of results. The use of informal mechanisms helps preventing problems from arising, dealing more effectively with problems that have arisen and resolving identified infringements more quickly, while enhancing transparency and information exchange.

A number of considerations were taken into account in developing the methodology for compliance checking, amongst others: 1) the assessment has to be as objective and transparent as possible, 2) the methodology should allow the comparison of implementation efforts and expected results across Member States, and 3) strong quality assurance procedures have to be put in place to ensure a harmonised assessment across the EU.

The reports have been largely submitted through WISE using the European Environment Agency Central Data Repository (CDR) and compliance checking was done on the latest submission by the Member States. The cut-off date for consideration of submitted reports has been 31 October 2008. Reports submitted later than that date may have been taken into account only partially. Some Member States also uploaded reports into the CDR, provided links to further documents on their WISE reports or sent paper reports. These documents were also taken into account for the assessment.



**Figure 1 General approach to compliance checking**

<sup>21</sup> COM(2007) 502; see [http://ec.europa.eu/community\\_law/eulaw/pdf/com\\_2007\\_502\\_en.pdf](http://ec.europa.eu/community_law/eulaw/pdf/com_2007_502_en.pdf)

The first step was to check the *communication* of Member States' monitoring reports to the European Commission by the deadline of 22 March 2007.

The submitted information was then subject to an analysis of *completeness and clarity*. A feedback mechanism for the correction of errors and improving the completeness of the electronic submissions was led by the European Environment Agency (EEA) in direct contact with the data providers in Member States. This analytical quality control has proven very successful and has considerably improved the quality of the data.

It is important to note that the success of the compliance assessment strongly depends on the completeness and clarity of Member States' reports and this is true not only for the reports on Article 8, but also for those on Articles 3 and 5 as reports for the latter were also sources of information for the development of some of the compliance indicators. The Commission has based its assessment on the reports received. In some cases these may not fully reflect all information available in the Member State. Therefore, good reporting is a pre-requisite for a fair compliance assessment.

The format of the electronic reporting was developed by Working Group D Reporting of the WFD Common Implementation Strategy and endorsed by the Water Directors. Due to the need to keep the format flexible to adapt to the different approaches taken by different Member States and river basin districts, the final format is quite complex. This has complicated the compliance checking of the information, which has proven to be a difficult task. A contractor assisted the Commission in firstly developing a methodology to perform this task and then to carry out the assessment of the monitoring programmes. The contractor worked with a network of national consultants to be able to assess the Member States' reports in their national languages.

The conformity checking assessment of the Article 8 reports of Member States was guided by a structured questionnaire based on the following three questions: 1) Are the reports complete and clear? 2) Are the reports understandable? 3) Are the reports compliant with regard to key issues? Targeted questions were used to specifically address the monitoring requirements of Annex V WFD. The answers to the questions were standardised in order to allow a systematic analysis of the reports.

The following *key issues* were addressed in the compliance checking procedure:

1. Objectives of monitoring programmes

Question: Have the objectives in Annex 5 of WFD been taken into account in the design of the monitoring programme?

2. Comprehensiveness

Question: Are the monitoring programmes comprehensive?

3. Status of developments of methods

Question: Are the methods available for the assessment of water status?

4. Selection of quality elements

Question: Which quality elements are used for the assessment of water status?

5. Frequency of monitoring

Question: What is the temporal intensity of monitoring?

Methodologies as well as delivered data, e.g. number of monitoring stations, were analysed. The complete questionnaire is attached as **Annex 1**.

Based on the information provided by the Member States a number of *compliance indicators* were developed in order to visualise how the Member States have implemented the monitoring requirements and to allow a comparison across the 27 Member States of the European Union (EU27). In some cases, such indicators are simply numbers of monitoring stations reported, but some indicators are more complex e.g. showing the ratio of water bodies estimated to be at risk in the Article 5 analysis versus the number of operational monitoring sites reported under Article 8. In other cases, information provided on the development of methods or on the frequency of monitoring was used to assess the degree of compliance of the Member States' monitoring programmes with the WFD requirements. The interpretation of the figures should be done with care. Differences in the results of Member States may be due to differences in ambition and interpretation of the Directive's requirements but might also be due to differences in natural characteristics of the Member State (e.g. hydrological, geographic and climatic conditions) and type and intensity of human activities.

The results of the questionnaire mentioned above and the results of the compliance indicators were used by the Commission for the overall assessment of the monitoring programmes of each Member State. This summary information is provided in **Annex 2**.

#### **4. RESULTS OF THE ASSESSMENT OF MEMBER STATES' MONITORING PROGRAMMES**

##### **4.1. Communication and completeness of the reports**

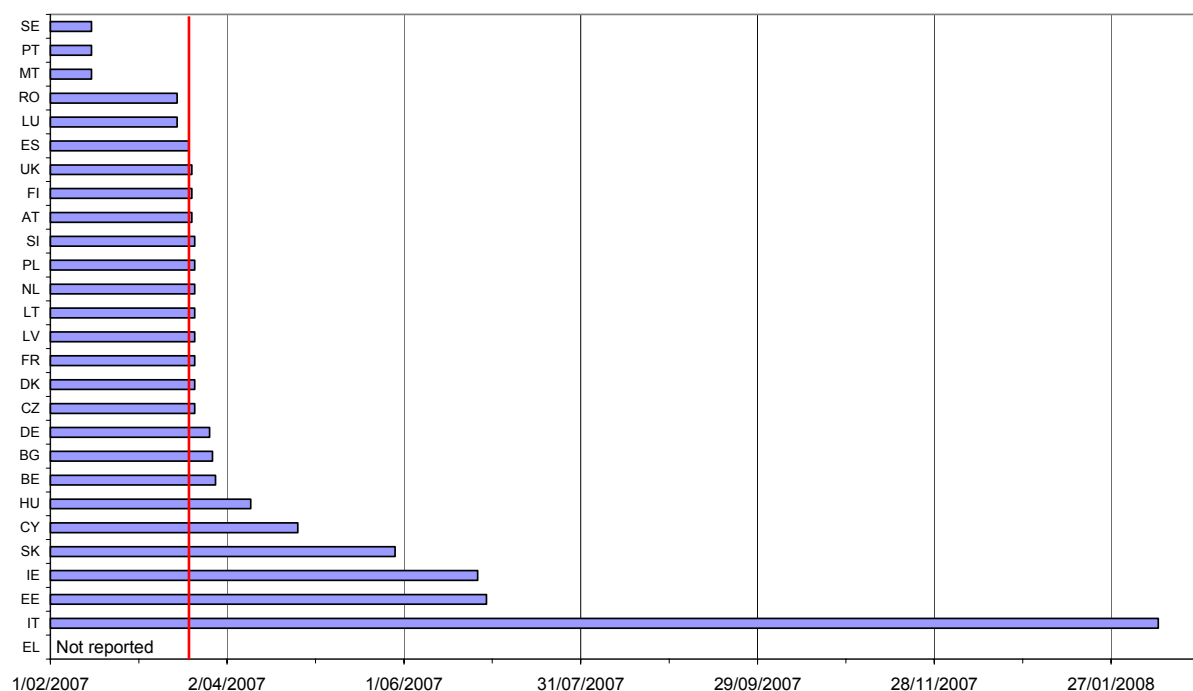
To date, 26 Member States have reported on the monitoring programmes designed under Article 8 WFD (see **Figure 2**). Greece has not reported. Malta has reported on its groundwater monitoring programmes only. The Commission has launched infringement procedures against Greece and Malta for this reason.

Portugal did not submit monitoring programmes for the islands Açores and Madeira. Spain did not submit monitoring programmes for surface waters for the Balears river basin district.

24 Member States reported electronically through WISE. Poland has reported electronically, but not in the agreed format. Malta has reported on paper only. Romania initially reported on paper, but has recently also submitted the relevant data electronically through WISE (January 2009); this information could not be assessed in the frame of this compliance checking exercise. Similarly, the updated information provided by Slovenia in January 2009 could not be considered in this report.

Overall, reporting into WISE has proven to be extremely useful.





**Figure 2** Date of reporting of the Member States on the implementation of Article 8; red line: reporting deadline (22 March 2007). Malta has only reported for groundwater.

#### 4.2. Overview of monitoring networks in the European Union

The monitoring reports of the Member States show that there are more than 50,000 WFD monitoring stations for surface waters and a similar number for groundwater (see **Table 5**). The numbers vary largely between Member States. This is in part related to differences in natural characteristics, population densities, types of water uses and exerted pressures, but different concepts in the design of the monitoring programmes also play a role and may influence these numbers.

**Maps 1 and 2** visualise the spread of monitoring sites across the European Union (see Chapter 4.3.2 for surface waters and Chapter 4.4.2 for groundwater).

**Table 5 Number of monitoring stations on surface waters and groundwater in EU27 (surv = surveillance monitoring, op = operational monitoring, quant = quantitative)<sup>22</sup>**

MS	rivers		lakes		transitional waters		coastal waters		groundwater		
	surv	op	surv	op	surv	op	surv	op	surv	op	quant
AT <sup>23</sup>	76	497	33	1	-	-	-	-	2012	247	3359
BE	127	673	10	36	13	21	4	5	454	140	288
BG	188	228	74	32	-	-	7	6	185	70	224
CY	19	12	10	1	-	-	7	1	84	69	84
CZ	111	835	27	76	-	-	-	-	462	462	670
DE	260	5728	68	585	7	7	34	70	5682	3979	8960
DK	728	748	263	265	0	0	34	51	858	858	123
EE	226	17	96	24	-	-	55	0	383	44	257
EL	No report										
ES	1986	700	239	101	316	15	1144	327	2067	662	2660
FI	73	40	92	15	-	-	51	48	180	84	181
FR	1581	2070	200	212	54	70	93	61	1742	1284	1634
HU	121	307	21	32	-	-	-	-	1742	0	1772
IE	191	2540	65	133	26	58	12	21	219	115	139
IT <sup>24</sup>	4714	4795	710	714	253	253	2540	2540	5705	5705	0
LT	498	532	178	126	-	-	-	-	237	0	74
LU	5	17	0	0	-	-	-	-	31	0	11
LV	33	88	30	42	10	2	14	4	77	0	57
MT	No report for surface waters								38	38	40
NL	74	227	70	224	18	18	26	16	1048	394	1004
PL	1218	1594	1288	53	17	19	16	7	918	115	804
PT	301	316	30	46	40	0	14	0	349	211	328
RO	1529	650	453	262	18	18	40	39	2500	1142	3363
SE	235	769	342	660	2	1	113	132	115	0	0
SI	48	200	4	15	-	-	4	5	128	30	139
SK	565	615	23	8	-	-	-	-	130	413	1507
UK	1418	10518	113	257	130	250	384	460	3673	3625	1289
<b>Total</b>	<b>16325</b>	<b>34716</b>	<b>4439</b>	<b>3920</b>	<b>904</b>	<b>732</b>	<b>4592</b>	<b>3793</b>	<b>31019</b>	<b>19687</b>	<b>28967</b>
<b>Total<sup>25</sup></b>	<b>43042</b>		<b>7154</b>		<b>1283</b>		<b>5831</b>		<b>34968</b>		<b>28967</b>
<b>Total surface water: 57310</b>									<b>Total Groundwater: 51446</b>		

<sup>22</sup> The numbers of the monitoring stations may not be identical with those provided for the Member States in Annex 2, since the numbers in this table were extracted from WISE whereas those in Annex 2 were updated by Member States in a consultation in January 2009.

<sup>23</sup> Includes only monitoring stations in water bodies with catchments larger than 100 km<sup>2</sup> (see Annex 2).

<sup>24</sup> Italy has not differentiated between surveillance and operational monitoring. Almost all stations serve both purposes. On 3 March 2009 Italy has provided new numbers of monitoring stations which are considerably lower than those shown here, but these have not been integrated in the assessment (compare Annex 2).

<sup>25</sup> The total number of monitoring stations is not the sum of surveillance and operational monitoring as some stations may serve both purposes and some stations that are neither surveillance nor operational. The same applies to groundwater chemical and quantitative stations.

### 4.3. Monitoring programmes on surface waters

#### 4.3.1. *Quality of the data provided*

The monitoring network required by WFD needs to be designed so as to provide a coherent and comprehensive overview of ecological and chemical status within each river basin district. On the basis of the characterisation and impact assessment of 2004 Member States were to establish a surveillance monitoring programme and an operational monitoring programme. In addition, information on investigative monitoring was to be provided.

The quality of the information reported in the Article 8 reports varied greatly and in many cases there was reliance on secondary reports (which were not always readily available). This made the assessment of the monitoring programmes difficult in many cases and led to the possibility of misinterpretation of information. On the other hand, some Member States provided very clear and detailed information on their monitoring programmes. Some of these positive examples are Austria, Czech Republic, Hungary and the Netherlands.

Different approaches have been taken in designing the monitoring programmes. The information was structured in monitoring programmes and sub-programmes. The monitoring programmes can cover more than one water category. The sub-programmes are water category specific. This structure was designed to be flexible to accommodate Member States needs and it has been used in very different ways. In general, most countries have set up separate programmes for surveillance and operational monitoring. In some cases, though, programmes have been reported to incorporate both types of monitoring.

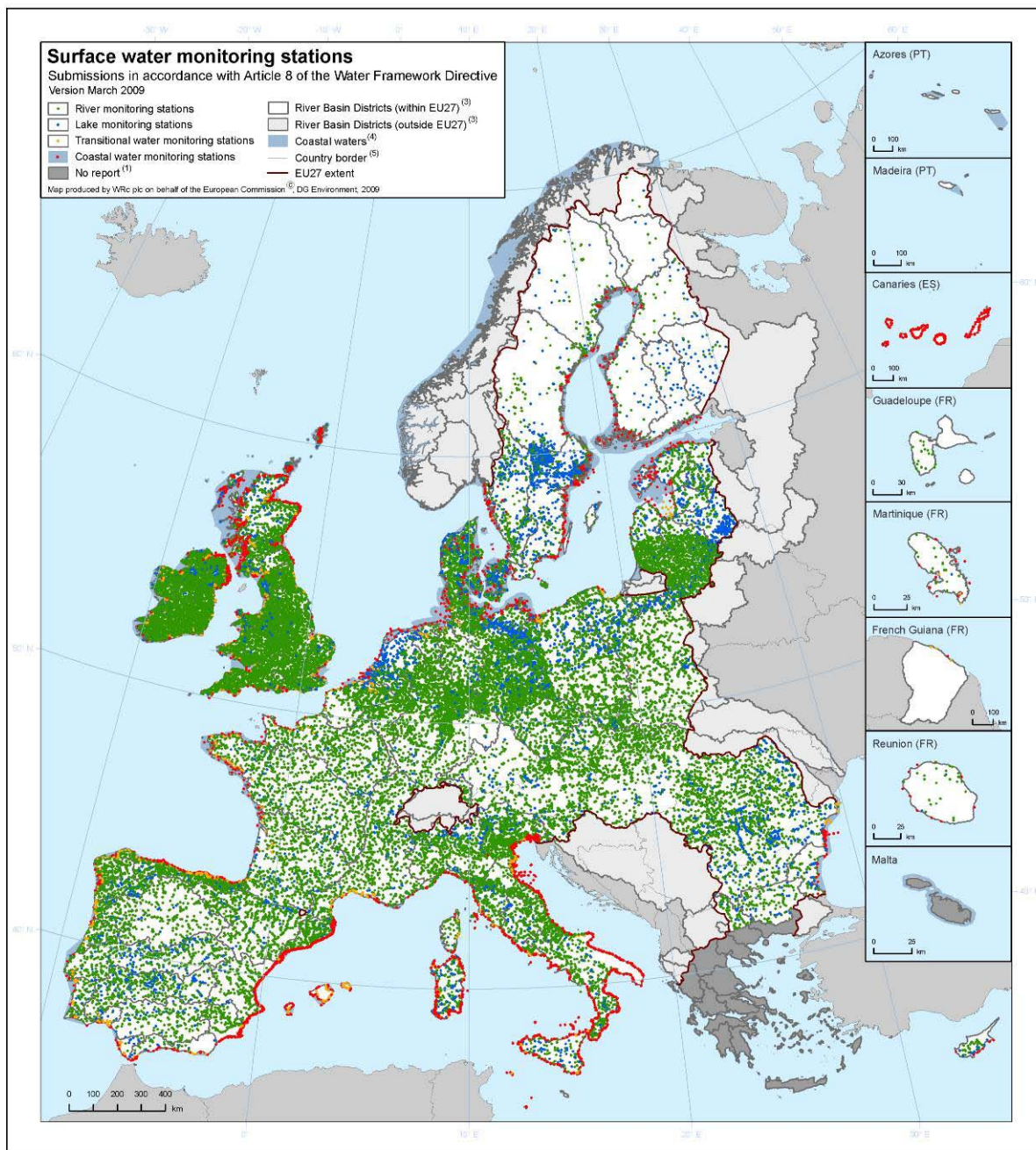
The most complex reporting have been the one from the UK, as sub-programmes were structured on the basis of water category and quality elements, resulting in a large number of sub-programmes. Spain also provided a high number of programmes and sub-programmes, structured on the basis of different purposes (assessment of long-term trends, monitoring of specific protected areas, etc.).

#### 4.3.2. *Overview of monitoring on surface waters*

**Map 1** gives an overview of the monitoring stations that have been reported by the Member States.

**Table 5** gives the number of monitoring stations for different kinds of monitoring in different water categories.

**Table 6** gives the total number of monitoring stations in rivers and lakes per 1000 km<sup>2</sup>. The figures provide a rough indication of the monitoring effort, although it should be taken into account that other factors like the selection of quality elements and the frequency of monitoring vary greatly between countries and have to be considered when comparing the efforts (see Annex 2 for country specific information). In addition, countries with long coastlines require, in general, more monitoring stations to achieve the same level of confidence due to larger number of river basins. Finally, it is expected that countries with higher levels of pressure and higher number of water bodies at risk of failing the WFD objectives would require more monitoring stations than those that present low levels of pressure. Even considering the uncertainties that these factors introduce, the average densities of monitoring stations in countries like UK and Ireland are significantly higher than the rest, while those for Finland, Bulgaria, Hungary and Sweden are significantly lower.



**Footnotes:**

(1) Greece has not reported on its monitoring programmes under Article 8.

(2) Malta has not reported on its surface water monitoring programmes under Article 8.

(3) The boundaries for all River Basin Districts are displayed using the WISE River Basin Districts dataset, available from the European Environment Agency:  
<http://dataservice.eea.europa.eu/dataservice/metadetails.asp?id=1041>.  
International and National River Basin Districts have been reported by EU Member States and Norway under Article 3 of the Water Framework Directive.

River catchments extending beyond the EU27 border have been derived from the Catchment Characterisation and Modelling (CCM) database, developed by the Joint Research Centre (JRC). The boundaries for the Danube International RBD were supplied by the International Commission for the Protection of the Danube River (ICPDR).

(4) Coastal waters are defined in the Water Framework Directive as extending 1 nautical mile from the coastline. However, some Member States have included a larger part of their coastal waters within the RBD boundaries.

(5) The country border data was provided by Eurostat and is derived from EGM at a scale of 1:3 million.

**Map 1 Overview of surface water monitoring stations in EU27**

**Table 6 Number of monitoring stations in rivers and lakes per 1000 km<sup>2</sup>**

Member State	Number of monitoring stations in rivers and lakes per 1000 km <sup>2</sup>
United Kingdom	47.7
Ireland	42.3
Belgium	23.8
Denmark	23.5
Lithuania	22.5
Germany	18.5
Italy	18.3
Slovakia	15.1
Czech Republic	12.2
Slovenia	11.9
Netherlands	11.4
Poland	11.3
Romania	8.4
Spain	7.8
Latvia	7.6
Portugal	7.5
Estonia	7.2
Austria <sup>26</sup>	7.0
Luxembourg	6.6
France	5.8
Cyprus	4.5
Sweden	4.4
Hungary	4.1
Bulgaria	4.1
Finland	0.6
Average (25 MS)	12.0

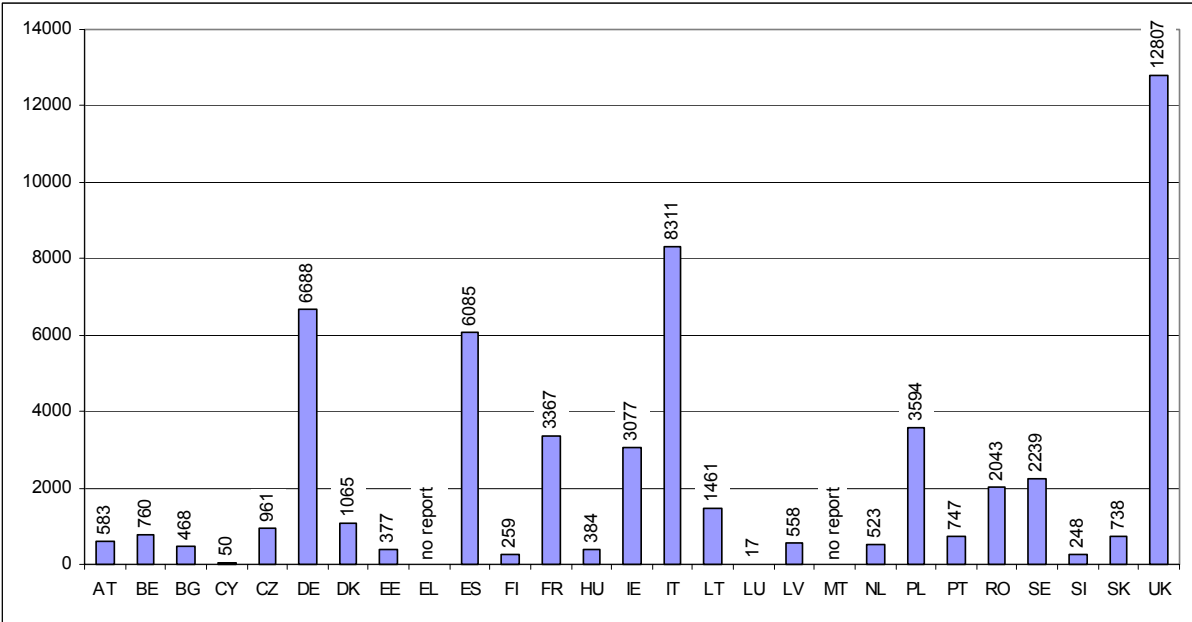
**Figure 3** shows the total number of surface water monitoring sites under the WFD. These numbers are largely influenced by the size of the country, but also illustrate the monitoring effort undertaken by each Member State in order to comply with the monitoring requirements of the WFD, with the highest number being shown by the United Kingdom with more than 12,000 monitoring sites. Also, Germany, Spain and Italy have very high numbers of monitoring stations for surface waters. In order to make numbers comparable, they have been standardised in the next figure.

**Figure 4** shows the number of surveillance and operational monitoring stations in rivers and lakes for each Member State, standardised per land area of 1000 km<sup>2</sup>. Although differences are expected due to the different situations in Member States, the graph shows such large variation which can only be explained by different concepts and understanding of the monitoring requirements in the WFD. For example, the number of surveillance monitoring stations in Estonia is 7 times the number of operational sites. In Germany, the opposite relationship is true and the number of operational monitoring stations is 18 times the number of surveillance sites. In some cases, e.g. Lithuania and Slovakia, the number of monitoring

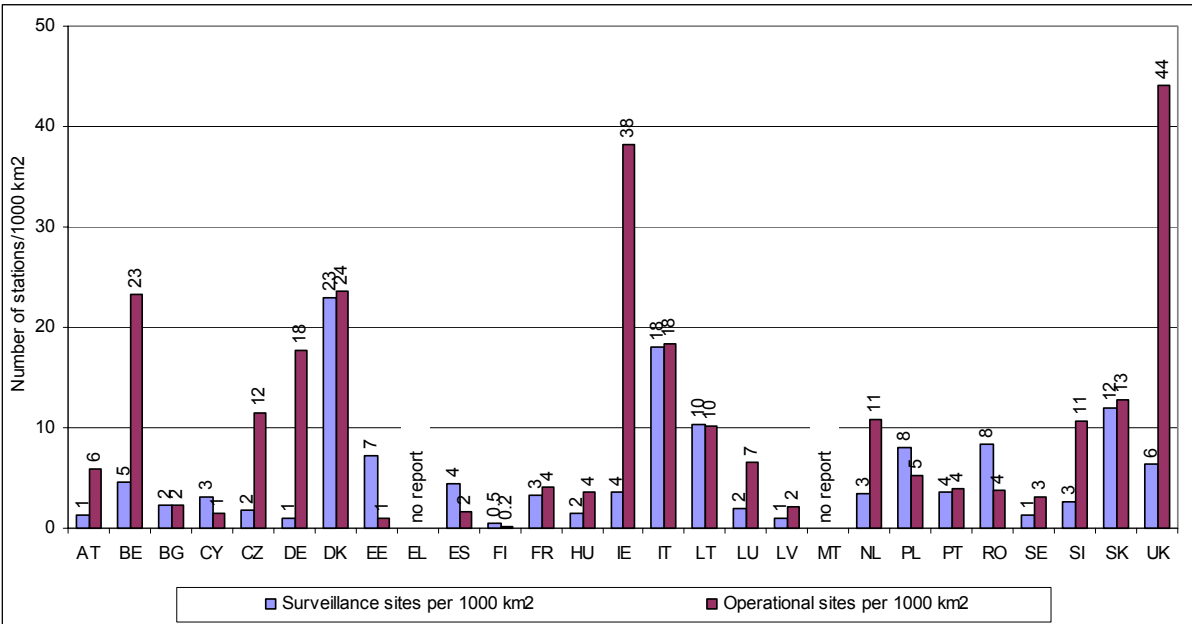
<sup>26</sup> Includes only monitoring stations in water bodies with catchments larger than 100 km<sup>2</sup> (see Annex 2). If the ca. 1500 stations foreseen for smaller water bodies are included in the calculation the ratio increases to 25 stations per 1000 km<sup>2</sup>.

stations for surveillance and operational monitoring are similar. In other cases (e.g. Denmark and Italy) monitoring programmes are reported to serve both for surveillance and operational monitoring, making it difficult to distinguish between the two types of monitoring and therefore to derive the indicators in a reliable way.

These examples indicate that the concept of setting up comprehensive monitoring programmes may have not been fully understood and that the interpretation of the WFD requirements is different across the Member States.



**Figure 3** Total number of monitoring sites on surface waters (rivers, lakes, transitional and coastal waters) in the EU Member States



**Figure 4** Number of surveillance and operational monitoring sites for rivers and lakes per 1000 km² area (some sites may be for both, surveillance and operational monitoring).

### 4.3.3. *Design of the monitoring programmes*

This section addresses the question whether the objectives in Annex 5 WFD have been taken into account in the design of the monitoring programmes for surveillance, operational and investigative monitoring. Furthermore, the analysis includes checking if the monitoring programmes are comprehensive, i.e. if the additional monitoring requirements for protected areas have been considered and if coordination of monitoring has taken place in the context of bilateral and/or international agreements in international river basin districts. For each type of monitoring programme the requirements have been checked in relation to the objectives, the selection of quality elements and the monitoring frequencies.

#### 4.3.3.1. **Surface water surveillance monitoring**

##### **Objectives**

According to Annex V WFD Member States have to establish surveillance monitoring programmes to provide information for supplementing and validating the impact assessment procedure, for the efficient and effective design of future monitoring programmes and for the assessment of long-term changes in natural conditions and those resulting from widespread anthropogenic activity.

Surveillance monitoring is carried out to provide an assessment of the overall surface water status within the river basin district. Surveillance monitoring needs to cover all biological, hydromorphological and general physico-chemical quality elements as well as priority list pollutants which are discharged in the river basin.

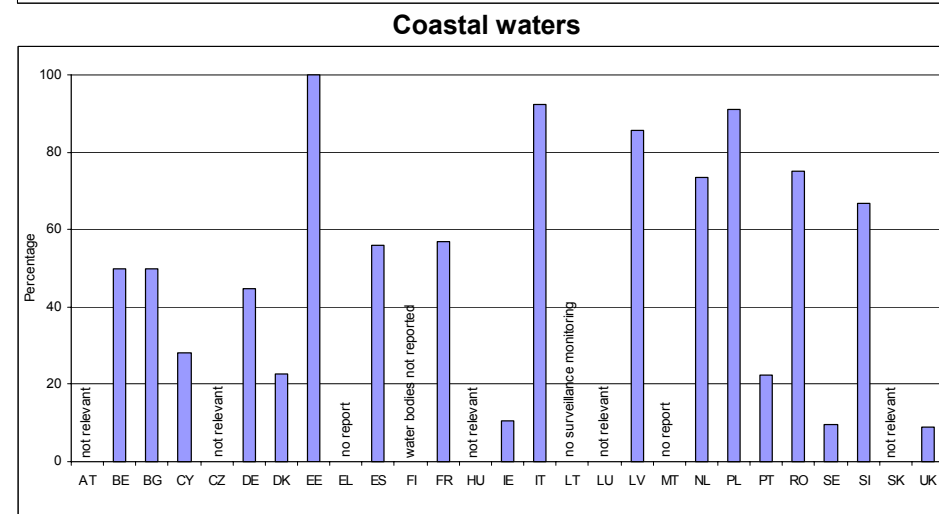
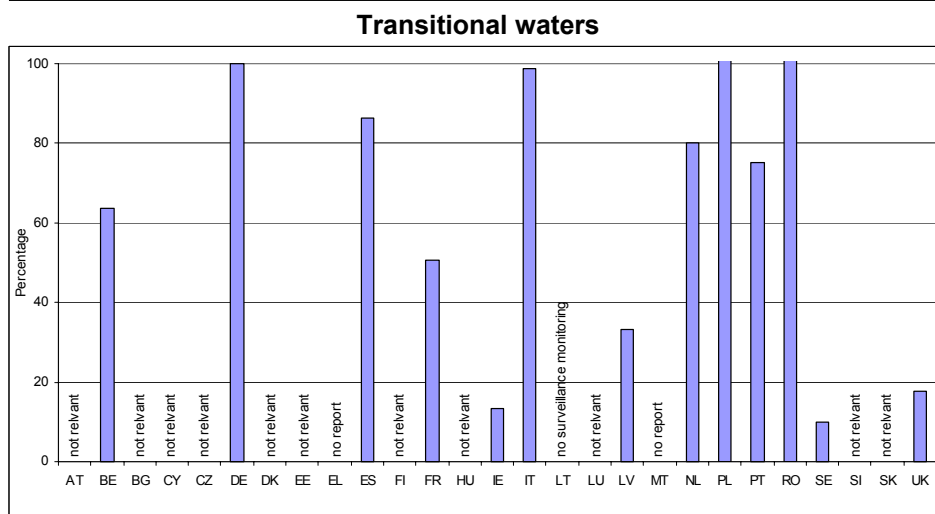
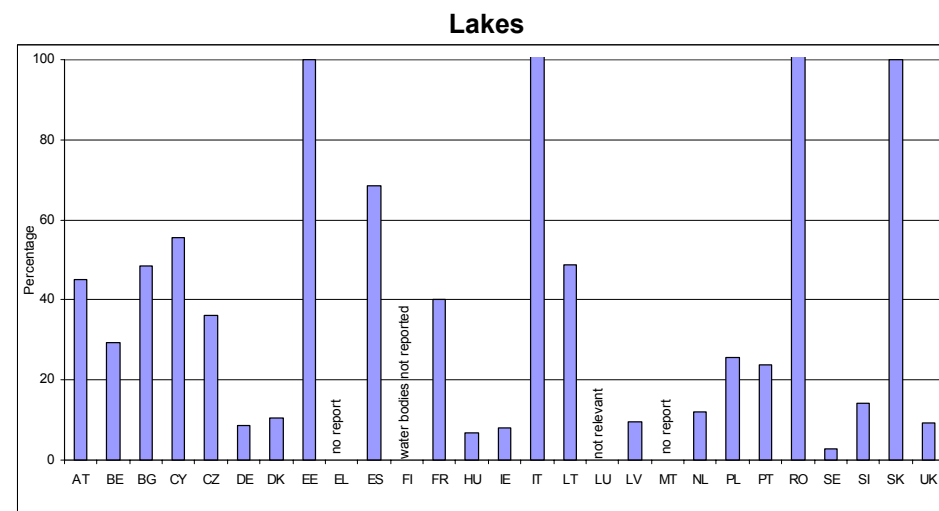
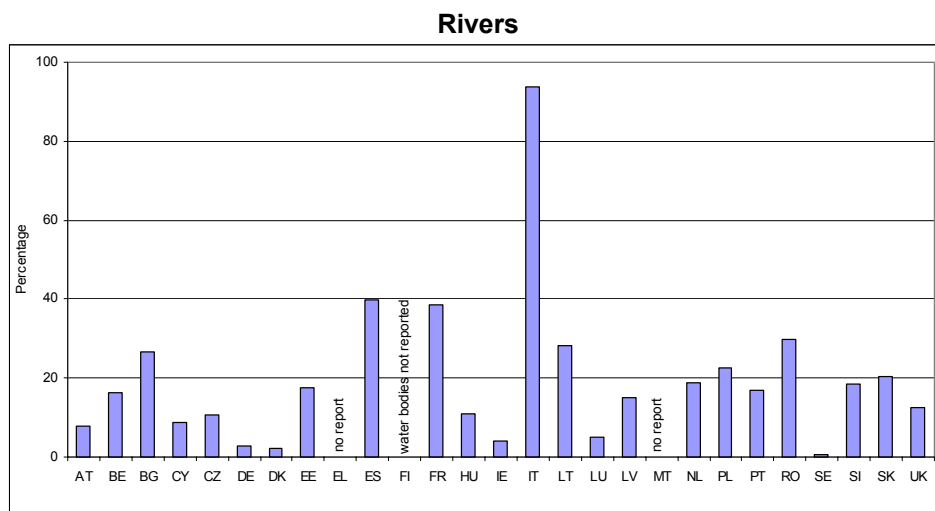
According to the Member States reports, the main objectives of surveillance monitoring have been explicitly incorporated into the programme design in about a third to one half of the programmes across the four water categories, but for a significant proportion of the river basin districts the information was not clear enough to make a judgement, and for some river basin districts there was no information reported at all. There were surveillance programmes reported for most but not all river basin districts (see **Annex 2** for country-specific information).

**Figure 5** shows the percentage of water bodies included into surveillance monitoring compared to the total number of water bodies for rivers, lakes, transitional and coastal waters. Results shown here indicate different approaches in the design of the surveillance monitoring programmes, but they are also influenced by how the Member States have delineated their water bodies, e.g. Member States with larger water bodies can easily reach higher percentages.

The report from Italy has not provided information on the design of the monitoring programmes. The report states that the regions have not provided the information. All monitoring programmes and stations are marked as both surveillance and monitoring. It would seem that the WFD monitoring programmes have not been set up yet and that the reported information reflects the existing monitoring practice.

Finland has not reported the codes of the water bodies in which the monitoring stations are located. Therefore, it was not possible to identify the number of water bodies that are monitored in each water category.

Lithuania has not established surveillance monitoring for transitional and coastal waters.

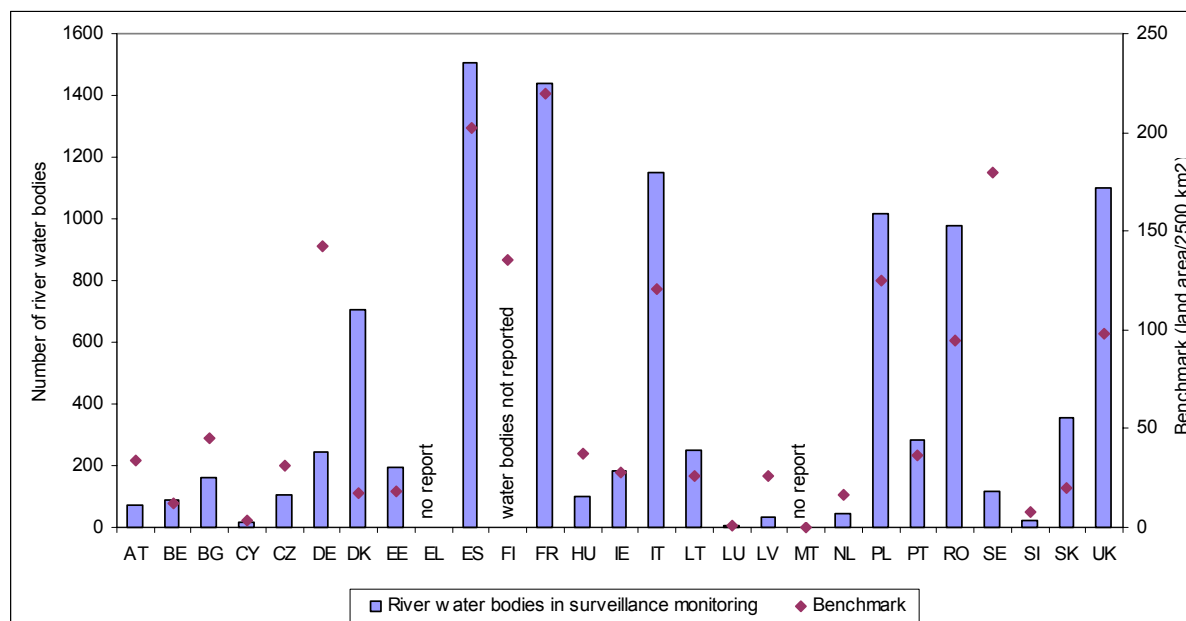


**Figure 5** Percentage of water bodies included in surveillance monitoring compared to total number of water bodies for rivers, lakes, transitional and coastal waters



**Figure 6** shows the number of river water bodies included in surveillance monitoring compared to a benchmark. The benchmark is derived from the criteria given in section 1.3.1 of Annex V of the Directive where the selection of monitoring points should include, where appropriate, points on large rivers where the catchment is greater than 2500 km<sup>2</sup>. The benchmark is the land area of a Member State divided by 2500 km<sup>2</sup> and gives an average value of how many surveillance monitoring points would be necessary if only this criterion were applied. The relevance of the benchmark depends on the hydrography of each country and therefore has to be interpreted with care, meaning that lower numbers do not necessarily represent a poorly designed network. Some countries such as Denmark, Spain, Poland, Romania and the United Kingdom show significantly higher numbers than the benchmark. The very low numbers for Finland and Sweden are likely influenced by the large areas in the North which are hardly populated.

According to WFD Annex V section 1.3.1, the surveillance monitoring network needs to be used to supplement and validate the results of the pressure and impact analysis. Surveillance monitoring should improve the knowledge about the pressure and impact relationship and hence improve the precision of the analysis. About half of the Member States included specifically this objective among the design criteria of surveillance monitoring in rivers and lakes but hardly any in the case of transitional and coastal waters. Similarly, there is very little information included on the criteria of selection of monitoring points according to WFD for transitional and coastal waters.



**Figure 6** Number of river water bodies included in surveillance monitoring. The diamonds indicate a benchmark calculated by dividing the area of each country by 2500 km<sup>2</sup> (inspired by WFD Annex V, 1.3.1)

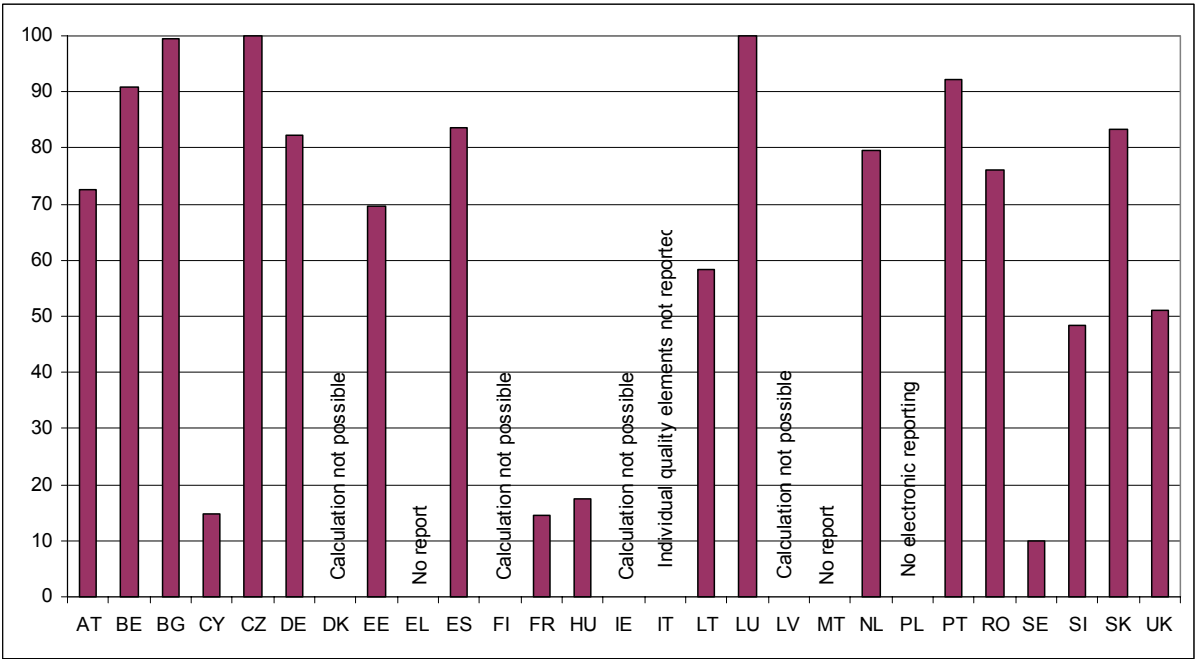
An additional purpose of surveillance monitoring is to detect long-term changes. For this purpose a network of water bodies in high status or in reference conditions needs to be established. A large majority of Member States addressed the need of assessing long-term changes in natural conditions and as well as changes resulting from widespread anthropogenic activity in rivers and lakes, but in many cases it was unclear how this was integrated in the

design of the monitoring programme. For transitional and coastal waters this information was often not provided.

### Selection of quality elements

According to WFD Annex V section 1.3.1, surveillance monitoring should be carried out for parameters indicative of all biological quality elements. **Figure 7** shows the percentage of surveillance monitoring sites in which all relevant biological quality elements are being monitored<sup>27</sup>. In the case of Denmark, Ireland and Latvia it was not possible to extract the information from the reports. Finland did not report the water bodies in which the monitoring stations are located. Poland did not report electronically and therefore the calculation was not possible. Italy reported all stations as surveillance monitoring, but did not indicate which quality elements are monitored in those sites.

Only Bulgaria, Czech Republic and Luxembourg are monitoring all biological quality elements across all stations in their surveillance monitoring network. For the remaining countries more or less large gaps appear. In how far this is related to incorrect or unclear reporting or incomplete implementation of the monitoring requirements cannot be assessed at the moment.



**Figure 7 Percentage of water bodies in surveillance monitoring in which all relevant biological quality elements are monitored<sup>28</sup>**

One of the key *supporting elements for ecological status* assessment in rivers is the rate of flow. **Table 7** shows the number of monitoring stations for quantitative monitoring of rivers in 19 EU Member States. Flow is usually reported to be monitored continuously.

<sup>27</sup> Given the fact that phytoplankton is not relevant in many European rivers, the calculation has been done without considering this quality element for rivers.

<sup>28</sup> In the case of DK, IE, IT and LV it was not possible to extract the information, because the data was not supplied at the station level; PL has not reported the relevant information electronically.

**Table 7 Number of monitoring stations for quantitative monitoring in rivers (data not available for all Member States)**

Member State	Number of monitoring stations	Density of monitoring stations per 1000 km <sup>2</sup>
AT	518	6.2
BE	207	6.8
BG	208	1.9
CZ	206	2.6
DE	708	2.0
DK	1166	27.1
EE	61	1.4
ES	2408	4.8
FI	118	0.3
FR	2240	4.1
HU	952	10.2
LT	1144	17.6
LU	4	1.5
NL	104	2.5
PT	396	4.3
RO	1031	4.3
SE	58	0.1
SI	102	5.0
SK	412	8.4
UK	2230	9.1

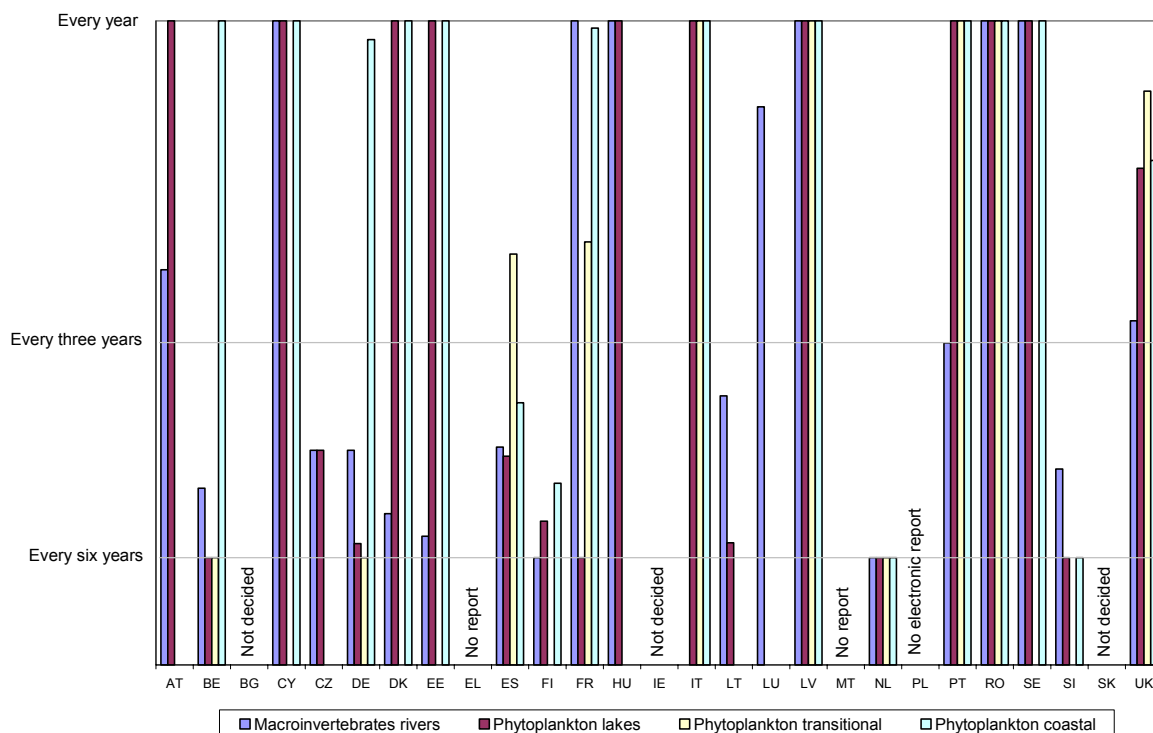
#### **Frequency of monitoring**

In general, the WFD requires that surveillance monitoring for biological quality elements is carried out at least once during the 6 year planning cycle.

**Figure 8** shows the reported monitoring cycle for selected biological quality elements. The monitoring cycle indicates at which interval monitoring is carried out (e.g. every year or every three years). The monitoring may involve one or more measuring events every year. In many cases the cycle varies between different monitoring sub-programmes for the same quality element and water category. In order to be able to show the average monitoring cycle for such quality elements, an indicator has been developed that takes into account the number of sites in each sub-programme. The indicator is calculated as the weighted average of the monitoring cycle using the number of sites of each sub-programme as the weight. This indicator provides an estimate of the average monitoring cycle for some selected quality elements.

The figure shows that in many cases Member States are monitoring more frequently than the minimum required by the WFD for surveillance monitoring (which is once every 6 years). Only the Netherlands, Flanders in Belgium and Guadalquivir and Canary Islands river basin districts in Spain apply strictly the minimum cycle required by the WFD for all the biological quality elements (including those not displayed in **Figure 8**). Finland also applies the minimum cycle for a large majority of the biological quality elements and river basin districts. The application of this minimum cycle does not follow the recommendations of the CIS guidance document on monitoring (see section 2.10.2 of the guidance) and it is not clear how some of the objectives of the surveillance monitoring, in particular those related to the assessment of long-term changes, can be accomplished with such long cycles of monitoring every 6 years.

Some Member States have not yet decided the monitoring cycle at which a quality element will be monitored for a number of reasons including the lack of historical data and experience in monitoring for some quality elements on which to determine an adequate monitoring frequency. In these cases Member States may undertake (more intensive) monitoring during the first year of the planning cycle after which future monitoring will be planned.



**Figure 8 Frequency of monitoring in surveillance monitoring for one selected biological quality element in each water category. Please note not all water categories are relevant in all countries.**

#### 4.3.3.2. Surface water operational monitoring

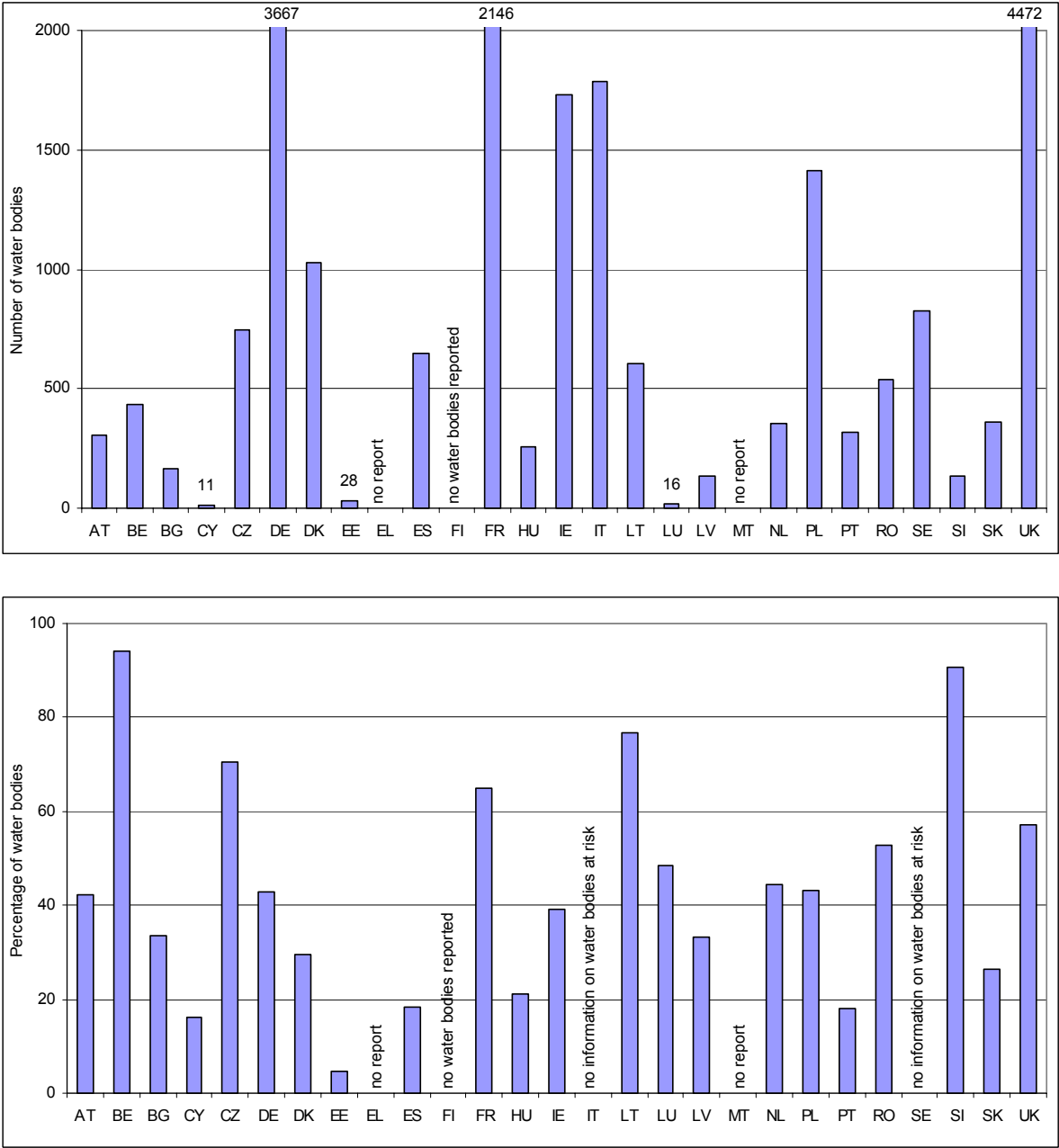
##### Objectives

In order to assess the magnitude and impact of the pressures Member States are obliged to monitor the following quality elements:

1. *parameters indicative of the biological quality element* or elements most sensitive to the pressures to which the water bodies are subject,
2. *all priority substances* discharged, and other pollutants discharged in significant quantities,
3. *parameters indicative of the hydromorphological quality element* most sensitive to the pressure identified.

The deadline for starting operational monitoring was the 22 December 2006. For three quarters of river basin districts it was reported that the start of operational monitoring would not be delayed. For rivers and lakes, Bulgaria, France, Poland, Portugal and Slovakia reported that operational monitoring will start later than December 2006. France and Poland have not started operational monitoring on transitional waters. For coastal waters, Belgium, Bulgaria, France and Poland reported that operational monitoring will start later. In most cases where monitoring was going to be delayed reasons for the delay were given. Reasons given

included: administrative and financial difficulties such as associated with upgrading monitoring; lack of approved national methodologies and metrics for some quality elements; and waiting for finalisation of sites from the results of the first surveillance monitoring. Spain did not provide information on operational monitoring in coastal waters for almost half of their river basin districts (see **Annex 2**).



**Figure 9** Number of water bodies included in operational monitoring (top) and percentage of water bodies at risk or with insufficient information reported in the WFD article 5 pressure and impact analysis that are included in operational monitoring (bottom) (all water categories included) <sup>29</sup>

<sup>29</sup> Since Denmark is updating its delineation of water bodies to reduce its number to ca. 5000, the percentage of water bodies identified as being at risk in the Article 5 analysis was applied to this estimated number for the calculation of this indicator.

**Figure 9** shows the number of water bodies (top) and the percentage of water bodies (bottom) that have been identified as being at risk under the Article 5 assessment and that are now monitored under operational monitoring. These two indicators visualise to which degree the operational monitoring programmes respond to the risk assessment made in 2004, yet these numbers may not always be precise for a number of reasons. The numbers of water bodies at risk used for the calculation of this indicator are those that were consulted with the Member States in February/March 2007, but in several Member States the delineation of water bodies has been modified since then. Also, the results of the risk assessment may have changed as more information on the pressures and impacts has become available and the category "possibly at risk" or "insufficient information" has been resolved. Furthermore, Member States may have adapted their operational monitoring programmes as the first WFD-compliant assessment results have come in, resulting in either lower or higher numbers of water bodies needing operational monitoring. Therefore, the numbers used may not be precise, but should still be suitable to give an overall picture of the relationship between the risk assessment and operational monitoring.

At first glance the percentages of water bodies at risk that are included in operational monitoring appear to be quite low, especially in some Member States. One of the main objectives of the operational monitoring is to assess the status of those water bodies that have been identified as being at risk. The WFD allows grouping of water bodies that are subject to diffuse sources or hydromorphological pressures as long as sufficient water bodies are monitored within a group to provide an accurate assessment of status. The status of water bodies that are not monitored has to be inferred or extrapolated from the results for the other water bodies in the group. The more water bodies are monitored, the higher confidence can be achieved in the status results<sup>30</sup>. Given the lack of information provided in the reports on the estimated confidence and precision of the monitoring results, it is difficult to assess whether figures as low as 20-30% of water bodies at risk that are included in operational monitoring can achieve a reasonable level of confidence to serve as a reliable basis for decisions on measures. .

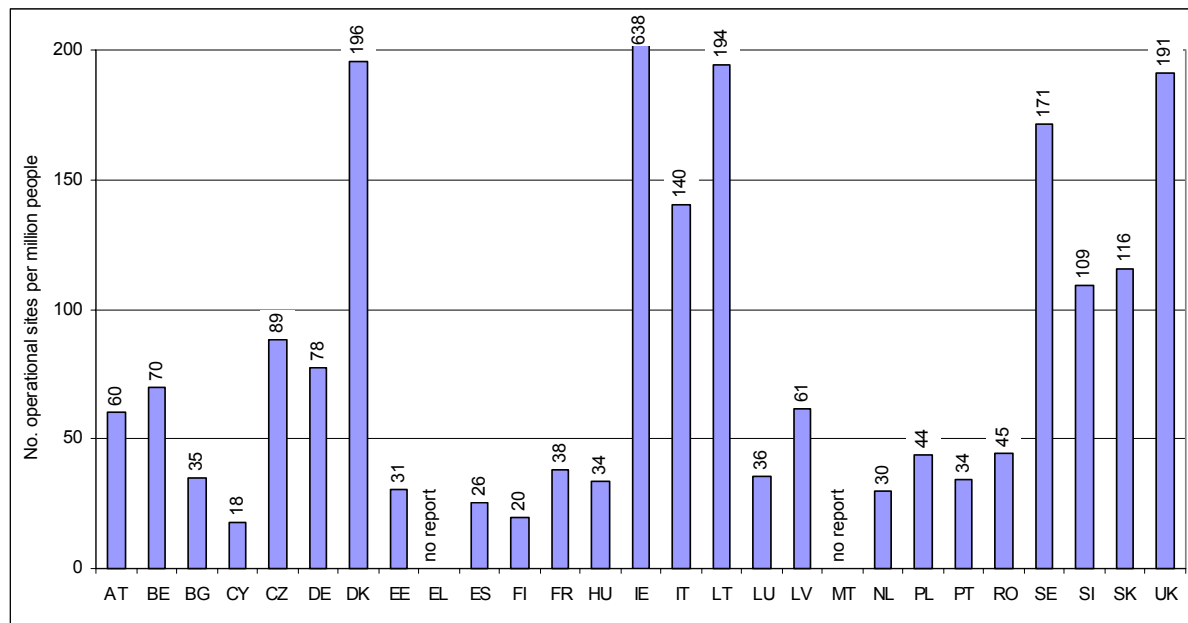
In general, pressures resulting from human activity can be linked to population density in the river basin district. Population can therefore be used as very rough surrogate of overall pressure, mainly related to urban wastewater discharges but also to other economic activities. **Figure 10** presents the number of operational monitoring sites in relation to population for each Member State. Ireland shows very high numbers of operational monitoring sites indicating a remarkable effort in operational monitoring. Other countries with high numbers include Denmark, Lithuania, the United Kingdom and Sweden.

The figure gives a rough indication of the level of effort in operational monitoring but should be interpreted with care. The indicator has its limits as the same size of population can be related to different levels of industrial development or intensity of agriculture. The degree to which the Urban Wastewater Treatment Directive has been implemented in the Member State will have an influence on the number of water bodies at risk due to urban waste water discharges and therefore needing operational monitoring. In 2007 the 4th Commission

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<sup>30</sup> See summary of the key conclusions of the ECOSTAT Classification Workshop, held on 6-7 March 2008: [http://circa.europa.eu/Public/irc/jrc/jrc\\_eewai/library?l=/classification\\_workshop/classification\\_2008-05pd/ EN\\_1.0\\_&a=d](http://circa.europa.eu/Public/irc/jrc/jrc_eewai/library?l=/classification_workshop/classification_2008-05pd/ EN_1.0_&a=d)

Report<sup>31</sup> on the implementation of the Urban Waste Water Treatment Directive was published, covering EU15. According to this report Austria, Denmark and Germany are in full compliance with the requirements of the Urban Waste Water Treatment Directive. Consequently, it can be expected that the number of water bodies at risk due to urban waste water discharges in these countries will be comparatively lower and hence a lower number of operational monitoring sites would be needed in these countries.

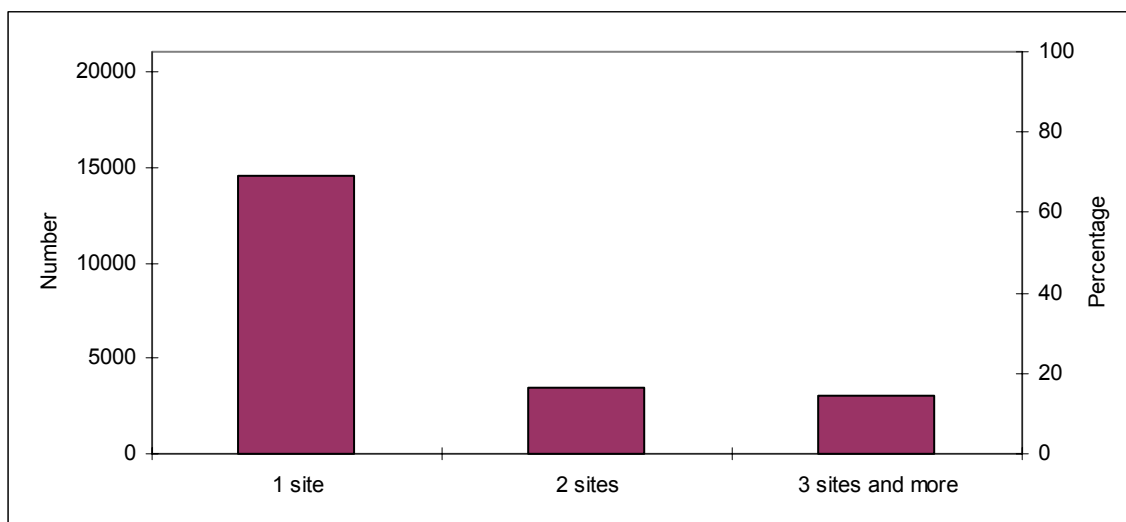


**Figure 10** Number of operational monitoring sites in relation to the population of the Member State; population is used as an indicator of the amount of potential pressure from human activity

For some water bodies several monitoring stations have been set up. **Figure 11** shows the number of monitoring sites for water bodies under operational monitoring. Most of the water bodies (70 %) are monitored at only one monitoring site, but about 15 % are monitored at two or more than two sites.

<sup>31</sup> 4<sup>th</sup> Commission Report on Implementation of the Urban Waste Water Treatment Directive. Commission Staff Working Document, Annex to the Communication from the Commission to the European Parliament and the Council 'Towards Sustainable Water Management in the European Union'. [COM(2007) 128 final, SEC(2007) 362]

[http://ec.europa.eu/environment/water/water-framework/implrep2007/pdf/sec\\_2007\\_0362\\_en.pdf](http://ec.europa.eu/environment/water/water-framework/implrep2007/pdf/sec_2007_0362_en.pdf)



**Figure 11** Number and percentage of surface water bodies with 1, 2, and 3 and more monitoring sites in operational monitoring

#### Selection of quality elements

Most Member States have established targeted monitoring programmes for *operational monitoring*. Many of the river basin district reports mention explicitly that their programmes for operational monitoring are targeted to the existing pressures by selecting the most sensitive biological quality element(s).

**Figure 12** presents an overview of the use of the different quality elements in different water categories in operational monitoring. The figures show the percentages of the total number of operational monitoring sites for each water category in which each biological quality element is measured. In some countries and some river basin districts the operational monitoring programmes are based on only one biological quality element in each water category. In these cases typically macroinvertebrates are monitored in rivers and phytoplankton in lakes and coastal waters. In most Member States more than one quality element is used in operational monitoring, in some cases in a systematic way in all sites. Some countries (e.g. the United Kingdom) show low percentages for the use of all biological quality elements, because there are operational monitoring sites that are monitored only for physico-chemical and/or hydromorphological parameters.

**Figure 13** shows the total number of sites monitored for each of the four biological quality elements. The quality element "other aquatic flora" includes macrophytes and phytobenthos in rivers and lakes, and macroalgae and angiosperms in transitional and coastal waters. This indicator can be interpreted to reflect the amount of effort invested by a Member State in certain types of monitoring.



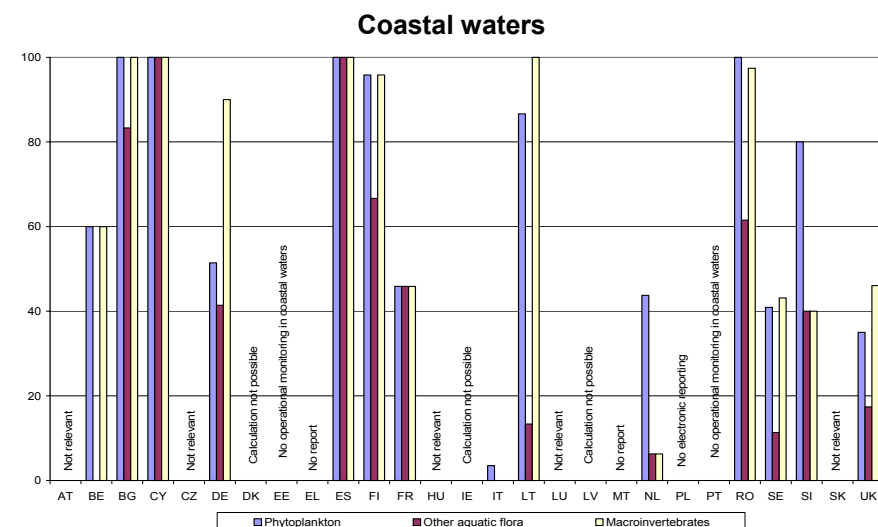
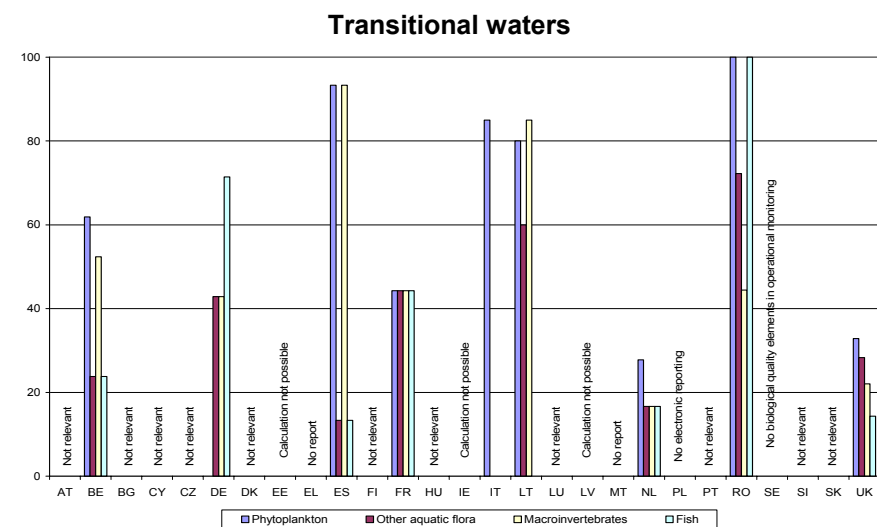
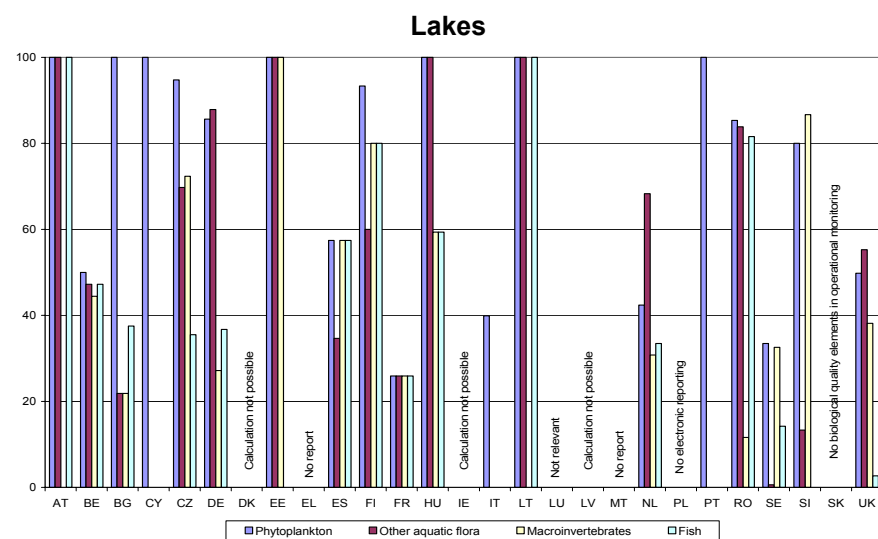
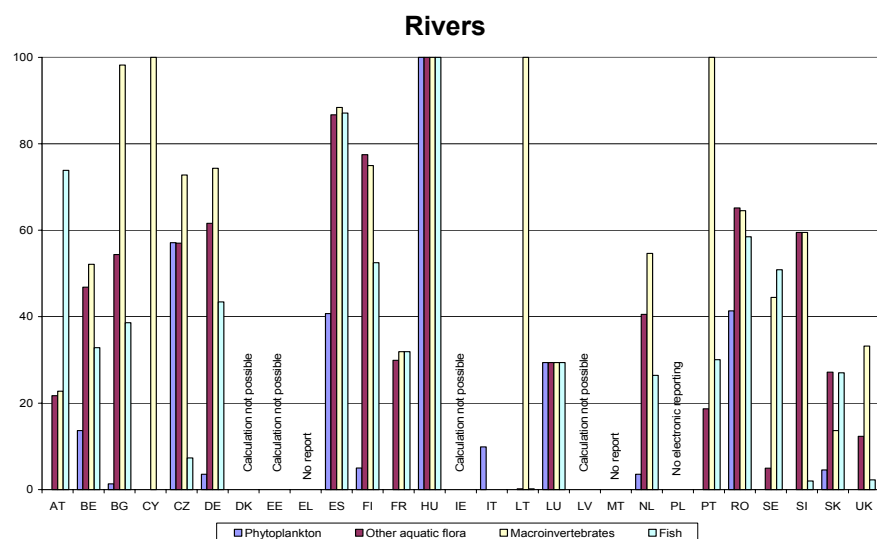
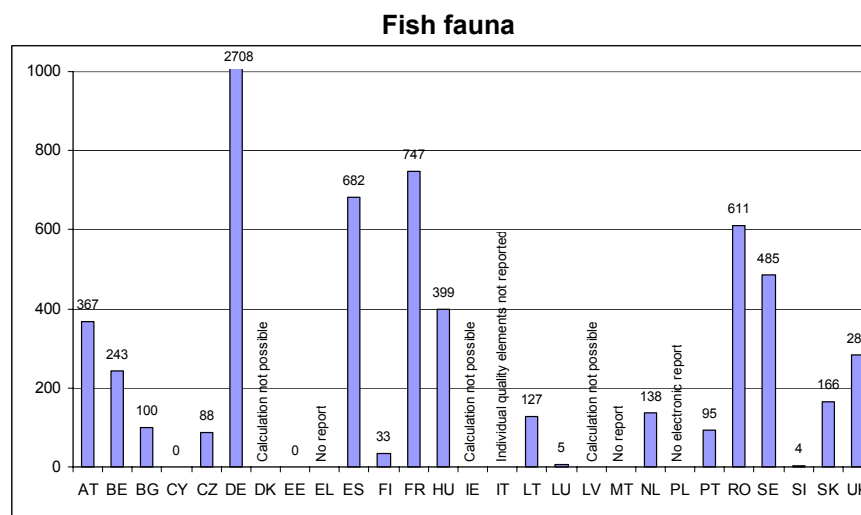
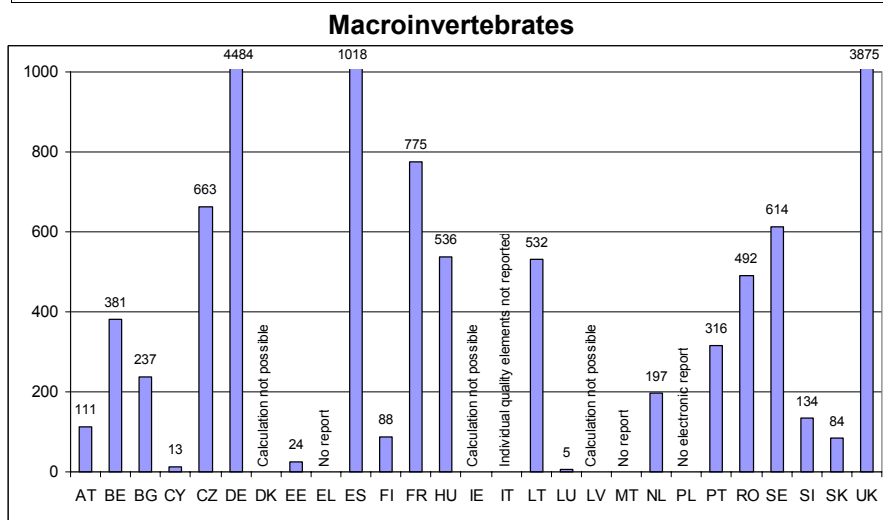
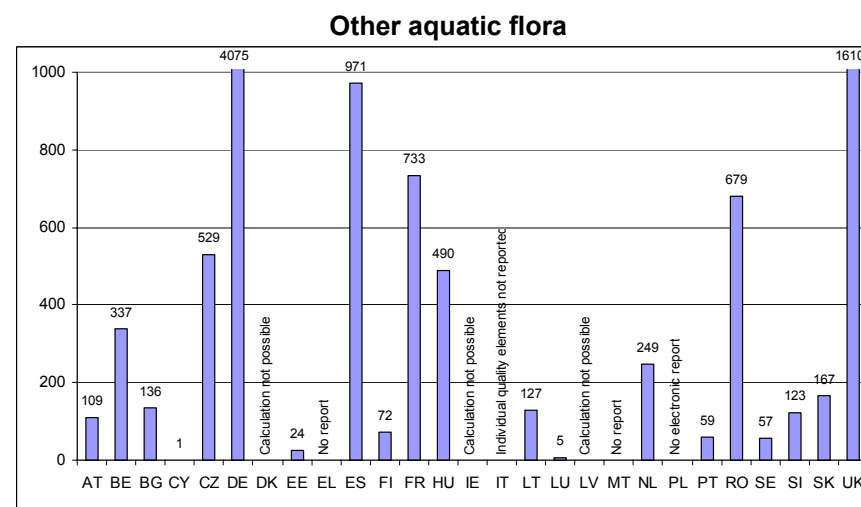
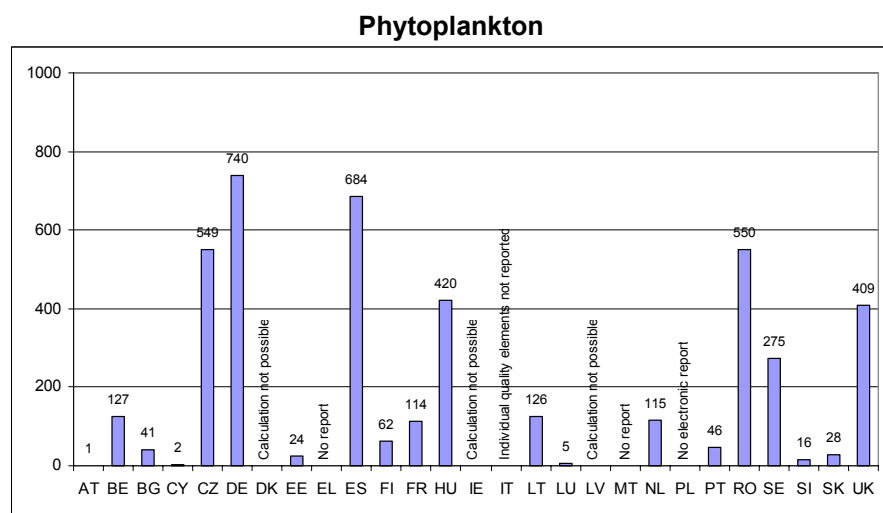
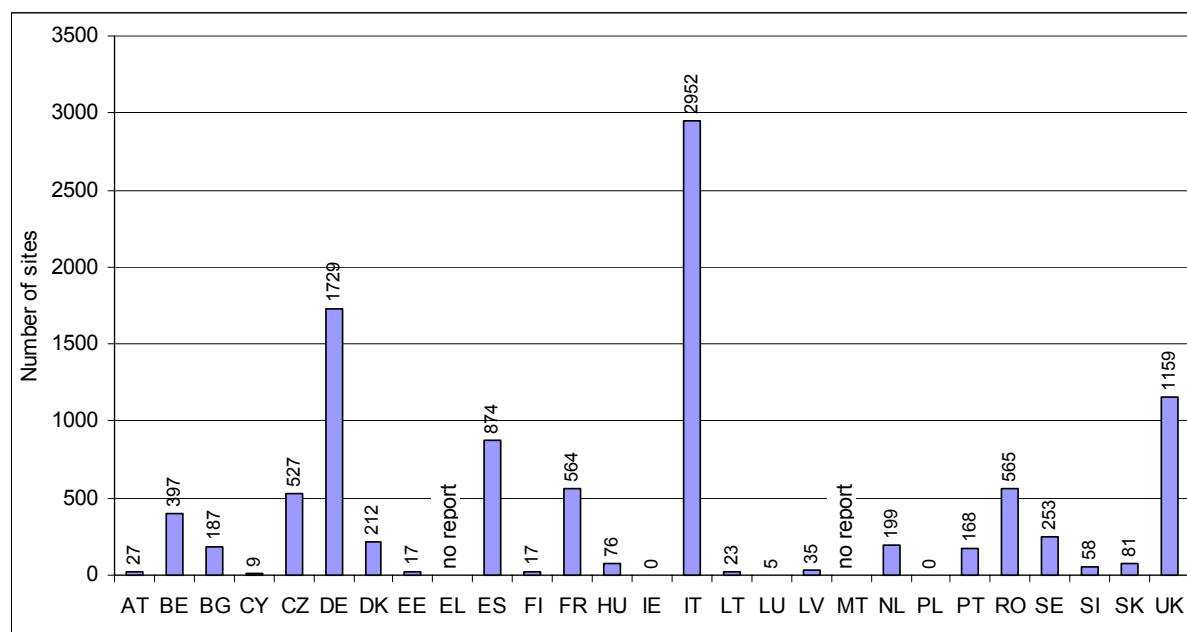


Figure 12 Percentage of operational monitoring stations, in which each of the four biological quality elements is measured



**Figure 13** Number of sites monitored for phytoplankton, other aquatic flora, macroinvertebrates, and fish in operational monitoring (includes all relevant water categories)

The number of monitoring stations in which priority substances are measured varies largely between Member States (see **Figure 14**).



**Figure 14** Number of water bodies monitored for priority substances in operational monitoring (includes all water categories)

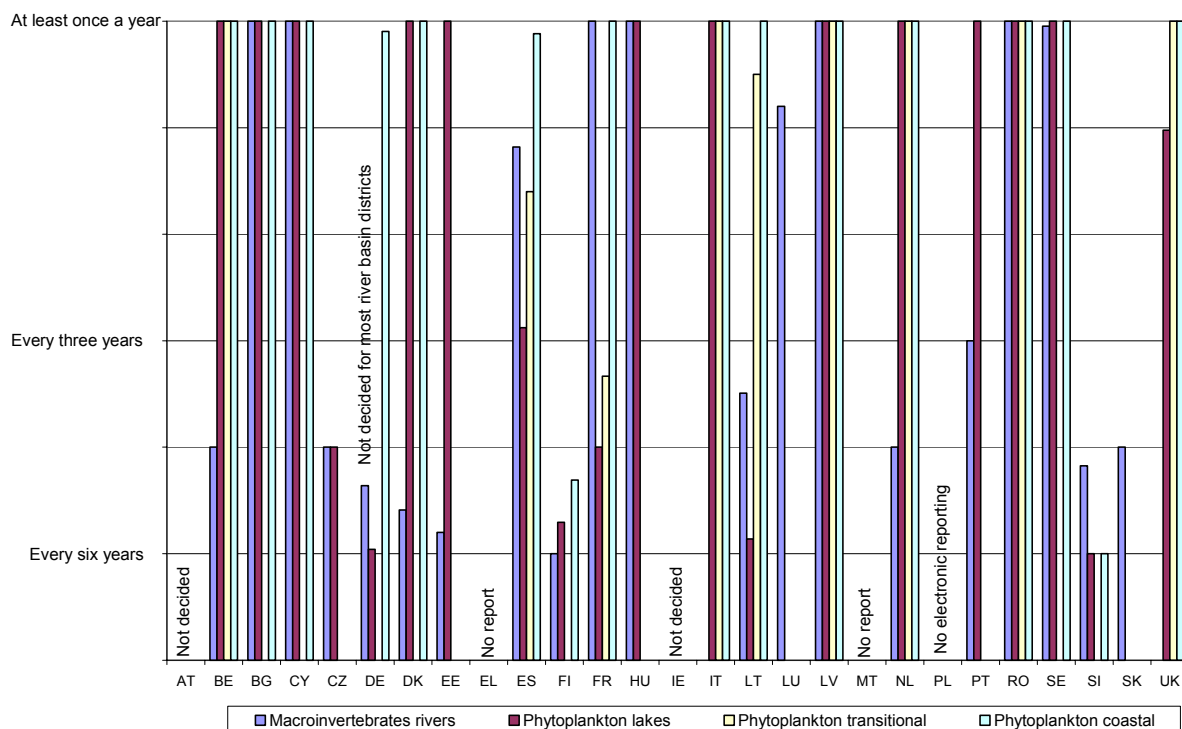
#### **Frequency of monitoring**

The WFD provides an indicative minimum monitoring frequency of once every 3 years for biological quality elements used in operational monitoring except for phytoplankton which is twice every year. Only about half of the river basin districts show monitoring frequencies at the minimum required by the Directive or above. Some Member States have not yet decided at which frequency the quality elements will be monitored. This can be due to a number of reasons including the lack of historical data or lack of experience in monitoring some of these quality elements. Some Member States have indicated that they will undertake monitoring during the first year of the planning cycle after which future monitoring will be decided.

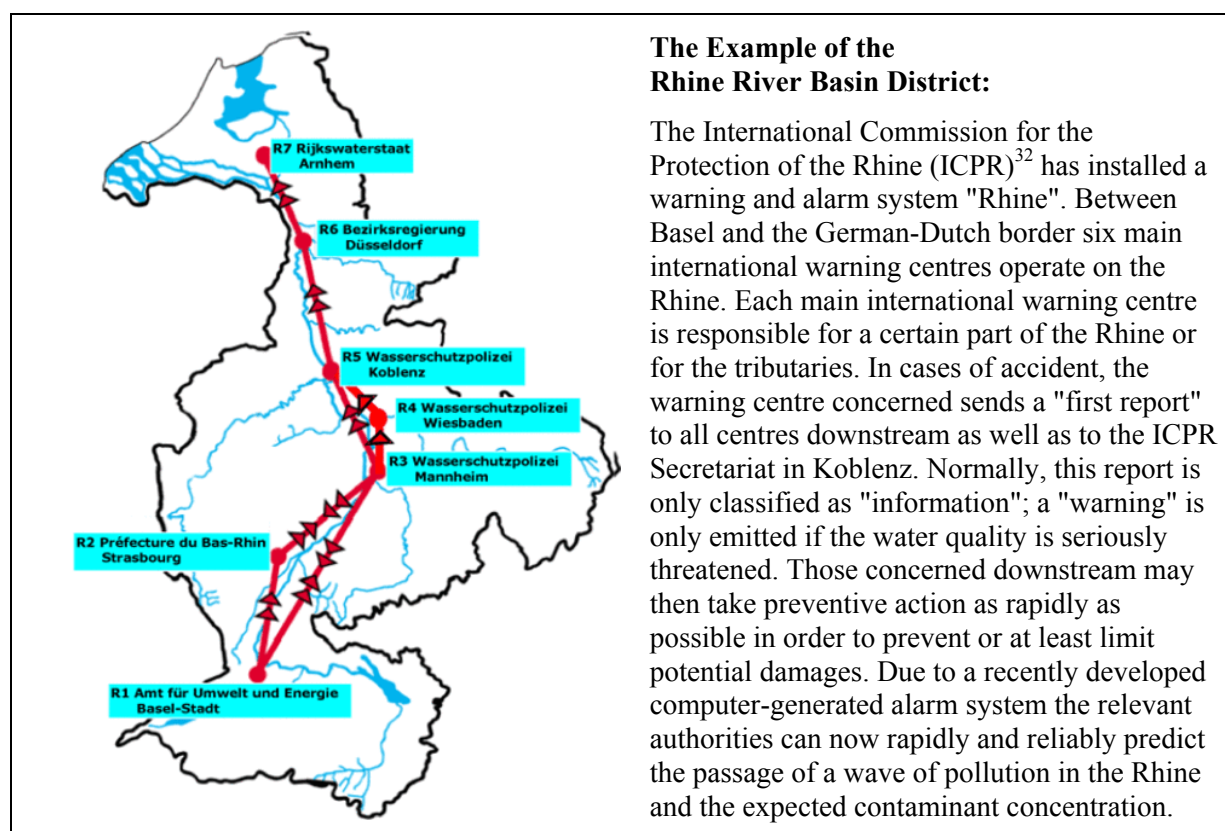
**Figure 15** is the equivalent to **Figure 8** for surveillance monitoring. It shows the calculated weighted average monitoring frequencies for selected biological quality elements for operational monitoring in the four water categories.

#### **4.3.3.3. Surface water investigative monitoring**

Over three quarters of the reported river basin districts indicated that there was a strategy in place for investigative monitoring. A few river basin districts provided some examples of specific incidents. These included: significant number of dead sea birds from suspected hazardous substances or toxins; kills of crabs/crayfish and a significant decrease in catches thought to be because of unusually high water temperatures; release of pollutants from the pulp and paper industry; acidification incidents causing fish kills; ammonia contamination; and cyanobacterial blooms in a reservoir. There were also examples provided on transboundary early warning and information system which play an important role in warning of oil or fuel spills.



**Figure 15** Frequency of monitoring in operational monitoring for one selected biological quality element in each water category. Please note not all water categories are relevant in all countries



<sup>32</sup> For more information see <http://www.iksr.org/>

#### 4.3.3.4. Additional monitoring of protected areas

The WFD requires carrying out additional monitoring in drinking water protected areas (bodies of surface water which provide more than 100 m<sup>3</sup>/day as an average) and in habitat and species protection areas. There is other related EU legislation existing requiring monitoring of other protected areas such as Bathing Water Directive (76/160/EEC), Nitrates Directive (91/676/EEC) and Urban Waste Water Treatment Directive (91/271/EEC). In addition, there are other protected areas that are currently monitored through directives that will be repealed by the WFD in 2013 (Fish Waters Directive 78/659/EEC and Shellfish Waters Directive 79/923/EEC) and therefore the monitoring of those protected areas should be taken over by the WFD. **Table 8** below presents the numbers of monitoring stations located in protected areas reported by Member States under the WFD.

It should be noted here that according to the format agreed by the Commission and the Member States, the monitoring of protected areas needs to be reported under WFD only if it has not been done under other Directives. Indeed, the Bathing Water Directive and the Nitrates Directive requires the reporting of monitoring stations. The same applies to the monitoring stations for the Fish Water and Shellfish Directives, which are reported according to the provisions of the Standardised Reporting Directive 91/692/EEC.

In addition, some Member States have opted for implementing the more stringent treatment of the Urban Waste Water Directive in their whole territory (Article 5.8 of Directive 91/271/EEC) and/or applying the action programmes of the Nitrates Directive in their whole territory (Article 3.5 of Directive 91/676/EEC). In these cases, the Member States are exempted from designation of protected areas (sensitive areas and/or vulnerable zones respectively) and the concept of additional monitoring stations in protected areas is not applicable. These cases are identified in **Table 8** as not applicable.

The case is different for the Habitats and Birds Directives, as there is no reporting of monitoring stations in water under the reporting obligations of these Directives. The same applies to the drinking water protected areas, as those are created specifically by the WFD.

For most of the river basin districts it was not clear or there was no information as to whether the requirements to monitor drinking water protected areas under had been taken into account. For most of the cases where they had been considered there were no specific sub-programmes established.

Two thirds of the Member States provided information on monitoring stations located in or associated with protected areas under the Birds and Habitats Directives.

#### 4.3.3.5. Information on monitoring under WISE - State of the Environment (SoE)

About two thirds of all river basin districts reported on sites within the WISE-SoE network (previously referred to as Eionet-Water). As for the international river basin districts, approximately half of them had sites in the SoE network.

**Table 8 Number of monitoring stations in protected areas defined under relevant EU legislation and reported under WFD. NA means not applicable<sup>33</sup>.**

Member state	Habitats and Birds Directive	Drinking Water Directive	Bathing Directive	Fish Waters Directive	Shellfish Waters Directive	Nitrates Directive	UWWT Directive
AT	105	49	33	149	NA	NA	NA
BE	161			67		147	NA
BG	261	13		53	3	23	263
CY	13	22	4	8		6	
CZ					NA		NA
DE	2184	733	317	933	17	NA	5673
DK						NA	NA
EE							NA
EL	No report						
ES	1489	788	421	249	5	315	416
FI	113	26	36	32			NA
FR	581	37	47	27	66	1261	1824
HU	115		30	23	NA	197	27
IE	1029	404	6	2	14	NA	130
IT	3509					1236	1694
LT					NA	NA	NA
LU	4	1		12		NA	NA
LV	261	94	35	187		55	NA
MT	No report					NA	
NL						NA	NA
PL	514		4	930		243	NA
PT							
RO	260	209		342		304	NA
SE							NA
SI						NA	
SK							NA
UK	1560	9	225	1792	345	1186	989
<b>Total</b>	<b>11899</b>	<b>2176</b>	<b>1158</b>	<b>4464</b>	<b>450</b>	<b>10713</b>	<b>12389</b>

#### 4.3.4. Status of the development of assessment methods

The *development of methods* for the assessment of ecological status is one of the key challenges of the Directive. The assessment systems need to be scientifically based and should respond to the different surface water types identified in the river basin. Before adoption of the Directive no Member States had assessments methods available that fulfilled all the requirements of the Directive. Many Member States have undertaken great efforts to develop these methods in time for the intercalibration exercise carried out in 2004/2005 and








<sup>33</sup> The numbers of the monitoring stations may not be identical with those provided for the Member States in Annex 2, since the numbers in this table were extracted from WISE whereas those in Annex 2 were updated by Member States in a consultation in January 2009.

filling the gaps in time for the official start of the monitoring programmes. Depending on the methods previously used in the Member State assessment methods for some biological quality elements have been developed sooner and others later. For some biological quality elements there has been a long tradition in using them for monitoring assessment. This is generally the case for benthic macroinvertebrates in rivers and for phytoplankton in lakes. For other quality elements, such as for fish, this tradition did not exist.

**Table 9 Overview of development of biological assessment methods in the Member States for all water categories (PP = phytoplankton, MP = macrophytes and phytobenthos, BI = benthic invertebrates, FI = fish fauna, MA = macro-algae and angiosperms)**

Member State	rivers				lakes				transitional waters				coastal waters		
	PP	MP	BI	FI	PP	MP	BI	FI	PP	MA	BI	FI	PP	MA	BI
AT									-	-	-	-	-	-	-
BE															
BG									-	-	-	-			
CY						-			-	-	-	-			
CZ									-	-	-	-	-	-	-
DE															
DK									-	-	-	-			
EE									-	-	-	-			
EL	No report														
ES															
FI									-	-	-	-			
FR															
HU									-	-	-	-	-	-	-
IE															
IT															
LT															
LU					-	-	-	-	-	-	-	-	-	-	-
LV															
MT	No report														
NL															
PL															
PT															
RO															
SE															
SI									-	-	-	-			
SK									-	-	-	-	-	-	-
UK															

### Legend:

	Method available
	Method under development or incomplete information
	Method not developed or no information
	Differences in river basin districts: methods partially available, partially under development or incomplete information
	Differences in river basin districts: methods partially under development, partially not developed or no information
	Differences in river basin districts: development of methods shows complete range from developed to undeveloped
	Not relevant

As can be seen from **Table 9** the biological assessment methods have not yet been developed in all Member States or in all river basin districts. For quite a large number of river basin districts there was either no information on the status of method development or the information was incomplete. In some cases information was available on the development of methods from sources other than the WFD article 8 report (e.g. web pages from river basin authorities), but these have not been systematically searched if they have not been reported. Therefore, the status of development of biological assessment methods might be better than is reflected here, but it was not possible to extract a clearer picture based on the information delivered. Please see **Annex 2** for river basin specific information.

No Member State has delivered complete information on the *level of confidence and precision* of the methods developed. About half of the Member States have at least delivered some information, but this is largely insufficient for the purpose of assessing confidence and precision in the biological assessment results. This is definitely an area where further progress is needed.

## 4.4. Monitoring programmes on groundwater

### 4.4.1. Quality of the data provided

Member States established programmes for the monitoring of water status in order to set up a coherent and comprehensive overview of water status within each river basin district. For groundwater such programmes cover monitoring of the chemical and quantitative status.

The information reported by the Member States was quite general in many cases and it relied heavily on secondary reports. In some cases it was also difficult to identify the relevant documents or the references given.

This made the assessment of the monitoring programmes difficult and led to the possibility of misinterpretation of the information. This has also restricted this assessment to general statements.

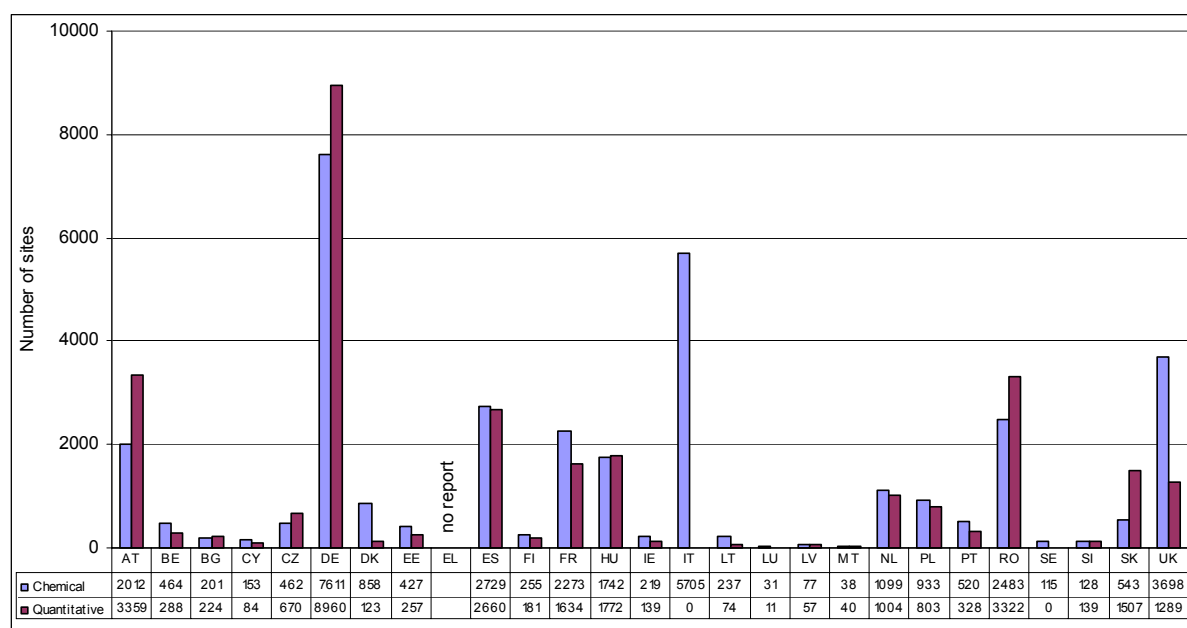
The WISE reporting for groundwater was structured in monitoring programmes. The purpose of this structure is to provide flexibility to the Member States to report according to their needs. Many Member States have reported separate monitoring programmes for chemical surveillance, chemical operational and quantitative monitoring. Still, quite a lot of programmes have been designed to cover more than one monitoring objective of the WFD. This has complicated the analysis of the information.



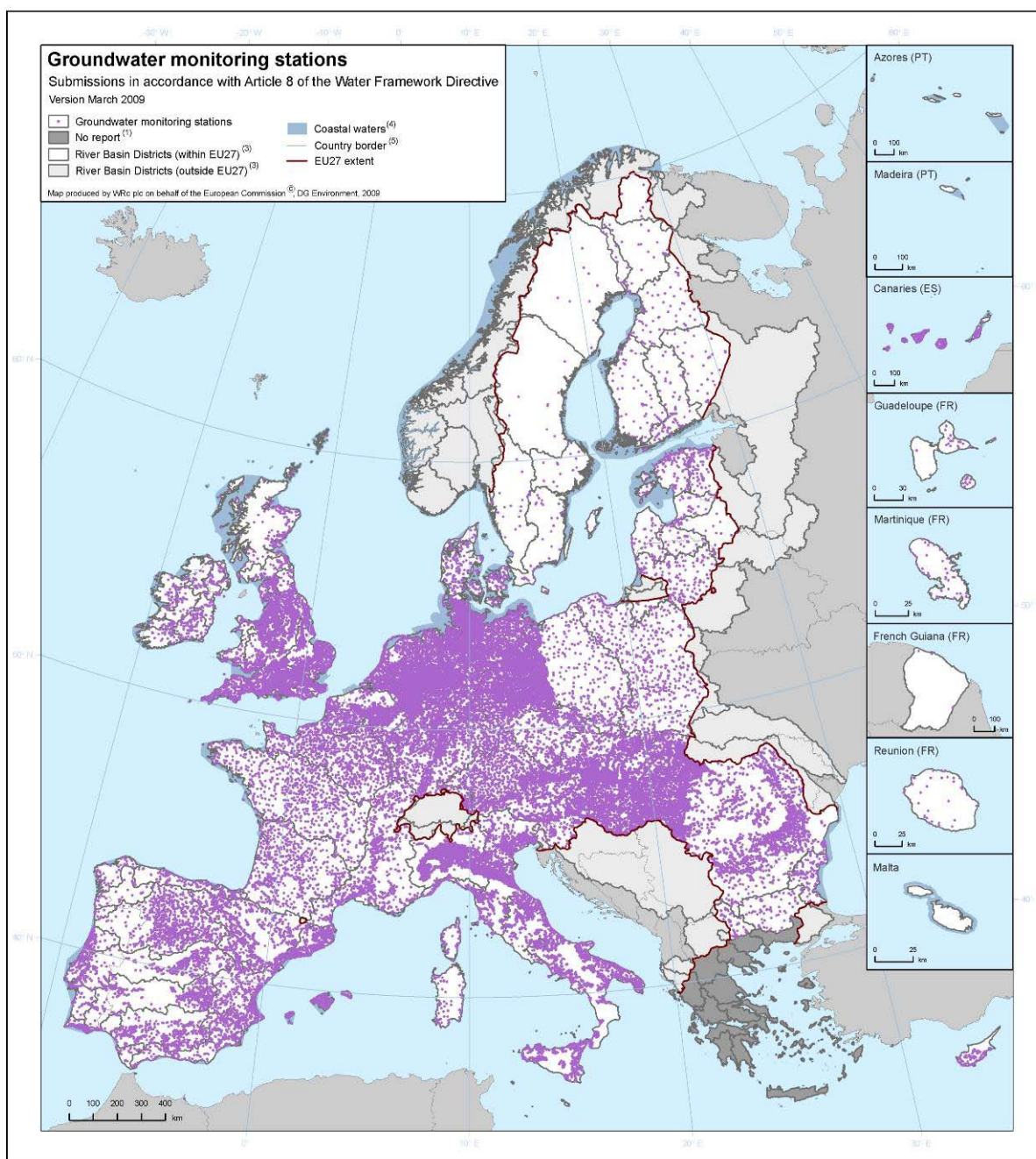
#### 4.4.2. Overview of monitoring on groundwater

**Map 2** gives an overview of the groundwater monitoring stations in EU27 showing quite a dense spread in central Europe and significantly fewer monitoring stations in the Northern countries. The map is a rough reflection of the usage of groundwater in Europe, with a trend to have denser networks in those areas, in which groundwater is used for drinking water or other purposes.

**Table 5** gives the numbers of groundwater monitoring stations in the Member States. **Figure 16** shows the number of monitoring stations for quantitative and for chemical groundwater monitoring. **Figure 17** shows the number of groundwater monitoring stations of Member States per 1000 km<sup>2</sup> area. Some stations are used for both quantitative and chemical monitoring. The figure indicates significant differences across Member States in the approach of establishing groundwater monitoring. It is difficult to compare all Member States, because the figure is highly influenced by the size of the countries, and the density of the network depends on the intensity of groundwater use and on the types of uses (e.g. more intensive monitoring may be needed in Member States where groundwater is used as a source of drinking water). There is a possibility, however, to compare Member States located in similar areas of Europe with similar use patterns.



**Figure 16** Total number of monitoring stations for quantitative and for chemical groundwater monitoring



**Footnotes:**

(1) Greece has not reported on its monitoring programmes under Article 8.

(2) Malta has not reported the locations of its groundwater monitoring stations.

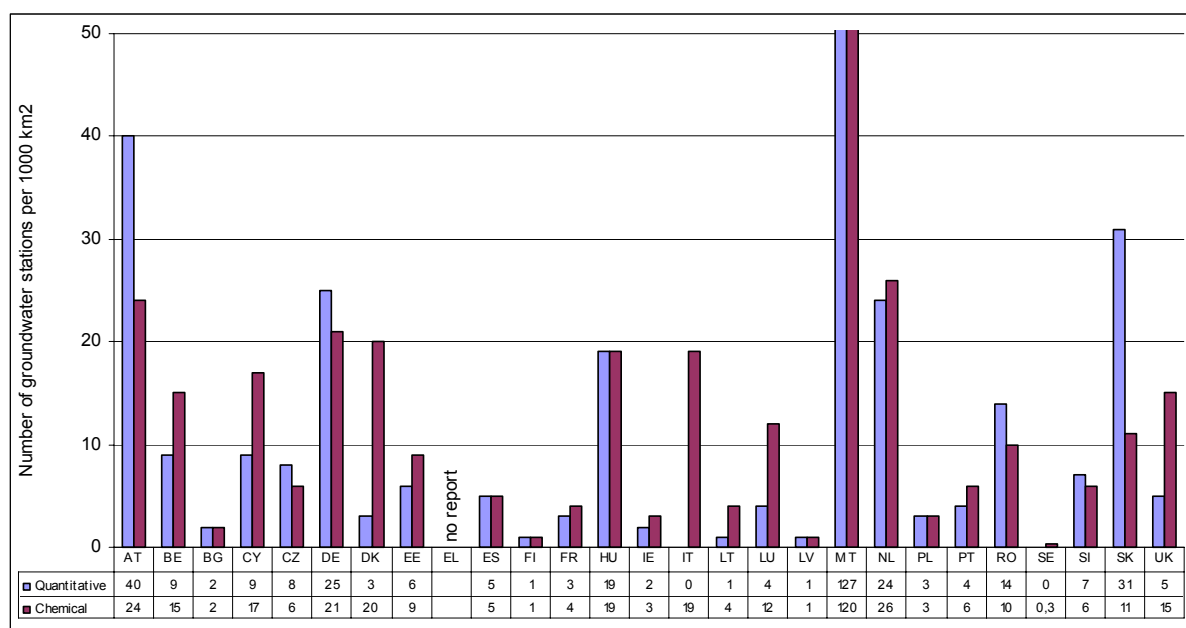
(3) The boundaries for all River Basin Districts are displayed using the WISE River Basin Districts dataset, available from the European Environment Agency: <http://dataservice.eea.europa.eu/dataservice/metadata/details.asp?id=1041>. International and National River Basin Districts have been reported by EU Member States and Norway under Article 3 of the Water Framework Directive.

River catchments extending beyond the EU27 border have been derived from the Catchment Characterisation and Modelling (CCM) database, developed by the Joint Research Centre (JRC). The boundaries for the Danube International RBD were supplied by the International Commission for the Protection of the Danube River (ICPDR).

(4) Coastal waters are defined in the Water Framework Directive as extending 1 nautical mile from the coastline. However, some Member States have included a larger part of their coastal waters within the RBD boundaries.

(5) The country border data was provided by Eurostat and is derived from EGM at a scale of 1:3 million.

**Map 2 Overview of groundwater monitoring stations in EU27**



**Figure 17 Number of groundwater monitoring stations per 1000 km<sup>2</sup> of Member State land area for quantitative and chemical monitoring**

#### 4.4.3. Design of the monitoring programmes

The monitoring network needs to be designed so as to provide a coherent and comprehensive overview of groundwater chemical status within each river basin and to detect the presence of long-term anthropogenically induced upward trends in pollutants. It also needs to be designed to provide a reliable assessment of the quantitative status of all groundwater bodies or groups of bodies including assessment of the available groundwater resource.

The majority of Member States have updated their existing monitoring programmes for groundwater to take into account the objectives of WFD. Several of them have, however, indicated that this process had not been completed and that new stations would be progressively added to their networks during the first management cycle.

Different approaches have been taken between Member States in designing monitoring programmes, but in general a comparable approach has been applied across each particular Member State. Even in Member States with a large number of river basin districts and known strong regional differences, in all but one Member States the reporting was centralised, and a harmonised approach seems to have been applied across the different river basin districts.

In the following chapters the question is addressed, if the objectives mentioned in Annex V WFD have been taken into account in the design of the monitoring programmes for quantitative monitoring, chemical surveillance and chemical operational monitoring. For each type of monitoring programme the requirements will be checked in relation to the objectives, the selection of parameters and the monitoring frequencies.

#### 4.4.3.1. Groundwater level monitoring (quantitative status)

##### Objective

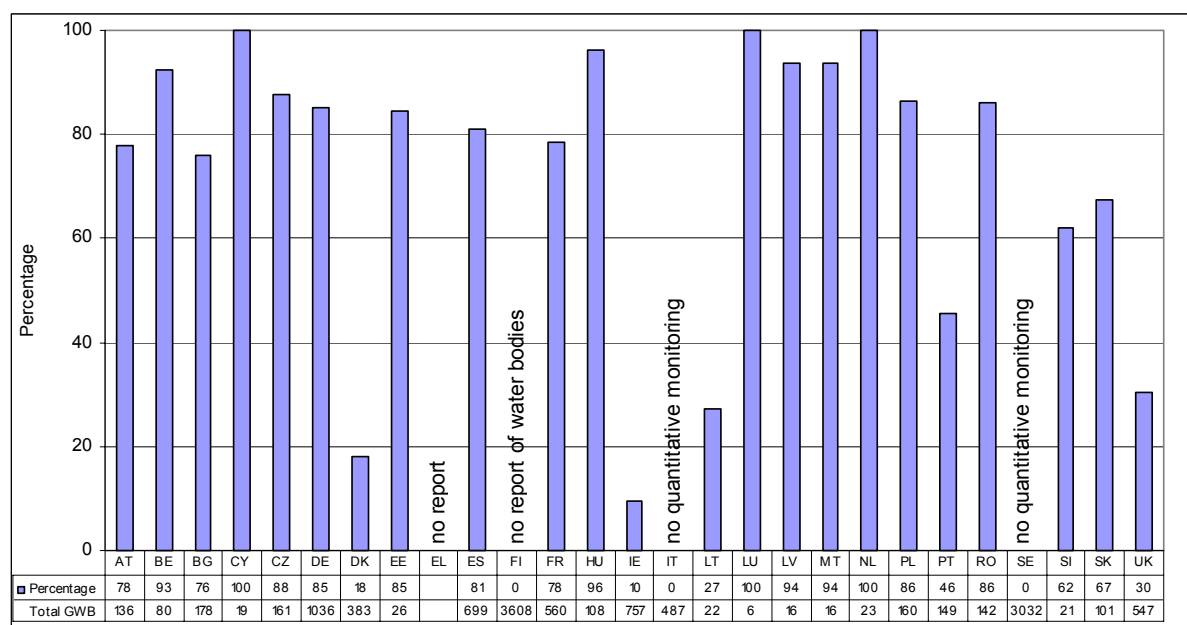
The groundwater quantitative monitoring network has to include sufficient representative monitoring points to estimate the groundwater level in each groundwater body or group of bodies taking into account short and long-term variations in recharge.

In most of the river basin districts there was a separate programme and network for quantitative assessment while in a few river basin districts/Member States programmes have been reported to incorporate both quantitative and surveillance monitoring. In a few river basin districts monitoring programmes were further divided into sub-programmes to cover specific objectives of the WFD or different methods or different parts of the river basin district. For a small number of river basin districts, no stations were reported to be part of a quantitative monitoring programme.

For most of the river basin districts the main objectives of quantitative monitoring were reported to be incorporated into the programme design. However, for a fifth of the river basin districts, information was not clear enough to make a judgement. In cases where information was clear, it was reported that the results of the validation of the pressure and impact analysis carried out in 2004 had been taken into account and had influenced the density of monitoring points and selection of parameters.

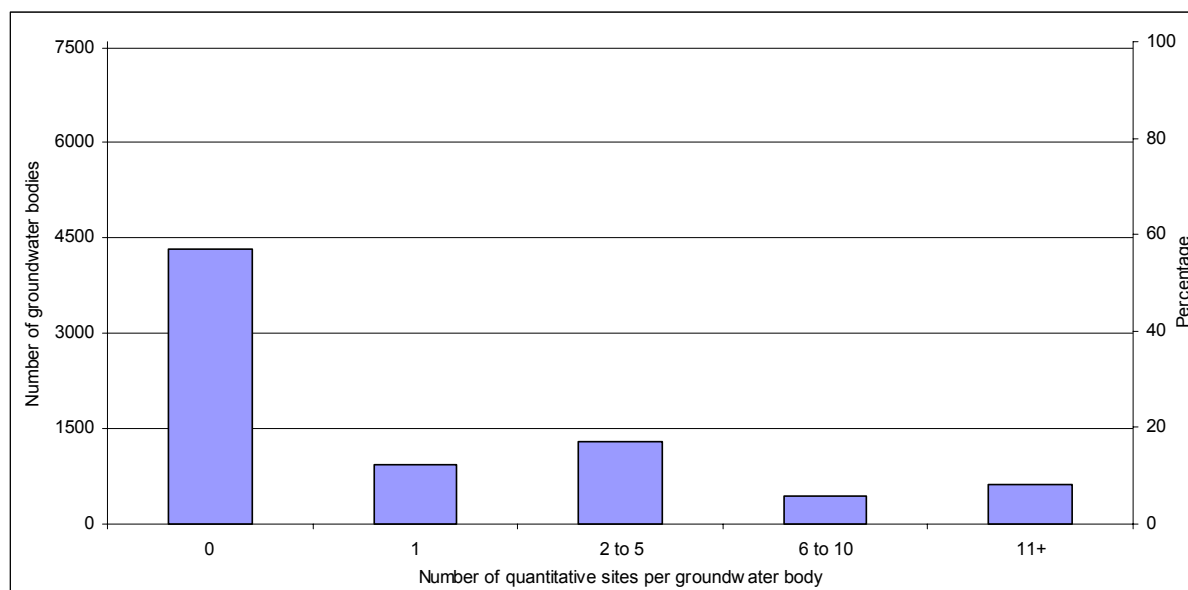
**Figure 18** shows that a very high percentage of European groundwater bodies is included in quantitative monitoring. It has to be mentioned that the percentage depends significantly on the delineation of groundwater bodies as some countries have performed a very detailed delineation resulting in a large number of groundwater bodies (e.g. Denmark, the Netherlands) and therefore the percentages of water bodies covered appear low even with similar (or higher) number of monitoring stations as other countries.

There is no groundwater quantitative monitoring reported by Italy and Sweden. Greece has not reported on monitoring programmes.



**Figure 18** Percentage of groundwater bodies included in quantitative monitoring

**Figure 19** shows the number and percentage of quantitative monitoring sites per groundwater body. Almost 60% of the groundwater bodies do not have quantitative monitoring. Of the groundwater bodies monitored almost three quarters have more than one monitoring site. This is partly, because groundwater bodies generally are of large extent.



**Figure 19** Number and percentage of groundwater bodies with 0, 1, 2-5, 6-10, and 11 and more monitoring sites for quantitative monitoring (data from 23 Member States)

### Frequency of monitoring

The WFD requires that the groundwater level monitoring is carried out in such a way that the frequency of observation is sufficient to allow assessment of groundwater quantitative status, taking into account short- and long-term variations in recharge and aquifer characteristics.

Almost 90 % of the river basin district reports indicated that quantitative monitoring will be carried out every year for the first planning cycle (see **Table 10**). The annual frequency varies greatly across river basin districts.

**Table 10 Overview of monitoring cycles for different types of groundwater monitoring. For chemical monitoring, only the cycle of core parameters is indicated. The number of sampling events per year varies and is not indicated. Not decided may mean that the cycle is decided only after the monitoring results of the first year are available.**

MS	Quantitative	Chemical surveillance	Chemical operational
AT	Every year	Every year	Every year
BE	Brussels: every year Wallonia: every year Flanders: not decided	Brussels: every year Wallonia: every 3 years Flanders: not decided	Brussels: every year Wallonia: every 3 years Flanders: not decided
BG	Every year	Not decided	Every year
CY	Every year	Every year	Every year
CZ	Every year	Every 3 years	Every 2 years
DE	Every year except Rhine (every 6 years) and Warnow/Peene (not decided)	In most river basin districts every year, except in three (every 3 years) and in Warnow/Peene (not reported)	In most river basin districts every year, except in one (every 4 years), in two (every 2 years) and in Warnow/Peene (not reported)
DK	Every year	Every year	Every year
EE	Every year	Every year	Every year
EL	No report	No report	No report
ES	Every year except Duero (not decided)	In most river basin districts every year, except in one (every 2 years and in two every 3 years)	In three river basin districts every year, in two not decided
FI	Every year	Not decided	Not decided
FR	Every year	Every year	Every year
HU	Every year	Every year	No operational monitoring
IE	Not decided	Not decided	Not decided
IT	No quantitative monitoring	Every year	Every year
LT	Every year	Every year	No operational monitoring
LU	Every year	Every year	No operational monitoring
LV	Every year	Every year	No operational monitoring
MT	Every year	Every 6 years	Every year
NL	Every year	Every 6 years	Every year
PL	Every year	Every 3 or 6 years	Every year
PT	Every year	Every year	Every year
RO	Every year	Every year and every 6 years, depending on the site	Every year
SE	No quantitative monitoring	Every year	No operational monitoring
SI	Every year	Every 6 years	Every year
SK	Every year	Not decided	Every year
UK	Every year except Northern Ireland (every three years)	Every year except Northern Ireland (not decided)	Every year except Northern Ireland (every three years)

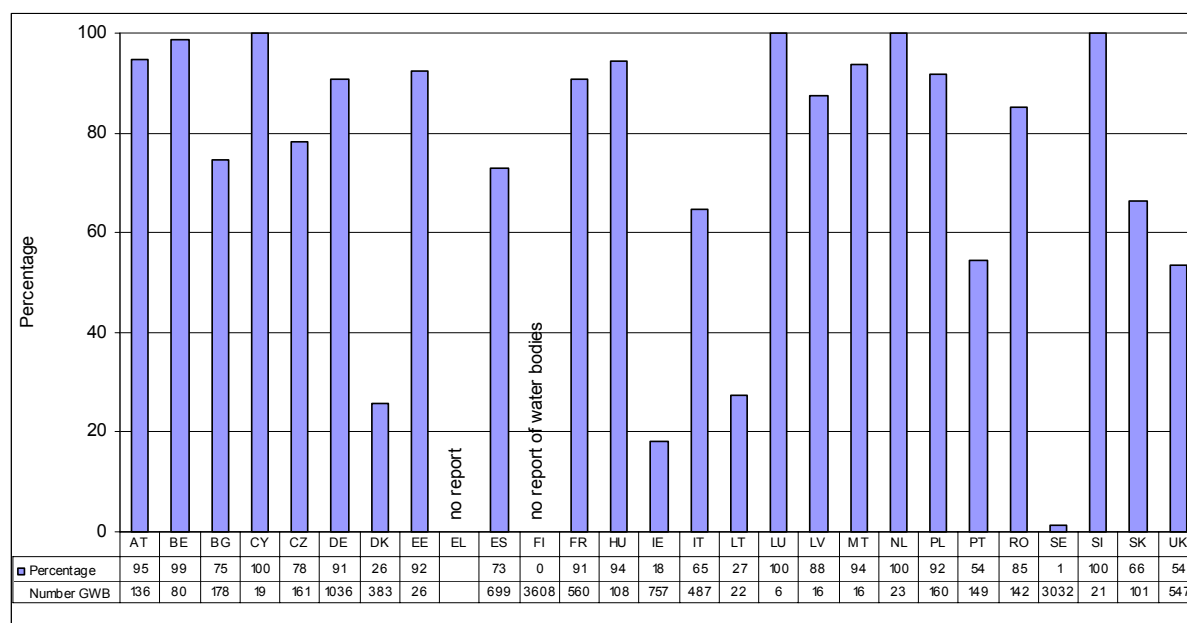


#### 4.4.3.2. Groundwater surveillance monitoring (chemical status)

Surveillance monitoring needs to be carried out in order to supplement and validate the impact assessment procedure and provide information for use in the assessment of long term trends both as a result of changes in natural conditions and through anthropogenic activity. Sufficient monitoring sites should be selected for bodies identified as being at risk and for bodies which cross a Member State boundary.

For the majority of the river basin districts validation of the results of the risk analysis were incorporated into the programme design but for around a fifth of the river basin districts the information was not clear enough to make a judgement or there was no information reported at all.

**Figure 20** shows that a high percentage of European groundwater bodies is included in chemical surveillance monitoring. As with the figure above for quantitative monitoring, the percentages are influenced by the delineation of groundwater bodies, i.e. lower numbers are not necessarily a signal of weaker monitoring as they may indicate a detailed delineation resulting in a large number of groundwater bodies (in particular Denmark and the Netherlands). Lower numbers do not necessarily mean bad compliance as some countries (Netherlands, Ireland, Denmark, or Finland) used a more targeted approach than others when establishing groundwater chemical surveillance monitoring.



**Figure 20 Percentage of groundwater bodies included in chemical surveillance monitoring**

#### Selection of quality elements

Most of the river basin district reports indicated that the quality elements selected for surveillance monitoring fully met the requirements of the WFD. However, a few river basin district reports are not detailed enough to assess if all core parameters are being monitored. Portugal, Hungary, Latvia and Luxembourg do not include monitoring of specific pollutants in surveillance monitoring.

### **Frequency of monitoring**

In general, the WFD stipulates that chemical surveillance monitoring should be carried out during each 6 year planning cycle. No minimum duration or frequency is specified for the surveillance programme though it would have to be carried out for at least one year during the planning cycle<sup>34</sup>.

More than 75% of the river basins indicated that the general parameters will be monitored every year (see **Table 10** above). General parameters are reported to be monitored 2 or 4 times, other pollutants once or twice. However, a few of these Member States have reported that the cycle of monitoring could change and be less frequent in the future (every 3 or every 6 years) following the first results. A few Member States have also established an initial intensive surveillance monitoring programme followed by a more extensive programme either annually or every 6 years. Only the Netherlands and Slovenia have reported a surveillance monitoring cycle of every 6 years. A few Member States also reported to carry out surveillance monitoring for the first year only.

#### **4.4.3.3. Groundwater operational monitoring (chemical status)**

Operational monitoring is undertaken in the periods between surveillance monitoring programmes in order to establish the chemical status of all groundwater bodies or groups of bodies determined as being at risk of failing to meet the environmental objectives and the presence of any long-term anthropogenically induced upward trend in the concentration of any pollutant.

The assessment of the status of water bodies at risk has been reported to be included in most of the reported operational programmes.

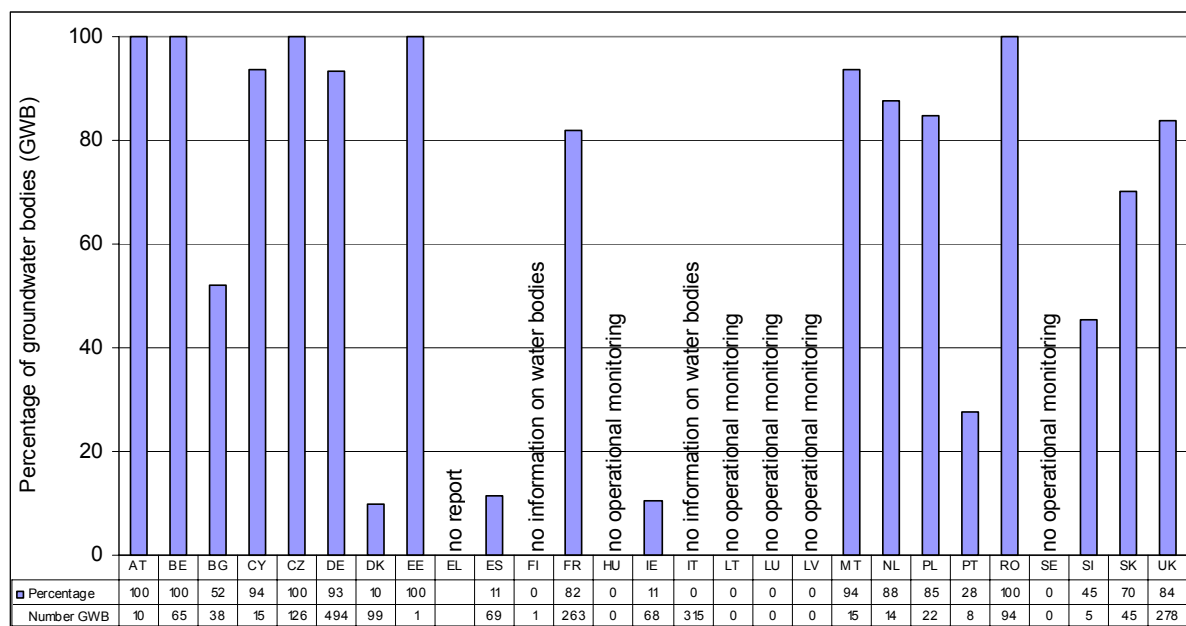
For about 15% of river basin districts there were no stations reported to be included in an operational monitoring programme. For about 15% of river basin districts it was reported that the start of operational monitoring would be delayed, and in most cases reasons given were: waiting for finalisation of sites from the results of the first surveillance monitoring, administrative and financial difficulties with upgrading monitoring.

**Figure 21** shows the percentage of groundwater bodies included in chemical operational monitoring. The numbers here are lower compared to quantitative and surveillance monitoring. Hungary, Lithuania, Latvia, Luxembourg and Sweden have not reported on the establishment of groundwater chemical operational monitoring. Some of them have, however, an extended groundwater chemical surveillance monitoring network, in particular Hungary, Latvia and Luxembourg, although as indicated above they do not report monitoring of specific pollutants. In 2005, Sweden reported more than 80% of groundwater bodies as being at risk of failing to meet environmental objectives, or for which information was insufficient. Despite this high number Sweden has not established operational monitoring for groundwater.

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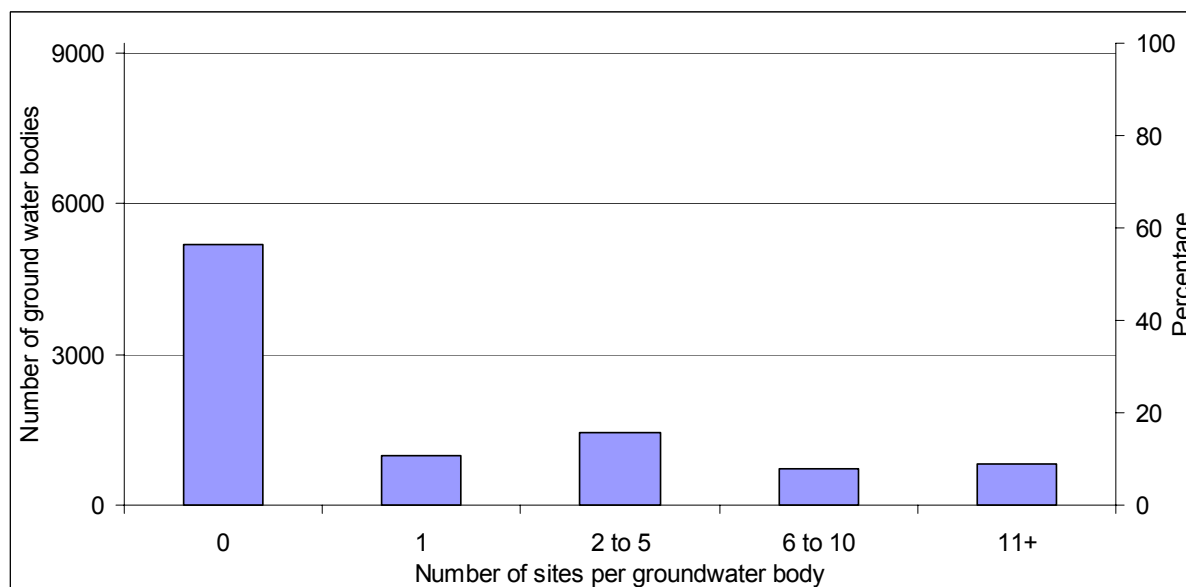
<sup>34</sup> See Annex V, 2.4.1





**Figure 21** Number of water bodies with operational monitoring in relation to the number of water bodies at risk of reaching the environmental objectives, as reported by the Member State under Article 5 WFD<sup>35</sup>. "Number GWB" are the number of water bodies included in operational monitoring.

**Figure 22** shows the number and percentage of chemical monitoring sites per groundwater body. Of the groundwater bodies monitored three quarters have more than one monitoring site, partly because groundwater bodies are generally quite large.



**Figure 22** Number and percentage of groundwater bodies with 0, 1, 2-5, 6-10, and 11 and more monitoring sites for chemical monitoring (surveillance and operational monitoring)

<sup>35</sup> Since Denmark and the Netherlands have substantially reduced the number of water bodies since 2005, the percentage of water bodies identified as being at risk in the Article 5 analysis was applied to the new number of water bodies to derive an estimate of the number of water bodies at risk for the calculation of this indicator.

In most river basin districts the operational monitoring covers all the core parameters (see Chapter 2) and specific pollutants. France and Portugal monitor only nitrates among the core parameters in operational monitoring. In addition, Portugal does not indicate any monitoring of specific pollutants in operational monitoring.

According to the WFD groundwater chemical operational monitoring is to be carried out in the periods between those for surveillance monitoring at a frequency sufficient to detect the impacts of relevant pressures but at a minimum of once per annum. **Table 11** shows that a large majority of Member States monitor every year.

#### 4.4.3.4. Additional monitoring of protected areas

The WFD requires carrying out additional monitoring in drinking water protected areas for bodies of water which provide more than 100 m<sup>3</sup>/day as an average. In addition, there is other related EU legislation requiring monitoring of groundwater such as Nitrates Directive (91/676/EEC).

**Table 11** *Number of groundwater monitoring stations located in protected areas for the abstraction of drinking water and reported under WFD<sup>36</sup>*

Member State	Number of groundwater monitoring stations in protected areas for drinking water abstraction
AT	0
BE	221
BG	170
CY	110
CZ	0
DE	1364
DK	70
EE	0
EL	no report
ES	664
FI	164
FR	1293
HU	1154
IE	203
IT	467
LT	105
LU	17
LV	0
MT	89
NL	222
PL	129
PT	120
RO	97
SE	28
SI	0
SK	0
UK	3

<sup>36</sup> The numbers of the monitoring stations may not be identical with those provided for the Member States in Annex 2, since the numbers in this table were extracted from WISE whereas those in Annex 2 were updated by Member States in a consultation in January 2009.

**Table 11** provides an overview of groundwater monitoring stations that lie in areas protected for the abstraction of drinking water and reported under WFD. Numbers in this table may differ from those in Annex 2 as the latter are the result of a consultation with Member States in January 2009. The numbers in **Table 11** are those reported in WISE.

#### 4.4.3.5. Information on monitoring under WISE - State of the Environment (SoE)

Only 5 Member States (Belgium, Bulgaria, Cyprus, Spain and France) reported to have sites within the WISE-SoE groundwater network (previously referred to as Eionet-Water), for a total of 2343 stations.

## 5. RESULTS IN INTERNATIONAL RIVER BASIN DISTRICTS

60 % of EU territory is covered by international river basin districts amounting to a total number of 110 international river basin districts in EU27. According to the WFD Member States have to ensure that a river basin covering the territory of more than one Member State is assigned to an international river basin district. In the case of an international river basin district Member States also have to ensure coordination with the aim of producing a single international river basin management plan. **Table 12** gives some examples of international river basin districts where Member States have reported that international coordination mechanisms are in place specifically for monitoring networks.

**Table 12 Overview of international coordination mechanisms reported for the coordination of monitoring programmes in selected international river basin districts**

	Danube	Rhine	Ems	Elbe	Odra	Vistula	Meuse	Scheldt	Douro	Tagus	Gua-diana	East Aegean	Dau-gava
AT													
BE													
BG													
CZ													
DE													
ES													
FR													
HU													
LT													
LU													
LV													
NL													
PL													
PT													
RO													
SI													
SK													

	Yes, international coordination is in place.
	No, international coordination is not in place, although the Member State shares this river basin district.
	International coordination is not relevant; Member State does not share this river basin district.
	International coordination is incomplete.

With respect to *surface waters* around one third of all river basin districts demonstrated some evidence of international coordination of their monitoring programmes and three quarters reported sites to be associated with other international commitments. In respect to international river basin districts, 60 % reported information on international coordination, two thirds reported sites associated with other international commitments.

International coordination was reported to exist related to

- Sea Conventions/Commissions such as for the Black Sea, OSPAR, UNEP/MAP, Wadden Sea Corporation and HELCOM, and
- River Conventions/Commissions such as for the Danube, Elbe, Ems, Odra, Meuse, Moselle, Rhine, Sarre, and the Scheldt.

Concerning *groundwater* not all Member States demonstrated evidence of international coordination of their monitoring programmes in the international river basin districts. Although discussions and exchange of information and even recommendations have been reported to have been agreed for monitoring programmes, there were differences in the approaches and the acknowledgement of this coordination; some of them were not made clear enough in the reports, and some Member States having international river basin districts provided no information on transboundary cooperation.

In general, the same international coordination mechanisms already mentioned for surface water were reported for coordination of groundwater monitoring issues. The countries cooperating under the Danube River Protection Convention have set up coordinated monitoring programmes for surface waters and groundwater.

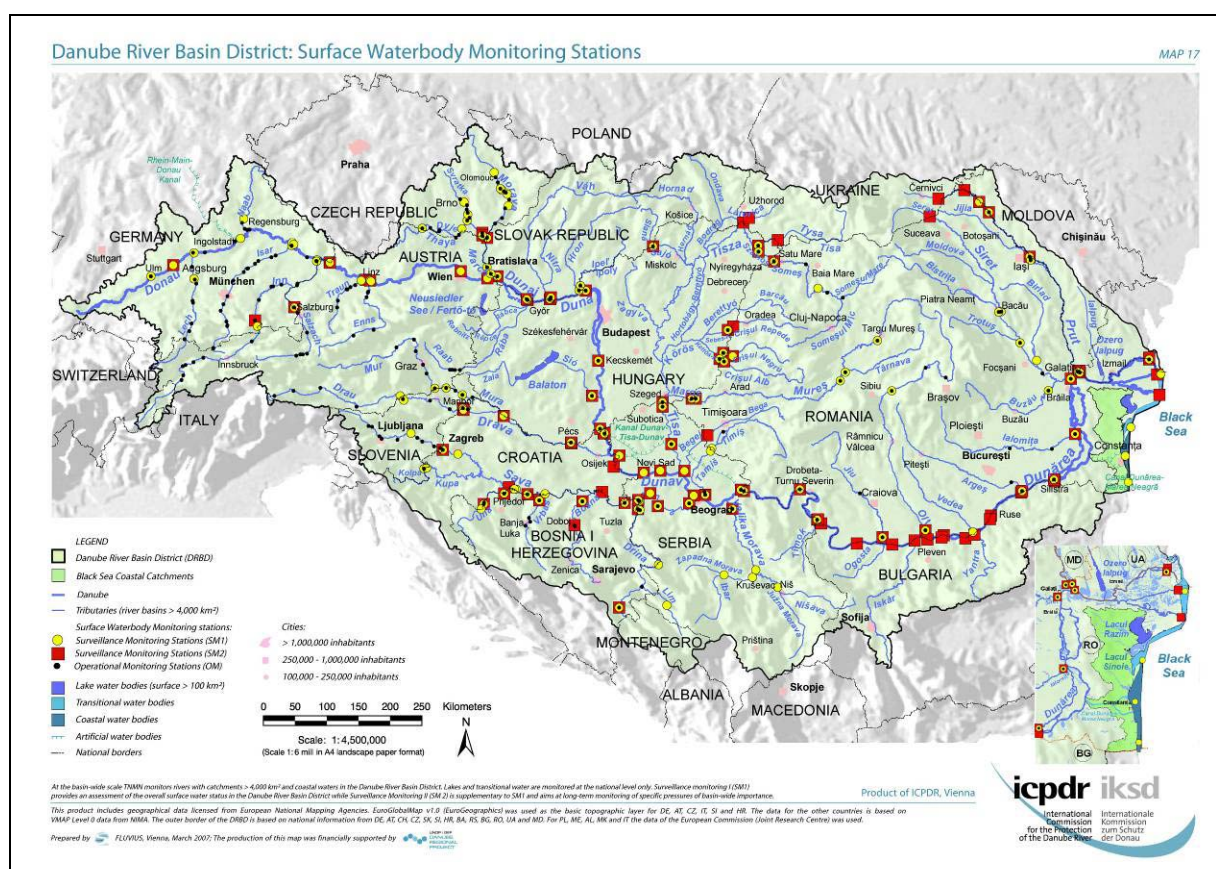
#### **The Example of the Danube River Basin District:**

The Transnational Monitoring Network (TNMN) is the basin-wide monitoring network of the Danube River Protection Commission (ICPDR)<sup>37</sup>. It was established in 1995 and constitutes a joint monitoring programme of the 14 main Danube river basin countries. The major objective of the TNMN is to provide an overview of the overall status and long-term changes of surface water and – where necessary – groundwater status in a basin-wide context with a particular attention paid to the transboundary pollution load. In view of the link between the nutrient loads of the Danube and the eutrophication of the Black Sea, it is necessary to monitor the sources and pathways of nutrients in the Danube River Basin District and the effects of measures taken to reduce the nutrient loads into the Black Sea. The TNMN data is supported by a sound analytical quality control programme.

The TNMN covers monitoring of rivers relevant at the basin-wide scale (catchments larger than 4000 km<sup>2</sup>) and coastal waters that are part of the Danube River Basin District. In addition, a groundwater monitoring network has been established for important transboundary groundwater bodies. In 2004 the TNMN was upgraded to meet the requirements of the Water Framework Directive establishing two types of surveillance monitoring (one for the assessment of ecological status, one for targeted monitoring of specific pressures) and an operational monitoring programme. Joint surveys of the Danube and its major tributaries are used for the purpose of investigative monitoring. The latest Joint Danube Survey was carried out in 2006.

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<sup>37</sup> For more information see <http://www.icpdr.org/>



## 6. CONCLUSIONS

### 6.1. Reporting

All Member States have reported on the establishment of monitoring programmes in accordance with Article 8 and Annex V WFD, with the exception of Greece which has not reported and Malta, which has not reported on surface water monitoring programmes. In addition, gaps were detected in individual river basin districts or individual water categories.

For the first time ever, Member States have reported electronically through WISE, the Water Information System for Europe<sup>38</sup>. The electronic submission of reports through WISE has proven to be successful with a total of 24 Member States having reported through this channel to date. WISE provides for a more effective and streamlined reporting and is already bringing benefits in terms of avoiding double reporting of monitoring stations.

However, there are still some improvements needed to ensure that the reports submitted are clear and comprehensive. While some Member States have strictly kept to the agreed format, there are numerous examples where Member States have submitted only very general information and relied heavily on secondary documents which were often difficult to find (given web links not active), or the relevant information was not easily accessible since the reports were very general. Member States are therefore urged to provide all necessary information in a clear, concise and transparent form directly into WISE. Clear and comprehensive reporting is a pre-requisite to enable the Commission to carry out a proper

<sup>38</sup> see <http://water.europa.eu/>

analysis of the implementation. Good practice examples of clear reporting include the reports of Austria, the Czech Republic, Hungary and the Netherlands.

The desired flexibility in reporting formats requested by the Member States has produced a complicated reporting structure with many reporting options. These options have led to different interpretations that in some cases have made the systematic assessment of the reported information difficult. In addition, some of the features included in the formats have been used by very few or no Member States. It has become apparent that there is a need to strike a better balance between providing flexibility and limiting complexity and that the formats have to be better documented and explained to ensure a common understanding of the reporting needs.

## **6.2. Monitoring**

The results of surface water and groundwater monitoring will determine whether the water bodies are in good status and whether appropriate measures need to be undertaken in order to reach good status as a rule by 2015. Investment in targeted and effective monitoring is therefore well-invested money. Precise and reliable results are a prerequisite for sound planning of investments in the programme of measures. Therefore, monitoring should not be seen just as an expensive burden but rather as an important tool for cost-effectiveness in river basin management.

In general terms, there is a good monitoring effort across the European Union. More than 107,000 monitoring stations were reported for monitoring of surface water and groundwater under the Water Framework Directive. On surface waters, by far the largest number of monitoring stations is located on rivers (75%), followed by lakes (13%), coastal waters (10%) and transitional waters (2%).

In general, it appears that the provisions of Annex V to the WFD and the existing guidance documents on monitoring of surface water and groundwater have been applied, although there is room for improvement in some Member States to improve the understanding and application of the basic concepts of surveillance, operational and investigative monitoring. In Italy, there is no distinction between surveillance and operational monitoring; almost all monitoring stations serve both purposes. Also, in other countries there appear to be large overlaps between surveillance and operational monitoring stations. Not all Member States fulfil all requirements for monitoring under surveillance monitoring. Only four Member States monitor all biological quality elements in all water bodies as required in surveillance monitoring; in the other Member States there are large numbers of water bodies where this is not the case.

Most Member States have developed a targeted approach in operational monitoring using one or more biological quality elements to assess ecological status, but only a fraction of the water bodies identified to be at risk of failing to reach the environmental objectives in the pressure and impact assessment in 2004 has been subjected to operational monitoring. Although there may be a number of reasons for this, it is surprising that these numbers are so low. Where the Member States have made use of grouping of water bodies, a sufficient level of confidence and precision of the monitoring results should be ensured in order to effectively inform decision making in relation to the programme of measures. As regards frequency of monitoring, many Member States apply higher frequencies than the ones given in the Directive, with some exceptions. Many Member States are still in the process of deciding which monitoring frequencies to apply in the future, but all this information will need to be



reported in the river basin management plans, in which Member States will need to demonstrate the reliability of the results.

The reports from Austria, Czech Republic and Hungary can be cited as examples of good practice, showing a clear approach to the development of WFD monitoring programmes. In addition, the reports from Ireland and the United Kingdom show a significant monitoring effort to ensure confidence in the monitoring results. Finally, the efforts of the countries joining the EU 2007 should also be acknowledged. Whilst the development of methods to assess ecological status is far from being completed in Bulgaria and Romania, the monitoring programmes have been established in accordance with the concepts of the WFD and, particularly in Romania, provide for comprehensive monitoring.

One of the key elements of the WFD is that it sets a framework to take into account all pressures and impacts in the aquatic environment and integrates the requirements of other key existing EU water legislation as minimum basic measures. The WFD requires specific monitoring of protected areas, in particular in water bodies used for the abstraction of drinking water and in water dependent habitat and species protection areas. However, in many cases these specific requirements have not been clearly incorporated into the WFD monitoring programmes. The programmes adopted in Ireland can be cited as a positive example of an approach to meet these requirements through specific monitoring sub-nets. The integration of monitoring requirements from other Directives into the monitoring programmes under the WFD should bring benefits for planning and allocating resources for monitoring more efficiently.

Despite international coordination mechanisms being in place in many international river basin districts only a few Member States such as Germany, Ireland, the Netherlands, Romania and United Kingdom have reported using them in establishing their monitoring programmes. In order to ensure a targeted and sound planning of the programme of measures in international river basin districts, Member States need to coordinate monitoring programmes within the river basin district in order to provide an integrated assessment of the existing pressures and impacts.

The main aim of monitoring is to assess the status of water with the assessment of ecological status of surface waters being of central importance. As has already been seen in the intercalibration exercise<sup>39</sup>, there remain quite a number of gaps in the development of biological assessment methods for determining ecological status. The analysis of the information provided on monitoring programmes shows that there are still many river basin districts where the necessary assessment methods for biological quality elements are not yet in place. This is particularly true in the countries that joined the EU in 2004 and 2007. It is very important that Member States conclude the development of their national methods and continue the work on intercalibration to finalise the exercise by 2011 as agreed by the Water Framework Directive Committee in the Intercalibration Work Programme. There are several research programmes on-going which are expected to bring valuable information for the completion of the intercalibration exercise, one of the main ones being WISER<sup>40</sup>.

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<sup>39</sup> See Commission Decision 2008/915/EC of 30 October 2008 establishing, pursuant to Directive 2000/60/EC of the European Parliament and of the Council, the values of the Member State monitoring system classifications as a result of the intercalibration exercise, available at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:332:0020:0044:EN:PDF>

<sup>40</sup> <http://www.wiser.eu>

Little information was delivered on the levels of confidence and precision of the overall monitoring programmes and in particular of the assessment methods for ecological status. It is therefore difficult to assess whether the monitoring programmes will deliver a sufficient level of confidence and precision for the purpose of providing a coherent and comprehensive overview of the status of water bodies across the river basin districts and to inform the decision making in relation to the programme of measures. The river basin management plans due at the end of 2009 will provide the whole picture of the river basin districts in terms of pressures, impacts, status assessment and measures and this will enable the Commission to assess comprehensively the results delivered by the monitoring programmes.



### **List of Annexes to the Commission Staff Working Document**

**ANNEX 1:** Questionnaires for Compliance Checking of Monitoring Reports  
for Surface Waters and Groundwater

**ANNEX 2:** Information on the Monitoring Programmes of the Member States



## **ANNEX 1**

### **Questionnaires for Compliance Checking of Monitoring Reports for Surface Waters and Groundwater submitted under Article 8 WFD**



## **WATER FRAMEWORK DIRECTIVE**



### **PRELIMINARY ASSESSMENT OF ARTICLE 8 REPORTS (2007 REPORTING)**

#### **SURFACE WATERS**

**MEMBER STATE:**

**RIVER BASIN DISTRICT:**

**Language of the report:**

**Date of  
submission  
as in CDR  
(dd/mm/yyyy)**

**Files assessed**

**Status box:**

**Version:**

**Author and date**

**Note:** This assessment has been carried out by a consultant under the framework of a support contract with DG Environment. It does not necessarily reflect the opinion of DG Environment or other Commission services.

# COMPLIANCE CHECKING QUESTIONS

## SURFACE WATERS

### 1. Objectives of monitoring programmes

**WFD reference:** Article 8.1 and Annex 5 sections 1.3.1, 1.3.2, 1.3.3

**Context:** the general objective of WFD monitoring is to establish a coherent and comprehensive overview of water status in each river basin district (Article 8.1). The WFD includes a number of specific objectives for the various types of monitoring (surveillance, operational, investigative) that the programmes should fulfil in order to provide such coherent and comprehensive picture. A well designed WFD monitoring programme should take account of these objectives. For example, this can be done by designing specific sub-programmes to address those needs. This is however not the only way as there may be sub-programmes that cover more than one objective. In any case, the Member State report should clearly explain the design basis and should give account on how the different WFD objectives have been considered.

**Where to look for the information:**

**File:** The parent file is “Monitoring.xml”. The subsidiary elements are ‘Surface Water Monitoring Programmes’ in the HTML Factsheet or <SWPROGRAMME> in original XML file (in some cases Member States have separated reports describing their monitoring programmes and hence the information is not in the xml file)

**Fields:** Name of the programmes and/or sub-programmes  
Surveillance or operational monitoring  
Summary of the overall key design considerations for the programme  
Specific reports explaining the design of the monitoring programmes  
Hyperlink or reference to associated reference statement or file

### **Question 1: Have the following objectives in Annex 5 of WFD been taken into account in the design of the monitoring programme?**

#### **Surface water surveillance monitoring**

##### **a) Supplementing and validating the impact assessment procedure detailed in Annex II.**

In the context of the pressure and impact analysis of 2004 Member States had to make a number of assumptions on the levels and combinations of pressures that could cause a water body to fail to achieve good status. The risk assessment was not conclusive for many water bodies due to insufficient data. Therefore, the design of the surveillance monitoring network should take into account the results of the pressure and impact analysis to supplement and validate it.

*Please select the answer (only one) that in your opinion most accurately reflects the information provided in the report:*

R L T C  
☐ ☐ ☐ ☐

Yes. There are specific sub-programmes for surveillance monitoring that are designed to validate the results of the 2004 pressure and impact analysis

R L T C  
☐ ☐ ☐ ☐

Yes. Although there are no specific sub-programmes, the validation of the results of the 2004 pressure and impact analysis is one of the criteria used for the design of the surveillance monitoring network

R L T C  
☐ ☐ ☐ ☐

The report provides information on how the results of the 2004 pressure and impact analysis have been used in the design of the surveillance monitoring, but the criteria used do not seem to fit for the purpose of validation of the pressure and impact results.

R L T C  
☐ ☐ ☐ ☐

It is not clear from the report how the results of the 2004 pressure and impact analysis have been used in the design of the surveillance monitoring. Information is insufficient.

R L T C  
☐ ☐ ☐ ☐

No information provided on the design of the surveillance (sub-) programmes.

R L T C  
☐ ☐ ☐ ☐

There are no surveillance monitoring (sub-)programmes.

Comments (please provide further explanations, difficulties found, and in general additional information deemed useful. In particular, if differences are found between water categories, they should be explained in this section):

**b) Assess long-term changes in natural conditions**

In order to detect these long-term changes, a network of water bodies in high status or in reference conditions should be established. In case those are not available, water bodies in less than high status may be used.

*Please select the answer (only one) that in your opinion most accurately reflects the information provided in the report:*

R L T C  
☐ ☐ ☐ ☐

Yes. There are specific sub-programmes for surveillance monitoring that are designed to assess long-term changes. They are based on a network of reference sites or water bodies in high status.

R L T C  
☐ ☐ ☐ ☐

Yes. Although there are no specific sub-programmes, the assessment of long-term changes is one of the criteria used for the design of the surveillance monitoring network.

R L T C  
☐ ☐ ☐ ☐

It is not clear from the report if this objective has been used in the design of the surveillance monitoring. Information is insufficient.

R L T C  
☐ ☐ ☐ ☐

No information provided on the design of the surveillance (sub-) programmes.

R L T C  
☐ ☐ ☐ ☐

There are no surveillance monitoring (sub-)programmes.

Comments (please provide further explanations, difficulties found, and in general additional information deemed useful. In particular, if differences are found between water categories, they should be explained in this section):

**c) Assess long-term changes resulting from widespread anthropogenic activity**

It is likely that these water bodies would be at good or worse status and be subject to the long range transport and deposition of pollutants. If water bodies were less than good status they would also be expected to be included in operational monitoring.

*Please select the answer (only one) that in your opinion most accurately reflects the information provided in the report:*

R L T C  
☐ ☐ ☐ ☐

Yes. There are specific sub-programmes for surveillance monitoring that are designed to assess long-term changes.

R L T C  
☐ ☐ ☐ ☐

Yes. Although there are no specific sub-programmes, the assessment of long-term changes is one of the criteria used for the design of the surveillance monitoring network.

R L T C  
☐ ☐ ☐ ☐

It is not clear from the report if this objective has been used in the design of the surveillance monitoring. Information is insufficient.

R L T C  
☐ ☐ ☐ ☐

No information provided on the design of the surveillance (sub-) programmes.

R L T C  
☐ ☐ ☐ ☐

There are no surveillance monitoring (sub-)programmes.

Comments (please provide further explanations, difficulties found, and in general additional information deemed useful. In particular, if differences are found between water categories, they should be explained in this section):

**d) Does the report mention the criteria in WFD Annex V section 1.3.1 *Selection of monitoring points* as taken into account to design the surveillance monitoring network?**

These criteria are:

- In sufficient water bodies to provide an assessment of the overall surface water status (*i.e. covers the range of statuses from high to bad, where they exist*) within each catchment and sub-catchment of the river basin district.
- The rate of water flow is significant within the river basin district as a whole; including points on large rivers where the catchment is greater than 2 500 km<sup>2</sup>;



- The volume of water present is significant within the river basin district, including large lakes and reservoirs;
- Significant bodies of water cross a Member State boundary;
- Sites are identified under the Information Exchange Decision 77/795/EEC;
- At such other sites as are required to estimate the pollutant load which is transferred across Member States boundaries, and which is transferred into the marine environment.

R	L	T	C	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No
R	L	T	C	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Yes

Comments (please provide further explanations, difficulties found, and in general additional information deemed useful. In particular, if differences are found between water categories, they should be explained in this section):

### Surface water operational monitoring

- e) **Establish the status of those bodies identified as being at risk of failing to meet their environmental objectives and assess any changes in the status of such bodies resulting from the programmes of measures.**

The status of the water bodies that as a result of the pressure and impact analysis of 2004 have been identified as at risk of failing to meet the environmental objectives has to be determined through operational monitoring.

*Please select the answer (only one) that in your opinion most accurately reflects the information provided in the report:*

R	L	T	C	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Yes. There are specific sub-programmes for operational monitoring that are designed to assess the status of water bodies at risk.
R	L	T	C	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Yes. Although there are no specific sub-programmes, the assessment of water bodies at risk is one of the criteria used for the design of the operational monitoring network.
R	L	T	C	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	It is not clear from the report if this objective has been used in the design of the operational monitoring. Information is insufficient.
R	L	T	C	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No information provided on the design of the operational (sub-) programmes.
R	L	T	C	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	There are no operational monitoring (sub-)programmes.

Comments (please provide further explanations, difficulties found, and in general additional information deemed useful. In particular, if differences are found between water categories, they should be explained in this section):

**f) Does the report indicate that operational monitoring will start later than December 2006?**

Information in the field "Intended start date of the monitoring programme (if after 2006-12-22)" and "Reason(s) for delay if applicable".

R L T C  
☐ ☐ ☐ ☐

No

R L T C  
☐ ☐ ☐ ☐

Yes, and the following reason is given:

R L T C  
☐ ☐ ☐ ☐

Yes, but no reason is given.

Comments (please provide further explanations, difficulties found, and in general additional information deemed useful. In particular, if differences are found between water categories, they should be explained in this section):

**Surface water investigative monitoring**

**g) Does the report provide any information on investigative monitoring?**

Information in section 2 (Surface Water Investigative Monitoring Programmes) of the Monitoring.xml file.

*Please select the answer (only one) that in your opinion most accurately reflects the information provided in the report:*

☐

Yes, including information on specific incidents.

☐

Yes, but it does not include information on specific incidents.

☐

No.

Comments (please provide further explanations, difficulties found, and in general additional information deemed useful. In particular, if differences are found between water categories, they should be explained in this section):

**Protected areas**

**h) Does the report provide information on monitoring of drinking water protected areas?**

As required in WFD Article 7 and section 1.3.5 of WFD Annex V. There could be specific sub-programmes for this purpose (section 1.2 Surface water monitoring programmes) or information may be given in the SWMonitoringStations.xml file in under the field "Drinking water abstraction", in section "Protected areas" and in the field "Additional monitoring requirements for waters used in the abstraction of drinking water in relation to Article 7".

*Please select the answer (only one) that in your opinion most accurately reflects the information provided in the report:*

☐

Yes, there are specific (sub-)programmes with this objective.

☐

Yes, although there are no specific (sub-)programmes, the information provided indicates that the objective is covered.

☐

It is not clear from the report if this objective has been used in the design of the monitoring programmes. Information is insufficient.

☐ No information.

Comments (please provide further explanations, difficulties found, and in general additional information deemed useful. In particular, if differences are found between water categories, they should be explained in this section):

i) **Does the report include links to reports in which a more detailed explanation of the monitoring concept is given? If yes, please paste links into the comments box below.**

R	L	T	C	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Yes
R	L	T	C	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No

Comments (please provide further explanations, difficulties found, and in general additional information deemed useful. In particular, if differences are found between water categories, they should be explained in this section):

## 2. Comprehensiveness

**WFD reference:** Recital 36, Article 8.1.

**Context:** The WFD integrates all existing water legislation into its programme of measures and through the requirement to identify protected areas. Article 8.1 states that, for protected areas, the WFD monitoring programmes must be supplemented by those specifications contained in Community legislation under which the individual protected areas have been established. The monitoring is one of the most important elements that inform the decisions on measures. In addition many international river basins have established transboundary monitoring networks and there are other legislative and voluntary drivers for water monitoring. A joint approach towards the design of the monitoring programmes under the various drivers is integral part of the WFD and it is considered good practice.

**Where to look for the information:**

**File:** The spreadsheet with statistical information contains a summary of the number of monitoring stations that are located in protected areas.

**File:** Monitoring.xml (in some cases Member States have separated reports describing their monitoring programmes and hence the information is not in the xml file)

**Fields:** Name of the programmes and/or sub-programmes

Field "Summary of the overall key design considerations for the programme"

Field "If part of an international monitoring programme, please describe the international programme and how this programme relates to it"

**File:** SWMonitoringStations.xml

**Fields:** Field "Other networks" and section "International networks".

**Question 2: Is the report on monitoring programmes comprehensive?**

- a) **Does the report provide information of networks linked to the implementation of water Directives other than WFD, international obligations like river conventions or of voluntary agreements?**

*Please select the answer (only one) that in your opinion most accurately reflects the information provided in the report:*

- ☐ Yes. The report is comprehensive and provides complete information on monitoring of protected areas and other international and voluntary commitments.
- ☐ Partly. The report provides some information on monitoring of protected areas, but it is not comprehensive.
- ☐ No. The report does not provide information on monitoring of protected areas.

Comments (please provide further explanations, difficulties found, and in general additional information deemed useful. In particular, if differences are found between water categories, they should be explained in this section):

- b) **Does the report provide information on monitoring under the following legislative or voluntary agreements?**

The information to answer this question can be based on the information on the protected areas provided in the spreadsheet and on the field "Other networks" in the SWMonitoringStations.xml file.

*Please check as appropriate:*

- ☐ Bathing Directive 76/160/EEC No
- ☐ Birds Directive 79/409/EEC
- ☐ Drinking Water Directive 80/778/EEC
- ☐ Fish Waters Directive 78/659/EEC
- ☐ Shellfish Waters Directive 79/923/EEC
- ☐ Habitats Directive 92/43/EEC
- ☐ Nitrates Directive 91/676/EEC
- ☐ Urban Waste Water Treatment Directive 91/271/EEC
- ☐ Directive concerning the quality required of surface water intended for the abstraction of drinking water 75/440/EEC

- ☐ EIONET-Water
- ☐ International conventions. If yes please specify which (e.g. Danube, Rhine, etc):

Please include in the 'Comments' section below any information about the design criteria for international monitoring networks and their compliance with WFD requirements. This may be found in the 'Monitoring.xml' file, field 'If part of an international monitoring programme, please describe the international programme and how this programme relates to it' or 'Brief summary of the methodology or criteria used to select sites'.

Comments (please provide further explanations, difficulties found, and in general additional information deemed useful. In particular, if differences are found between water categories, they should be explained in this section):

c) **Is there any indication of international coordination in designing the monitoring networks?**

- ☐ Yes (please explain below in Comments section)  
☐ No

Comments (please provide further explanations, difficulties found, and in general additional information deemed useful. In particular, if differences are found between water categories, they should be explained in this section):

### 3. Status of development of methods

**WFD reference:** Article 8.1, Annex V.

**Context:** The WFD provides for a comprehensive scheme for the assessment of surface waters status by means of a combination of biological, physicochemical and hydromorphological quality elements (see 1.1 of WFD Annex V). Many of those quality elements, and in particular the biological ones, were new at the time of the WFD adoption. According to WFD article 8, Member States had to make operational their monitoring programmes by 22 December 2006. This includes having the methods developed. The article 8 reporting should provide a summary of the methods in use in the RBD for each quality element.

**Where to look for the information:**

**File:** Monitoring.xml (in some cases Member States have separated reports describing their monitoring programmes and hence the information is not in the xml file)

**Fields:** Sampling methodology, Analysis methodology, Standards applied, Frequency methodology, Level of confidence

**Question 3: Are the methods available for the assessment of water status?**

a) **What is the status of development of the methods to assess ecological status of surface waters?**

*Please select the answer (only one) that in your opinion most accurately reflects the information provided in the report:*

R L T C  
☐ ☐ ☐ ☐

Fully developed. The report contains complete information on the methods (sampling, analysis and frequency) for biological quality elements and references to methodological documents or standards in use.

R L T C  
☐ ☐ ☐ ☐

Under development. The description of the methods for some quality elements indicates that they are under development (please comment below).

R L T C

☐ ☐ ☐ ☐ Incomplete information. Information on the methods for some quality elements is missing (please comment below).

R L T C  
☐ ☐ ☐ ☐ No information on methods.

Comments (please provide further explanations, difficulties found, and in general additional information deemed useful. In particular, if differences are found between water categories, they should be explained in this section):

**b) Is there information on the level of confidence achieved by the methods?**

*Please select the answer (only one) that in your opinion most accurately reflects the information provided in the report:*

- ☐ Information is complete. The report contains complete information on the levels of confidence.
- ☐ Incomplete information. Information on the methods for some quality elements is missing (please comment below).
- ☐ Strong differences in the information given from one water category to another (please comment below).
- ☐ No information on levels of confidence.

Comments (please provide further explanations, difficulties found, and in general additional information deemed useful. In particular, if differences are found between water categories, they should be explained in this section):

## 4. Selection of quality elements

**WFD reference:** Article 8.1, Annex V sections 1.3.1, 1.3.2.

**Context:** Annex V of the WFD requires Member States to monitor all quality elements in surveillance monitoring (section 1.3.1 *Selection of quality elements*). In the case of operational monitoring, Member States need only to monitor those quality elements which are indicative of the pressures to which the body is subject. In particular for biological quality elements it refers to the elements most sensitive to the pressures (section 1.3.2 *Selection of quality elements*). Available information shows that Member States may have different understandings of which those quality elements are. The main objective of this section is to serve as a basis to allow the identification of those differences.

**Where to look for the information:**

**File:** The spreadsheet with statistical information contains the number of stations in each monitoring (sub-)programme in which a particular quality element is monitored.

**File:** Monitoring.xml (in some cases Member States have separated reports describing their monitoring programmes and hence the information is not in the xml file)

**Fields:** section Quality elements

#### **Question 4: Which quality elements are used for the assessment of water status?**

##### **a) At which level are the quality elements reported?**

The reporting of the quality elements can be done at three different levels of detail. Minimum recommended level is level 2. An example of level 1 is QE1 "Biological elements". Reporting at this level is not recommended as it gives very little information (there is no information on which specific element or elements are monitored). An example of level 2 is QE1-1 "Composition, abundance and biomass of phytoplankton". See Appendix A in article 8 schema guide for a full list.

*Please tick as appropriate:*

Biological elements:

- ☐ Level 1 (only QE1).
- ☐ Level 2, e.g. QE1-1, QE1-2, etc.
- ☐ Level 3, e.g. QE1-2-1, QE1-2-2, etc.
- ☐ Level of monitoring or reporting of monitoring varies from one monitoring programme to another or from one water category to another (please comment below)
- ☐ Monitoring of biological quality elements is not reported

Hydromorphological elements:

- ☐ Level 1 (only QE2).
- ☐ Level 2, e.g. QE2-1, QE2-2, etc.
- ☐ Level 3, e.g. QE2-1-1, QE2-1-2, etc.
- ☐ Level of monitoring or reporting of monitoring varies from one monitoring programme to another or from one water category to another (please comment below)
- ☐ Monitoring of hydromorphological quality elements is not reported

Chemical and physico-chemical elements:

- ☐ Level 1 (only QE3).
- ☐ Level 2, e.g. QE3-1, QE3-2, etc.
- ☐ Level 3, e.g. QE3-1-1, QE3-1-2, etc.
- ☐ Level of monitoring or reporting of monitoring varies from one monitoring programme to another or from one water category to another (please comment below)
- ☐ Monitoring of chemical and physico-chemical quality elements is not reported

Comments (please provide further explanations, difficulties found, and in general additional information deemed useful. In particular, if differences are found between water categories, they should be explained in this section):

##### **b) Are surveillance monitoring (sub-) programmes comprehensive in terms of quality elements monitored?**

In this context "comprehensive" means that they cover all quality elements at level 2, as required in section 1.3.1 of WFD Annex V. Please note that some quality elements are not applicable to certain water categories, i.e. fish is not applicable in coastal waters. Details of which QEs apply to which water category are given in the 'QE Codes' worksheet in the workbook 'QE\_SWProgrammes\_20080130.xls'

*Please select the answer that in your opinion most accurately reflects the information provided in the report:*

- ☐ Yes. The surveillance monitoring includes all quality elements in all water categories.
- ☐ Partly. Some quality elements are missing.
- ☐ Not enough information.
- ☐ Monitoring of biological quality elements is not reported.

Comments (please provide further explanations, difficulties found, and in general additional information deemed useful. In particular, if differences are found between water categories, they should be explained in this section):

**c) Is the selection of quality elements to monitor in operational monitoring (sub-) programmes in line with the requirements of the WFD?**

The spreadsheet with statistical data contains information on the quality elements monitored in each programme or sub-programme. The intention of this question is to understand the approach taken by the Member State in selecting the quality elements to monitor. The main focus of the question is on the biological quality elements.

*Please select the answer (only one) that in your opinion most accurately reflects the information provided in the report:*

- ☐ Yes. The operational monitoring is structured in various sub-programmes addressing different pressures. The selection of quality elements is made on the basis of these main pressures.
- ☐ Yes. Although there are no specific sub-programmes addressing specific pressures, the information provided indicates that there is a targeted approach in selecting the various quality elements depending on the pressures to which the water body is subject.
- ☐ No. Operational monitoring is systematically based on only one specific biological quality element in each water category, largely disregarding the rest (e.g. typically macroinvertebrates for rivers and phytoplankton for lakes and coastal). (Please comment below)
- ☐ Not clear or not enough information. (Please comment below)
- ☐ Monitoring of quality elements is not reported.

Comments (please provide further explanations, difficulties found, and in general additional information deemed useful. In particular, if differences are found between water categories, they should be explained in this section):

## **5. Frequency of monitoring**

**WFD reference:** Article 8.1, Annex V sections 1.3.1, 1.3.4, 1.3.5.

**Context:** Annex V of the WFD provides indication of minimum frequencies for surveillance and operational monitoring (see ‘QE Codes’ worksheet in the workbook ‘QE\_SWProgrammes\_20080130.xls’). In some cases, though, the achievement of the monitoring objectives and of an adequate level of confidence and precision would



involve using a higher frequency than this minimum (see CIS Guidance document number 7 – Monitoring, section 2.10).

**Where to look for the information:**

**File:** The spreadsheet with statistical information contains information about the frequency of monitoring in each monitoring (sub-)programme for each quality elements.

**File:** Monitoring.xml (in some cases Member States have separated reports describing their monitoring programmes and hence the information is not in the xml file)

**Fields:** "Frequency methodology", section "Quality elements" fields "Frequency", "Cycle", "Levels of confidence".

**File:** SWMonitoringStations.xml

**Fields:** "Programmes", "Quality Element", "Frequency", "Cycle", "Cycle Description"

**Question 5: What is the temporal intensity of monitoring?**

- a) In general the WFD requires that the surveillance monitoring is carried out for a period of one year during the 6 years planning cycle. Does the report indicate higher frequencies than this minimum?

This would be characterised by the "Cycle" field, 1 meaning every year, 2 every 2 years and so on. A 0 in the "Cycle" field means that the programme will be implemented the first year and depending on the results, future monitoring will be decided.

*Please select the answer (only one) that in your opinion most accurately reflects the information provided in the report:*

- ☐ Yes. In general the indicated cycle is 1, meaning that the surveillance monitoring programmes will be carried out every year for the first cycle.
- ☐ Yes. In general the indicated cycle is 2, meaning that the surveillance monitoring programmes will be carried out every second year for the first cycle.
- ☐ Yes. In general the indicated cycle is 3, meaning that the surveillance monitoring programmes will be carried out every third year for the first cycle.
- ☐ Not yet decided. In general the indicated cycle is 0, meaning that for the moment the surveillance monitoring programmes will be carried out the first year only.
- ☐ Not clear answer, there are many differences between the different programmes and/or water categories (please comment below).
- ☐ No. In general the indicated cycle is 6, meaning that the surveillance monitoring programmes will be carried at the minimum frequency in the WFD.
- ☐ Monitoring frequency is not reported.

Comments (please provide further explanations, difficulties found, and in general additional information deemed useful. In particular, if differences are found between water categories, they should be explained in this section):

**b) The WFD provides indicative minimum monitoring frequency for biological quality elements operational monitoring. Does the report indicate higher frequencies than this minimum?**

The minimum frequency is once every 3 years for the biological quality elements (Annex V section 1.3.4). This would be characterised by the combination of a number 1 in the "Frequency" field and a number 3 in the "Cycle" field. Any higher values for "Frequency" or lower for "Cycle" would imply a higher intensity of sampling. Please note that some countries may have not interpreted those fields in the proposed way.

*Please select the answer (only one) that in your opinion most accurately reflects the information provided in the report:*

- ☐ Yes. In general the indicated cycle is 1, meaning that the operational monitoring programmes will be carried out every year for the first cycle.
- ☐ Yes. In general the indicated cycle is 2, meaning that the operational monitoring programmes will be carried out every second year for the first cycle.
- ☐ No. In general the indicated cycle is 3, meaning that the operational monitoring programmes will be carried out every third year for the first cycle, i.e. according to the minimum in WFD.
- ☐ Not yet decided. In general the indicated cycle is 0, meaning that for the moment the operational monitoring programmes will be carried out the first year only.
- ☐ Not clear answer, there are many differences between the different programmes and/or water categories (please comment below).
- ☐ No. In general the indicated cycle is 6, meaning that the operational monitoring programmes will be carried at less than the minimum frequency in the WFD.
- ☐ Monitoring frequency is not reported.

Comments (please provide further explanations, difficulties found, and in general additional information deemed useful. In particular, if differences are found between water categories, they should be explained in this section):

## **WATER FRAMEWORK DIRECTIVE**



### **PRELIMINARY ASSESSMENT OF ARTICLE 8 REPORTS (2007 REPORTING)**

#### **GROUNDWATER**

**MEMBER STATE:**

**RIVER BASIN DISTRICT:**

**Language of the report:**

<b>Date of submission as in CDR (dd/mm/yyyy)</b>	<b>Files assessed</b>

**Status box:**

<b>Version:</b>	<b>Author and date</b>
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**Note:** This assessment has been carried out by a consultant under the framework of a support contract with DG Environment. It does not necessarily reflect the opinion of DG Environment or other Commission services.

# COMPLIANCE CHECKING QUESTIONS

## GROUNDWATER

### 1. Objectives of monitoring programmes

**WFD reference:** Article 8.1 and Annex 5 sections 2.2 and 2.4

**Context:** the general objective of WFD monitoring is to establish a coherent and comprehensive overview of water status in each river basin district (Article 8.1). For groundwater, the WFD includes a number of specific objectives for three types of monitoring (surveillance, operational, quantitative) that the programmes should fulfil in order to provide such coherent and comprehensive picture. A well designed WFD monitoring programme should take account of these objectives. For example, this can be done by designing specific sub-programmes to address those needs. This is however not the only way as there may be sub-programmes that cover more than one objective. In any case, the Member State report should clearly explain the design basis and should give account on how the different WFD objectives have been considered.

#### **Where to look for the information:**

**File:** Monitoringprogrammes.xml (in some cases Member States have separate reports describing their monitoring programmes and hence the information is not in the xml file)

**Fields:** Name of the programmes and/or sub-programmes  
Summary of the overall key design considerations for the programme  
Specific reports explaining the design of the monitoring programmes

#### **Question 1: Have the following objectives in Annex 5 of WFD been taken into account in the design of the monitoring programme?**

##### **Groundwater level monitoring (quantitative status)**

a) Supplementing and validating the impact assessment procedure detailed in Annex II.

In the context of the pressure and impact analysis of 2004 Member States had to make a number of assumptions on the levels and combinations of pressures that could cause a water body to fail to achieve good status. The risk assessment was not conclusive for many water bodies due to insufficient data. Therefore, the design of the surveillance monitoring network should take into account the results of the pressure and impact analysis to supplement and validate it.

*Please select the answer (only one) that in your opinion most accurately reflects the information provided in the report:*

- ☐ Yes. There are specific sub-programmes for groundwater level monitoring that are designed to validate the results of the 2004 pressure and impact analysis, with appropriate monitoring density and frequency to assess impacts on abstractions and discharges on the groundwater level
- ☐ Yes. Although there are no specific sub-programmes, the validation of the results of the 2004 pressure and impact analysis is one of the criteria used for the design of the groundwater level monitoring network
- ☐ The report provides information on how the results of the 2004 pressure and impact analysis have been used in the design of the groundwater level

monitoring, but the criteria used do not seem to be fit for the purpose of validation of the pressure and impact results.

- ☐ It is not clear from the report how the results of the 2004 pressure and impact analysis have been used in the design of the groundwater level monitoring. Information is insufficient.
- ☐ No information provided on the design of the groundwater level (sub-) programmes.
- ☐ There are no groundwater level monitoring (sub-)programmes.

Comments:

### Groundwater surveillance monitoring (chemical status)

b) Supplementing and validating the impact assessment procedure detailed in Annex II.

In the context of the pressure and impact analysis of 2004 Member States had to make a number of assumptions on the levels and combinations of pressures that could cause a water body to fail to achieve good status. The risk assessment was not conclusive for many water bodies due to insufficient data. Therefore, the design of the surveillance monitoring network should take into account the results of the pressure and impact analysis to supplement and validate it.

*Please select the answer (only one) that in your opinion most accurately reflects the information provided in the report:*

- ☐ Yes. There are specific sub-programmes for surveillance monitoring that are designed to validate the results of the 2004 pressure and impact analysis
- ☐ Yes. Although there are no specific sub-programmes, the validation of the results of the 2004 pressure and impact analysis is one of the criteria used for the design of the surveillance monitoring network
- ☐ The report provides information on how the results of the 2004 pressure and impact analysis have been used in the design of the surveillance monitoring, but the criteria used do not seem to be fit for the purpose of validation of the pressure and impact results.
- ☐ It is not clear from the report how the results of the 2004 pressure and impact analysis have been used in the design of the surveillance monitoring. Information is insufficient.
- ☐ No information provided on the design of the surveillance (sub-) programmes.
- ☐ There are no surveillance monitoring (sub-)programmes.

Comments:

c) Providing information for use in the assessment of long term trends as a result of changes in natural conditions and through anthropogenic activity

In order to detect these long-term changes, an evaluation of groundwater background levels should be established.

*Please select the answer (only one) that in your opinion most accurately reflects the information provided in the report:*

- ☐ Yes. There are specific sub-programmes for surveillance monitoring that are designed to assess long-term changes. They take into account an estimate of background levels in monitored groundwater bodies.

- ☐ Yes. Although there are no specific sub-programmes, the assessment of long-term changes is one of the criteria used for the design of the surveillance monitoring network.
- ☐ It is not clear from the report if this objective has been used in the design of the surveillance monitoring. Information is insufficient.
- ☐ No information provided on the design of the surveillance (sub-) programmes.
- ☐ There are no surveillance monitoring (sub-)programmes for trend studies.

Comments:

- d) Does the report mention the criteria in the WFD Annex V 2.4.2 *Selection of monitoring sites* as taken into account to design the surveillance monitoring network?

- ☐ Yes
- ☐ No

Comments:

### Groundwater operational monitoring (chemical status)

- e) Establish the chemical status of those bodies identified as being at risk of failing to meet their environmental objectives and assess any changes in the status of such bodies resulting from the programmes of measures.

The status of the water bodies that as a result of the pressure and impact analysis of 2004 have been identified as at risk of failing to meet the environmental objectives has to be determined through operational monitoring.

*Please select the answer (only one) that in your opinion most accurately reflects the information provided in the report:*

- ☐ Yes. There are specific sub-programmes for operational monitoring that are designed to assess the status of water bodies at risk.
- ☐ Yes. Although there are no specific sub-programmes, the assessment of water bodies at risk is one of the criteria used for the design of the operational monitoring network.
- ☐ It is not clear from the report if this objective has been used in the design of the operational monitoring. Information is insufficient.
- ☐ No information provided on the design of the operational (sub-) programmes.
- ☐ There are no operational monitoring (sub-)programmes.

Comments:

- f) Establish the presence of any long term anthropogenically induced upward trend in the concentration of any pollutant

In order to detect these long-term changes, an evaluation of groundwater background levels should be established.

*Please select the answer (only one) that in your opinion most accurately reflects the information provided in the report:*

- ☐ Yes. There are specific sub-programmes for operational monitoring that are designed to establish the presence of upward pollution trends. They take into account estimates of background levels in monitored groundwater bodies.

- ☐ Yes. Although there are no specific sub-programmes, the assessment of pollution trends is one of the criteria used for the design of the operational monitoring network.
- ☐ It is not clear from the report if this objective has been used in the design of the operational monitoring. Information is insufficient.
- ☐ No information provided on the design of the operational (sub-) programmes.
- ☐ There are no operational monitoring (sub-)programmes for trend studies.

Comments:

- g) Does the report indicate that monitoring will start later than December 2006?  
Information in the field “Intended start date of the monitoring programme (if after 2006-12-22)” and “Reason(s) for delay if applicable”.

- ☐ No
- ☐ Yes, and the following reason is given: [Please complete]
- ☐ Yes, but no reason is given.

Comments:

### Protected areas

- h) Does the report provide information on monitoring of drinking water protected areas?  
As required in WFD Article 7. This is linked to surface water monitoring obligations. Information may be in the “Design Considerations” field and/or “Additional monitoring requirements for waters used in the abstraction of drinking water in relation to Article 7” and/or “Number of protected drinking water abstraction areas for which monitoring sites are associated” fields.

- ☐ Yes, there are specific (sub-)programmes with this objective.
- ☐ Yes, although there are no specific (sub-)programmes, the information provided indicate that the objective is covered.
- ☐ It is not clear from the report if this objective has been used in the design of the monitoring programmes. Information is insufficient.
- ☐ No information.

Comments:

- i) Does the report include links to reports in which a more detailed explanation of the monitoring concept is given? If yes, please give details such as hyperlinks in the comments section below.

- ☐ No
- ☐ Yes

Comments:

## 2. Comprehensiveness

**WFD reference:** Recital 36, Article 8.1.

### **Context:**

The WFD integrates all existing water legislation into its programme of measures and through the requirement to identify protected areas. Article 8.1 states that, for protected areas, the WFD monitoring programmes must be supplemented by those specifications contained in Community legislation under which the individual protected areas have been established. The monitoring is one of the most important elements that inform the decisions on measures. In addition many international river basins have established transboundary monitoring networks and there are other legislative and voluntary drivers for water monitoring. A joint approach towards the design of the monitoring programmes under the various drivers is integral part of the WFD and it is considered good practice.

### **Where to look for the information:**

**File:** MonitoringProgrammes.xml (in some cases Member States have separate reports describing their monitoring programmes and hence the information is not in the xml file)

**Fields:** Name of the programmes and/or sub-programmes

Field "Summary of the overall key design considerations for the programme"

Field "If part of an international monitoring programme, please describe the international programme and how this programme relates to it"

Field "Number of protected drinking water abstraction areas for which monitoring sites are associated in this programme".

**File:** GroundWaterMonitoringStations.xml

**Fields:** Field "Other networks" (Brief description of any other networks that this station is a part of) and section "International networks" (Name of the international network, e.g. EIONET)

### **Question 2: Is the report on monitoring programmes comprehensive?**

- a) Does the report provide information of networks linked to the implementation of other water Directives than WFD, international obligations like river conventions or of voluntary agreements?

*Please select the answer (only one) that in your opinion most accurately reflects the information provided in the report:*

- ☐ Yes. The report is comprehensive and provides complete information on monitoring of protected areas and other international and voluntary commitments.
- ☐ Partly. The report provides some information on monitoring of protected areas, but it is not comprehensive.
- ☐ No. The report does not provide information on monitoring of protected areas.

Comments:

- b) Does the report provide information on monitoring under the following legislative or voluntary agreements?

The information to answer this question can be based on the information in the fields "Other networks" and "International networks" in the GWMonitoringStations.xml file.



- Please tick as appropriate:*
- ☐ Drinking Water Directive 80/778/EEC
- ☐ Nitrates Directive 91/676/EEC
- ☐ Urban Waste Water Treatment Directive 91/271/EEC
- ☐ Habitats Directive 92/43/EEC
- ☐ Birds Directive 79/409/EEC
- ☐ International conventions. If yes please specify which:
- ☐ EIONET-Water

Comments:

### 3. Status of development of methods

**WFD reference:** Article 8.1, Annex V.

**Context:** The WFD provides general requirements for the assessment of groundwater (quantitative and chemical) status in Annex V.2.2 and 2.4. According to WFD article 8, by December 2006 Member States have to make operational their monitoring programmes. This includes having the methods developed. The article 8 reporting should provide a summary of the methods in use in the RBD for each groundwater parameter.

**Where to look for the information:**

**File:** MonitoringProgrammes.xml (in some cases Member States have separated reports describing their monitoring programmes and hence the information is not in the xml file)

**Fields:** Sampling methodology, Analysis methodology, Standards applied, Frequency methodology

#### **Question 3: Are the methods available for the assessment of water status?**

- a) What is the status of development of the methods used to assess the chemical status of groundwater?

*Please select the answer (only one) that in your opinion most accurately reflects the information provided in the report:*

- ☐ Fully developed. The report contains complete information on the methods for monitoring groundwater chemical status and references to methodological documents or standards in use.
- ☐ Under development. The description of the methods for some groundwater parameters indicates that they are under development.
- ☐ Incomplete information. Information on the methods for some groundwater parameters is missing.
- ☐ No information on methods.

Comments:

## 4. Selection of parameters

**WFD reference:** Article 8.1, Annex V section 2.4.2

**Context:** Annex V of the WFD requires Member States to monitor a set of core parameters in all groundwater bodies and parameters indicative of indicative pressures in groundwater bodies identified as being at risk (section 2.4.2 *Selection of parameters*) for surveillance monitoring. In the case of operational monitoring, Member States should monitor only those parameters which are indicative of the pressures to which the body is subject.

### Where to look for the information:

**File:** The spreadsheet (QE\_GWProgrammes) with statistical information contains the number of sites in each monitoring (sub-) programme at which each parameter is monitored.

**File:** MonitoringProgrammes.xml (in some cases Member States have separated reports describing their monitoring programmes and hence the information is not in the xml file)

**Fields:** "Parameters" monitored in terms of parameter code (see summary spreadsheet for translation of codes), number of sites, monitoring frequency and cycle.

File; GWMonitoringStations.xml

Fields: "Parameter", codes of each parameter monitored at each monitoring site

### **Question 4: Which parameters are used for the assessment of groundwater chemical status?**

- a) Are surveillance monitoring (sub-)programmes comprehensive in terms of parameters monitored?

In this context "comprehensive" means that they cover all parameters, as required in section 2.4.2 of WFD Annex V.

*Please select the answer (only one) that in your opinion most accurately reflects the information provided in the report:*

- ☐ Yes. The surveillance monitoring includes all core parameters and parameters indicative of identified pressures.
- ☐ Partly: Only core parameters are monitored
- ☐ Partly. Some parameters are missing.
- ☐ Not enough information.
- ☐ Monitoring of core and other parameters is not reported.

Comments:

- b) Is the selection of parameters to monitor in operational monitoring (sub-) programmes in line with the requirements of the WFD?

The spreadsheet with statistical data contains information on the parameters monitored in each programme or sub-programme, and for surveillance and/or operational monitoring. The intention of this question is to understand the approach taken by the Member State in selecting the parameters to monitor. The main focus of the question is on the parameters indicative of impacts of identified pressures.

*Please select the answer (only one) that in your opinion most accurately reflects the information provided in the report:*

- ☐ Yes. The operational monitoring is structured in various sub-programmes addressing different pressures. The selection of parameters is made on the basis of these main pressures.
- ☐ Yes. Although there are no specific sub-programmes addressing specific pressures, the information provided indicates that there is a targeted approach in selecting the various parameters depending on the pressures to which the water body is subject.
- ☐ Not fully. The approach taken includes the monitoring of a few selected parameters in each water body. (Please comment below)
- ☐ Not enough information.
- ☐ Monitoring of parameters (indicative of pressures) is not reported.

Comments:

## 5. Frequency of monitoring

**WFD reference:** Article 8.1, Annex V sections 2.2.3 and 2.4.3

**Context:** Annex V of the WFD provides indication of minimum frequencies for quantitative, surveillance and operational monitoring. In some cases, though, the achievement of the monitoring objectives and of an adequate level of confidence and precision would involve using a higher frequency than this minimum (see CIS Guidance document number 15 – Monitoring, sections 4.1.3, 4.2.3 and 5.1.3).

### Where to look for the information:

**File:** The spreadsheet (QE\_GWProgrammes) with statistical information may contain the frequency and cycle of monitoring the parameters in each monitoring (sub-) programme.

**File:** MonitoringProgrammes.xml (in some cases Member States have separated reports describing their monitoring programmes and hence the information is not in the xml file)

**Fields:** “Frequency”, “Cycle”, “Cycle description” and “Frequency methodology”

File: GWMonitoringStations.xml

Fields: “Frequency”, “Cycle”, and “Cycle description”

### **Question 5: What is the temporal and spatial intensity of monitoring?**

- a) The WFD requires that the **groundwater level monitoring** is carried out in such a way that the frequency of observation is sufficient to allow assessment of groundwater quantitative status, taking into account short and long-term variations in recharge and aquifer characteristics. Does the report provide information about this frequency?

This would be characterised by the "Cycle" field, 1 meaning every year, 2 every 2 years and so on. 0 means that the programme will be implemented the first year and depending on the results, future monitoring will be decided.

*Please select the answer (only one) that in your opinion most accurately reflects the information provided in the report:*

- ☐ Yes. In general the indicated cycle is 1, meaning that the groundwater level monitoring programmes will be carried out every year for the first cycle.
- ☐ Yes. In general the indicated cycle is 2, meaning that the groundwater level monitoring programmes will be carried out every second year for the first cycle.
- ☐ Yes. In general the indicated cycle is 3, meaning that the groundwater level monitoring programmes will be carried out every third year for the first cycle.
- ☐ Not yet decided. In general the indicated cycle is 0, meaning that for the moment the groundwater level monitoring programmes will be carried out the first year only.
- ☐ No. In general the indicated cycle is 6, meaning that the groundwater level monitoring programmes will be carried once over the RBMP cycle.
- ☐ Monitoring frequency is not reported.

Comments:

- b) In general the WFD stipulates that **chemical surveillance monitoring** must be carried out during each 6 year planning cycle. No minimum duration or frequency is specified for the surveillance programme though it would have to be carried for at least one year during the planning cycle. Does the report indicate higher frequencies than this minimum?

This would be characterised by the "Cycle" field, 1 meaning every year, 2 every 2 years and so on. 0 means that the programme will be implemented the first year and depending on the results, future monitoring will be decided.

*Please select the answer (only one) that in your opinion most accurately reflects the information provided in the report:*

- ☐ Yes. In general the indicated cycle is 1, meaning that the surveillance monitoring programmes will be carried out every year for the first cycle.
- ☐ Yes. In general the indicated cycle is 2, meaning that the surveillance monitoring programmes will be carried out every second year for the first cycle.
- ☐ Yes. In general the indicated cycle is 3, meaning that the surveillance monitoring programmes will be carried out every third year for the first cycle.
- ☐ Not yet decided. In general the indicated cycle is 0, meaning that for the moment the surveillance monitoring programmes will be carried out the first year only.
- ☐ No. In general the indicated cycle is 6, meaning that the surveillance monitoring programmes will be carried at the minimum frequency implied in the WFD.
- ☐ Monitoring frequency is not reported.

Comments:

- c) The WFD provides an indicative minimum monitoring frequency of at least once a year for **chemical operational monitoring** of parameters indicative of pressures. Does the report indicate higher frequencies than this minimum?

Operational monitoring has to be carried out for the periods between surveillance monitoring programmes at a frequency sufficient to detect the impacts of relevant pressures but a minimum of once per annum (Annex V section 2.4.3). This would be characterised by the combination of a number 1 in the "Frequency" field and a number 6 in the "Cycle" field. Any higher values for "Frequency" or lower for "Cycle" would

imply a higher intensity of sampling. Please note that some countries may have not interpreted those fields in the proposed way.

*Please select the answer (only one) that in your opinion most accurately reflects the information provided in the report:*

- ☐ Yes. In general the indicated cycle is 1, meaning that the operational monitoring programmes will be carried out every year for the first cycle.
- ☐ Yes. In general the indicated cycle is 2, meaning that the operational monitoring programmes will be carried out every second year for the first cycle.
- ☐ Yes. In general the indicated cycle is 3, meaning that the operational monitoring programmes will be carried out every third year for the first cycle.
- ☐ No. In general the indicated cycle is 6, meaning that the operational monitoring programmes will be carried out only for one year for the first cycle, i.e. according to the minimum in WFD.
- ☐ Not yet decided. In general the indicated cycle is 0, meaning that for the moment the operational monitoring programmes will be carried out the first year only.
- ☐ Not clear answer, there are many differences between the different programmes and/or parameters (please comment below).
- ☐ Monitoring frequency is not reported.

Comments:

