Selection of Quality Elements and Frequency of Monitoring

The proposed *quality elements* for monitoring cover all the required elements for quantitative and surveillance monitoring. Additional elements selected on a case-by-case basis will also be monitored for operational monitoring depending on the pressures identified in the risk assessment.

In addition to monitoring water levels, information on groundwater abstraction and discharge rates is also required to determine the quantitative status of groundwater bodies.

There are operational monitoring subnets for assessing the effectiveness of measures for dealing with point, diffuse and urban pollution sources/pressures.

The information on frequency is not included in the WISE electronic report but in a separate word document uploaded in WISE. The report provides information on monitoring *frequency* for the first 3 years.

The monitoring frequency for surveillance monitoring varies between 4 and 2 times a year and for operational monitoring between 12 and 4 times a year and for quantitative monitoring data loggers downloaded should take place between 6 and 2 times a year. The installation of data loggers to measure water level is proposed at all quantitative monitoring locations.

Operational monitoring will be carried out between periods of surveillance monitoring and samples will be taken, as a minimum, at least once a year. Higher frequencies are proposed where the existing data is not sufficient.

## FURTHER INFORMATION

http://www.epa.ie/whatwedo/wfd/monitoring/programme/

## SUMMARY OF TECHNICAL ASSESSMENT: STRENGTHS AND WEAKNESSES

+ Clear concept for developing the monitoring programmes following WFD requirements
+ Integration of monitoring of protected areas for surface and groundwaters
+ High density of monitoring stations
+ Coordination with United Kingdom in development of methods and monitoring programmes
– Reporting on methods for the assessment of ecological status not clear
– The electronic reporting is almost empty as regards methods and design considerations, largely referring to the paper report
– All methods for lakes appear to be under development
– Reporting of monitoring frequencies is not clear but it appears hardly beyond the minimum recommended in the WFD

## Member State: ITALY

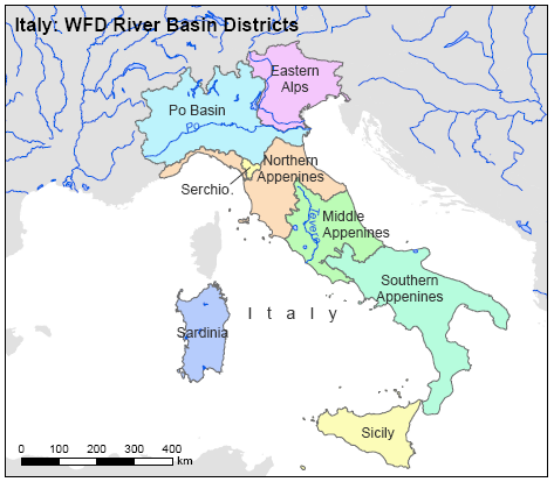
### INFORMATION SUPPLIED

Italy has submitted eight reports through WISE in the agreed format, covering all eight of its river basin districts. While the reports are at a river basin district level, almost all the monitoring programmes within them are organised at regional level.

### FACTS AND FIGURES

Italy has a population of 59 million (Eurostat, 2007) and an area of 304,392 km$^2$.

Italy shares two international river basins with neighbouring countries: Po Basin and Eastern Alps.




**River basin districts and number of water bodies**

| River Basin District | Surface (km$^2$) | % National territory | Number of river water bodies | Number of lake water bodies | Number of transitional water bodies | Number of coastal water bodies | Number of groundwater bodies |
|---|---|---|---|---|---|---|---|
| Po Basin | 70700 | 23 | 117 | 53 | 4 | 2 | 145 |
| Southern Appenines | 68200 | 22 | 267 | 30 | 7 | 79 | 131 |
| Eastern Alps | 39385 | 13 | 195 | 22 | 10 | 21 | 62 |
| Northern Appenines | 39000 | 13 | 137 | 9 | 3 | 19 | 15 |
| Middle Appenines | 35800 | 12 | 452 | 29 | 5 | 33 | 19 |
| Sicily | 25707 | 8 | 38 | 34 | 12 | 38 | 73 |
| Sardinia | 24000 | 8 | 22 | 32 | 39 | 67 | 37 |
| Serchio | 1600 | 0.5 | 2 | 1 | - | 1 | 5 |
| ***Italy*** | ***304392*** | ***100*** | ***1230*** | ***210*** | ***80*** | ***260*** | ***487*** |

**Number of surveillance, operational and quantitative monitoring stations**

| River Basin District | Rivers | | Lakes | | Transitional waters | | Coastal waters | | Groundwaters | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Surv | Op | Surv | Op | Surv | Op | Surv | Op | Surv | Op | Quant |
| Po Basin | 203 | 415 | 26 | 74 | 0 | 7 | 0 | 5 | 97 | 1018 | 0 |
| Southern Appenines | 44 | 80 | 7 | 9 | 0 | 15 | 16 | 52 | 72 | 709 | 0 |
| Eastern Alps | 221 | 164 | 21 | 10 | 0 | 8 | 0 | 73 | 395 | 75 | 0 |
| Northern Appenines | 7 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Middle Appenines | 135 | 229 | 8 | 13 | 4 | 7 | 94 | 31 | 633 | 526 | 0 |
| Sicily | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sardinia | 10 | 92 | 18 | 66 | 23 | 113 | 193 | 24 | 28 | 47 | 0 |
| Serchio | 0 | 0 | 0 | 0 | - | - | 0 | 0 | 0 | 0 | 0 |
| ***Total*** | ***620*** | ***996*** | ***80*** | ***172*** | ***27*** | ***150*** | ***303*** | ***185*** | ***1225*** | ***2375*** | ***0*** |
| ***Total number of monitoring stations*** | | | | | | | | | | | |

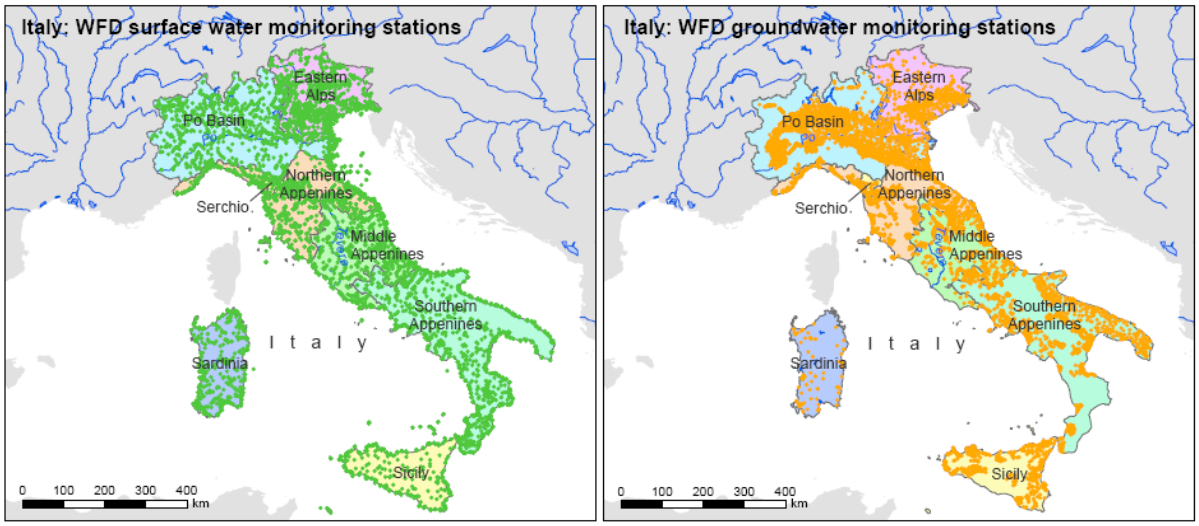
**Note:**
1. The total number of monitoring stations was not provided. Total number of monitoring stations is not necessarily the sum of surveillance and operational as there are stations that serve both purposes.
2. The numbers presented in this table were only received on 3 March 2009 and therefore this information has not been taken into account in the assessment. The numbers differ substantially from the ones reported under article 8 by Italy in 2007, which are the ones used in the indicators and tables in the rest of this report. The numbers in the table above are much lower and have been provided as a response to a consultation in January 2009.

**Number of monitoring stations in protected areas reported under the WFD**

| River Basin District | Surface water | | | | | | | Ground water |
|---|---|---|---|---|---|---|---|---|
| | Bathing Water | Habitats / Birds | Drinking Water | Fish | Shellfish | Nitrates | Urban waste water | Drinking water |
| Po Basin | | 355 | | 152 | 34 | 326 | 170 | 22 |
| Southern Appenines | | 373 | | 173 | 55 | 122 | 24 | 3 |
| Eastern Alps | | 425 | | 444 | 85 | 239 | 336 | 135 |
| Northern Appenines | | 289 | | 241 | 138 | 52 | 218 | 273 |
| Middle Appenines | | 287 | | 242 | 64 | 69 | 71 | 31 |
| Sicily | | 131 | | 0 | 0 | 8 | 9 | 0 |
| Sardinia | | 365 | | 43 | 128 | 15 | 210 | 0 |
| Serchio | | 9 | | 29 | 0 | 2 | 0 | 1 |
| Total | | ***2234*** | | ***1324*** | ***504*** | ***833*** | ***1038*** | ***465*** |

**Note**:
1. The reporting of monitoring of protected areas under the Water Framework Directive was due only if the information was not reported under other directives. A total of 2599 surface water monitoring stations for nitrates have been reported by Italy under the nitrates Directive in 2008 (reference period 2004-2007). 5692 surface water monitoring stations were reported under the bathing water directive (bathing season 2007). Those figures are preliminary as quality checking is on-going at the time this report is written.
2. The numbers presented in this table were only received on 3 March 2009 and therefore this information has not been taken into account in the assessment. The numbers in the table have been provided as a response to a consultation in January 2009.

**Location of surface water and groundwater monitoring stations**




**Note**: These maps have not been adjusted to the numbers provided by Italy on 3 March 2009 shown in the table above.

## SURFACE WATER MONITORING PROGRAMMES

Design of Monitoring Programmes

The reports assign all monitoring programmes and monitoring stations to both *surveillance* and *operational monitoring* and do not provide description to distinguish the two programmes. The reports state that not all regions have provided relevant data. In the Serchio river basin district, the report states that there are no monitoring programmes set up for coastal waters.

The reports do not provide information on the design of the monitoring programmes: for example, whether monitoring has been designed to supplement a previous pressure and impact assessment; how surveillance programmes are designed to monitor long-term changes; or whether *operational monitoring* focuses on water bodies at risk.

The report provides no information on design criteria other than a reference to the Italian transposition of the WFD Annex V. In addition, almost no information is provided on the monitoring of biological and hydromorphological quality elements. The report appears to be based solely on pre-WFD networks.

For *investigative* monitoring, the reports provide a general statement of objectives without any detail of the programmes themselves.

In terms of design of the monitoring programmes for *drinking water protected areas*, the reports for some of the river basin districts cite an annex to Legislative Decree no. 152 of 2006 which implies that drinking water monitoring programme should exist, but this is not clear.

The report provides information on the monitoring stations that are located in protected areas established by four other directives: Birds Directive; Habitats Directive; Nitrates Directive; and Urban Waste Water Treatment Directive. No information is given on *international*

*coordination* in the design of monitoring networks for those river basin districts which cross boundaries.

The monitoring programmes are mostly reported at regional level and there is no indication that those are coordinated at river basin district level.

## Development of Biological Assessment Methods

No information reported on development of biological assessment methods or levels of confidence.

**Summary of available biological assessment methods**

| | Rivers | | | | Lakes | | | | Transitional Waters | | | | Coastal Waters | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Phytoplankton | Macrophytes and Phytobenthos | Benthic invertebrates | Fish | Phytoplankton | Macrophytes and Phytobenthos | Benthic invertebrates | Fish | Phytoplankton | Macroalgae and Angiosperms | Benthic invertebrates | Fish | Phytoplankton | Macroalgae and Angiosperms | Benthic invertebrates |
| Italy | | | | | | | | | | | | | | | |

*Method available* | *Under development or incomplete information* | *Not developed or no information* | *Not relevant* -

**Note**: In the context of the WFD intercalibration exercise, Italy has intercalibrated the national assessment methods for macroinvertebrates in rivers (Alpine, Central and Mediterranean geographical areas) and macroalgae in Mediterranean coastal waters. In addition, Italy has intercalibrated a parameter indicative of taxonomic composition and abundance of phytoplankton in lakes (Alpine and Mediterranean reservoirs), a parameter indicative of biomass of phytoplankton in lakes (Mediterranean reservoirs only) and a parameter indicative of biomass of phytoplankton in coastal waters (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).

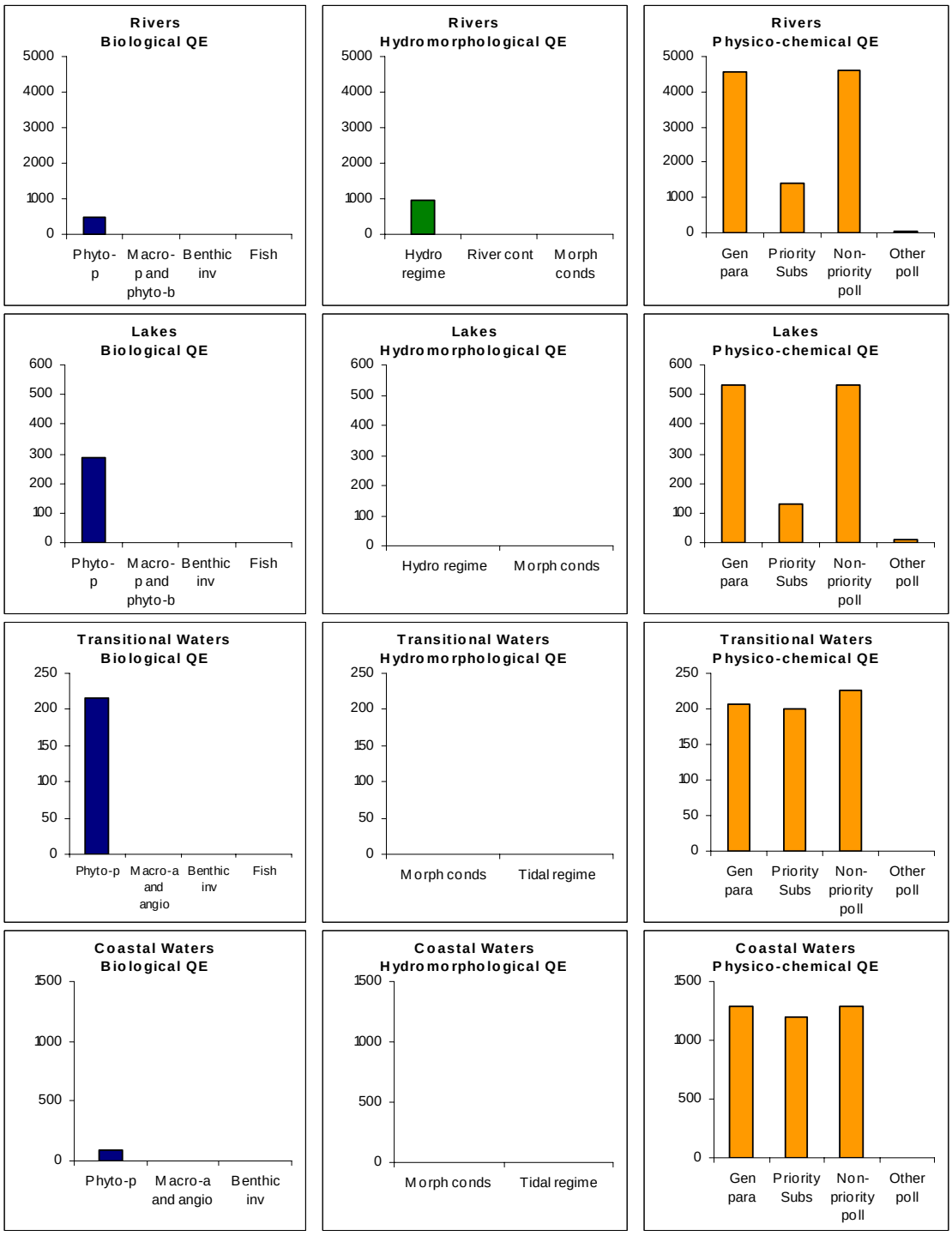
## Selection of Quality Elements and Frequency of Monitoring

The reporting by Italy does not specify which biological quality elements are monitored in each water category, except for phytoplankton, which is specified in some rivers, lakes, coastal and transitional waters sub-programmes. Priority substances are not monitored in rivers in Sardegna and Sicily river basin districts, nor in transitional waters in Southern Apennines, where also other specific pollutants are not monitored. No information is given on the monitoring of hydromorphological parameters in lakes except in Eastern Alps river basin district. Hydromorphology is not monitored in transitional waters in Eastern Alps, and in coastal waters, only in Padano and Northern Apennines. In Sicily no general physico-chemical parameters are reported to be monitored in transitional waters.

Frequency of monitoring is generally reported once a year for all quality elements and monitoring programmes.

**Number of stations where quality elements are monitored (surveillance and operational monitoring) in rivers, lakes, transitional and coastal waters**

**Note**: The reporting by Italy does not specify which biological quality elements are monitored in each water category, except for phytoplankton




## GROUNDWATER

Design of Monitoring Programmes

Information is missing on design of groundwater monitoring programmes.

According to the report, the Italian regions have not yet provided specific information on *operational* and *surveillance monitoring* programmes, and in the interim, the reports assign all monitoring stations to both surveillance and operational monitoring.

The report provides information on monitoring stations located in drinking water protected areas. Information on other international networks and networks under other EC legislation is not provided

Selection of Quality Elements and Frequency of Monitoring

The coverage of parameters varies across the various river basin districts.

In all river basin districts, monitoring stations cover chemical parameters. Many stations do not, however, cover Oxygen content or pH value. No information is provided on monitoring design with regard to pressures on groundwater.

Essentially all monitoring stations are monitored yearly.

## FURTHER INFORMATION

*Further information has not been provided*

## SUMMARY OF TECHNICAL ASSESSMENT: STRENGTHS AND WEAKNESSES

+ Monitoring network for surface waters and groundwater (chemical monitoring) with annual monitoring frequency
– It seems that there has not been a development of WFD monitoring programmes but instead the report includes existing pre-WFD networks
– The report give evidence of the lack of coordination between the regions (monitoring programmes are in many cases regionally based)
– Groundwater quantitative monitoring is missing
– Coastal monitoring is missing for the Serchio river basin district

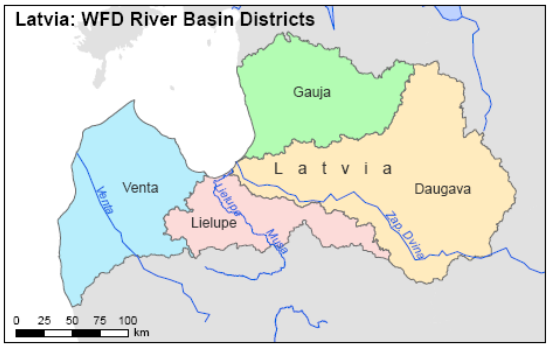
# Member State: LATVIA

## INFORMATION SUPPLIED

Latvia has reported through WISE in the agreed format for its 4 river basin districts (Ventas, Lielupes, Gaujas and Daugavas). In addition a link to a national report "Vides monitoringa programma" has been provided.

## FACTS AND FIGURES

Latvia has a population of 2.3 million (Eurostat, 2007) and an area of 64,586 km$^2$.
Latvia is situated in four international river basins: Daugava, Venta, Gauja and Lielupe.




**River basin districts and number of water bodies**

| River Basin District | Surface (km$^2$) | % National territory | Number of river water bodies | Number of lake water bodies | Number of transitional water bodies | Number of coastal water bodies | Number of groundwater bodies |
|---|---|---|---|---|---|---|---|
| Daugava | 27062 | 42 | 68 | 188 | 1 | - | 4 |
| Venta | 15625 | 24 | 68 | 30 | - | 6 | 8 |
| Gauja | 13050 | 20 | 47 | 36 | 1 | 1 | 4 |
| Lielupe | 8849 | 14 | 39 | 13 | 1 | - | 0 |
| ***Latvia*** | ***64586*** | ***100*** | ***222*** | ***267*** | ***3*** | ***7*** | ***16*** |

**Number of surveillance, operational and quantitative monitoring stations**

| River Basin District | Rivers | | Lakes | | Transitional waters | | Coastal waters | | Groundwaters | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Surv | Op | Surv | Op | Surv | Op | Surv | Op | Surv | Op | Quant |
| Daugava | 9 | 25 | 17 | 19 | 1 | 0 | - | - | 22 | 0 | 18 |
| Venta | 9 | 25 | 7 | 10 | - | - | 9 | 3 | 19 | 0 | 23 |
| Gauja | 10 | 17 | 3 | 11 | 6 | 2 | 5 | 1 | 22 | 0 | 11 |
| Lielupe | 5 | 21 | 3 | 4 | 3 | 0 | - | - | 14 | 0 | 9 |
| ***Total*** | ***33*** | ***88*** | ***30*** | ***44*** | ***10*** | ***2*** | ***14*** | ***4*** | ***77*** | ***0*** | ***61*** |
| ***Total number of monitoring stations*** | ***121*** | | ***74*** | | ***12*** | | ***18*** | | ***77*** | | ***61*** |

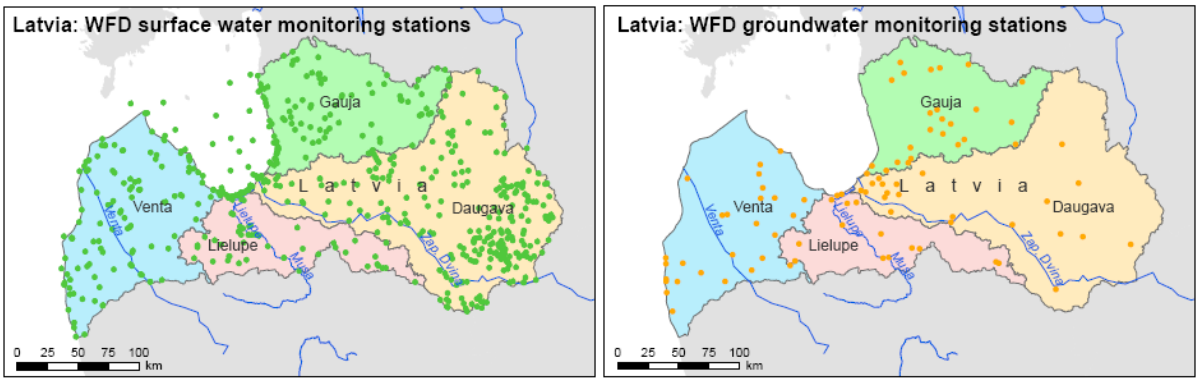
**Note**: A large number of additional monitoring stations were reported but marked as neither surveillance nor operational monitoring: 101 additional stations for rivers, 197 for lakes, 12 for transitional waters and 23 for coastal waters.

**Number of WFD monitoring stations in protected areas reported under the WFD**

| River Basin District | Surface water | | | | | | | Ground water |
|---|---|---|---|---|---|---|---|---|
| | Bathing Water | Habitats / Birds | Drinking Water | Fish | Shellfish | Nitrates | Urban waste water | Drinking Water |
| Daugava | 1 | 118 | 2 | 52 | | 7 | - | |
| Venta | 13 | 57 | | 44 | | | - | |
| Gauja | 11 | 64 | | 25 | | 11 | - | |
| Lielupe | 10 | 22 | | 13 | | 37 | - | |
| ***Total*** | ***35*** | ***261*** | ***2*** | ***134*** | | ***55*** | ***-*** | |

**Notes**:
1. The reporting of monitoring of protected areas under the Water Framework Directive was due only if the information was not reported under other directives. A total of 356 surface water monitoring stations for nitrates have been reported by Latvia under the nitrates Directive in 2008 (reference period 2004-2007). 278 surface water monitoring stations were reported under the bathing water directive (bathing season 2007). Those figures are preliminary as quality checking is on-going at the time this report is written.
2. Latvia applies more stringent waste water treatment in the whole of its territory and therefore, in accordance to article 5.8 of the Urban Waste Water Directive 1991/271/EEC, it is exempted from designation of specific sensitive areas.

**Location of surface water and groundwater monitoring stations**




## SURFACE WATER MONITORING PROGRAMMES

### Design of Monitoring Programmes

There are standard national monitoring programmes for both *operational* and *surveillance monitoring* with subprogrammes for rivers, lakes, transitional and coastal waters. The design objectives of the programmes are not reported and are not obvious in the source reference. Although the monitoring programmes are probably aimed at assessing the long term changes arising from anthropogenic activity this is not explicitly stated, and only one reference monitoring site is reported. There is insufficient information on the methodology to upgrade the existing network and to assess if Water Framework Directive objectives and criteria were covered or taken into account by the monitoring programmes.

There is no clear separation of surveillance and operational programmes. Many stations are identified as belonging neither to surveillance nor to operational monitoring programmes. Although there might be reasons for stations being neither surveillance not operational (i.e.

reporting of networks for other purposes), those are not clear from the report. The information in the monitoring programmes file is not consistent with that in the stations file.

The report states that *investigative monitoring* is "performed to clarify reasons (if unknown) of endangering of environmental quality, of failures to reach ecological quality targets, and to assess the impact of pollution which has been arisen in an incident and to obtain necessary data for improving countermeasures", but it does not provide any additional information.
The monitoring programmes were already in place in 2006 and revised in 2007.

The report provides quite comprehensive information on the location of monitoring stations in *protected areas*.

Almost no information is given on international co-ordination. Some sites are reported to be part of WISE-SoE (formerly Eionet-Water) and/or Helcom reporting/monitoring.

Development of Biological Assessment Methods

Information is provided neither on development of biological assessment methods nor on *confidence levels and precision*.

**Summary of available biological assessment methods**

| | Rivers | | | | Lakes | | | | Transitional Waters | | | | Coastal Waters | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Phytoplankton | Macrophytes and Phytobenthos | Benthic invertebrates | Fish | Phytoplankton | Macrophytes and Phytobenthos | Benthic invertebrates | Fish | Phytoplankton | Macroalgae and Angiosperms | Benthic invertebrates | Fish | Phytoplankton | Macroalgae and Angiosperms | Benthic invertebrates |
| Daugava | | | | | | | | | | | | | --- | --- | --- |
| Venta | | | | | | | | | --- | --- | --- | --- | | | |
| Gauja | | | | | | | | | | | | | | | |
| Lielupe | | | | | | | | | | | | | --- | --- | --- |

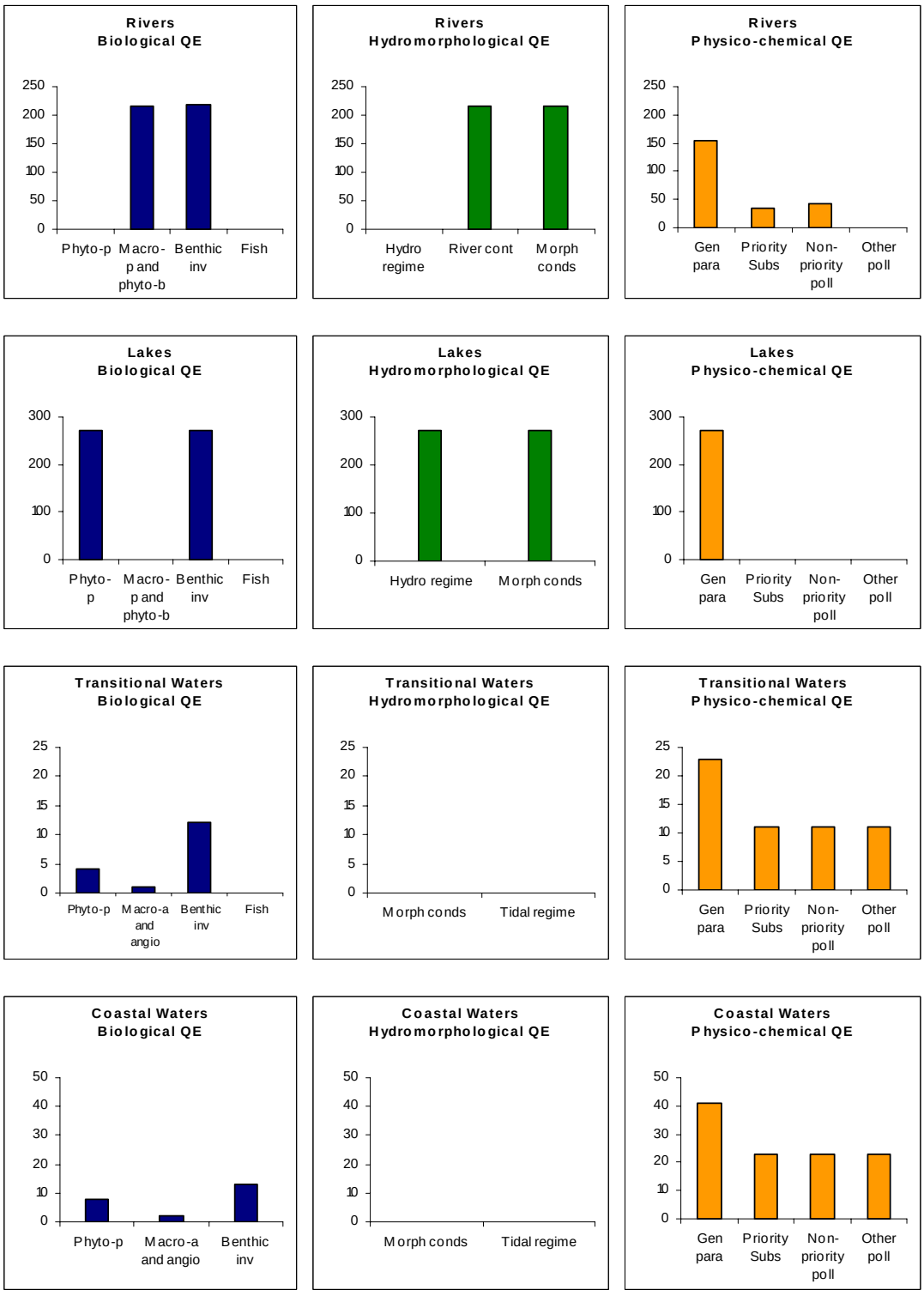
*Method available* | *Under development or incomplete information* | *Not developed or no information* | *Not relevant* -

**Note**: In the context of the WFD intercalibration exercise, Latvia has intercalibrated the national assessment method for macrophytes in lakes. In addition, Latvia has intercalibrated a parameter indicative of biomass of phytoplankton in lakes and in coastal waters (chlorophyll-a) (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).

Selection of Quality Elements and Frequency of Monitoring

The selection of quality elements is not at all comprehensive. Fish is not monitored in any water category. Phytoplankton is not monitored in rivers. Other aquatic flora apart from phytoplankton is not monitored in lakes. Priority substances are not monitored in lakes in Daugava river basin district. In transitional waters, macroinvertebrates is the only biological quality element monitored in Daugava and Lielupe river basin district, whereas in the Gauja fish is missing. Hydromorphology is not monitored in transitional and coastal waters.

**Number of stations where quality elements are monitored (surveillance and operational monitoring) in rivers, lakes, transitional and coastal waters**




All quality elements are reported to be monitored every year except composition and abundance of other aquatic flora which is monitored once every 3 years. Chemical and physico-chemical quality elements are measured 3-6 times a year.

## GROUNDWATER MONITORING PROGRAMMES

Design of Monitoring Programmes

There are specific monitoring programmes for chemical *surveillance monitoring* in each of the river basin district. No *operational monitoring* programme is reported (no stations).
For both programmes, the information is limited. There is no information on the methodologies for site selection except that there are existing wells. In the reference report there is no clear evidence that the results of 2004 analysis, or that long-term trends or that the criteria in WFD have been taken into account.

There is no information on additional monitoring in relation to *drinking water protected areas.*
In the reference document all of the listed Directives are reported to be listed as legal acts on which the monitoring program is developed. In the stations report the stations belonging to WISE-SoE are identified.

Although, all Latvian river basin districts are international, there is no reference to any international co-operation or any relevant comments.

Selection of Quality Elements and Frequency of Monitoring

Chemical *surveillance monitoring* covers only core parameters.

According to the electronic reporting the groundwater level is monitored once a year, but the information in the reference report suggests that in 2006 monitoring is annual but from 2007 the frequency of the monitoring will be reduced to every 3 years. Chemical parameters are reported to be monitored once a year.

## FURTHER INFORMATION

*http://www.lvgma.gov.lv/vmp2005/*

## SUMMARY OF TECHNICAL ASSESSMENT: STRENGTHS AND WEAKNESSES

+ Frequency of monitoring of surface waters is higher than the minimum in the WFD
– The report is incomplete in many areas
– No clear concept in developing WFD monitoring programmes
– No information on methods to assess ecological status

## Member State: LITHUANIA

### INFORMATION SUPPLIED

Lithuania has reported through WISE in the agreed format surface and groundwater monitoring stations and monitoring programmes for its four river basin districts. Reference to the national monitoring programme on groundwater was mentioned but no web links or copy of the programmes was provided. There are transitional and coastal waters only in the Nemunas river basin district.

### FACTS AND FIGURES

Lithuania has a population of 3.4 million (Eurostat, 2007) and an area of 65,300 km$^2$.

Lithuania is situated in four international river basins: Nemunas, Lielupe, Venta and Daugava.


**River basin districts and number of water bodies**

| River Basin District | Surface (km$^2$) | % National territory | Number of river water bodies | Number of lake water bodies | Number of transitional water bodies | Number of coastal water bodies | Number of groundwater bodies |
|---|---|---|---|---|---|---|---|
| Nemunas | 48203 | 74 | 620 | 288 | 4 | 2 | 17 |
| Lielupe | 8949 | 14 | 136 | 22 | - | - | 3 |
| Venta | 6278 | 10 | 104 | 22 | - | - | 2 |
| Daugava | 1870 | 3 | 17 | 28 | - | - | 0 |
| ***Lithuania*** | ***65300*** | ***100*** | ***877*** | ***360*** | ***4*** | ***2*** | ***22*** |

**Numbers of surveillance, operational and quantitative monitoring stations**

| River Basin District | Rivers | | Lakes | | Transitional waters | | Coastal waters | | Groundwaters | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Surv | Op | Surv | Op | Surv | Op | Surv | Op | Surv | Op | Quant |
| Nemunas | 445 | 382 | 162 | 98 | 0 | 18 | 0 | 17 | 174 | 0 | 54 |
| Lielupe | 77 | 76 | 7 | 11 | - | - | - | - | 25 | 0 | 8 |
| Venta | 62 | 68 | 5 | 14 | - | - | - | - | 28 | 0 | 9 |
| Daugava | 20 | 6 | 25 | 3 | - | - | - | - | 10 | 0 | 3 |
| ***Total*** | ***604*** | ***532*** | ***199*** | ***126*** | ***0*** | ***18*** | ***0*** | ***17*** | ***237*** | ***0*** | ***74*** |
| ***Total number of monitoring stations*** | ***1136*** | | ***325*** | | ***18*** | | ***17*** | | ***237*** | | ***74*** |

**Note**: A number of additional monitoring stations were reported but marked as neither surveillance nor operational monitoring: 106 additional stations for rivers and 21 for lakes.

**Number of monitoring stations in protected areas reported under the WFD**

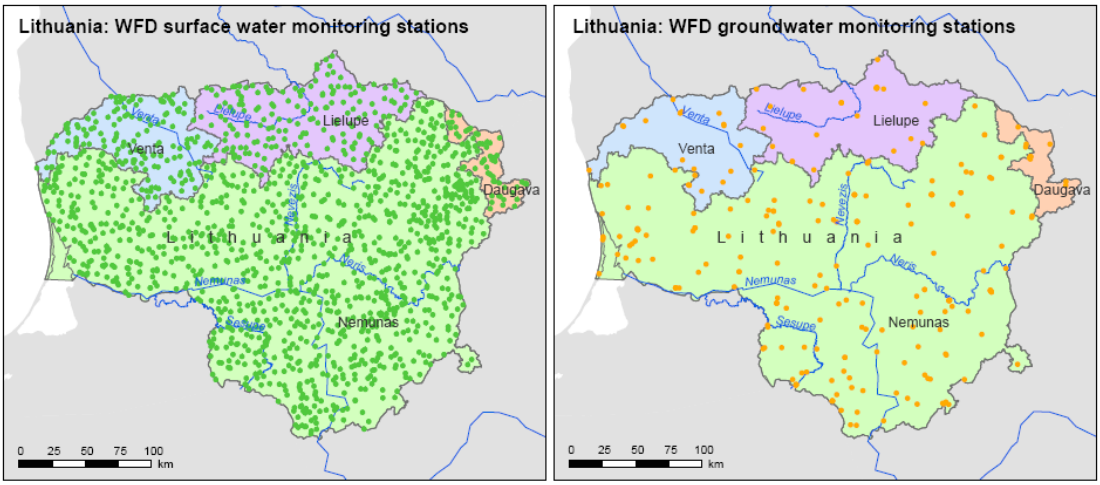
| River Basin District | Surface water | | | | | | | Ground water |
|---|---|---|---|---|---|---|---|---|
| | Bathing Water | Habitats / Birds | Drinking Water | Fish | Shellfish | Nitrates | Urban waste water | Drinking water |
| Nemunas | | | | | | - | - | 76 |
| Lielupe | | | | | - | - | - | 12 |
| Venta | | | | | - | - | - | 14 |
| Daugava | | | | | - | - | - | 3 |
| ***Total*** | | | | | | **-** | **-** | ***105*** |

**Notes**:
1. The reporting of monitoring of protected areas under the Water Framework Directive was due only if the information was not reported under other directives. A total of 127 surface water monitoring stations for nitrates have been reported by Lithuania under the nitrates Directive in 2008 (reference period 2004-2007). 100 surface water monitoring stations were reported under the bathing water directive (bathing season 2007). Those figures are preliminary as quality checking is on-going at the time this report is written.

2. Lithuania has established and applies action programmes in the whole of its territory and therefore, in accordance to article 3.5 of the Nitrates Directive 1991/676/EEC, it is exempted from designation of specific vulnerable zones.

3. Lithuania applies more stringent waste water treatment in the whole of its territory and therefore, in accordance to article 5.8 of the Urban Waste Water Directive 1991/271/EEC, it is exempted from designation of specific sensitive areas.

**Location of surface water and groundwater monitoring stations**




## SURFACE WATER MONITORING PROGRAMMES

### Design of Monitoring Programmes

WFD objectives in terms of validating the results of the 2004 Article 5 risk assessment and for detecting long term changes in natural conditions are reported to have been taken into account in the design of *surveillance monitoring* for rivers and lakes. No surveillance monitoring is reported for transitional and coastal waters in the Nemunas river basin district. In addition, no monitoring stations in transitional or coastal waters have been reported in the stations file (only the monitoring programmes are reported).

*Operational monitoring* has been designed to assess the status of water bodies at risk in rivers and lakes. The information is not clear for transitional and coastal waters.

A strategy for *investigative monitoring* has been established.

The report does not provide any information on the *monitoring of protected areas* although it mentions that some sites are located in the protected areas. No specific sub-programmes have been established in relation to drinking water protected areas.

Reference is made to linkages with the HELCOM Baltic Sea monitoring programme, but there was no other evidence of *international coordination* in designing the monitoring networks.

## Development of Biological Assessment Methods

There is incomplete information on development of biological assessment methods and no information given on *levels of confidence and precision*. Macroinvertebrates in rivers are said to be assessed with the Danish method.

**Summary of available biological assessment methods**

| | Rivers | | | | Lakes | | | | Transitional Waters | | | | Coastal Waters | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Phytoplankton | Macrophytes and Phytobenthos | Benthic invertebrates | Fish | Phytoplankton | Macrophytes and Phytobenthos | Benthic invertebrates | Fish | Phytoplankton | Macroalgae and Angiosperms | Benthic invertebrates | Fish | Phytoplankton | Macroalgae and Angiosperms | Benthic invertebrates |
| Lithuania | | | | | | | | | | | | | | | |

*Method available* | *Under development or incomplete information* | *Not developed or no information* | *Not relevant* -

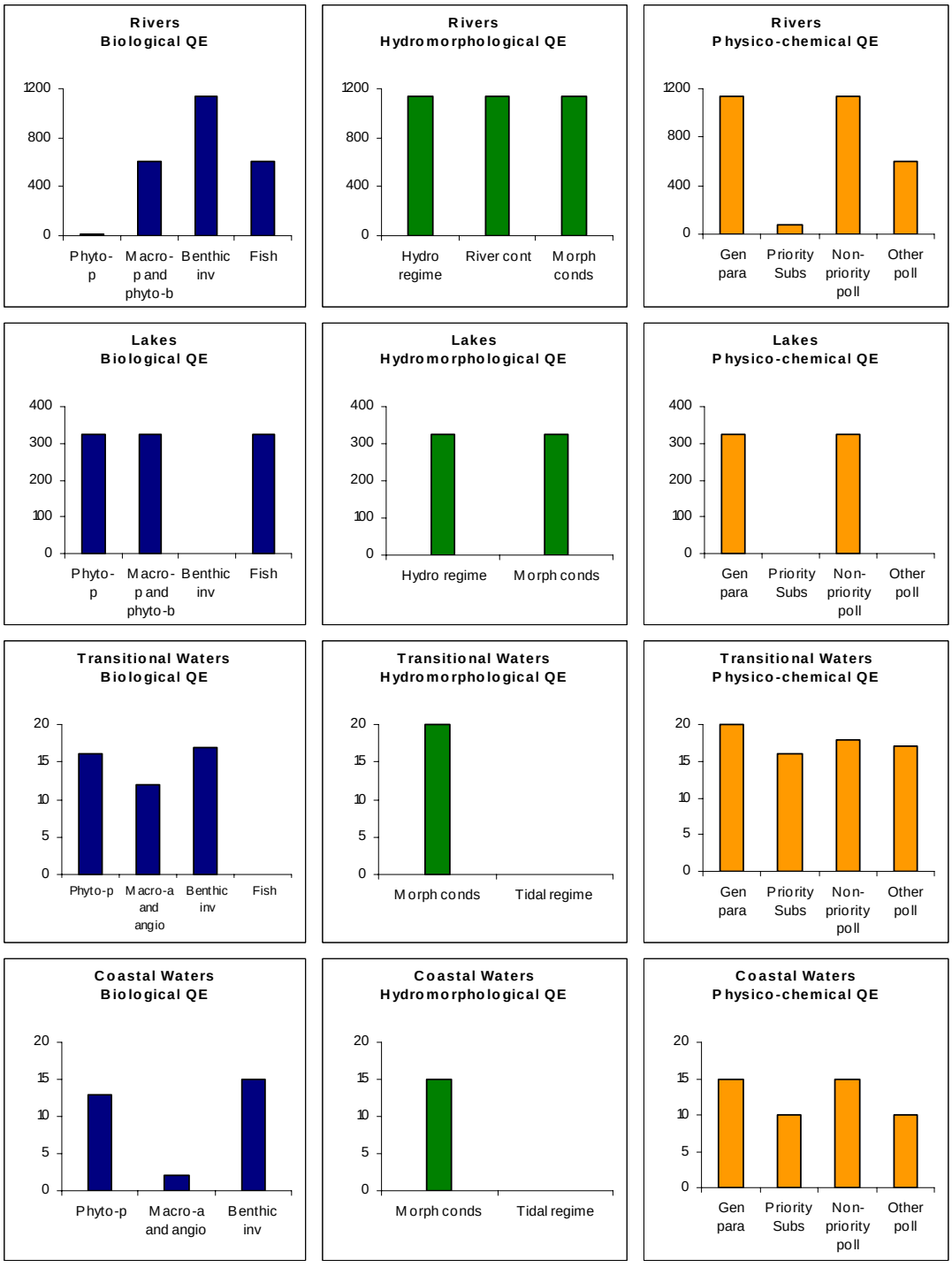
**Note**: In the context of the WFD intercalibration exercise, Lithuania has only intercalibrated parameters indicative of biomass of phytoplankton in lakes and in one type of transitional waters (see Commission Decision 2008/915/EC of 30 October 2008 establishing, pursuant to Directive 2000/60/EC of 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).

## Selection of Quality Elements and Frequency of Monitoring

Surveillance monitoring for rivers covers all quality elements. In lakes neither macroinvertebrates nor priority substances are monitored. There is no surveillance monitoring for transitional and coastal waters.

Biological *operational monitoring* in rivers focuses on one quality element, composition, abundance and diversity of benthic invertebrate fauna. In lakes, operational monitoring is based on phytoplankton, macrophytes and fish. Biological quality elements are monitored in transitional waters excluding fish and in coastal waters all three elements and zooplankton.

**Number of stations where quality elements are monitored (surveillance and operational monitoring) in rivers, lakes, transitional and coastal waters**




*The frequency of monitoring* varies between the different sub-programmes, quality elements and water bodies. For rivers and lakes monitoring of biological quality elements will be carried out every 3 or 6 years except for macroinvertebrates, every year. For transitional and coastal waters the monitoring of biological quality elements is carried out every year.

## GROUND WATER MONITORING PROGRAMMES

Design of monitoring programme

The Article 8 reports for groundwater monitoring are incomplete and do not provide sufficient and clear information for most of the sections required.

In each of the river basin districts, there are specific monitoring programmes for chemical *surveillance monitoring* and for groundwater level monitoring. No *operational monitoring* programme was reported.

For both surveillance and quantitative programmes, the information in the report is limited and insufficient. The description of the methodologies does not provide sufficient information to understand how the sites were selected and if the results of 2004 pressure and impact analysis have been taken into account. Although the report indicates that WFD requirements are fulfilled, it does not provide supportive evidence that the criteria for surveillance monitoring have been taken into account.

Although the monitoring programme indicates that drinking water abstraction sites, with less than 100 m3/d, are included in the *surveillance monitoring* network, there is no further information on additional monitoring in relation to *drinking water abstraction*.

Information on *protected areas* is limited to comments that monitoring requirements under the Nitrates and Groundwater Directives are covered by the surveillance programme. For drinking water areas with more than 100 m3/d and sites of Integrated Pollution Prevention and Control Directive specific monitoring programmes are in place. Although, each river basin district is international, there is no reference to *international co-operation,* only a brief comment that for transboundary groundwater bodies, monitoring stations are provided in the river basin district in which they physically occur. The report on monitoring stations indicates which stations are part of the WISE-SoE.

Selection of Quality Elements and Frequency of Monitoring

Chemical *surveillance monitoring* covers all general parameters (oxygen content, pH value, conductivity, nitrate and ammonium) and other pollutants (not specific parameters).

*Frequency of monitoring:* Groundwater level is monitored daily every year (cycle one, frequency 365). All general and other chemical parameters are measured once a year every year.

## FURTHER INFORMATION

No further information was provided.

## SUMMARY OF TECHNICAL ASSESSMENT: STRENGTHS AND WEAKNESSES

+ High density of monitoring stations in rivers and lakes
– Report very brief, no information about design criteria
– Availability of methods to assess ecological status

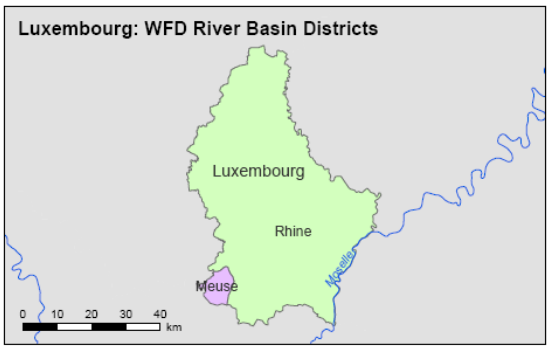
# Member State: LUXEMBOURG

## INFORMATION SUPPLIED

Luxembourg supplied reports through WISE in the agreed format for its two river basin districts.

## FACTS AND FIGURES

Luxembourg has a population of 0.5 million (Eurostat, 2007) and an area of 2,586 km$^2$.
Luxembourg is situated in two international river basins: Rhine and Meuse.
Luxembourg has no lakes, transitional or coastal waters.




**River basin districts and number of water bodies**

| River Basin District | Surface (km$^2$) | % national territory | Number of river water bodies | Number of lake water bodies | Number of transitional water bodies | Number of coastal water bodies | Number of groundwater bodies |
|---|---|---|---|---|---|---|---|
| Rhine | 2521 | 97 | 98 | - | - | - | 2 |
| Meuse | 65 | 3 | 3 | - | - | - | 1 |
| ***Luxembourg*** | ***2586*** | ***100*** | ***101*** | ***-*** | ***-*** | ***-*** | ***3*** |

**Numbers of surveillance, operational and quantitative monitoring stations**

| River Basin District | Rivers | | Lakes | | Transitional waters | | Coastal waters | | Groundwaters | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Surv | Op | Surv | Op | Surv | Op | Surv | Op | Surv | Op | Quant |
| Rhine | 4 | 16 | - | - | - | - | - | - | 31 | 0 | 11 |
| Meuse | 1 | 1 | - | - | - | - | - | - | 0 | 0 | 0 |
| ***Total*** | ***5*** | ***17*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***31*** | ***0*** | ***11*** |
| ***Total number of monitoring stations*** | ***17*** | | ***-*** | | ***-*** | | ***-*** | | ***31*** | | ***11*** |

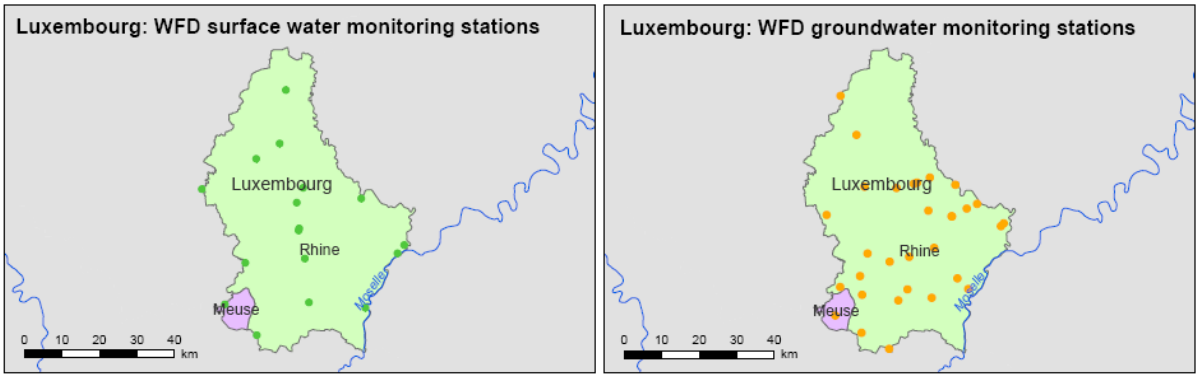
**Note:** Total number of monitoring stations is not necessarily the sum of surveillance and operational as there are stations that serve both purposes

**Number of monitoring stations in protected areas reported under the WFD**

| River Basin District | Surface water | | | | | | | Ground water |
|---|---|---|---|---|---|---|---|---|
| | Bathing Water | Habitats / Birds | Drinking Water | Fish | Shellfish | Nitrates | Urban waste water | Drinking Water |
| Rhine | | 4 | 1 | 12 | - | - | - | 17 |
| Meuse | | | | | - | - | - | |
| ***Total*** | | ***4*** | ***1*** | ***12*** | ***-*** | ***-*** | ***-*** | ***17*** |

**Notes**:
1. The reporting of monitoring of protected areas under the Water Framework Directive was due only if the information was not reported under other directives. A total of 16 surface water monitoring stations for nitrates have been reported by Luxembourg under the nitrates Directive in 2008 (reference period 2004-2007). 20 surface water monitoring stations were reported under the bathing water directive (bathing season 2007). Those figures are preliminary as quality checking is on-going at the time this report is written.
2. Luxembourg has established and applies action programmes in the whole of its territory and therefore, in accordance to article 3.5 of the Nitrates Directive 1991/676/EEC, it is exempted from designation of specific vulnerable zones.
3. Luxembourg applies more stringent waste water treatment in the whole of its territory and therefore, in accordance to article 5.8 of the Urban Waste Water Directive 1991/271/EEC, it is exempted from designation of specific sensitive areas.

**Location of surface water and groundwater monitoring stations**




## SURFACE WATER MONITORING PROGRAMMES

### Design of Monitoring Programmes

Sub-programmes for *surveillance* and, in the case of the Rhine river basin district, *operational monitoring* have been established. There is no information on strategic objectives, neither for surveillance monitoring, nor for operational monitoring. The only criteria mentioned, are that the selected sites should be representative of the entire river basin and that quality elements should be monitored within the same water body but not necessarily at the same monitoring station.

*Investigative Monitoring:* the reports merely indicate that 'immediate investigations and analyses will be carried out in order to remedy problems'. Information on types of incidents (other) is marked as 'not applicable'.

There is no reported information as to whether additional monitoring is undertaken in relation to *drinking water protected areas*. The reports identify monitoring stations located in protected areas, but there is no information on the design of the monitoring programmes under the various drivers, nor of the methodology or criteria used to select sites

There is one operational monitoring site (Rhine) with conflicting information about whether there is any drinking water abstraction from the site or associated water bodies, all others are indicated as not part of a *protected area* under the *Drinking Water Directive*.

The report does not mention any *international coordination* for the surface water monitoring programmes.

### Development of Biological Assessment Methods

A brief description of the methods for the biological quality elements for rivers is included in the report, but no clear reference to developed assessment methods. Therefore, the methods have been considered under development. There is no information on frequency or levels of *confidence and precision*.

**Summary of available biological assessment methods**

| | Rivers | | | | Lakes | | | | Transitional Waters | | | | Coastal Waters | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Phytoplankton | Macrophytes and Phytobenthos | Benthic invertebrates | Fish | Phytoplankton | Macrophytes and Phytobenthos | Benthic invertebrates | Fish | Phytoplankton | Macroalgae and Angiosperms | Benthic invertebrates | Fish | Phytoplankton | Macroalgae and Angiosperms | Benthic invertebrates |
| Luxembourg | | | | | - | - | - | - | - | - | - | - | - | - | - |

*Method available* *Under development or incomplete information* *Not developed or no information* *Not relevant* -

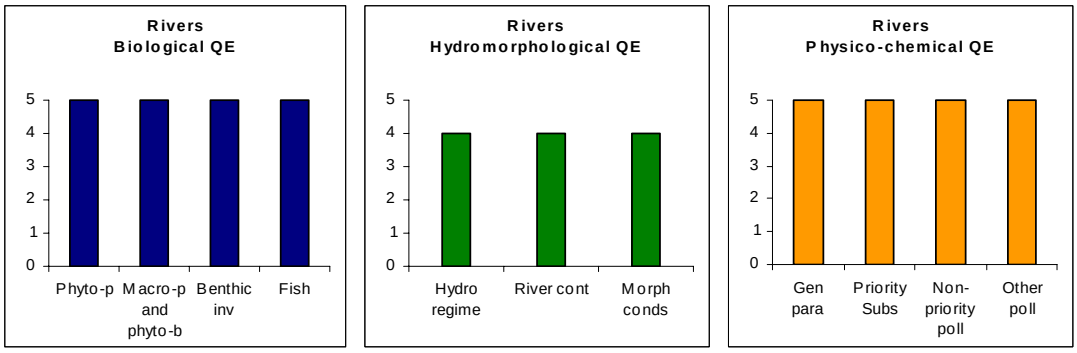
**Note**: In the context of the WFD intercalibration exercise, Luxembourg has intercalibrated the national assessment methods for macroinvertebrates and phytobenthos in rivers (see Commission Decision 2008/915/EC of 30 October 2008 establishing, pursuant to Directive 2000/60/EC of the European Parliament 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).

## Selection of Quality Elements and Frequency of Monitoring

Surveillance monitoring covers all quality elements. For operational monitoring (in the Rhine only), the biological quality elements are not specified.

The monitoring cycle is every year or every 3 years depending on the quality element and river basin district. The frequency of operational monitoring is still to be decided.

**Number of stations where quality elements are monitored (surveillance and operational monitoring) in rivers, lakes, transitional and coastal waters**




## GROUNDWATER MONITORING PROGRAMMES

### Design of Monitoring Programmes

Whilst there is no groundwater monitoring in the Luxembourg part of the Meuse river basin district, there is a monitoring programme in the Rhine river basin district. This includes *surveillance*, *chemical* and *quantitative monitoring*, but no *operational monitoring* in this part of the Rhine river basin district.

A very brief description indicates that sites were selected on the basis of pressures, such as land use and geomorphological conditions, to get a general overview of chemical status and trends. However, it is not clear how the 2004 pressure and impact analysis is taken into account.

Although the monitoring programme includes drinking water abstraction sites, additional monitoring in relation to drinking water abstraction is yet to be established.

There is a brief reference to *international co-operation* in the Rhine RBD (Saar-Moselle Convention – ICPSM).

Selection of Quality Elements and Frequency of Monitoring

*Surveillance monitoring* (no operational monitoring) in the Rhine river basin district includes the all the core parameters except oxygen content. Other specific pollutants are not included. Additional monitoring at drinking water abstraction sites is still to be established.

Groundwater level is monitored once a year (cycle one, frequency one) at about one third of total sites. Chemical parameters are also measured once a year.

## FURTHER INFORMATION

*No further information was submitted*

## SUMMARY OF TECHNICAL ASSESSMENT: STRENGTHS AND WEAKNESSES

+ Frequency of surveillance monitoring is higher than the minimum required in the WFD
– Report very brief, no information about design criteria
– Status of development of methods for the assessment of ecological status not clear

## Member State: MALTA

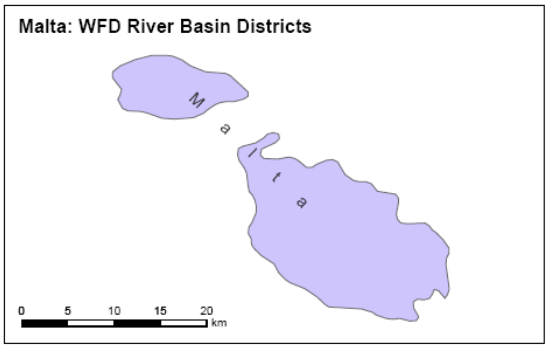
### INFORMATION SUPPLIED

Malta sent a report only on monitoring of groundwater. There is no information provided on surface waters. Malta did not submit the report in electronic format through WISE, but a electronic version of a paper report was provided together with a link to additional information.

### FACTS AND FIGURES

Malta has a population of 400,000 and an area of 399 km$^2$ (including coastal waters).

Malta comprises one river basin district.




**River basin districts and number of water bodies**

| River Basin District | Surface (km$^2$) | % National territory | Number of river water bodies | Number of lake water bodies | Number of transitional water bodies | Number of coastal water bodies | Number of groundwater bodies |
|---|---|---|---|---|---|---|---|
| Malta | 399 | 100 | 4 | 4 | 3 | 19 | 16 |
| ***Malta*** | ***399*** | ***100*** | ***4*** | ***4*** | ***3*** | ***19*** | ***16*** |

**Number of surveillance, operational and quantitative monitoring stations**

| River Basin District | Rivers | | Lakes | | Transitional waters | | Coastal waters | | Groundwaters | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Surv | Op | Surv | Op | Surv | Op | Surv | Op | Surv | Op | Quant |
| Malta | | | | | | | | | 38 | 38 | 40 |
| ***Total*** | | | | | | | | | ***38*** | ***38*** | ***40*** |
| ***Total number of monitoring stations*** | | | | | | | | | ***38*** | | ***40*** |

**Notes:**
1. No information on surface water monitoring has been submitted.
2. Total number of monitoring stations is not necessarily the sum of surveillance and operational as there are stations that serve both purposes
3. There are 102 groundwater monitoring sites that are neither marked as quantitative, surveillance nor operational, included the stations covering protected areas.

**Number of monitoring stations in protected areas reported under the WFD**

| River Basin District | Surface water | | | | | | | Ground water |
|---|---|---|---|---|---|---|---|---|
| | Bathing Water | Habitats / Birds | Drinking Water | Fish | Shellfish | Nitrates | Urban waste water | Drinking Water |
| Malta | | | | | | - | | 89 |
| ***Total*** | | | | | | **-** | | ***89*** |

**Notes:**
1. No information on surface water monitoring has been submitted.
2. The reporting of monitoring of protected areas under the Water Framework Directive was due only if the information was not reported under other directives. A total of 36 surface water monitoring stations for nitrates have been reported by Malta under the nitrates Directive in 2008 (reference period 2004-2007). 87 surface water monitoring stations were reported under the bathing water directive (bathing season 2007). Those figures are preliminary as quality checking is on-going at the time this report is written.
3. Malta has established and applies action programmes in the whole of its territory and therefore, in accordance to article 3.5 of the Nitrates Directive 1991/676/EEC, it is exempted from designation of specific vulnerable zones.

**Location of surface water and groundwater monitoring stations**

No information on surface water monitoring has been submitted. Co-ordinates for groundwater monitoring stations have been submitted but in an unknown projection, therefore can not be displayed.

## SURFACE WATER MONITORING PROGRAMMES

There was no report on surface waters provided by Malta.

## GROUNDWATER MONITORING PROGRAMMES

Design of Monitoring Programmes

Malta has put in place quantitative and surveillance monitoring programmes for groundwater. Surveillance monitoring stations may also be used as operational monitoring sites.

Although the *quantitative monitoring* programme is reported to assist the characterisation process, there was no clear evidence that the validation of the 2004 analysis had been taken into account in the design of such a programme. The selection of sites is based on conceptual models. Groundwater levels in boreholes will be used as the basic parameter for measuring quantitative status. In addition, in the perched aquifers, flow from springs will be used conjunctively with water level. The existing network which only covers 2 groundwater bodies will be complemented with additional sites in the other groundwater bodies.

*Surveillance monitoring* programme is reported to have taken into account the validation of 2004 analysis and long-term trends assessment. The criteria of the design of monitoring of the WFD have been taken into account for the selection of sites (in terms of groundwater bodies at risk). The selection of the monitoring sites was based on conceptual models. A wide range of parameters is reported to be monitored once every 6 years with an increased frequency being proposed for a number of additional indicators of anthropogenic contamination typical

of the land-use activity in the area and with the potential to impact groundwater status. These parameters would be part of the operational monitoring programme.

In addition, for groundwater bodies at risk included in the surveillance network, these are covered by an *operational monitoring* programme. Operational monitoring is carried out during the periods between surveillance monitoring, and focuses on groundwater bodies at risk.

There is an existing specific monitoring programme covering *drinking water protected areas* which will be adapted to reflect WFD objectives. All boreholes and pumping stations abstracting water intended for human consumption are monitored monthly under that programme. As regards protected areas, the report provides information on monitoring of *drinking water protected areas*.

Stations part of the WISE-SoE are identified.

Selection of Quality Elements and Frequency of Monitoring

Core plus other *quality elements* (long list including microbiological, organic and inorganic parameters and metals) are reported to be selected on basis of potential risk to groundwater under the surveillance monitoring.

Under operational monitoring, core plus specific determinands selected on basis of pressures and including sodium, lead, zinc, copper, boron, chloride, fluoride and selected pesticides will be monitored in groundwater bodies at risk. In addition, any other parameters whereby any risks are identified from studies carried out during the planning cycle could be added to that list.

At existing sites in the 2 groundwater bodies, water level is continuously monitored while monthly measurement of water level will be introduced in the other water bodies, although initially these measurements will be done on a quarterly level. These monitoring points will be complemented, where possible, with flow measurements from springs. Flow measurements will initially be performed on a monthly basis; with automated systems measuring flow on a daily basis being gradually introduced with the aim of automating the whole network in the medium term.

Surveillance monitoring programme will be carried out once during each planning cycle (that is once every six years); with an increased *frequency* being proposed for a number of additional indicators of anthropogenic contamination typical of the land-use activity in the area and with the potential to impact groundwater status. For management purposes, these parameters will be incorporated with the operational monitoring programme.

For operational monitoring, monitoring frequency is being proposed to be twice every year, in spring and autumn. However, if the initial results coming out from these monitoring programmes identify significant threats from pollution in certain bodies of groundwater, a review of the monitoring strategy in these bodies will be carried out; and the possibility of extending the frequency of the operational monitoring to a quarterly basis will be considered.

## FURTHER INFORMATION

http://www.mra.org.mt/wfd_introduction.shtml

## SUMMARY OF TECHNICAL ASSESSMENT: STRENGTHS AND WEAKNESSES

+ Clear concept for the design of the groundwater monitoring programmes
+ High density of groundwater monitoring stations
– Report for surface waters missing
– No electronic reporting through WISE

## Member State: THE NETHERLANDS

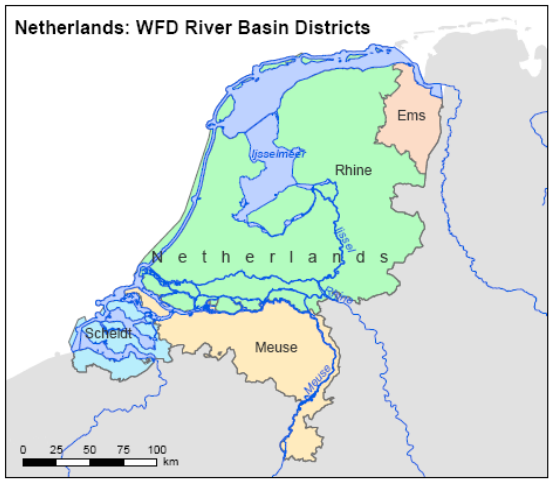
### INFORMATION SUPPLIED

The Netherlands have reported through WISE in the agreed format for its four river basin districts. In addition, detailed reports on the national and international monitoring programmes were supplied:

- Samenvatting Nederlandse Monitoringprogramma's voor de deelstroomgebieden Rijndelta, Maas, Schelde en Eems
- Rapport inzake de Monitoringprogramma's volgens Kaderrichtlijn Water in het Stroomgebiedsdistrict Eems
- Rapportage inzake de coördinatie van de toestand- en trendmonitoringsprogramma´s conform artikel 8 en artikel 15, lid 2 KRW in het internationale stroomgebiedsdistrict Rijn (Rijndistrict) (deel A – rapportage)
- Internationaal stroomgebieddistrict Maas: Rapport over de coördinatie van de toestand- en trendmonitoringprogramma's in het internationaal stroomgebieddistrict Maas

### FACTS AND FIGURES

The Netherlands has a population of 16.4 million (Eurostat, 2007) and an area of ca. 41,800 km$^2$. The Netherlands are situated in four international river basins: Rhine, Meuse, Scheldt and Ems.




**River basin districts and number of water bodies**

| River Basin District | Surface (km$^2$) | % National territory | Number of river water bodies | Number of lake water bodies | Number of transitional water bodies | Number of coastal water bodies | Number of groundwater bodies |
|---|---|---|---|---|---|---|---|
| Rhine | 28500 | 68 | 142 | 340 | 2 | 6 | 11 |
| Meuse | 7500 | 18 | 103 | 49 | 1 | 2 | 5 |
| Scheldt | 3200 | 8 | 1 | 49 | 1 | 5 | 5 |
| Ems | 2600 | 6 | 5 | 14 | 1 | 2 | 2 |
| ***Netherlands*** | ***41800*** | ***100*** | ***251*** | ***452*** | ***5*** | ***15*** | ***23*** |

**Note:** Many artificial canals and ditches are included as lake water bodies due to their similar ecological character.

### Numbers of surveillance, operational and quantitative monitoring stations

| River Basin District | Rivers | | Lakes | | Transitional waters | | Coastal waters | | Groundwaters | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Surv | Op | Surv | Op | Surv | Op | Surv | Op | Surv | Op | Quant |
| Rhine | 27 | 109 | 46 | 156 | 5 | 8 | 12 | 8 | 566 | 193 | 753 |
| Meuse | 43 | 108 | 13 | 31 | 4 | 5 | 4 | 2 | 384 | 178 | 186 |
| Scheldt | 2 | 3 | 6 | 24 | 4 | 3 | 7 | 5 | 38 | 3 | 32 |
| Ems | 2 | 5 | 5 | 15 | 5 | 2 | 3 | 1 | 60 | 20 | 33 |
| ***Total*** | ***74*** | ***225*** | ***70*** | ***226*** | ***18*** | ***18*** | ***26*** | ***16*** | ***1048*** | ***394*** | ***1004*** |
| ***Total number of monitoring stations*** | ***235*** | | ***238*** | | ***22*** | | ***28*** | | ***1099*** | | ***1004*** |

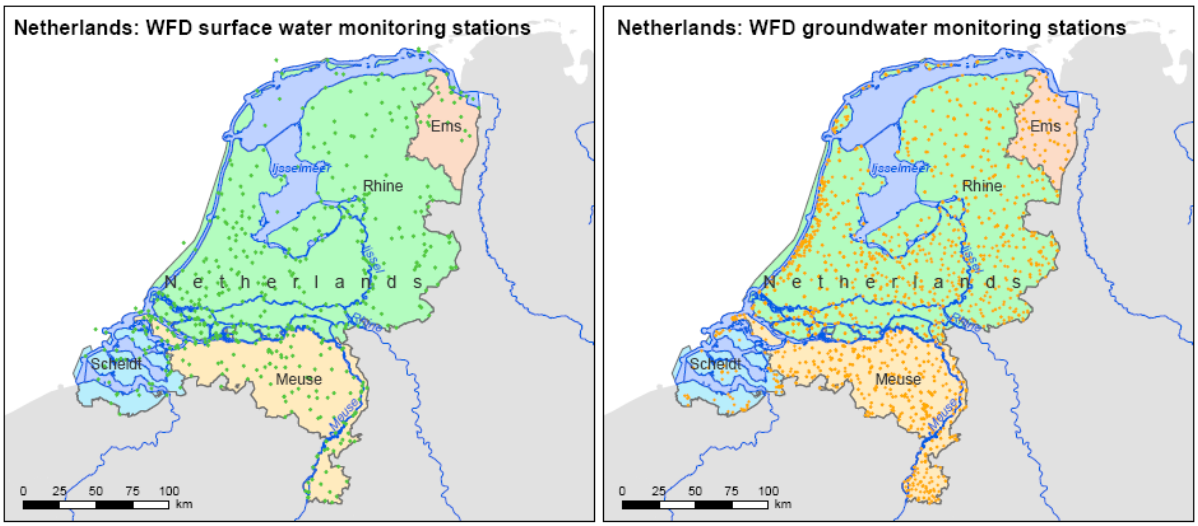
**Note**: Total number of monitoring stations is not necessarily the sum of surveillance and operational as there are stations that serve both purposes

### Number of monitoring stations in protected areas reported under the WFD

| River Basin District | Surface water | | | | | | | Ground water |
|---|---|---|---|---|---|---|---|---|
| | Bathing Water | Habitats / Birds | Drinking Water | Fish | Shellfish | Nitrates | Urban waste water | Drinking Water |
| Rhine | | | 2 | | | - | - | 147 |
| Meuse | | | 4 | | | - | - | 62 |
| Scheldt | | | | | | - | - | 5 |
| Ems | | | 1 | | | - | - | 8 |
| ***Total*** | | | ***7*** | | | ***-*** | ***-*** | ***222*** |

**Notes**:
1. The reporting of monitoring of protected areas under the Water Framework Directive was due only if the information was not reported under other directives. A total of 546 surface water monitoring stations for nitrates have been reported by the Netherlands under the nitrates Directive in 2008 (reference period 2004-2007). 643 surface water monitoring stations were reported under the bathing water directive (bathing season 2007). Those figures are preliminary as quality checking is on-going at the time this report is written.
2. The Netherlands has established and applies action programmes in the whole of its territory and therefore, in accordance to article 3.5 of the Nitrates Directive 1991/676/EEC, it is exempted from designation of specific vulnerable zones.
3. The Netherlands applies more stringent waste water treatment in the whole of its territory and therefore, in accordance to article 5.8 of the Urban Waste Water Directive 1991/271/EEC, it is exempted from designation of specific sensitive areas.
4. Under reporting directive 91/692/EC the Netherlands has reported 22 monitoring stations for the fish directive and 14 for the shellfish directive.
5. According to the information provided by the Dutch authorities, monitoring in habitats and birds protected areas will be part of a specific monitoring chapter in the management plan under preparation as a resulting obligation of these directives.

**Location of surface water and groundwater monitoring stations**




## SURFACE WATER MONITORING PROGRAMMES

Design of Monitoring Programmes

In general the reports provide clear and comprehensive information about the monitoring programmes. The approach to reporting on monitoring is very similar in all four river basin districts. There are no differences in terms of information on design of the networks between the different river basin districts. In each river basin district, separate programmes for surveillance and operational monitoring have been established. These are further sub-divided into sub-programmes to cover each water category and the four groups of quality elements (biological, chemical, physicochemical and hydromorphological).

The objectives for monitoring have been clearly mentioned except the validation of the 2004 analysis, which is not mentioned.

Monitoring points for *surveillance monitoring* are selected based on the criteria for surveillance monitoring listed in the Directive.
Monitoring points for *operational monitoring* were selected to establish the status of those bodies identified as being at risk.

*Investigative monitoring* will take place if the cause(s) for a water body to fail its objective or potential can not be ascertained after operational monitoring.

None of the reports provided information on *protected areas*. The reports stated that there is no additional specific monitoring effort for the purpose of drinking water protected areas.

*International coordination* of monitoring programmes has been put into place in each of the four international river basin districts and the reports refer to the relevant documents. The co-ordination of the programmes is carried out in the context of the International Commissions for the Protection of the Rhine, Meuse and Scheldt Rivers.

## Development of Biological Assessment Methods

The methods for biological assessment are described, referenced and reported to be available for all biological quality elements. There is no information on the *levels of confidence and precision* in any of the reports.

**Summary of available biological assessment methods**

| | Rivers | | | | Lakes | | | | Transitional Waters | | | | Coastal Waters | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Phytoplankton | Macrophytes and Phytobenthos | Benthic invertebrates | Fish | Phytoplankton | Macrophytes and Phytobenthos | Benthic invertebrates | Fish | Phytoplankton | Macroalgae and Angiosperms | Benthic invertebrates | Fish | Phytoplankton | Macroalgae and Angiosperms | Benthic invertebrates |
| Netherlands | | | | | | | | | | | | | | | |

*Method available* | *Under development or incomplete information* | *Not developed or no information* | *Not relevant* -

**Note**: In the context of the WFD intercalibration exercise, the Netherlands has intercalibrated national methods for a range of biological quality elements (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).

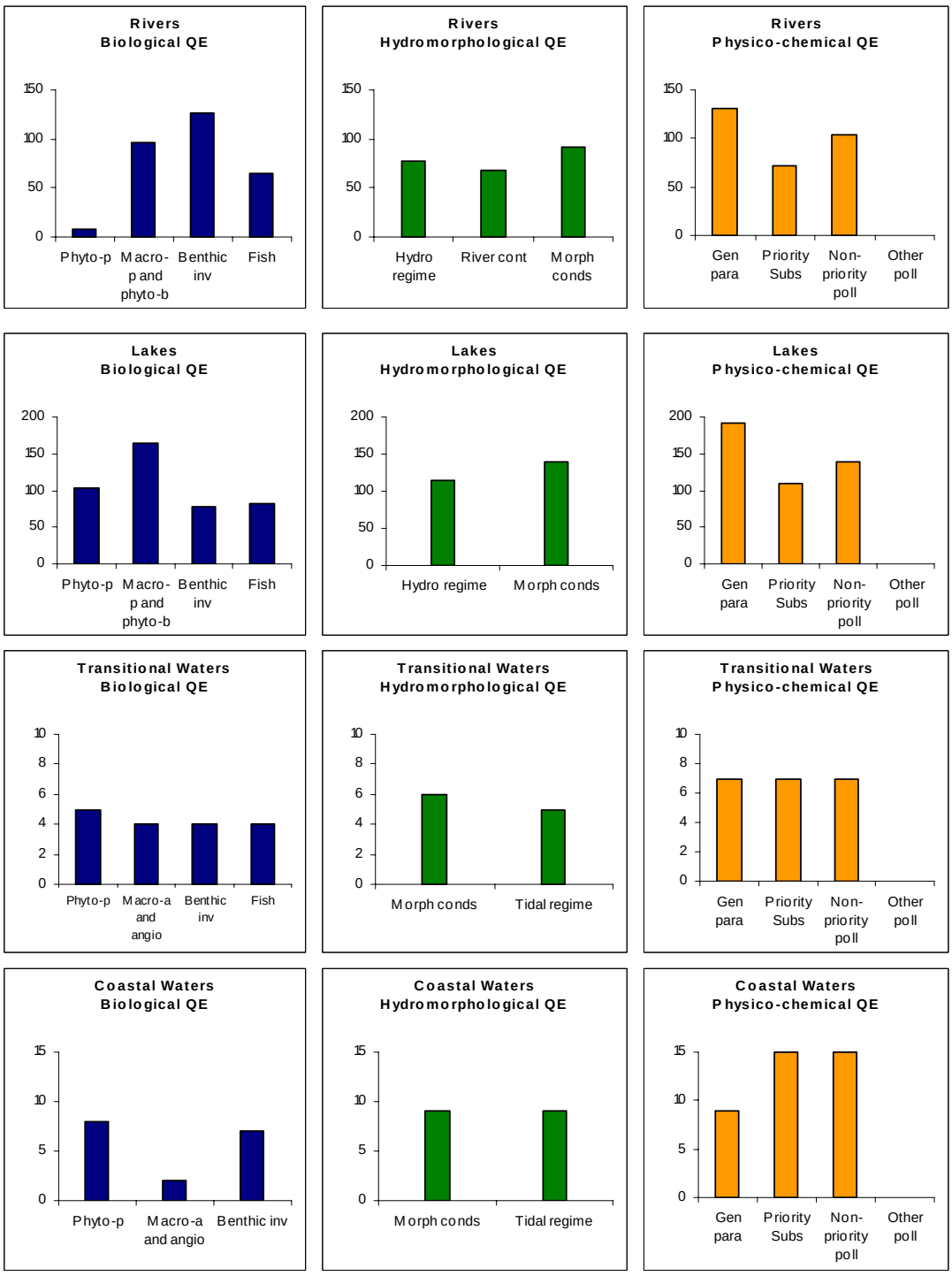
## Selection of Quality Elements and Frequency of Monitoring

Surveillance monitoring covers all *quality elements* in all water categories except other aquatic flora in coastal waters in the Ems and the Meuse and hydromorphology of lakes in the Scheldt river basin district.
Operational monitoring programmes are structured according to water category and group of quality elements. A wide range of biological quality elements is used in what looks a targeted approach to monitor the existing pressures.

Surveillance monitoring will be carried out at the minimum *frequency* of once per 6 years as specified in the WFD across the different elements and across water categories for the four river basin districts.

Operational monitoring in all water categories is carried out every 3 years for biological quality elements except for phytoplankton, which is every year. Physico-chemical parameters and priority substances are monitored every year.

**Number of stations where quality elements are monitored (surveillance and operational monitoring) in rivers, lakes, transitional and coastal waters**



## GROUNDWATER

Design of Monitoring Programmes

Groundwater monitoring in all four river basin districts includes surveillance monitoring (named 'status and trends') and operational chemical monitoring. In addition, there is a quantitative monitoring programme which consists of three sub-programmes, i.e.

1. Salt: focuses on confirming/establishing boundaries between freshwater and brackish-/seawater;

2. Terrestial ecosystems: focuses on changes resulting from groundwater abstraction and resulting risks to terrestrial ecosystems.

3. Regional equilibria: focuses on balance between abstraction and replenishment.

All programmes are closely linked to pre-existing monitoring programmes, which are referred to, notably monitoring of drinking water abstraction sites (Dutch drinking water regulations require raw water to be monitored by water suppliers), including sites in *drinking water protected areas*.

The surveillance and operational programmes are closely linked and designed for each water body to confirm existing chemical status and *assess any trends*. The operational programme focuses on pressures and the assessment of the effects of programmes of measures. No sub-sites have been defined.
Overall, the WFD criteria for surveillance monitoring of groundwater chemical status have been taken into account. The reports are comprehensive and clear.

There is reference to *international cooperation* at near border groundwater bodies, although the relevant international conventions are not necessarily referred to. Only one cross-border water body has been defined (in the Scheldt river basin district).

Selection of Quality Elements and Frequency of Monitoring

All *core parameters and 'other pollutants'* are monitored, some specific parameters are listed, including pesticides.

The *frequency* for quantitative monitoring is twice a month each year (all three sub-programmes). Chemical surveillance monitoring is carried out once in 6 years, whilst operational monitoring is once a year.

## FURTHER INFORMATION

- Ministerie van Verkeer en Waterstaat / DG Water Coördinatiebureau Stroomgebieden Nederland (CSN) (2006): Samenvatting Nederlandse Monitoringprogramma's voor de deelstroomgebieden Rijndelta, Maas, Schelde en Eems – http://www.kaderrichtlijnwater.nl

- Niedersächsischer Landesbetrieb für Wasserwirtschaft, Küsten- und Naturschutz, Ministerie van Verkeer en Waterstaat, Bezirksregierung Münster (2007): Rapport inzake de Monitoringprogramma's volgens Kaderrichtlijn Water in het

Stroomgebiedsdistrict Eems, Rapportage 2007 KRW – Stroomgebiedsdistrict Eems – http://www.ems-eems.eu

- IKSR/CIPR/ICBR (2007): Rapportage inzake de coördinatie van de toestand- en trendmonitoringsprogramma´s conform artikel 8 en artikel 15, lid 2 KRW in het internationale stroomgebiedsdistrict Rijn (Rijndistrict) (deel A – rapportage) - http://www.iksr.org/fileadmin/user_upload/Dokumente_nl/PLEN-CC_06-06nl_rev._15.03.07_m.K..pdf

- Internationale Maascommissie (2007): Internationaal stroomgebieddistrict Maas: Rapport over de coördinatie van de toestand- en trendmonitoringprogramma's in het internationaal stroomgebieddistrict Maas – www.meuse-maas.be

**SUMMARY OF TECHNICAL ASSESSMENT: STRENGTHS AND WEAKNESSES**

+ Clear concept for developing the monitoring programmes following WFD requirements
+ The report is clear and of very good quality
+ International coordination
+ Comprehensive development of methods to assess ecological status
+ High density of chemical and quantitative groundwater monitoring stations
– Frequency of biological monitoring of surface waters is strictly the minimum required in the WFD

## Member State: POLAND

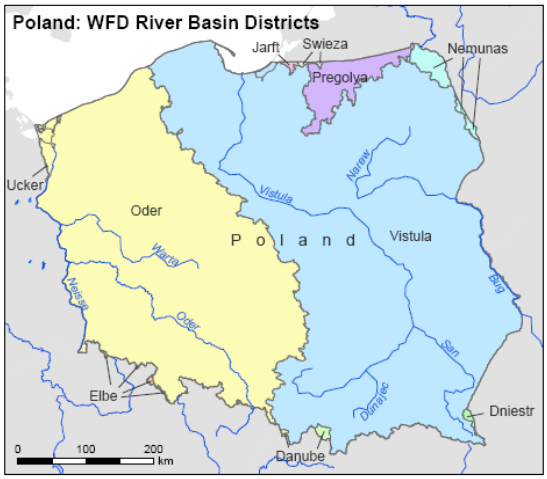
### INFORMATION SUPPLIED

Poland has reported through WISE in the agreed format only for surface water monitoring stations for all ten river basin districts. Information on design of monitoring programmes and on groundwater monitoring stations was reported through WISE in the form of the following textual documents:

- Description of surface and groundwater monitoring programmes
- Reference to sampling standards

### FACTS AND FIGURES

Poland has a population of 38.5 million and an area of 312,788 km2.
Poland comprises ten international river basins: Vistula, Oder, Pregola, Nemunas, Danube, Dniestr, Elbe, Jarft, Swieza and Ucker.




**River basin districts and number of water bodies**

| River Basin District | Surface ($km^2$) | % National territory | Number of river water bodies | Number of lake water bodies | Number of transitional water bodies | Number of coastal water bodies | Number of groundwater bodies |
|---|---|---|---|---|---|---|---|
| Vistula | 183560 | 69 | 2660 | 483 | 5 | 6 | |
| Oder | 118003 | 38 | 1734 | 420 | 4 | 5 | |
| Pregola | 7486 | 2 | 120 | 101 | - | - | |
| Nemunas | 2523 | 1 | 40 | 36 | - | - | |
| Danube | 380 | 0.1 | 11 | - | - | - | |
| Dniestr | 243 | 0.08 | 3 | - | - | - | |
| Elbe | 226 | 0.07 | 8 | - | - | - | |
| Jarft | 207 | 0.03 | 6 | - | - | - | |
| Swieza | 154 | 0.05 | 4 | 1 | - | - | |
| Ucker | 6 | 0.002 | - | - | - | - | |
| ***Poland*** | ***312788*** | ***100*** | ***4586*** | ***1041*** | ***9*** | ***11*** | ***160*** |

**Note:** The number of groundwater bodies in each river basin district is not available. The number of water bodies in the river basin districts other than Vistula and Oder are not available..

**Numbers of surveillance, operational and quantitative monitoring stations**

| River Basin District | Rivers | | Lakes | | Transitional waters | | Coastal waters | | Groundwaters | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Surv | Op | Surv | Op | Surv | Op | Surv | Op | Surv | Op | Quant |
| Vistula | 686 | 876 | 640 | 31 | 8 | 13 | 9 | 3 | 582 | 28 | 483 |
| Oder | 458 | 682 | 483 | 15 | 9 | 6 | 7 | 4 | 336 | 87 | 321 |
| Pregola | 45 | 26 | 98 | 0 | - | - | - | - | 0 | 0 | 0 |
| Nemunas | 21 | 8 | 67 | 7 | - | - | - | - | 0 | 0 | 0 |
| Danube | 2 | 1 | 0 | 0 | - | - | - | - | 0 | 0 | 0 |
| Dniestr | 1 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 |
| Elbe | 4 | 1 | 0 | 0 | - | - | - | - | 0 | 0 | 0 |
| Jarft | 2 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 |
| Swieza | 1 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 |
| Ucker | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 |
| ***Total*** | ***1218*** | ***1594*** | ***1288*** | ***53*** | ***17*** | ***19*** | ***16*** | ***7*** | ***918*** | ***115*** | ***804*** |
| ***Total number of monitoring stations*** | ***2235*** | | ***1312*** | | ***28*** | | ***16*** | | ***933*** | | ***804*** |

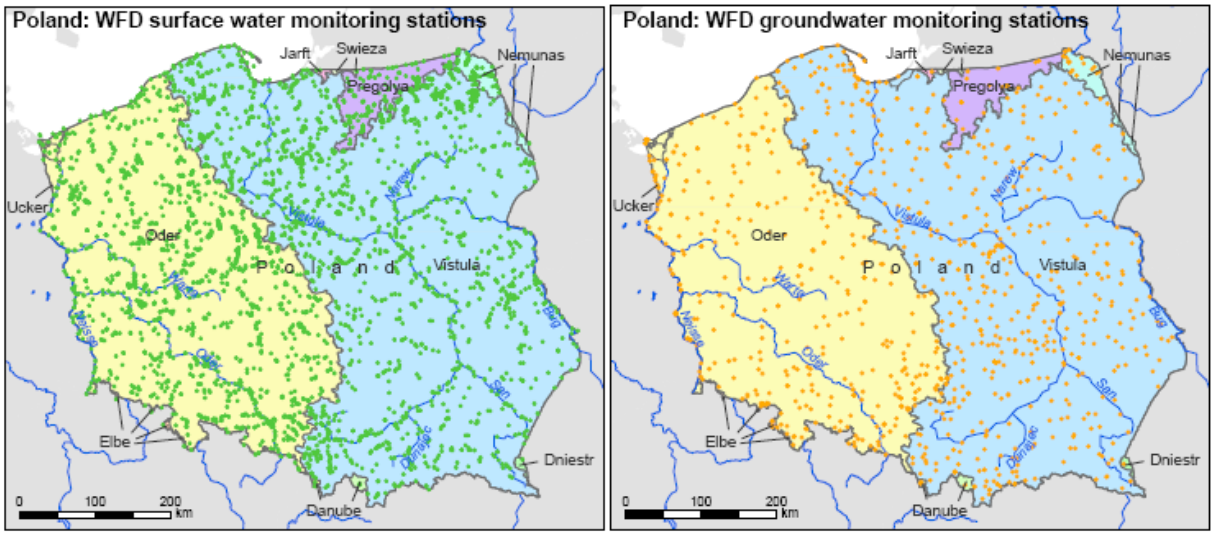
**Note**: Total number of monitoring stations is not necessarily the sum of surveillance and operational as there are stations that serve both purposes

**Number of monitoring stations in protected areas reported under the WFD**

| River Basin District | Surface water | | | | | | | Ground water |
|---|---|---|---|---|---|---|---|---|
| | Bathing Water | Habitats / Birds | Drinking Water | Fish | Shellfish | Nitrates | Urban waste water | Drinking water |
| Vistula | 4 | 266 | 39 | 535 | | 155 | - | |
| Oder | | 183 | 7 | 358 | | 87 | - | |
| Pregola | | 13 | | 26 | | | - | |
| Nemunas | | 49 | | 4 | | | - | |
| Danube | | 1 | | 2 | | 1 | - | |
| Dniestr | | | | 1 | | | - | |
| Elbe | | 2 | | 3 | | | - | |
| Jarft | | | | 1 | | | - | |
| Swieza | | | | | | | - | |
| Ucker | | | | | | | - | |
| ***Total*** | ***4*** | ***514*** | ***46*** | ***930*** | | ***243*** | ***-*** | |

**Notes**:
1. The reporting of monitoring of protected areas under the Water Framework Directive was due only if the information was not reported under other directives. A total of 3840 surface water monitoring stations for nitrates have been reported by Poland under the Nitrates Directive in 2008 (reference period 2004-2007). 320 surface water monitoring stations were reported under the Bathing Water Directive (bathing season 2007). Those figures are preliminary as quality checking is on-going at the time this report is written.
2. Poland applies more stringent waste water treatment in the whole of its territory and therefore, in accordance to article 5.8 of the Urban Waste Water Directive 1991/271/EEC, it is exempted from designation of specific sensitive areas.

**Location of surface water and groundwater monitoring stations**




## SURFACE WATER MONITORING PROGRAMMES

Design of Monitoring Programmes

Data on the monitoring programmes was presented for Odra and Vistula river basin districts. It is reported that the same rules are applied for monitoring of all smaller river basin districts (other than Odra and Vistula), however it is unclear if monitoring programmes were designed for them. No monitoring sites were reported for Ucker river basin district.

*Surveillance* and *operational monitoring* programmes are reported for all four water categories.

The objectives of surveillance and operational monitoring are listed in the report and some are a replication of the objectives given in the WFD. There are no separate sub-programmes designed to meet the individual specific objectives.

It is not clear whether the results of the 2004 pressure and impact analysis as well as for detecting long term changes in natural conditions, have been incorporated into the design of *surveillance* monitoring programme. Furthermore no reference sites that may be monitored to detect natural changes were reported. Surveillance monitoring was also based on selection of monitoring sites with the appropriate sampling frequencies that will preserve the continuity of a series of measurements to detect long term changes due to anthropogenic pressures. However the site selection criteria for surveillance monitoring for transitional and coastal waters have not been used.

The objectives of *operational monitoring* are included in the design for rivers, transitional and coastal waters but it is unclear if it was included for lakes. Start of operational monitoring was delayed due to lack of the methodologies and metrics for some quality elements developed on time.

*Investigative monitoring* is reported to be undertaken in cases where the reasons for failure of environmental objectives is not known, and to determine the size and impacts of accidental pollution.

Some additional requirements are mentioned for *drinking water* protected areas, however it is not clear whether this objective is introduced into the monitoring programmes.

The report states that the selection of water bodies for monitoring takes into account *protected areas* for *drinking water abstraction*, habitat and species, bathing waters. However, the monitoring sites reported do not include these areas.

There is very limited information on *international coordination* in designing monitoring networks (HELCOM's COMBINE monitoring manual is mentioned).

## Development of Biological Assessment Methods

A number of standards are mentioned in relation with the biological quality elements but there is no reference to assessment methods. Therefore, they have been considered as under development. It was also indicated that evaluation methods for hydromorphological quality elements were being tested and developed. No information on *levels of confidence and precision* has been provided.

**Summary of available biological assessment methods**

| | Rivers | | | | Lakes | | | | Transitional Waters | | | | Coastal Waters | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Phytoplankton | Macrophytes and Phytobenthos | Benthic invertebrates | Fish | Phytoplankton | Macrophytes and Phytobenthos | Benthic invertebrates | Fish | Phytoplankton | Macroalgae and Angiosperms | Benthic invertebrates | Fish | Phytoplankton | Macroalgae and Angiosperms | Benthic invertebrates |
| Poland | | | | | | | | | | | | | | | |

*Method available* | *Under development or incomplete information* | *Not developed or no information* | *Not relevant* -

**Note**: In the context of the WFD intercalibration exercise, Poland has intercalibrated the national assessment method for macroinvertebrates in rivers. In addition, Poland has intercalibrated a parameter indicative of biomass of phytoplankton in lakes and in coastal and transitional waters (chlorophyll-a) (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).

## Selection of Quality Elements and Frequency of Monitoring

All biological quality elements are reported to be monitored in the *surveillance monitoring* of rivers and lakes. All biological quality elements for coastal and transitional waters are also reported except macroalgae. Some sites are reported to be used for monitoring macrophytes and phytobenthos in transitional and coastal waters.

No hydromorphological quality elements are reported to be monitored for any water category both for *surveillance and operational monitoring*.

*Priority substances* are generally reported for all water categories but often it is only river monitoring that include other specific pollutants .

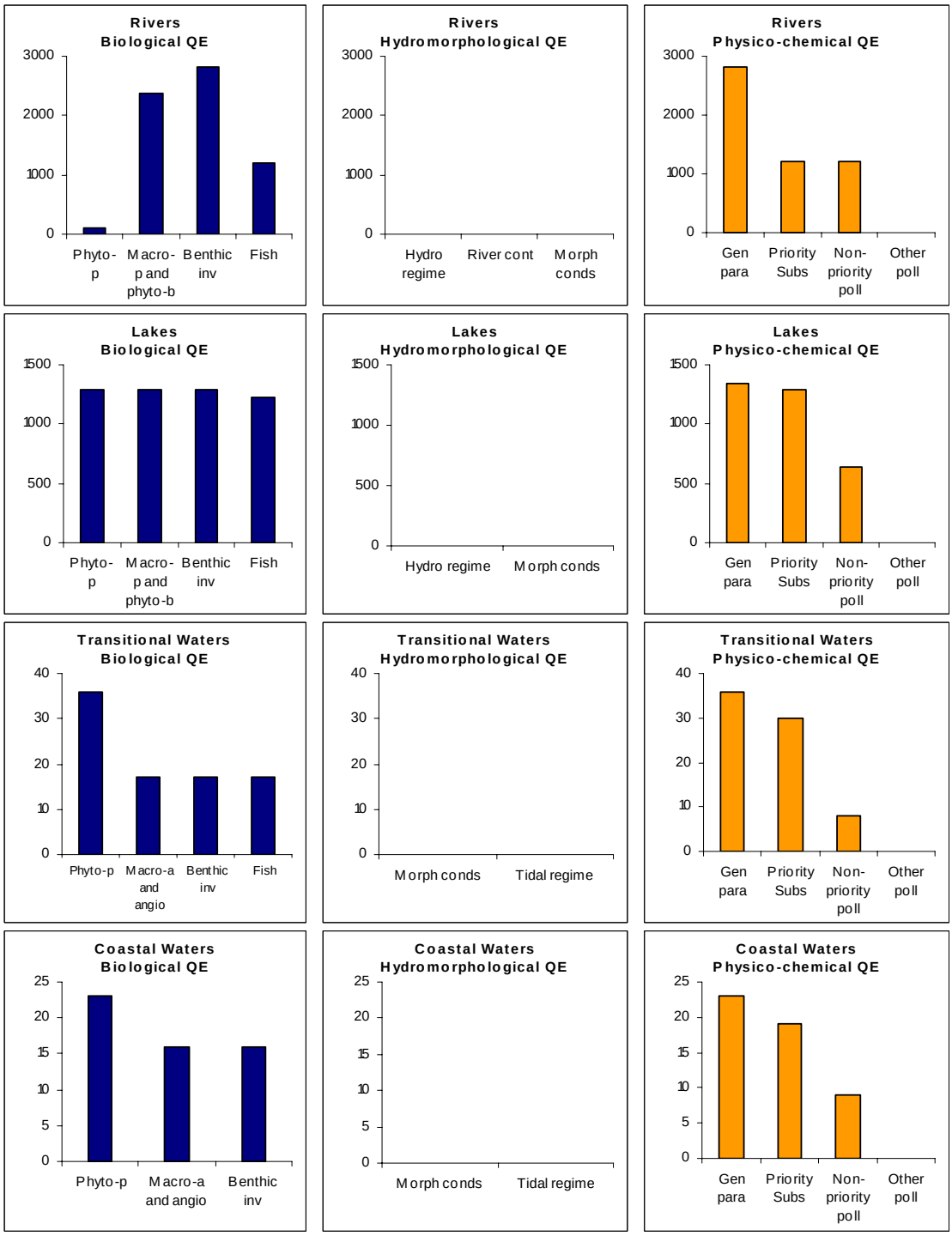
In *operational monitoring* for lakes sensitive quality elements are selected in relation to the types of pressures. No information provided for rivers, transitional and coastal waters.

For some river basin districts for the operational monitoring of lakes only physico-chemical quality elements are included. In transitional and coastal waters often the only biological quality element included is phytoplankton and in rivers 2-3 biological quality elements are generally monitored but there is no monitoring of fish and macrophytes. *Priority substances* are only reported for transitional and coastal waters.

No information was provided on *investigative monitoring*.

There is very limited information on monitoring cycles. General statement is made that annual *frequency of measurements* are in accordance with the WFD and there are only a few specific examples such as phytoplankton, physical and chemical properties in lakes for surveillance monitoring will be monitored 6-8 times in each year of the 6 year plan.

**Number of stations where quality elements are monitored (surveillance and operational monitoring) in rivers, lakes, transitional and coastal waters**




## GROUNDWATER MONITORING PROGRAMMES

### Design of Monitoring Programmes

Groundwater monitoring programmes cover only Odra and Vistula, while for other river basin districts only general information is provided.

There are specific monitoring programmes for chemical *surveillance monitoring, operational monitoring* and for groundwater level monitoring. For each programme, the information is comprehensive and sufficient. There is evidence that the results of 2004 analysis and that the criteria for groundwater surveillance monitoring have been taken into account.

There is specific *surveillance monitoring* to monitor background levels and long-term trends. It is indicated that *operational monitoring* will start later than December 2006. Although, quantitative and surveillance monitoring will take place by December 2006, the monitoring network is being developed between 2007 and 2009 and will be fully in place by 2010.

There is comprehensive information provided on monitoring of *protected areas*. Specific arrangements are indicated for *drinking water*, nitrates and Natura 2000 sites (established on the basis of Habitats and Birds Directives).

Although river basin districts are *international*, there are *no transboundary groundwater bodies* designated with the neighbouring countries.

Selection of Quality Elements and Frequency of Monitoring

Chemical *surveillance monitoring* covers all core and other parameters. Parameters characteristic of anthropogenic pollution will also be monitored.

*Operation monitoring* includes conductivity, pH and temperature and indicators which value on the basis of surveillance monitoring had exceeded the limits and characteristic of anthropogenic impact on the groundwater bodies.

The cycle and *frequency of monitoring* varies across programmes. For *quantitative monitoring*, of groundwater level is reported to be monthly. However, depending on the type of aquifer and the risk, it can be increased to a weekly monitoring. By the end of 2009, continuous monitoring will be carried out.

For *surveillance monitoring*, the minimum frequency is reported to be once every 6 years. However, depending on the types of aquifer, the frequency can be increased to once every 3 years.

For *operational monitoring*, it takes place in between periods of surveillance monitoring and the minimum frequency is reported to be once a year. This can be increased to twice a year depending on the type of aquifer.

**FURTHER INFORMATION**

Raport dla Komisji Europejskiej: program monitoringu wód powierzchniowych i podziemnych w Polsce według wymagań Dyrektywy 2000/60/WE (Description of surface and groundwater monitoring programmes)

Załącznik Ia: Zestawienie technik badań terenowych i analizy laboratoryjnej dla elementów biologicznych, fizykochemicznych i chemicznych. – (Reference to sampling standards)

**SUMMARY OF TECHNICAL ASSESSMENT: STRENGTHS AND WEAKNESSES**

+ The report provides information on the monitoring of protected areas
– The concept to design WFD monitoring programmes is not fully clear
– Only part of the report was submitted through WISE
– Methods are not available or under development
– No monitoring on hydromorphology

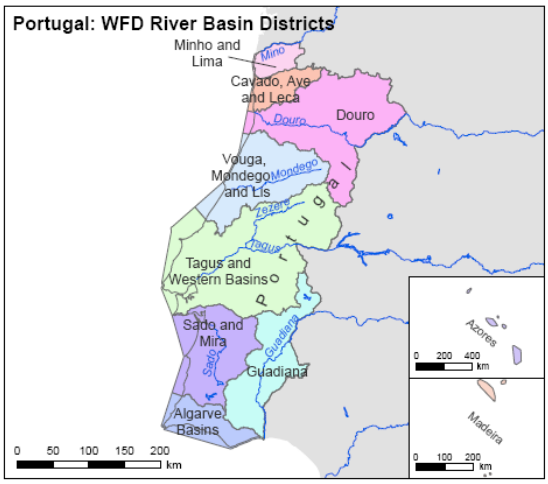
## Member State: PORTUGAL

### INFORMATION SUPPLIED

Portugal has reported through WISE in the agreed format for 8 mainland river basin districts. No information has been reported for the island river basin districts Açores and Madeira.

### FACTS AND FIGURES

Portugal has a population of 10.6 million (Eurostat, 2007) and an area of 109,480 km$^2$. Portugal shares four international river basins with Spain: Tagus and Western Basins, Douro, Guadiana, and Minho and Lima




**River basin districts and number of water bodies**

| River Basin District | Surface (km$^2$) | % National territory | Number of river water bodies | Number of lake water bodies | Number of transitional water bodies | Number of coastal water bodies | Number of groundwater bodies |
|---|---|---|---|---|---|---|---|
| Tagus | 25665 | 23 | 393 | 24 | 4 | 2 | 12 |
| Douro | 19219 | 18 | 353 | 17 | 3 | 2 | 3 |
| Vouga, Mondego, Lis and Western Basins | 16981 | 16 | 236 | 9 | 10 | 8 | 30 |
| Sado and Mira | 12149 | 11 | 200 | 19 | 9 | 3 | 8 |
| Guadiana | 11611 | 11 | 216 | 16 | 4 | 1 | 9 |
| Azores | 10047 | 9 | 13 | 24 | 3 | 27 | 54 |
| Algarve Basins | 5511 | 5 | 64 | 3 | 3 | 10 | 23 |
| Cavado, Ave and Leca | 3584 | 3 | 69 | 7 | 6 | 1 | 4 |
| Minho and Lima | 2465 | 2 | 55 | 3 | 10 | 1 | 2 |
| Madeira | 2248 | 2 | 94 | - | - | 8 | 4 |
| ***Portugal*** | ***109480*** | ***100*** | ***1693*** | ***122*** | ***52*** | ***63*** | ***149*** |

**Note:** There are no natural lakes in mainland Portugal, only reservoirs.

**Numbers of surveillance, operational and quantitative monitoring stations**

| River Basin District | Rivers | | Lakes | | Transitional waters | | Coastal waters | | Groundwaters | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Surv | Op | Surv | Op | Surv | Op | Surv | Op | Surv | Op | Quant |
| Tagus | 80 | 77 | 7 | 11 | 4 | 0 | 2 | 0 | 101 | 48 | 71 |
| Douro | 62 | 65 | 4 | 12 | 3 | 0 | 1 | 0 | 7 | 0 | 10 |
| Vouga, Mondego, Lis and Western Basins | 66 | 61 | 4 | 5 | 9 | 0 | 4 | 0 | 117 | 57 | 86 |
| Sado and Mira | 21 | 31 | 2 | 7 | 9 | 0 | 3 | 0 | 20 | 0 | 8 |
| Guadiana | 16 | 41 | 3 | 9 | 4 | 0 | 1 | 0 | 30 | 52 | 26 |
| Azores | 4 | 20 | 1 | 23 | 0 | 3 | 24 | 3 | 101 | 0 | 0 |
| Algarve Basins | 20 | 12 | 3 | 0 | 3 | 0 | 2 | 0 | 59 | 31 | 115 |
| Cavado, Ave and Leca | 15 | 24 | 6 | 2 | 7 | 0 | 1 | 0 | 9 | 23 | 8 |
| Minho and Lima | 21 | 5 | 1 | 0 | 1 | 0 | 0 | 0 | 6 | 0 | 4 |
| Madeira | 28 | 10 | - | - | - | - | 11 | 0 | 15 | 9 | 16 |
| ***Total*** | ***333*** | ***346*** | ***31*** | ***69*** | ***40*** | ***3*** | ***49*** | ***3*** | ***465*** | ***220*** | ***344*** |
| ***Total number of monitoring stations*** | ***679*** | | ***100*** | | ***43*** | | ***52*** | | ***685*** | | ***344*** |

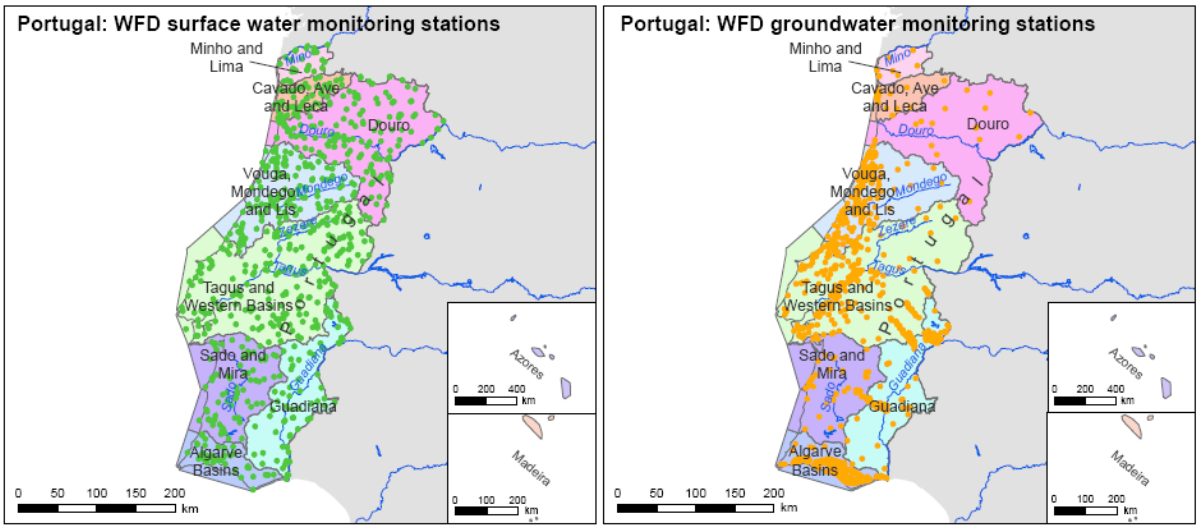
**Note**:
1. Total number of monitoring stations is not necessarily the sum of surveillance and operational as there are stations that serve both purposes
2. The number of monitoring stations in Azores and Madeira were reported in January 2009. No further information was provided on those and have not been taken into account in the rest of the report.

**Number of monitoring stations in protected areas reported under the WFD**

| River Basin District | Surface water | | | | | | | Ground water |
|---|---|---|---|---|---|---|---|---|
| | Bathing Water | Habitats / Birds | Drinking Water | Fish | Shellfish | Nitrates | Urban waste water | Drinking water |
| Tagus | | 6 | 24 | | - | | 2 | 24 |
| Douro | | 18 | 45 | | - | | 4 | 7 |
| Vouga, Mondego, Lis and Western Basins | | 6 | 30 | | - | | 2 | 44 |
| Sado and Mira | | 4 | 4 | | - | | 2 | 16 |
| Guadiana | | 17 | 9 | | - | | 1 | 13 |
| Azores | | 23 | 2 | - | - | | - | 100 |
| Algarve Basins | | 3 | 2 | | - | | 1 | 1 |
| Cavado, Ave and Leca | | | 10 | | - | | 0 | 9 |
| Minho and Lima | | | 12 | | - | | 0 | 6 |
| Madeira | | | | - | .- | | - | 23 |
| ***Total*** | | ***77*** | ***138*** | | - | | ***12*** | ***243*** |

**Note:** the reporting of monitoring of protected areas under the Water Framework Directive was due only if the information was not reported under other directives**.** A total of 168 surface water monitoring stations for nitrates have been reported by Portugal under the Nitrates Directive in 2008 (reference period 2004-2007). 564 surface water monitoring stations were reported under the Bathing Water Directive (bathing season 2007). Those figures are preliminary as quality checking is on-going at the time this report is written.

**Location of surface water and groundwater monitoring stations**




## SURFACE WATER

Design of monitoring programmes

Reporting across the different river basin districts is very homogeneous showing that the same concept was applied across the country. In general the reports contain enough information to understand the main elements about the design of the monitoring programmes.

The design of the *surveillance monitoring* is largely based on the criteria of WFD Annex V. In case of transitional waters, all water bodies are monitored due to the limited knowledge existing about this water category. There are no natural lakes in mainland Portugal, but the reservoirs are monitored.

There are no *operational monitoring* programmes for coastal and transitional waters. For rivers and lakes (reservoirs), the water bodies identified in WFD article 5 pressure and impact analysis as at risk of failing to meet the WFD objectives are mentioned as the main target of the operational monitoring.

The starting date of the monitoring programmes is reported to have been delayed to 1 July 2007 due to administrative and financial reasons.

All river basin districts report *investigative programmes*, and include an explanation about the strategic approach based on continuous monitoring instruments. No specific incidents or examples are reported.

The reports do not provide information about *monitoring of protected areas* (the figures in the table above were provided in January 2009). In particular, none of the reports provide clear enough information to determine if monitoring of drinking water protected areas has been considered in monitoring design.

There is no information about *international coordination* for any of the river basin districts.

Development of biological assessment methods

Information on the assessment methods for the biological quality elements is provided. In general the descriptions are more detailed for rivers and lakes showing a higher degree of development. The information is far less detailed for coastal and transitional waters. There are generic references to methods used in the intercalibration exercise for quality elements that have not been intercalibrated or have been intercalibrated only at parameter level. These have been considered under developed. There is no reference to methods for macroinvertebrates, macrophytes and phytobenthos in lakes; although some of those quality elements may not be relevant for the reservoirs in mainland Portugal, they can be for natural lakes in Azores.

Only brief information is provided on the levels of confidence, in general assuming that the minimum frequencies for biological monitoring included in the WFD would deliver an acceptable level of confidence, but without further justification.

**Summary of available biological assessment methods**

| | Rivers | | | | Lakes | | | | Transitional Waters | | | | Coastal Waters | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Phytoplankton | Macrophytes and Phytobenthos | Benthic invertebrates | Fish | Phytoplankton | Macrophytes and Phytobenthos | Benthic invertebrates | Fish | Phytoplankton | Macroalgae and Angiosperms | Benthic invertebrates | Fish | Phytoplankton | Macroalgae and Angiosperms | Benthic invertebrates |
| Portugal | | | | | | | | | | | | | | | |

*Method available* *Under development or incomplete information* *Not developed or no information* *Not relevant* -

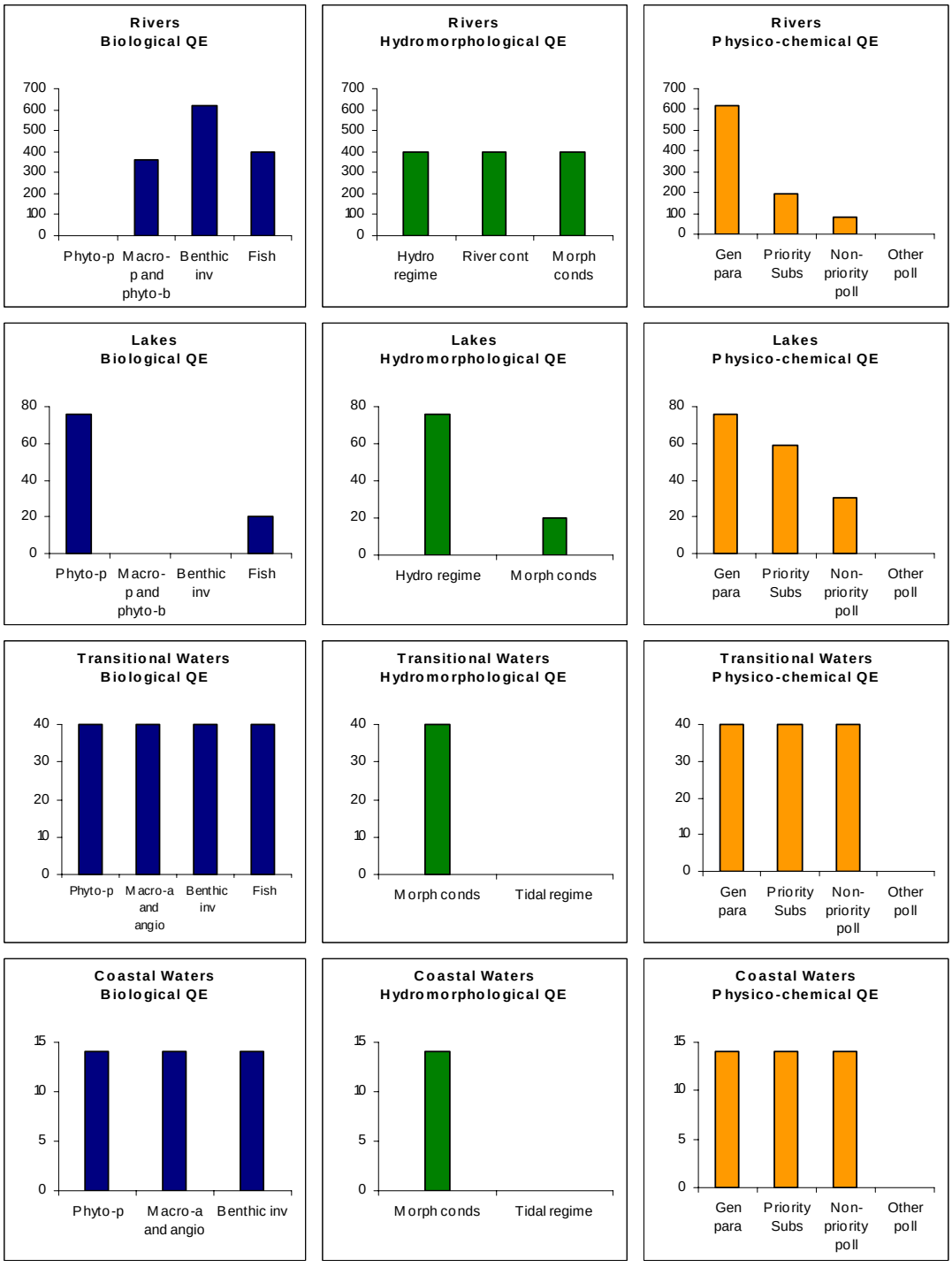
**Note**: In the context of the WFD intercalibration exercise, Portugal has intercalibrated the national assessment methods for macroinvertebrates in rivers (Central and Mediterranean geographical areas), phytobenthos in rivers (Mediterranean only) and macroinvertebrates in coastal waters. In addition, Portugal has intercalibrated parameters indicative of biomass and of taxonomic composition and abundance of phytoplankton in Mediterranean reservoirs, parameters indicative of biomass and of blooms of phytoplankton in coastal waters and a parameter indicative of composition of macroalgae in coastal waters (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).

Selection of quality elements and frequency of monitoring

Surveillance monitoring in rivers covers all quality elements except priority substances in Sado river basin district and other specific pollutants in Sado and in Tagus. Other aquatic flora and macroinvertebrates are not monitored in lakes but those are only reservoirs (there are no natural lakes in mainland Portugal) and the report states that those quality elements are not relevant. Other specific pollutants are not monitored in lakes in Cavado and Vouga river basin districts. In transitional and coastal waters the surveillance monitoring covers all quality elements.

Monitoring of biological quality elements both in surveillance and operational monitoring is carried out every two years except for phytoplankton, that is done every year. Priority substances are monitored between 3 and 6 times every year.

**Number of stations where quality elements are monitored (surveillance and operational monitoring) in rivers, lakes, transitional and coastal waters**




## GROUNDWATER

Design of Monitoring Programmes

In most river basin districts there are 3 specific monitoring programmes for quantitative assessment, chemical surveillance and operational monitoring. Some river basin districts have however no operational monitoring programmes.

The report provides some information on methodology - it lists criteria taken into account such as hydrogeology, regular distribution, easy access, away from impacts from abstraction, well/springs but it is not clear if validation of pressure and impact results or long-term trends have been into account.

The report does not mention the criteria in the WFD Annex V 2.4.2. Based on the reported information, it seems that the monitoring sites were not chosen according to prior risk assessment information.

It is reported that design criteria included monitoring sites near drinking water abstraction points. In the stations reports, it is indicated that some of the monitoring sites are also used for the abstraction of drinking water.

Although there are international river basin districts, there is no information on additional requirements for transboundary groundwater bodies.

There is no information on other monitoring requirements, except for the Nitrates Directive when there is an operational monitoring programme, it is designed to be compatible with the Nitrates directive monitoring requirements.

Selection of Quality Elements and Frequency of Monitoring

Only core parameters are reported to be monitored. When there is an operational monitoring, it is targeted specifically at nitrates pollution from agriculture.

Groundwater level measurements will take place annually every month.

Monitoring of core parameters will be carried out annually twice a year, covering dry and wet seasons.

**FURTHER INFORMATION**

No further information was provided.

**SUMMARY OF TECHNICAL ASSESSMENT: STRENGTHS AND WEAKNESSES**

+ Frequency of monitoring of biological quality elements higher than the minimum required in the WFD
– No report for Azores and Madeira
– No mentioning of international coordination
– Monitoring of protected areas is lacking

## Member State: ROMANIA

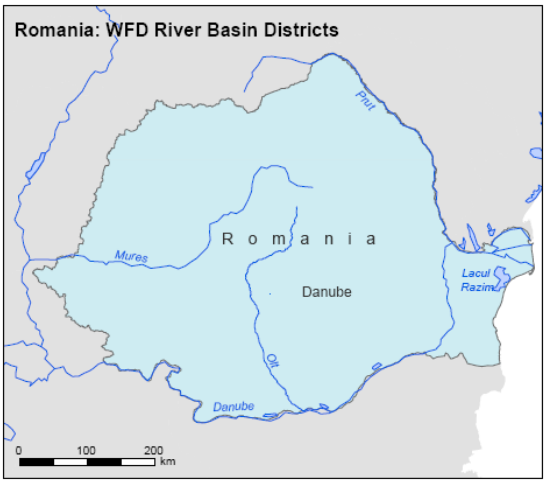
### INFORMATION SUPPLIED

Romania has reported both for surface water and groundwater a word report (RAPORT NATIONAL 2006 – Monitoring system of Romanian waters under Article 8(1) and (2) and Article 5 of the WFD 2000/60/EC) and excel spreadsheets for one river basin district (Danube). The report represents a synthesis of monitoring programmes for 11 separate hydrological sub-basins. Romania has reported also through WISE in agreed format on 19 December 2008 and 22 January 2009[1]. Due to the late reporting, this information could not be fully taken into account in this report.

### FACTS AND FIGURES

Romania has a population of 21.6 million and an area of 238,391 km$^2$.

Romania is situated entirely within the Danube international river basin.




**River basin districts and number of water bodies**

| River Basin District | Surface (km$^2$) | % National territory | Number of river water bodies | Number of lake water bodies | Number of transitional water bodies | Number of coastal water bodies | Number of groundwater bodies |
|---|---|---|---|---|---|---|---|
| Danube | 238391 | 100 | 3300 | 126 | 2 | 4 | 142 |
| ***Romania*** | ***238391*** | ***100*** | ***3300*** | ***126*** | ***2*** | ***4*** | ***142*** |

**Note:** Out of the 3300 river water bodies 168 are reservoirs and 1197 are temporary (non-permanent) water bodies

**Number of surveillance, operational and quantitative monitoring stations**

| River Basin District | Rivers | | Lakes | | Transitional waters | | Coastal waters | | Groundwaters | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Surv | Op | Surv | Op | Surv | Op | Surv | Op | Surv | Op | Quant |
| Danube | 1519 | 643 | 467 | 266 | 18 | 18 | 39 | 39 | 2500 | 1142 | 3363 |
| ***Total*** | 1519 | 643 | ***467*** | ***266*** | ***18*** | ***18*** | ***39*** | ***39*** | ***2500*** | ***1142*** | ***3363*** |
| ***Total number of monitoring stations*** | ***1519*** | | ***467*** | | ***18*** | | ***39*** | | ***2500*** | | ***3363*** |

**Note**: Total number of monitoring stations is not necessarily the sum of surveillance and operational as there are stations that serve both purposes

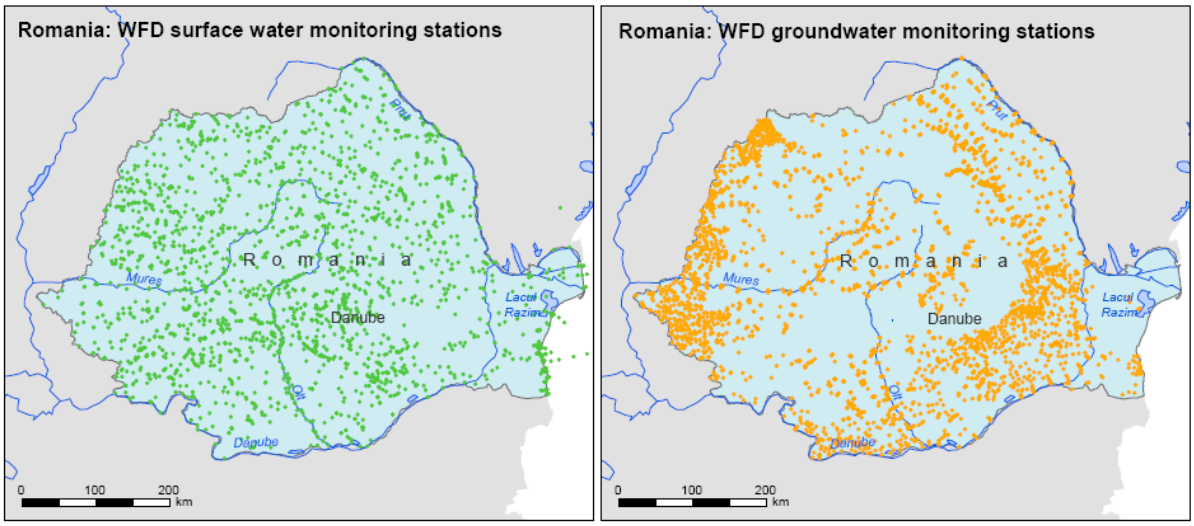
[1] Due to the quality assurance/quality control process the information was only available on 19 February 2009.

**Number of monitoring stations in protected areas reported under the WFD**

| River Basin District | Surface water | | | | | | | Ground water |
|---|---|---|---|---|---|---|---|---|
| | Bathing Water | Habitats / Birds | Drinking Water | Fish | Shellfish | Nitrates | Urban waste water | Drinking Water |
| Danube | | 249 | 113 | 313 | | 301 | - | 97 |
| ***Total*** | | ***249*** | ***113*** | ***313*** | | ***301*** | ***-*** | ***97*** |

**Notes:**
1. The reporting of monitoring of protected areas under the Water Framework Directive was due only if the information was not reported under other directives. A total of 1301 surface water monitoring stations for nitrates have been reported by Romania under the nitrates Directive in 2008 (reference period 2004-2007). 49 surface water monitoring stations were reported under the bathing water directive (bathing season 2007). Those figures are preliminary as quality checking is on-going at the time this report is written.
2. Romania applies more stringent waste water treatment in the whole of its territory and therefore, in accordance to article 5.8 of the Urban Waste Water Directive 1991/271/EEC, it is exempted from designation of specific sensitive areas.

**Location of surface water and groundwater monitoring stations**




## SURFACE WATER MONITORING PROGRAMMES

### Design of Monitoring Programmes

The national report describes separate *surveillance* and *operational monitoring programmes* each of which includes all four water categories.

The available information indicates that all the main objectives and site selection requirements of the WFD have been taken into account in the surveillance and operational monitoring programmes.

It is also mentioned that the results of the WFD risk assessment have been used in relation to the development of monitoring programmes. The *level of confidence and precision* in the WFD impact assessment is reported to be relatively low (not all the quality elements requested by the WFD have been monitored at that time). Consequently the surveillance monitoring was initially more extensive for the representative stations (in terms of numbers of

water bodies, sites and quality elements) than it subsequently increase the reliability of status assessments etc.

The strategy on *investigative monitoring* and early warning monitoring and information systems in cases of national and transboundary accidental pollution are reported to be in place in Romania .

The national report indicates that *drinking water protected areas* are monitored. Also it is mentioned that *protected areas* established under other EU Directives are monitored.

The report also includes information about monitoring under Romania's *international commitments* such as the Danube Convention (TNMN – TransNational Monitoring Network), Black Sea Convention, WISE-SoE (formerly EIONET–Water) and bilateral agreements with neighbouring countries.

Development of Biological Assessment Methods

The national report does not provided a description of the methods of sampling, analysis or assessment for any of the quality elements. However a separate file provides a tabulated list of standard methods for sampling and various analytical methods. In some cases there are references to methods developed in research projects but there are no description of methods to assess ecological status. It has been considered that all the methods are under development but the information is not clear on the current status of development. Also there is insufficient information on levels of confidence and precision for their assessment methods.

**Summary of available biological assessment methods**

| | Rivers | | | | Lakes | | | | Transitional Waters | | | | Coastal Waters | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Phytoplankton | Macrophytes and Phytobenthos | Benthic invertebrates | Fish | Phytoplankton | Macrophytes and Phytobenthos | Benthic invertebrates | Fish | Phytoplankton | Macroalgae and Angiosperms | Benthic invertebrates | Fish | Phytoplankton | Macroalgae and Angiosperms | Benthic invertebrates |
| Romania | | | | | | | | | | | | | | | |

*Method available* | *Under development or incomplete information* | *Not developed or no information* | *Not relevant* -

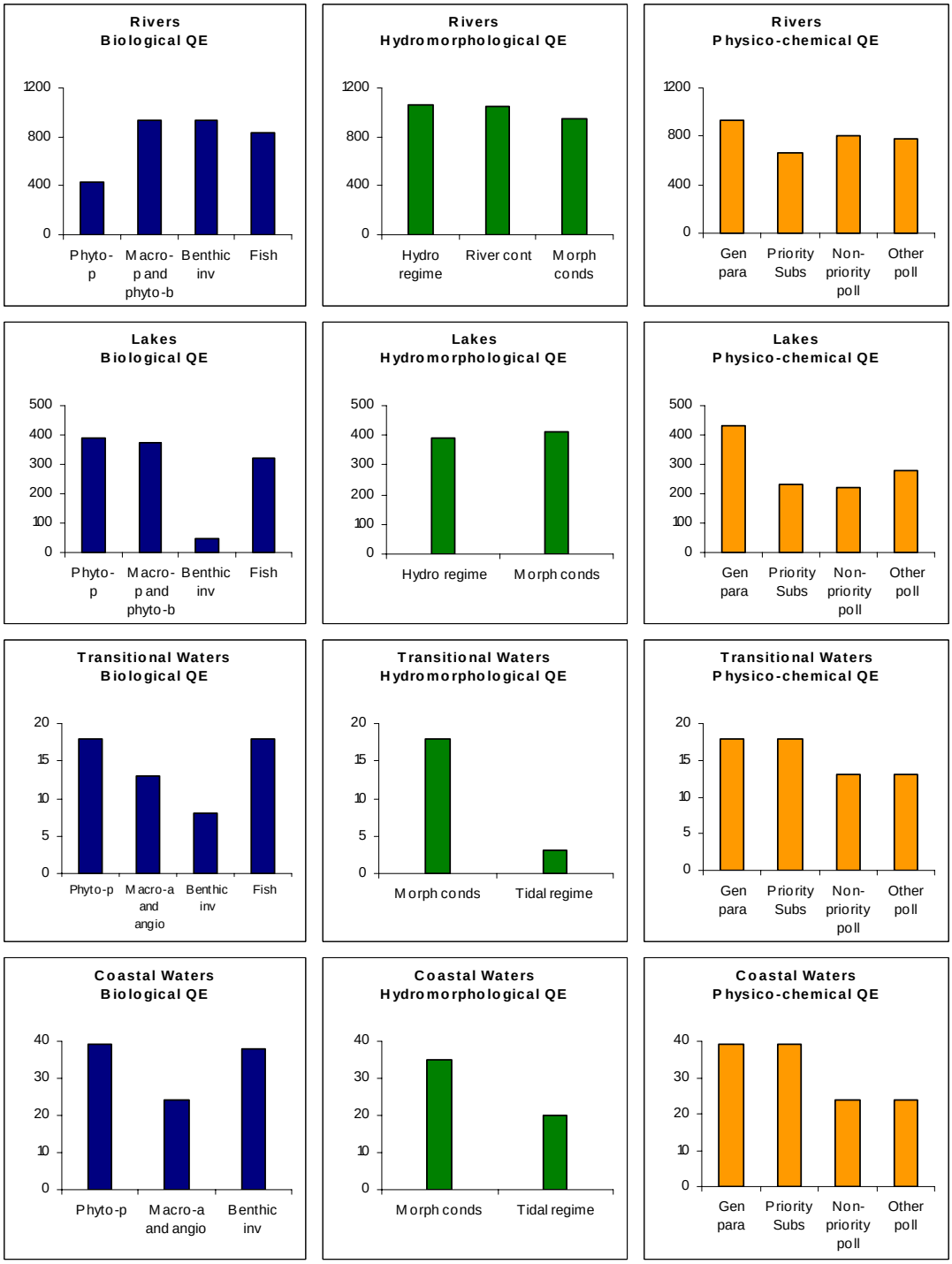
**Note**: In the context of the WFD intercalibration exercise, Romania has intercalibrated parameters indicative of biomass and of taxonomic composition and abundance of phytoplankton in Mediterranean lakes (reservoirs only) and has intercalibrated with Bulgaria some metrics for phytoplankton and macroinvertebrates in coastal waters, but not fully developed national assessment systems (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).

Selection of Quality Elements and Frequency of Monitoring

All quality elements with all relevant parameters are included in the *surveillance monitoring* of all water categories.

The results of the WFD risk assessment is considered to be unreliable and therefore the whole range of quality elements is selected for the *operational monitoring* instead of selection of quality elements sensitive to specific type of pressure/impact.

**Number of stations where quality elements are monitored (surveillance and operational monitoring) in rivers, lakes, transitional and coastal waters**




The national report shows that the surveillance and operational monitoring for biological quality elements is carried out every year for the 6 years of the river basin management cycle, except for macrophytes in rivers and lakes, fish in all relevant water categories and

angiosperms in transitional and coastal waters, which is every 3 years. Priority substances are monitored every year in all water categories.

**GROUNDWATER**

Design of Monitoring Programmes

The national report describes separate *quantitative, chemical operational and chemical surveillance monitoring programmes*. There are monitoring sites used for quantitative, surveillance and operational monitoring. In general the objectives of groundwater monitoring as listed in the WFD are reproduced in the national report with varying degrees of supportive information that illustrate how these objectives have been incorporated into the programme design.

In terms of quantitative monitoring the primary objective of validating the characterisation made in accordance with Article 5 appears to be incorporated in the design of the monitoring programme.

Similarly some of the objectives for chemical surveillance monitoring (e.g. validation of the results of the pressures and impacts analysis) and for chemical operational monitoring (e.g. assessment of status of water bodies at risk) are included in the programmes design. Monitoring sites have been selected in relation to a number of criteria including the presence of anthropogenic pressures and pollution (e.g. agricultural nitrates and dangerous substances), in terms of Protected Areas (e.g. drinking water abstraction areas) and WISE-SoE network. This is supported by the reporting of monitoring parameters for each monitoring site which shows some differences in the selection of parameter between sites possibly reflecting ambient pressures and pollutants.

However, it is not clear if the selection of monitoring sites for surveillance and operational monitoring includes as a criterion the detection of long term trends. Also the information on monitoring frequencies does not provide supportive information that this criterion has been included. There is no mention of evaluating groundwater background levels of parameters and pollutants. It is therefore not clear whether this objective for both chemical operational and surveillance monitoring has been integrated into the monitoring programmes.

The national report states that monitoring of groundwater is supplemented by additional specific programmes for *protected areas* for *abstraction of drinking water*. It also states that all bodies of water that are used as sources of drinking water are included in operational and surveillance monitoring. The inventories of groundwater sites indicate that some sites are associated with protected areas for drinking water abstractions and with Nitrate Vulnerable Zones. There is no information for other protected areas.

Romania has reported that some sites are associated with other international commitments which are bilateral agreements with neighbouring countries.

Selection of Quality Elements and Frequency of Monitoring

All core parameters and other indicative parameters are reported to be included in *chemical surveillance and operational monitoring*.

Groundwater level monitoring is reported to be undertaken between twice and 12 times per year. Chemical surveillance monitoring of general parameters will be undertaken every 6 years. The frequency of sampling for operational monitoring is twice per year in every year of the first planning cycle. *Drinking water* abstractions will be monitored quarterly every year.

## FURTHER INFORMATION

There is no links in the national report to further sources of information neither for surface waters nor for groundwater.

## SUMMARY OF TECHNICAL ASSESSMENT: STRENGTHS AND WEAKNESSES

+ Good density of monitoring stations in both surface and groundwaters, good coverage of quality elements and annual frequency of monitoring
+ International coordination
+ Monitoring of protected areas for surface and groundwater
– Late submission in WISE
– Availability of methods for the assessment of ecological status

## Member State: SLOVAK REPUBLIC

### INFORMATION SUPPLIED

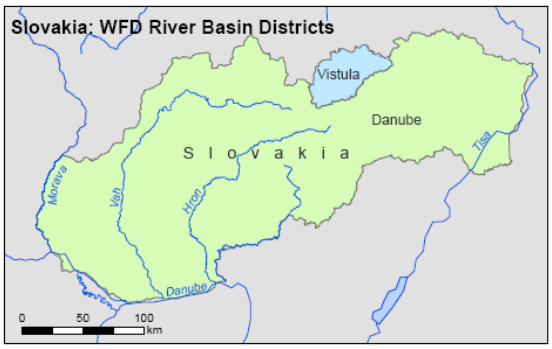
The Slovak Republic (Slovakia) has reported through WISE in the agreed format for its two river basin districts. Reference is made to more detailed information on monitoring programmes and respective methodologies, but no web links were provided.

### FACTS AND FIGURES

Slovakia has a population of 5.4 million (Eurostat, 2007) and an area of 49,032 km$^2$.

Slovakia is situated in two international river basins: Danube and Vistula.

Slovakia has no transitional or coastal waters.




**River basin districts and number of water bodies**

| River Basin District | Surface (km$^2$) | % National territory | Number of river water bodies | Number of lake water bodies | Number of transitional water bodies | Number of coastal water bodies | Number of groundwater bodies |
|---|---|---|---|---|---|---|---|
| Danube | 47072 | 96 | 1654 | 23 | - | - | 96 |
| Vistula | 1960 | 4 | 83 | - | - | - | 5 |
| ***Slovakia*** | ***49032*** | ***100*** | ***1737*** | ***23*** | ***-*** | ***-*** | ***101*** |

**Number of surveillance, operational and quantitative monitoring stations**

| River Basin District | Rivers | | Lakes | | Transitional waters | | Coastal waters | | Groundwaters | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Surv | Op | Surv | Op | Surv | Op | Surv | Op | Surv | Op | Quant |
| Danube | 532 | 584 | 23 | 8 | - | - | - | - | 122 | 406 | 1468 |
| Vistula | 33 | 31 | - | - | - | - | - | - | 8 | 7 | 39 |
| ***Total*** | ***565*** | ***615*** | ***23*** | ***8*** | ***-*** | ***-*** | ***-*** | ***-*** | ***130*** | ***413*** | ***1507*** |
| ***Total number of monitoring stations*** | ***768*** | | ***31*** | | ***-*** | | ***-*** | | ***543*** | | ***1507*** |

**Note**: Total number of monitoring stations is not necessarily the sum of surveillance and operational as there are stations that serve both purposes

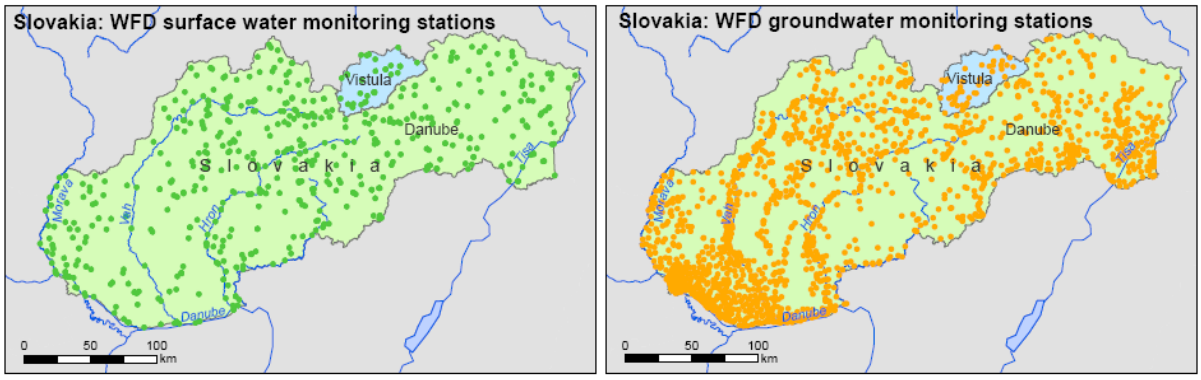
**Number of monitoring stations in protected areas reported under the WFD**

| River Basin District | Surface water | | | | | | | Ground water |
|---|---|---|---|---|---|---|---|---|
| | Bathing Water | Habitats / Birds | Drinking Water | Fish | Shellfish | Nitrates | Urban waste water | Drinking Water |
| Danube | | | 82 | | - | | - | |
| Vistula | | | | | - | | - | |
| ***Total*** | | | ***82*** | | **-** | | **-** | |

**Notes**:
1. The reporting of monitoring of protected areas under the Water Framework Directive was due only if the information was not reported under other directives. A total of 224 surface water monitoring stations for nitrates have been reported by Slovakia under the nitrates Directive in 2008 (reference period 2004-2007). 38 surface water monitoring stations were reported under the bathing water directive (bathing season 2007). Those figures are preliminary as quality checking is on-going at the time this report is written.

2. Slovakia applies more stringent waste water treatment in the whole of its territory and therefore, in accordance to article 5.8 of the Urban Waste Water Directive 1991/271/EEC, it is exempted from designation of specific sensitive areas.

**Location of surface water and groundwater monitoring stations**




## SURFACE WATER MONITORING PROGRAMMES

### Design of Monitoring Programmes

In both of the river basin districts the same methodologies and standards were generally applied and an identical design was used for setting up the monitoring programmes. There are specific monitoring programmes for operational, surveillance and investigative monitoring. Operational and surveillance monitoring programmes each have two sub-programmes, one for rivers and one for lakes. In principle, the monitoring programmes take account of the WFD objectives which will provide a coherent and comprehensive overview in the future.

The criteria mentioned in the Directive for the design of the *surveillance monitoring* network have been applied. There is no explicit reference to validation of the results of the pressure and impact analysis. The assessment of long-term changes in natural conditions and the long-term changes resulting from widespread anthropogenic activity are included in the key factors used for the design of the surveillance monitoring network.

There are two specific sub-programmes for *operational monitoring* – one for rivers and one for lakes. Annual updating of the operational monitoring network is foreseen based on the

results obtained. Site selection for rivers is based on the existing monitoring network and focuses on information in the sub-basins and downstream the significant pollution sources. A specific site aggregation procedure was adopted and applied. Reservoirs for drinking water production are included in water category "lakes".

The intended *starting date of the operational monitoring programme* is 1 January 2008 and the reason for delay is that the preliminary programme for operational monitoring is based on the pressure and impact analysis and on the results of the past monitoring programmes which were not WFD compliant. Operational monitoring still has to be adjusted to take account of the results of the surveillance monitoring in 2007.

The scope of *investigative monitoring* is described and it includes an assessment of impacts of accident pollution. The design of the future investigative monitoring will take into account the results of the surveillance monitoring in 2007.

Information is provided on *monitoring of protected areas* for drinking water abstraction, but not for monitoring of other protected areas.

Information on monitoring under *other legislative or voluntary agreements* was not provided for either of the river basin districts with the exception of the sites mentioned that are part of WISE-SoE (formerly EIONET-Water).

*International coordination* takes place in the Danube river basin district through the International Commission for the Protection of the Danube River (ICPDR). Some of the Slovak monitoring sites are part of the Transnational Monitoring Network of the ICPDR and a reference is given to the monitoring concept of the ICPDR. The Vistula river basin district is not part of any international river basin convention and no joint monitoring has been agreed in the frame of bilateral agreements with the neighbouring countries.

Development of Biological Assessment Methods

As regards the *development of biological assessment methods*, the reports provide a very brief description of most of the methods of sampling and analysis for some biological quality elements. Standard methods for sampling and various analytical methods are given. There is no description of assessment methods for ecological status and no reference to further information. It has been assumed that most of the methods are under development but the information is not clear on the current status of the various methods. There is no information for fish in lakes.

No information has been provided on *levels of confidence and precision*.

**Summary of available biological assessment methods**

| | Rivers | | | | Lakes | | | | Transitional Waters | | | | Coastal Waters | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Phytoplankton | Macrophytes and Phytobenthos | Benthic invertebrates | Fish | Phytoplankton | Macrophytes and Phytobenthos | Benthic invertebrates | Fish | Phytoplankton | Macroalgae and Angiosperms | Benthic invertebrates | Fish | Phytoplankton | Macroalgae and Angiosperms | Benthic invertebrates |
| Slovakia | | | | | | | | | - | - | - | - | - | - | - |

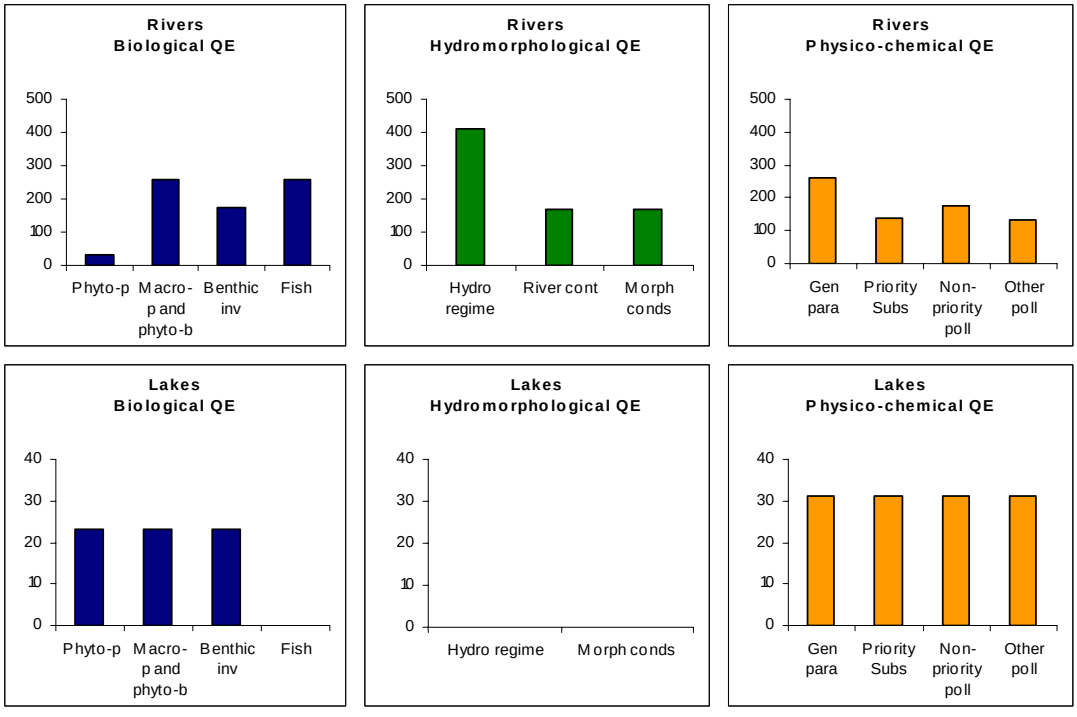
*Method available* | *Under development or incomplete information* | *Not developed or no information* | *Not relevant* -

Selection of Quality Elements and Frequency of Monitoring

Surveillance monitoring in rivers covers all quality elements. In lakes, no monitoring of fish and hydromorphology is included in surveillance monitoring.

Operational monitoring in rivers is based on biological, chemical, physicochemical and hydromorphological quality elements. Operational monitoring in lakes (i.e. in reservoirs for drinking water production) is based only on chemical and physicochemical quality elements.

**Number of stations where quality elements are monitored (surveillance and operational monitoring) in rivers, lakes, transitional and coastal waters**




With respect to *frequency*, the surveillance monitoring programmes will generally be carried out in the first year and then further monitoring decided on the basis of the results. The number of monitoring samples of the biological quality elements within the year of monitoring varies from 6 times for phytoplankton and twice for benthic invertebrates to once for other aquatic flora and fish. Fish are only monitored in rivers.

For operational monitoring biological quality elements are monitored at the WFD minimum requirement of every 3 years in rivers. The frequency of monitoring the biological quality elements within the year varies from 6 times for phytoplankton and twice for benthic invertebrates to once for other aquatic flora and fish. Priority substances are monitored every year. For lakes, operational monitoring does not include biological quality elements, only physico-chemical, priority substances and other specific pollutants.

## GROUNDWATER MONITORING PROGRAMMES

Design of Monitoring Programmes

In both of the river basin districts the same identical design was used for the groundwater monitoring programmes. There are specific monitoring programmes for operational, surveillance and quantitative monitoring of groundwater which are appropriate to provide a coherent and comprehensive overview. The monitoring sites have been selected to provide the necessary information to validate the impact assessment and to assess long-term changes in quantitative and qualitative status. The criteria for surveillance monitoring of groundwater chemical status given in the Directive have been applied although they are not specifically mentioned in the reports. Groundwater monitoring will start on 1 January 2007.

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 to assess impacts on abstractions and discharges on the groundwater level. About one-third of the sites have continuous measurements. The monitoring network will be upgraded by 2009.

There are specific sub-programmes for *surveillance monitoring of chemical status* that are designed to validate the results of the 2004 pressure and impact analysis. The monitoring network covers all quaternary and pre-quaternary groundwater bodies with at least one sampling site in each groundwater body.

*Operational monitoring of chemical status* will be carried out from 2007-2015. Selection of monitoring sites will be revised annually in respect to the information needs for preparation of river basin management plans. Operational monitoring will cover only those groundwater bodies identified as being at risk. The operational monitoring programme was designed as a multipurpose integrated monitoring system.

There are no monitoring sites associated with *protected drinking water abstraction areas* in the Vistula river basin district but there are a number of such stations in the Danube river basin district.

The report provides information on monitoring stations that belong to networks under the *international agreements* as the ICPDR. For the Vistula river basin district there is no mention of coordination of the monitoring programmes with the neighbouring countries. The stations report does mention which monitoring stations are part of EIONET.

Selection of Quality Elements and Frequency of Monitoring

Surveillance monitoring includes all core parameters and parameters indicative of identified pressures. There is a targeted approach for operational monitoring by selecting the critical parameters with respect to the existing pressure.

The monitoring frequency of the groundwater level monitoring is once a week for the whole 6-year planning cycle. Groundwater level and operational monitoring programmes will be carried out every year for the first cycle, while the surveillance monitoring programmes will be carried out the first year only.

## FURTHER INFORMATION

No web links on national monitoring programmes have been provided.

## SUMMARY OF TECHNICAL ASSESSMENT: STRENGTHS AND WEAKNESSES

+ Clear reporting of good quality
+ Clear concept for developing the monitoring programmes for groundwater following WFD requirements
– Availability of methods for the assessment of ecological status

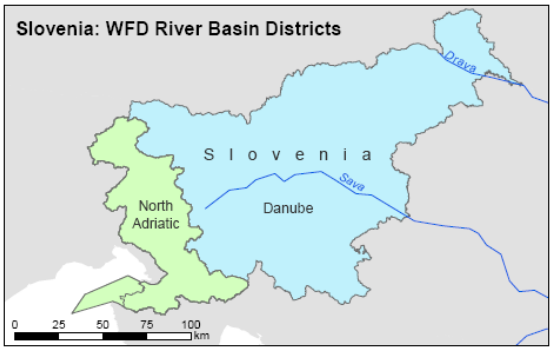
## Member State: SLOVENIA

### INFORMATION SUPPLIED

Slovenia submitted the report though WISE in the agreed format for its two river basin districts, Danube and the Adriatic sea.

### FACTS AND FIGURES

Slovenia has a population of 2 million (Eurostat, 2007) and an area of 20,275 km$^2$.
Slovenia is situated in two international river basins: North Adriatic and Danube
There are no transitional water bodies in Slovenia.




**River basin districts and number of water bodies**

| River Basin District | Surface (km$^2$) | % National territory | Number of river water bodies | Number of lake water bodies | Number of transitional water bodies | Number of coastal water bodies | Number of groundwater bodies |
|---|---|---|---|---|---|---|---|
| Danube | 16422 | 81 | 121 | 113 | - | 0 | 18 |
| North Adriatic | 3853 | 19 | 34 | 3 | - | 6 | 3 |
| ***Slovenia*** | ***20275*** | ***100*** | ***155*** | ***14*** | ***-*** | ***6*** | ***21*** |

**Number of surveillance, operational and quantitative monitoring stations**

| River Basin District | Rivers | | Lakes | | Transitional waters | | Coastal waters | | Groundwaters | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Surv | Op | Surv | Op | Surv | Op | Surv | Op | Surv | Op | Quant |
| Danube | 36 | 172 | 4 | 12 | - | - | - | - | 93 | 29 | 110 |
| North Adriatic | 12 | 28 | 0 | 3 | - | - | 4 | 5 | 11 | 0 | 5 |
| ***Total*** | ***48*** | ***200*** | ***4*** | ***15*** | ***-*** | ***-*** | ***4*** | ***5*** | ***104*** | ***29*** | ***115*** |
| ***Total number of monitoring stations*** | ***225*** | | ***17*** | | ***-*** | | ***9*** | | ***104*** | | ***115*** |

**Note:** Total number of monitoring stations is not necessarily the sum of surveillance and operational as there are stations that serve both purposes

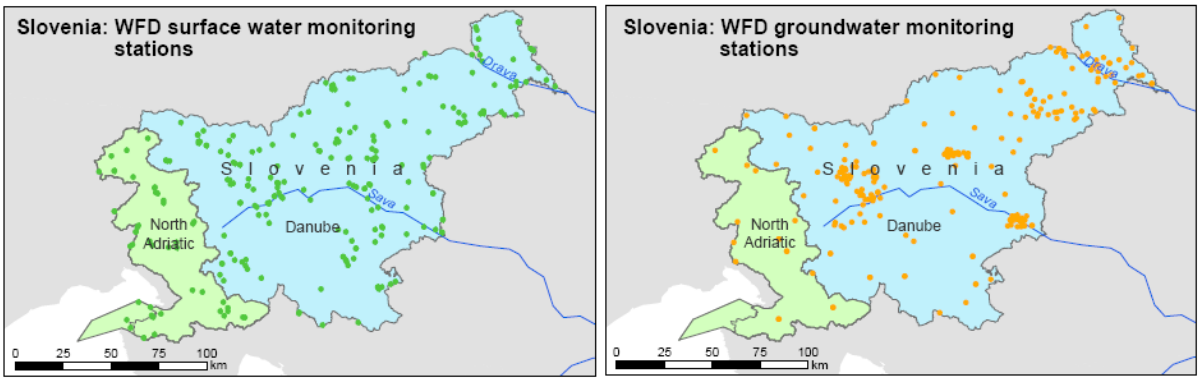
**Number of monitoring stations in protected areas reported under the WFD**

| River Basin District | Surface water | | | | | | | Ground water |
|---|---|---|---|---|---|---|---|---|
| | Bathing Water | Habitats / Birds | Drinking Water | Fish | Shellfish | Nitrates | Urban waste water | Drinking water |
| Danube | | | | | | - | | |
| North Adriatic | | | | | | - | | |
| ***Total*** | | | | | | **-** | | |

**Notes:**

1. the reporting of monitoring of protected areas under the Water Framework Directive was due only if the information was not reported under other directives**.** A total of 123 surface water monitoring stations for nitrates have been reported by Slovenia under the Nitrates Directive in 2008 (reference period 2004-2007). 37 surface water monitoring stations were reported under the Bathing Water Directive (bathing season 2007). Those figures are preliminary as quality checking is on-going at the time this report is written.
2. Slovenia has established and applies action programmes in the whole of its territory and therefore, in accordance to article 3.5 of the Nitrates Directive 1991/676/EEC, it is exempted from designation of specific vulnerable zones.

**Location of surface water and groundwater monitoring stations**




## SURFACE WATER MONITORING PROGRAMMES

### Design of Monitoring Programmes

Surveillance and operational monitoring sub-programmes have been established in for all relevant water categories in both river basin districts except surveillance monitoring for lakes in the Adriatic.

There is no clear information if any water body or monitoring site has been selected for the assessment of long-term changes in natural conditions and there is no information about monitoring of reference conditions.

The criteria for the selection of monitoring points of the WFD are taken into account in the design of the *surveillance monitoring* network.

The *operational monitoring* programme will be established for all water bodies in which priority substances are discharged and are at risk of failing to meet good status.

The report also explains in detail the criteria to locate the monitoring sites taking into account existing pressures in the water body and the objective of finding a representative location.

*Investigative monitoring* is described in the report.

No information is reported on the monitoring of protected areas.

All listed legislative and voluntary agreements are included in monitoring activity, but there is no additional explanation on their implementation. *International coordination* is expected only in a case of major accident or natural hazard – activities coordinated by special department at the Ministry of Defence according to the investigative monitoring programme.

Development of Biological Assessment Methods

In both river basin district reports there are surveillance sub-programmes where the sampling methodology, analyses methodology and standards applied are well presented and/or described. The report states that the methods for assessment of ecological status based on fish (rivers), phytobenthos (rivers), macrophytes (lakes) and macroinvertebrates (rivers, lakes) are in progress and will be gradually implemented during the first period of monitoring. For this reason, they have been considered under development. The report states that phytoplankton in rives is not relevant but does not provide any justification. There is no method for fish in lakes.

**Summary of available biological assessment methods**

| | Rivers | | | | Lakes | | | | Transitional Waters | | | | Coastal Waters | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Phytoplankton | Macrophytes and Phytobenthos | Benthic invertebrates | Fish | Phytoplankton | Macrophytes and Phytobenthos | Benthic invertebrates | Fish | Phytoplankton | Macroalgae and Angiosperms | Benthic invertebrates | Fish | Phytoplankton | Macroalgae and Angiosperms | Benthic invertebrates |
| Slovenia | | | | | | | | | - | - | - | - | | | |

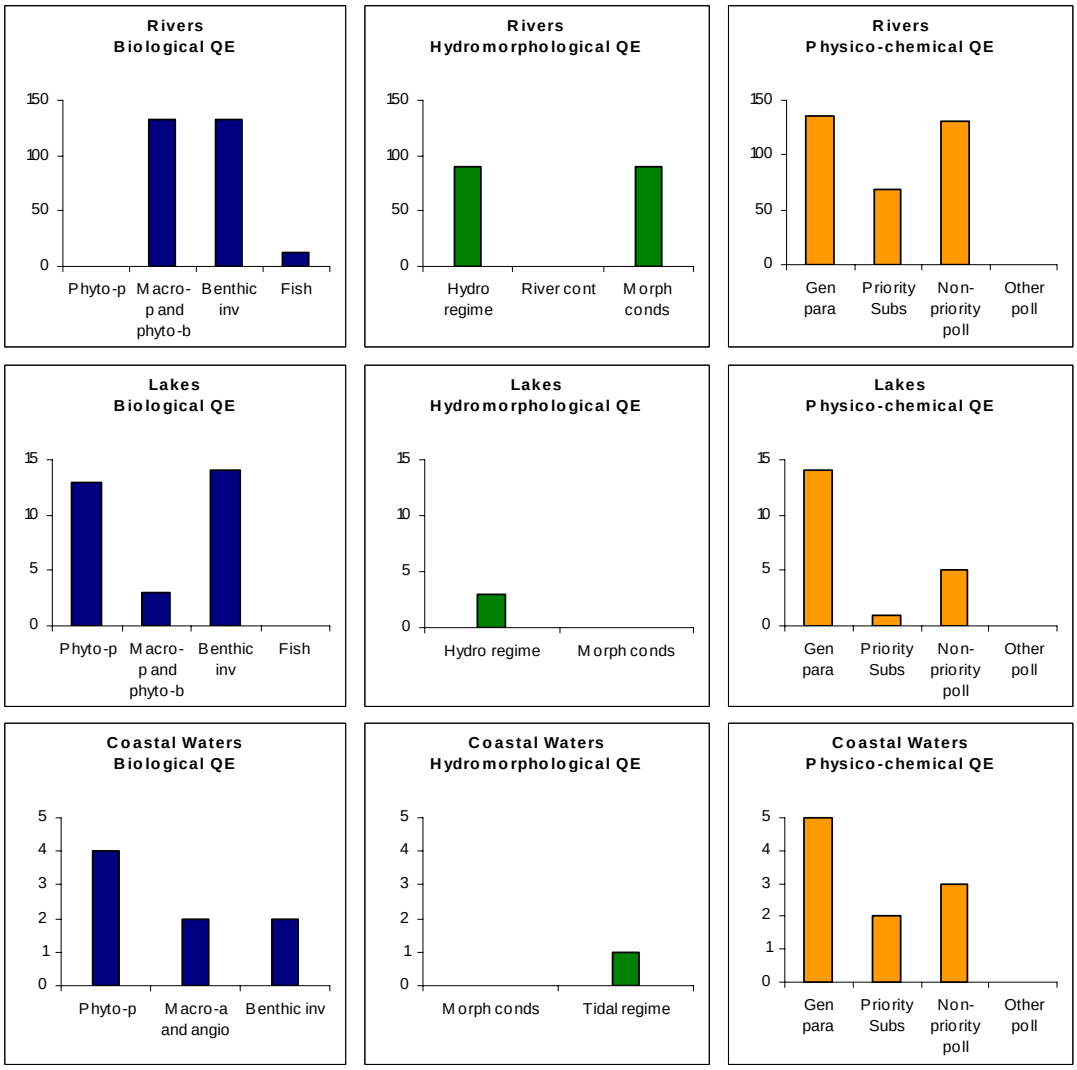
*Method available* | *Under development or incomplete information* | *Not developed or no information* | *Not relevant* -

**Note**: In the context of the WFD intercalibration exercise, Slovenia has intercalibrated the national assessment methods for macroinvertebrates and phytobenthos in rivers (Alpine) and macroinvertebrates and macroalgae in coastal waters. In addition, Slovenia has intercalibrated parameters indicative of biomass and taxonomic composition and abundance of phytoplankton in lakes (Alpine) and a parameter indicative of biomass of phytoplankton in coastal waters (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).

Selection of Quality Elements and Frequency of Monitoring

*Surveillance monitoring* of rivers cover all quality elements. Fish is not monitored in lakes. Priority substances and other specific pollutants are not monitored in surveillance monitoring in lakes and coastal waters of Adriatic river basin district. Other aquatic flora is not monitored in the coastal waters of Adriatic river basin district.

**Number of stations where quality elements are monitored (surveillance and operational monitoring) in rivers, lakes, transitional and coastal waters**




*Frequency* of sampling depends on type of monitoring (surveillance or operational). Surveillance monitoring of biological quality elements is carried out once every 6 years. The reported monitoring cycle of biological quality elements in operational monitoring is every 3 years for some quality elements and has not been decided for others.

## GROUNDWATER MONITORING PROGRAMMES

Design of Monitoring Programmes

In the Danube river basin district, there are specific monitoring programmes for chemical surveillance monitoring, operational monitoring and for groundwater level monitoring. In the Adriatic river basin district, there is no *operational monitoring* programme, because there is no identified groundwater body at risk.

There is evidence that the results of 2004 analysis and that the criteria of the WFD have been taken into account in the design of *surveillance monitoring* but it is not clear whether long-term trends assessment have been considered.

It is also not clear whether results of 2004 analysis and that the criteria of the WFD have been taken into account for *quantitative monitoring* programme.

There is information on the number of drinking water *protection areas* for which sampling and analysis frequencies are reported to be higher. There is no information on monitoring under any other legislative obligations different than WFD.

There is one reference to *international cooperation*, a bilateral Commission between Austria and Slovenia.

Selection of Quality Elements and Frequency of Monitoring

Chemical surveillance monitoring covers all core and other *parameters*. For operational monitoring, selection of parameters is reported to be based on main pressures.

*Frequency*: For quantitative monitoring, groundwater level is monitored annually on a daily bases or 4 times a year.

In surveillance monitoring general parameters are monitored twice every 6 years, other parameters once every 6 years.

In operational monitoring general parameters are monitored twice every year, other parameters once every year.

**FURTHER INFORMATION**

There is no further information provided.

**SUMMARY OF TECHNICAL ASSESSMENT: STRENGTHS AND WEAKNESSES**

+ Quite clear report of good quality
– Availability of methods for the assessment of ecological status

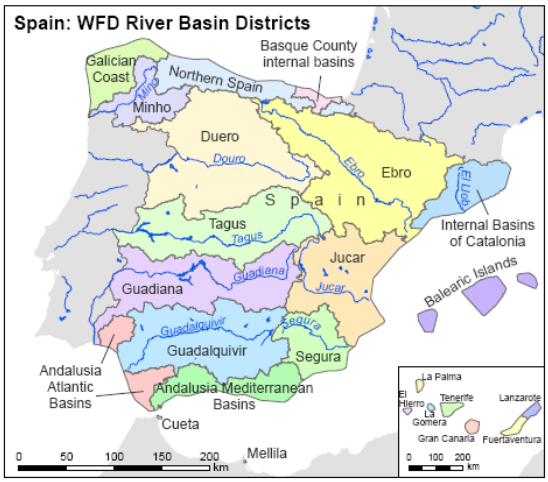
## Member State: SPAIN

### INFORMATION SUPPLIED

Spain has reported through WISE in the agreed format for 22 river basin districts. Information for Ceuta and Melilla is missing.

### FACTS AND FIGURES

Spain has a population of 44.5 million (Eurostat, 2007) and an area of 506,659km$^2$. Six of the Spanish river basin districts are international: Duero, Ebro, Tagus, Guadiana, Minho and Internal Basins of Catalonia.




**River basin districts and number of water bodies**

| River Basin District | Surface (km$^2$) | % National territory | Number of river water bodies | Number of lake water bodies | Number of transitional water bodies | Number of coastal water bodies | Number of groundwater bodies |
|---|---|---|---|---|---|---|---|
| Ebro | 85554 | 17 | 699 | 95 | 3 | 1 | 105 |
| Duero | 78889 | 16 | 342 | 17 | - | - | 31 |
| Guadalquivir | 57527 | 11 | 325 | 4 | 11 | 3 | 58 |
| Tagus | 55772 | 11 | 285 | 33 | - | - | 24 |
| Guadiana | 55461 | 11 | 229 | 32 | 4 | 2 | 20 |
| Jucar | 42989 | 8 | 296 | 20 | 3 | 43 | 79 |
| Northern Spain | 20826 | 4 | 291 | 24 | 23 | 13 | 36 |
| Segura | 18987 | 4 | 69 | 23 | - | 24 | 63 |
| Andalucia Mediterranean | 17956 | 4 | 120 | 5 | 9 | 26 | 67 |
| Minho | 17610 | 3 | 249 | 3 | 1 | - | 6 |
| Catalonia Internal Basins | 16494 | 3 | 260 | 54 | 21 | 31 | 39 |
| Galician Coast | 13131 | 3 | 466 | - | 24 | 123 | 18 |
| Andalucia Atlantic | 10743 | 2 | 113 | 4 | 20 | 14 | 17 |
| Balearic Islands | 5005 | 1 | 0 | 5 | 35 | 31 | 90 |
| Basque internal basins | 2268 | 0.4 | 48 | - | 14 | 4 | 14 |
| Tenerife | 2034 | 0.4 | - | - | - | 7 | 4 |
| Fuerteventura | 1660 | 0.3 | - | - | - | 5 | 4 |
| Gran Canaria | 1560 | 0.3 | - | - | - | 6 | 10 |
| Lanzarote | 846 | 0.2 | - | - | - | 6 | 1 |
| La Palma | 708 | 0.1 | - | - | - | 5 | 5 |
| La Gomera | 370 | 0.1 | - | - | - | 4 | 5 |
| El Hierro | 269 | 0.1 | - | - | - | 3 | 3 |
| Ceuta | 20 | 0.005 | - | - | - | 0 | - |
| Melilla | 13 | 0.003 | - | - | - | 0 | - |
| ***Spain*** | ***506659*** | ***100*** | ***3792*** | ***319*** | ***168*** | ***351*** | ***699*** |

**Numbers of surveillance, operational and quantitative monitoring stations**

| River Basin District | Rivers | | Lakes | | Transitional waters | | Coastal waters | | Groundwaters | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Surv | Op | Surv | Op | Surv | Op | Surv | Op | Surv | Op | Quant |
| Ebro | 560 | 177 | 36 | 19 | 9 | 5 | 3 | 1 | 616 | 188 | 260 |
| Duero | 192 | 113 | 17 | 3 | - | - | - | - | 343 | 84 | 381 |
| Guadalquivir | 150 | 34 | 38 | 7 | - | - | - | - | 133 | 62 | 266 |
| Tagus | 261 | 14 | 74 | 11 | - | - | - | - | 126 | 6 | 208 |
| Guadiana | 95 | 184 | 56 | 48 | 4 | 1 | 2 | 0 | 120 | 25 | 284 |
| Jucar | 142 | 243 | 6 | 16 | 15 | 0 | 473 | 0 | 219 | 62 | 283 |
| Northern Spain | 188 | 208 | 5 | 11 | 167 | 0 | 49 | 0 | 78 | 0 | 103 |
| Segura | 103 | 96 | 3 | 0 | 4 | 0 | 61 | 35 | 119 | 4 | 144 |
| Andalucia Mediterranean | 21 | 21 | 13 | 13 | 7 | 4 | 26 | 0 | 49 | 30 | 54 |
| Minho | 142 | 109 | 5 | 27 | - | - | - | - | 15 | 0 | 17 |
| Catalonia Internal Basins | 261 | 111 | 54 | 5 | 12 | 2 | 35 | 17 | 500 | 705 | 520 |
| Galician Coast | 75 | 29 | 0 | 0 | 22 | 2 | 11 | 12 | 41 | 0 | 0 |
| Andalucia Atlantic | 6 | 3 | 9 | 3 | 11 | 15 | 14 | 0 | 15 | 7 | 12 |
| Balearic Islands | 0 | 0 | 0 | 0 | 40 | 0 | 63 | 14 | 113 | 67 | 121 |
| Basque internal basins | 61 | 27 | 0 | 0 | 25 | 4 | 11 | 1 | 15 | 4 | 14 |
| Tenerife | - | - | - | - | - | - | 91 | 85 | 54 | 5 | 38 |
| Fuerteventura | - | - | - | - | - | - | 77 | 36 | 23 | 13 | 36 |
| Gran Canaria | - | - | - | - | - | - | 69 | 117 | 24 | 36 | 60 |
| Lanzarote | - | - | - | - | - | - | 66 | 41 | 1 | 0 | 1 |
| La Palma | - | - | - | - | - | - | 42 | 19 | 13 | 12 | 4 |
| La Gomera | - | - | - | - | - | - | 27 | 17 | 8 | 3 | 5 |
| El Hierro | - | - | - | - | - | - | 28 | 0 | 12 | 0 | 5 |
| Cueta | - | - | - | - | - | - | - | | - | - | - |
| Melilla | - | - | - | - | - | - | - | | - | - | - |
| ***Total*** | ***2257*** | ***1369*** | ***314*** | ***163*** | ***316*** | ***33*** | ***1148*** | ***395*** | ***2637*** | ***1313*** | ***2816*** |
| ***Total number of monitoring stations*** | ***3626*** | | ***477*** | | ***349*** | | ***1543*** | | ***3950*** | | ***2816*** |

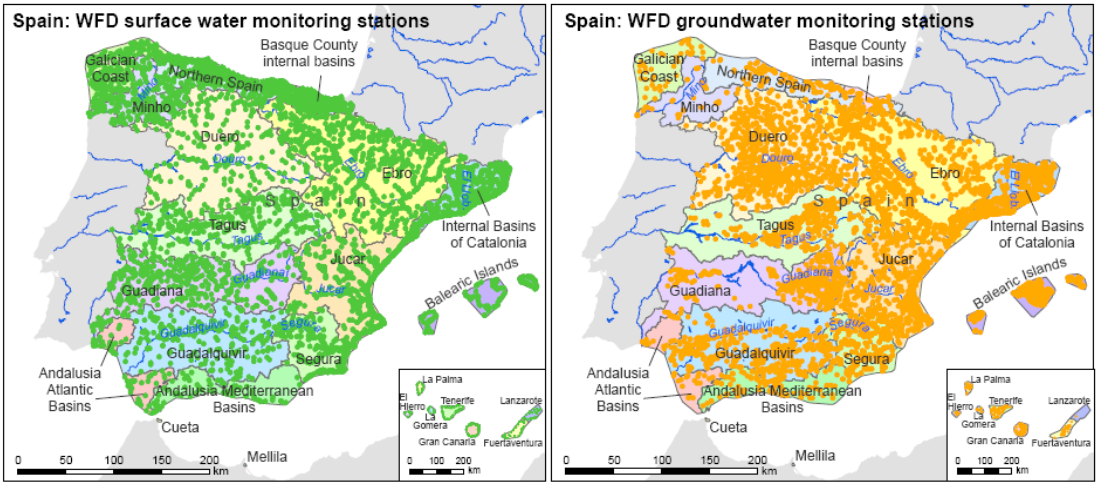
**Note:**
1. Total number of monitoring stations is not necessarily the sum of surveillance and operational as there are stations that serve both purposes
2. The numbers presented in this table differ substantially from the ones reported under article 8 by Spain in 2007, which are the ones used in the indicators and tables in the rest of this report. The numbers in the table above are higher and have been provided as a response to a consultation in January 2009.

**Number of monitoring stations in protected areas reported under the WFD**

| River Basin District | Surface water | | | | | | | Ground water |
|---|---|---|---|---|---|---|---|---|
| | Bathing water | Habitats / Birds | Drinking water | Fish | Shellfish | Nitrates | Urban waste water | Drinking water |
| Ebro | 31 | 11 | 152 | 14 | | 11 | 22 | 194 |
| Duero | | 89 | 45 | 43 | - | 1 | 46 | 173 |
| Guadalquivir | | | 42 | 17 | | 34 | | 67 |
| Tagus | 2 | 112 | 97 | 10 | - | 33 | 43 | 40 |
| Guadiana | 7 | 181 | 57 | 46 | | 96 | 83 | 70 |
| Jucar | 2 | 155 | 16 | 2 | | 58 | 29 | 113 |
| Northern Spain | 7 | 62 | 94 | 21 | 16 | | | 28 |
| Segura | 37 | 100 | 8 | | | 73 | 4 | 26 |
| Andalucia Mediterranean | 3 | 20 | 14 | 3 | | 5 | | 36 |
| Minho | 2 | | 41 | 9 | - | | | 0 |
| Catalonia Internal Basins | 257 | 189 | 48 | 67 | | | 130 | |
| Galician Coast | 18 | 4 | 10 | 11 | | | | |
| Andalucia Atlantic | 3 | 7 | 6 | 2 | | 4 | | 1 |
| Balearic Islands | | | | | | | | 76 |
| Basque internal basins | 52 | 24 | | 4 | | | 15 | 10 |
| Tenerife | | 44 | | | | | 7 | |
| Fuerteventura | | 28 | | | | | 12 | 5 |
| Gran Canaria | | 38 | | | | | | 11 |
| Lanzarote | | 22 | | | | | | |
| La Palma | | 13 | | | | | 8 | 2 |
| La Gomera | | 8 | | | | | 8 | 6 |
| El Hierro | | | | | | | 9 | 7 |
| Cueta | | | | | | | | |
| Melilla | | | | | | | | |
| ***Total*** | ***421*** | ***1116*** | ***630*** | ***249*** | ***21*** | ***315*** | ***416*** | ***865*** |

**Note**: the reporting of monitoring of protected areas under the Water Framework Directive was due only if the information was not reported under other directives. A total of 3084 surface water monitoring stations for nitrates have been reported by Spain under the nitrates Directive in 2008 (reference period 2004-2007). 2085 surface water monitoring stations were reported under the bathing water directive (bathing season 2007). Those figures are preliminary as quality checking is on-going at the time this report is written.

**Location of surface water and groundwater monitoring stations**




## SURFACE WATER MONITORING PROGRAMMES

Design of monitoring programmes

The reporting is structured in a very uniform way for all river basin districts. The titles of the programmes and sub-programmes are similar and refer to specific objectives of the surveillance or operational monitoring, or to monitoring under other related directives or voluntary agreements. However, the information on design of the networks is very uneven and is lacking or very brief in many river basin districts, and the contents of the reports vary greatly in level of detail and in substance.

Information on the monitoring networks is lacking for the following water categories and river basin districts:

- Rivers and lakes in Balearic Islands
- Transitional in Minho
- Coastal and transitional in Guadalquivir

For *surveillance monitoring* the criteria in Annex V section 1.3.1 are not systematically mentioned as the basis for the selection of sites. The information given by the different river basin districts indicate that the network at national level is not coherent. Seven river basin districts reported to have started the monitoring programmes on 1 March 2007.

For *operational monitoring*, almost every river basin district reports sub-programmes, but there is little information given on design of the programmes. Six river basin districts reported to have started the monitoring programmes on 1 March 2008, later than the required date of 22 December 2006.

Only the Duero river basin district reported information on *investigative monitoring*, detailing two occurrences.
Most of the river basin districts designed specific sub-programmes regarding drinking water protected areas.

Only two river basin districts give links or references to information contained in other documents.

Most of the river basin districts included information on the *monitoring of protected areas* with substantial information. Typically, there is no information on *international coordination* for the design of the monitoring programmes. Only the report from the Duero river basin district refers to collaboration in the monitoring of emissions to sea and the transboundary waters programme.

Development of biological assessment methods

Reporting of the biological assessment methods is extremely irregular, with only a few basins providing clear information. One of these is the Duero basin that makes reference to the use of methods developed by the Ebro basin authority. However, the Ebro report does not provide any information on the methods. In general the reporting of methods is very confusing and it looks as if there are no national methods developed.

There was no information given on the levels of confidence.

**Summary of available biological assessment methods**

| | Rivers | | | | Lakes | | | | Transitional Waters | | | | Coastal Waters | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Phytoplankton | Macrophytes and Phytobenthos | Benthic invertebrates | Fish | Phytoplankton | Macrophytes and Phytobenthos | Benthic invertebrates | Fish | Phytoplankton | Macroalgae and Angiosperms | Benthic invertebrates | Fish | Phytoplankton | Macroalgae and Angiosperms | Benthic invertebrates |
| Duero | | | | | | | | | - | - | - | - | - | - | - |
| Ebro | | | | | | | | | | | | | | | |
| Guadalquivir | | | | | | | | | | | | | | | |
| Tagus | | | | | | | | | - | - | - | - | - | - | - |
| Minho | | | | | | | | | | | | | - | - | - |
| Northern Spain | | | | | | | | | | | | | | | |
| Segura | | | | | | | | | | | | | | | |
| Andalucia Mediterranean | | | | | | | | | | | | | | | |
| Catalonia Internal Basins | | | | | | | | | | | | | | | |
| Galician Coast | | | | | | | | | | | | | | | |
| Guadiana | | | | | | | | | | | | | | | |
| Andalucia Atlantic | | | | | | | | | | | | | | | |
| Jucar | | | | | | | | | | | | | | | |
| Balearic Islands | | | | | | | | | | | | | | | |
| Basque internal basins | | | | | - | - | - | - | | | | | | | |
| Tenerife | - | - | - | - | - | - | - | - | - | - | - | - | | | |
| Fuerte-ventura | - | - | - | - | - | - | - | - | - | - | - | - | | | |
| Gran Canaria | - | - | - | - | - | - | - | - | - | - | - | - | | | |
| Lanzarote | - | - | - | - | - | - | - | - | - | - | - | - | | | |
| La Palma | - | - | - | - | - | - | - | - | - | - | - | - | | | |
| La Gomera | - | - | - | - | - | - | - | - | - | - | - | - | | | |
| El Hierro | - | - | - | - | - | - | - | - | - | - | - | - | | | |

*Method available* *Under development or incomplete information* *Not developed or no information* *Not relevant* -

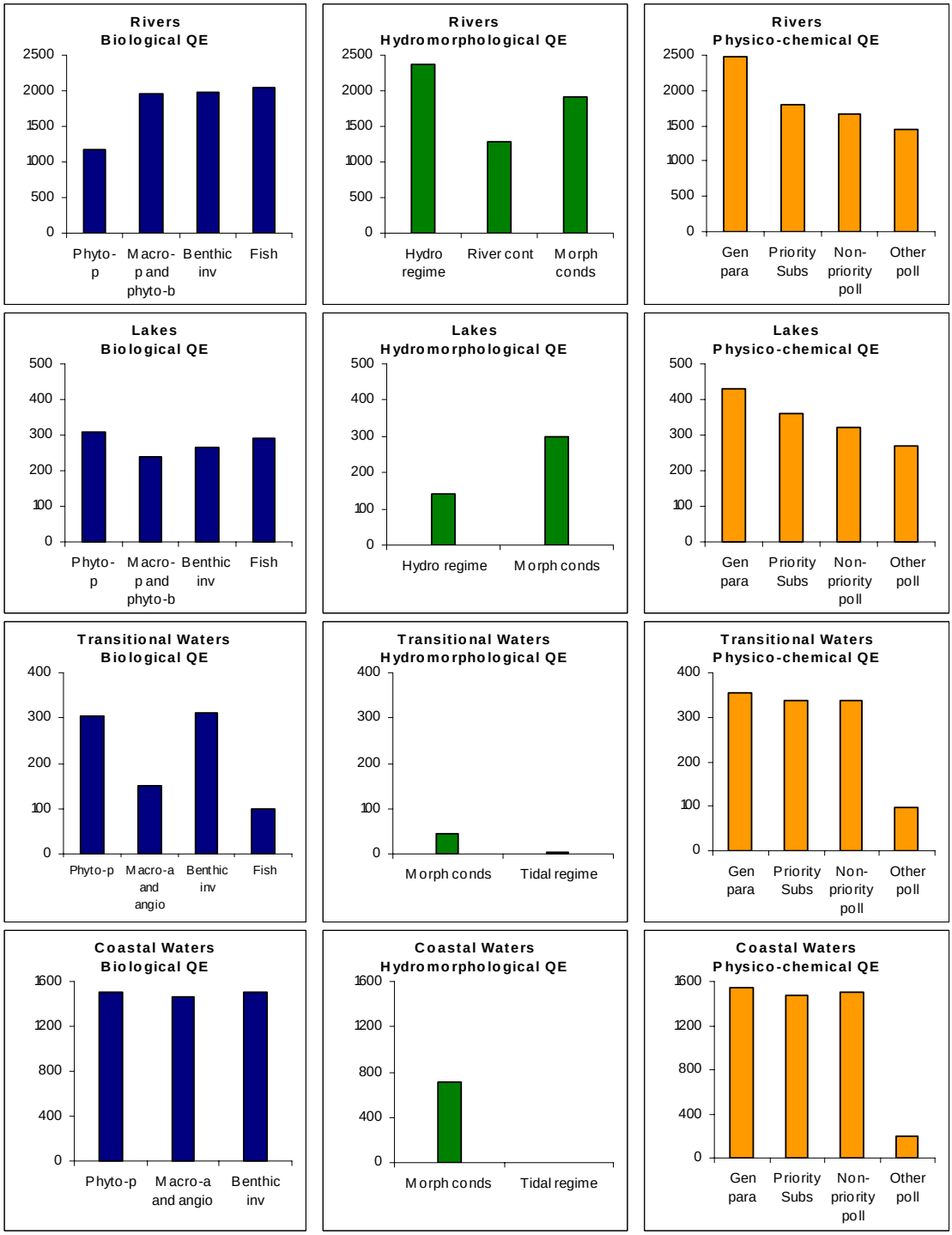
**Note**: In the context of the WFD intercalibration exercise, Spain has intercalibrated the national assessment methods for macroinvertebrates and phytobenthos in rivers (Central, Alpine and Mediterranean geographical areas), macroinvertebrates in North-East Atlantic and Mediterranean coastal waters and macroalgae in Mediterranean coastal waters. In addition, Spain has intercalibrated parameters indicative of biomass and of taxonomic composition and abundance of phytoplankton in Mediterranean reservoirs, parameters indicative of biomass of phytoplankton in coastal waters (both Mediterranean and North-East Atlantic), a parameter indicative of phytoplankton blooms in North-East Atlantic coastal waters, a parameter indicative of composition of macroalgae in North-East Atlantic and a parameter indicative of taxonomic composition of phytoplankton in Mediterranean coastal waters (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).

Selection of quality elements and frequency of monitoring

The monitoring of quality elements in *surveillance monitoring* is far from exhaustive and varies greatly among river basins. In surveillance monitoring, priority substances and other specific pollutants are missing from the monitoring programmes in the following river basin districts (for the water categories indicated in brackets): Minho (all), Norte (rivers and lakes), Jucar (lakes) and Ebro (rivers and lakes). Other specific pollutants are also missing in Guadalquivir river basin district. Biological quality elements are not monitored in rivers and lakes in both Mediterranean and Atlantic Basins of Andalucia. Phytoplakton is the only biological quality element monitored in lakes in the Segura. The reporting by the Ebro river basin district does not specify which biological quality elements are monitored in rivers and lakes. Other aquatic flora in lakes is missing in Guadalquivir and Jucar. Fish in lakes is not monitored in the Internal basins of Catalonia. Other aquatic flora and fish are not monitored in transitional waters in Guadiana and both basins of Andalucia. Biological quality elements are not monitored in transitional waters in Jucar basin. Phytoplankton and fish are not monitored in transitional waters in the Internal basins of Catalonia. Fish is missing in monitoring of transitional waters in the Baleares river basin district. Other aquatic flora is not included in surveillance monitoring of coastal waters in the Guadiana, both basins of Andalucia and Ebro. Again, it appears that there is no national approach in designing the monitoring programmes.

There is no information on the rationale for the selection of quality elements for *operational monitoring*.

**Number of stations where quality elements are monitored (surveillance and operational monitoring) in rivers, lakes, transitional and coastal waters**




The monitoring frequencies reported also vary greatly between the river basin districts, quality elements and water categories.

## GROUNDWATER

Design of monitoring programmes

As with the surface water, reporting is structured in a very uniform way for all river basin districts, although the level of detail and the quality of the reports differ considerably across river basin districts. All river basin districts have reported to have established specific monitoring programmes for groundwater quantitative and chemical assessment including surveillance and operational. In some cases programmes for drinking water and WISE-SoE are reported. One river basin district reported to have one monitoring programme encompassing everything. In general, information provided for the design of monitoring programmes was scarce.

For *surveillance monitoring*, although most reports referred to the objectives of Annex V.2 of WFD and provisions of Directive 2006/118/EC (wrongly quoted as 2006/116/EC across almost all reports) and sometimes to the results of WFD Article 5 pressure and impact analysis, it was not explained how the results of the 2004 analysis were used and if long-term trends assessment may have been taken into account in the design of these monitoring programmes. In some cases, there was no information provided.

The repors do not identify any transboundary groundwater body.

For 5 river basin districts, there are no *operational monitoring* programmes reported despite important percentages of groundwater bodies were identified at risk or lacking sufficient information in the pressure and impact analysis of 2004. No reasons are mentioned for the absence of operational monitoring in those basins. Generally the reports state that the objective of operational monitoring programmes were the assessment of water bodies at risk and establishment of upward trends. One river basin district indicated that the operational monitoring programme would be delayed (no reason provided) until February 2007.

Information was provided in monitoring stations that are located in *protected areas* and on other networks. Although most river basin districts reported to have stations which were also used for drinking water abstraction, there were no information/comments on additional monitoring requirements.

Ten river basin districts reported specific monitoring programmes for EIONET and/or drinking water.

Selection of quality elements and frequency of monitoring

In general, the reports indicate that monitoring will be carried out every year.

## FURTHER INFORMATION

No further information provided.

**SUMMARY OF TECHNICAL ASSESSMENT: STRENGTHS AND WEAKNESSES**

+ Well structured report to cover the objectives of WFD monitoring and protected areas
+ Information on monitoring of protected areas is provided
– Monitoring programmes missing for rivers and lakes in Baleares, transitional waters in Minho and coastal and transitional waters in Guadalquivir
– Diversity of approaches across river basin districts as regards all aspects of design and implementation (densities of monitoring stations, methods to assess ecological status, coverage of quality elements, frequencies, etc).
– Lack of information about international coordination (except in Duero river basin district)
– Availability of methods for the assessment of ecological status

## Member State: SWEDEN

### INFORMATION SUPPLIED

Sweden has reported through WISE in the agreed format for 9 out of 10 river basin districts. Additional reports or information has been submitted for 5 river basin districts. Three of the large Swedish river basin districts provided separate reports describing the surface water monitoring programmes, one of which also covered one of the small districts.

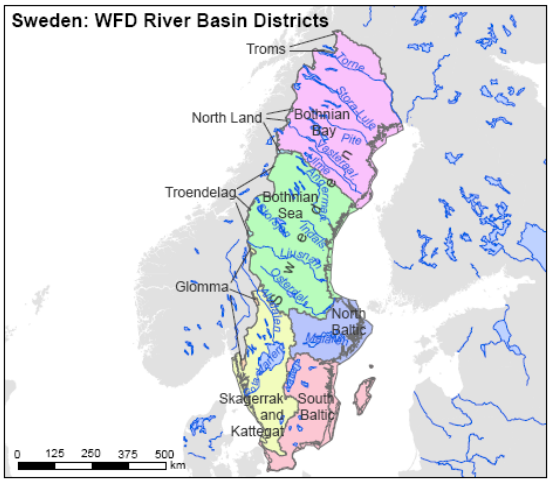
Sweden have designated 5 large river basin districts, located mainly on the Swedish territory (Bothnian Bay, Bothnian Sea, Northern Baltic Sea, Southern Baltic Sea and Skagerrak and Kattegat). For this report on monitoring Sweden has also indicated the existence of 5 additional small river basin districts, being those areas with rivers discharging into mainly Norwegian river basins (Glomma, South Troendelag, North Troendelag, Northland and Troms). For the purpose of this report, these river basin districts are referred to as the *large* and the *small* river basin districts respectively.

A separate report was provided on analytical methods, valid for the whole country, notably Handbook 2007:4 on quality requirements and in surface waters.

Links to further information provided to the Swedish Environmental Protection Agency (http://www.naturvardsverket.se), but the detailed information referred to as available on those links was not easily identified on that site.

### FACTS AND FIGURES

Sweden has a population of 9.1 million (Eurostat, 2007) and an area of 453,140 km$^2$.
Sweden shares seven international river basins: Bothnian Bay, Bothnian Sea, Skagerrak and Kattegat, North Land, Glomma, Troms and North Troendelag.



### River basin districts and number of water bodies

| River Basin District | Surface ($km^2$) | % National territory | Number of river water bodies | Number of lake water bodies | Number of transitional water bodies | Number of coastal water bodies | Number of groundwater bodies |
|---|---|---|---|---|---|---|---|
| Bothnian Bay | 147625 | 33 | 4931 | 1920 | - | 95 | 655 |
| Bothnian Sea | 141638 | 31 | 7369 | 3679 | - | 62 | 781 |
| Skagerrak and Kattegat | 69546 | 15 | 1679 | 755 | 2 | 110 | 477 |
| South Baltic | 54420 | 12 | 963 | 480 | - | 170 | 580 |
| North Baltic | 36959 | 8 | 629 | 338 | 18 | 135 | 536 |
| North Land | 1317 | 0.3 | 56 | 44 | - | - | 1 |
| Glomma | 990 | 0.2 | 32 | 23 | - | - | 2 |
| North and South Troendelag | 451 | 0.1 | 47 | 18 | - | - | - |
| Troms | 194 | 0.04 | 16 | 8 | - | - | - |
| ***Sweden*** | ***453140*** | ***100*** | ***15722*** | ***7265*** | ***20*** | ***572*** | ***3032*** |

**Note:** Northern and Southern Troendelag river basin districts are displayed together on this table

### Numbers of surveillance, operational and quantitative monitoring stations

| River Basin District | Rivers | | Lakes | | Transitional waters | | Coastal waters | | Groundwaters | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Surv | Op | Surv | Op | Surv | Op | Surv | Op | Surv | Op | Quant |
| Bothnian Bay | 40 | 81 | 25 | 0 | - | - | 4 | 13 | 17 | 0 | 0 |
| Bothnian Sea | 23 | 81 | 9 | 38 | - | - | 2 | 39 | 16 | 0 | 0 |
| Skagerrak and Kattegat | 35 | 367 | 28 | 127 | 1 | 1 | 31 | 9 | 28 | 0 | 0 |
| South Baltic | 43 | 86 | 41 | 48 | - | - | 1 | 71 | 38 | 0 | 0 |
| North Baltic | 93 | 145 | 238 | 447 | 1 | 0 | 75 | 0 | 16 | 0 | 0 |
| North Land | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 |
| Glomma | 1 | 9 | 1 | 0 | - | - | - | - | 0 | 0 | 0 |
| South Troendelag | 0 | 0 | 0 | 0 | - | - | - | - | - | - | - |
| Troms | 0 | 0 | 0 | 0 | - | - | - | - | - | - | - |
| North Troendelag | 0 | 0 | 0 | 0 | - | - | - | - | - | - | - |
| ***Total*** | ***235*** | ***769*** | ***342*** | ***660*** | ***2*** | ***1*** | ***113*** | ***132*** | ***115*** | ***0*** | ***0*** |
| ***Total number of monitoring stations*** | ***1003*** | | ***989*** | | ***3*** | | ***244*** | | ***115*** | | ***0*** |

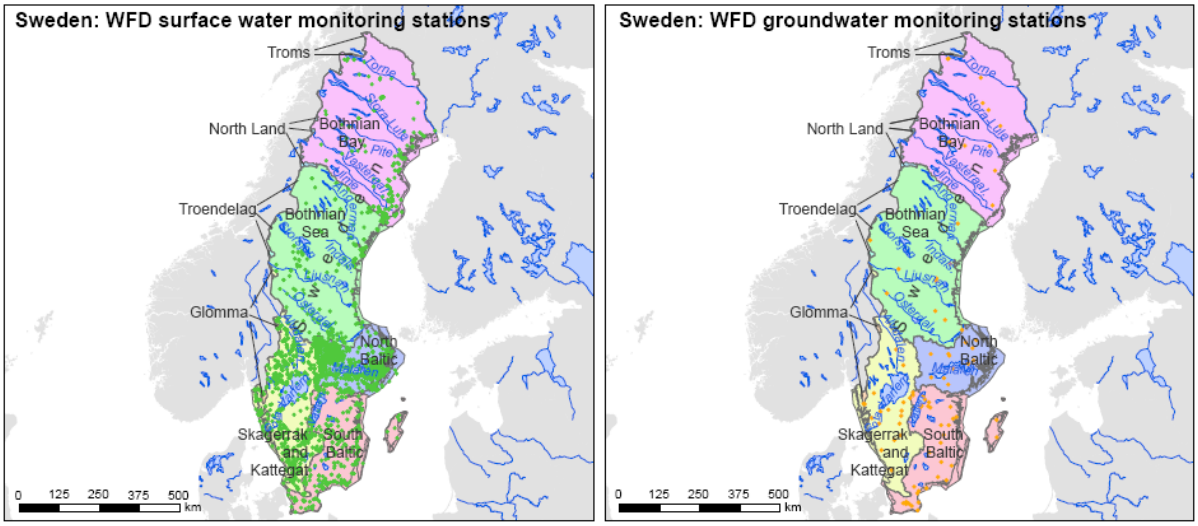
**Note:** Total number of monitoring stations is not necessarily the sum of surveillance and operational as there are stations that serve both purposes

**Number of monitoring stations in protected areas reported under the WFD**

| River Basin District | Surface water | | | | | | | Ground water |
|---|---|---|---|---|---|---|---|---|
| | Bathing Water | Habitats / Birds | Drinking Water | Fish | Shellfish | Nitrates | Urban waste water | Drinking Water |
| Bothnian Bay | | | | | | | - | 6 |
| Bothnian Sea | | | | | | | - | 7 |
| Skagerrak and Kattegat | | | | | | | - | 4 |
| South Baltic | | | | | | | - | 5 |
| North Baltic | | | | | | | - | 4 |
| North Land | | | | | | | - | |
| Glomma | | | | | | | - | |
| South Troendelag | | | | | | | - | |
| Troms | | | | | | | - | |
| North Troendelag | | | | | | | - | |
| ***Total*** | | | | | | | **-** | ***28*** |

**Notes**:
1. The reporting of monitoring of protected areas under the Water Framework Directive was due only if the information was not reported under other directives. A total of 2417 surface water monitoring stations for nitrates have been reported by Sweden under the nitrates Directive in 2008 (reference period 2004-2007). 470 surface water monitoring stations were reported under the bathing water directive (bathing season 2007). Those figures are preliminary as quality checking is on-going at the time this report is written.
2. Sweden applies more stringent waste water treatment in the whole of its territory and therefore, in accordance to article 5.8 of the Urban Waste Water Directive 1991/271/EEC, it is exempted from designation of specific sensitive areas.

**Location of surface water and groundwater monitoring stations**




## SURFACE WATER MONITORING PROGRAMMES

### Design of Monitoring Programmes

The programmes for the five large river basin districts are fairly uniform and transparent, with separate sub-programmes reported for both *surveillance and operational monitoring* programmes. The results of the pressures and impact analysis of Swedish water bodies were

however not ready for use by the river basin authorities when the WFD monitoring programmes were designed. Thus the river basin authorities could not design their monitoring programmes to supplement and validate the results from the pressure and impact analyses. It is reported that the monitoring network is in construction and will undergo changes in the next few years. The issue of allocating financial resources was also reported to be unsolved. The programmes reported represent a minimum level, and are mainly a subset of the existing national programmes.

The four reports submitted for the small river basin districts included only limited information, to the extent that it is concluded that no surface water monitoring programmes are established in practice in these districts.

For *surveillance monitoring* one stated general objective is to assess long-term trends in natural conditions, but the report does not specify how this is implemented in practice in the design (for example, no monitoring of reference sites were reported). Some of the criteria for selecting sites (flow, volume, indicative of pollution) are mentioned in the handbook for lakes and rivers.

In all river basin districts except for one (Skagerrak and Kattegat, including Glomma), *investigative monitoring* is referred to briefly.

The reports for the five large river basin districts and Glomma provide some information on *monitoring of protected areas*, but no information on monitoring stations located in protected areas was given. Most of the river basin district reports refer to *drinking water* abstraction points within the river basin districts, and state that there are monitoring stations for drinking water abstraction sites in the river basin district. However, it is not clear if any of the sites are included in the list of reported stations.

For three of the five large river basin districts the report mentions the number of sites or water bodies where monitoring under some of the *other water directives* is operated.

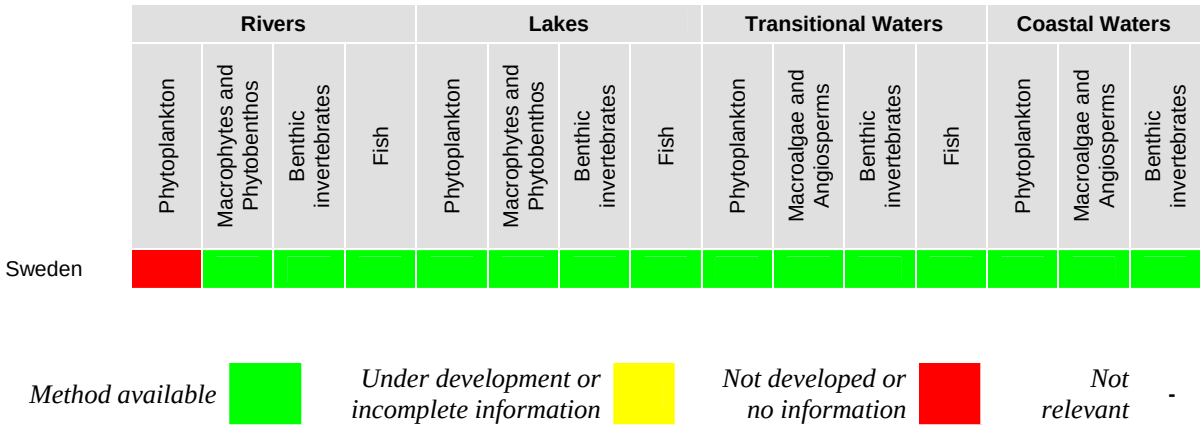
Two of the three main international river basin districts established *international collaboration* (Bothnian Bay, Skagerrak and Kattegat) in design of the monitoring networks with Norway.

Development of Biological Assessment Methods

All sampling, analyses and assessment methods are reported to be available except phytoplankton in rivers, which is not used (see Handbook no. 4 from Naturvårdsverket). The reported material contains references to methodological documents or standards in use.

No information is provided on *confidence level* for the current monitoring design, but the reports suggest that such an analysis will be made later.

**Summary of available biological assessment methods**




**Note**: In the context of the WFD intercalibration exercise, Sweden has intercalibrated a range of national methods and parameters for the assessment of ecological status (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).

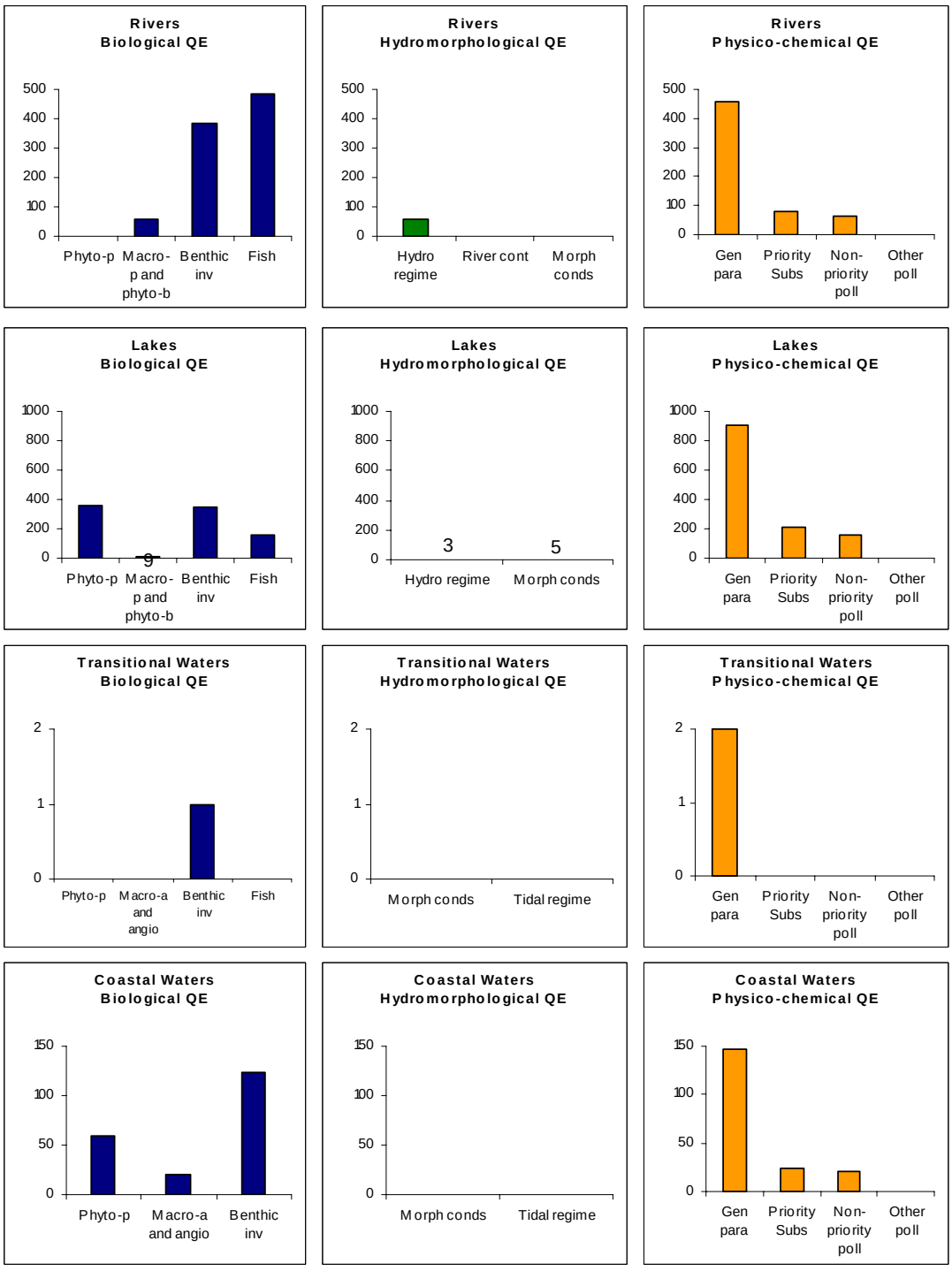
## Selection of Quality Elements and Frequency of Monitoring

The coverage of quality elements in surveillance monitoring is not comprehensive and varies greatly across river basin districts. Phytoplankton in rivers is not monitored. Priority substances are not included in surveillance monitoring in rivers in the Bothnian Sea and Bothnian Bay river basin districts. In lakes, other aquatic flora is not included in surveillance monitoring in Bothnian Sea, Bothnian Bay and Skagerrak and Kattegat river basin districts. Hydromorphology in lakes is only monitored in the North Baltic river basin district. In transitional waters, only general physico-chemical pollutants are monitored in one site in the North Baltic river basin district, and only macroinvertebrates in another site in the Skagerrak and Kattegat. In coastal waters, other aquatic flora is only monitored in the Skagerrak and Kattegat. Only Phytoplankton is monitored in the coastal waters of South Baltic. Hydromorphology, priority substances and other specific pollutants are not monitored in coastal waters.

In operational monitoring, a wide range of quality elements are used, suggesting a targeted approach to pressures.

All of the river basin districts report generally mentions that there will be yearly *surveillance monitoring and operational monitoring* in the first cycle, but the yearly frequency of samples varies between quality elements and river basin districts. Phytoplankton in coastal waters is monitored from 6-25 times per year, and in lakes from 4-12 times per year. Higher frequency is used for operational than for surveillance monitoring for lakes.

**Number of stations where quality elements are monitored (surveillance and operational monitoring) in rivers, lakes, transitional and coastal waters**




## GROUNDWATER MONITORING PROGRAMMES

### Design of Monitoring Programmes

The results of the risk analysis were not available at the time of reporting therefore they could not have been taken into account in the design of monitoring programmes. The report

submitted for the small river basin districts that have groundwater bodies contain no information on groundwater monitoring. The information provided is very general and in many places insufficient to draw a proper assessment.

The information for the large river basin districts is limited to general description of methodology for quantitative and surveillance monitoring and number of stations for *surveillance monitoring*.
Although the reports indicate that there are groundwater monitoring programmes for quantitative assessment, there are no stations associated to them.
Chemical surveillance monitoring of groundwater in all five large river basin districts is reported. It is not clear if long term changes have been taken into account in the design of such a programme.
*Operational monitoring* has not yet been established, but it is indicated that it will be set up once the surveillance monitoring has identified ground water bodies at risk.

The number of *protected drinking water abstraction areas* is provided and no additional monitoring requirements are reported to be necessary. It is however not clearly reported if a particular station is used for drinking water monitoring. The reports do not provide any information on other obligations.

It is indicated that Sweden has no *transboundary ground water* bodies.
The reports are incomplete especially regarding operational monitoring and the quantitative assessment.

Selection of Quality Elements and Frequency of Monitoring

For surveillance monitoring, the programmes are not comprehensive and cover only some of the core *parameters*. No operational and no quantitative monitoring yet established.

The indicated cycle and *frequency* for surveillance monitoring varies across river basin districts and across stations and/or quality elements. It varies between once every 6 years, once every year, twice a year, to 4 times a year every year.

## FURTHER INFORMATION

*Handbok 2007:4 Status, potential och kvalitetskrav för sjöar, vattendrag, kustvatten och vatten i övergångszon – En handbok om hur kvalitetskrav i ytvattensförekomster kan bestämmas och följas upp. (Handbook 2007:4 Status potential and quality objectives for lakes, rivers, coastal waters and transitional waters – A handbook on how quality objectives in surface waters can be determined and followed-up)* Available at: www.naturvardsverket.se
Links to further information provided to the Swedish EPA (http://www.naturvardsverket.se/sv/Nedre-meny/Webbokhandeln/ISBN/0100/978-91-620-0147-6/).
*Övervakningsprogram för yt- och grundvatten i Bottenvikens vattendistrikt 2007-2009, Vattenmyndigheten Bottenviken.*
*Övervakningsprogram för grund- och ytvatten i Södra Östersjöns vattendistrikt enligt förordningen om förvaltning av kvaliteten på vattenmiljön (SFS 2004:660)*
*Övervakningsprogram för yt- och grundvatten i Västerhavets vattendistrikt 2007-2009*

*Information on monitoring stations for waters used for drinking water abstraction, from the Food Safety Agency (Livsmedelsverket), entitled: Livsmedelverkets föreskrifter om dricksvatten, SLVFS 2001:30. ( http://www.slv.se/upload/dokument/Lagstiftning/2000-2005/2001_30.pdf )*

**SUMMARY OF TECHNICAL ASSESSMENT: STRENGTHS AND WEAKNESSES**

+ Good development of methods for the assessment of ecological status
– Groundwater quantitative and operational monitoring missing
– Important delay in the overall WFD implementation creates uncertainties on the effective design of the monitoring programmes (the risk assessment was not available at the time of development)
– Low density of monitoring stations in surface waters (although frequencies are higher than the minimum required in the WFD) and very low in groundwaters (lowest in EU)
– The WFD monitoring programmes appear to be a sub-set of national monitoring programmes, showing lack of integration (e.g. little information reported on monitoring of protected areas)

## Member State: UNITED KINGDOM

### INFORMATION SUPPLIED

The United Kingdom has reported through WISE in the agreed format for its 17 river basin districts in England and Wales, Scotland, Northern Ireland and Gibraltar. Additional information on the monitoring programmes was submitted in other formats through WISE for the following river basin districts: Neagh Bann, North Western, North Eastern, and Gibraltar.

The following reports were provided:

- United Kingdom Technical Advisory Group (UKTAG): guidance on the Selection of Monitoring Sites and Building Monitoring Networks for Surface Waters and Groundwater

- Scottish Environment Protection Agency (SEPA): Water Framework Directive aquatic monitoring strategy documents and

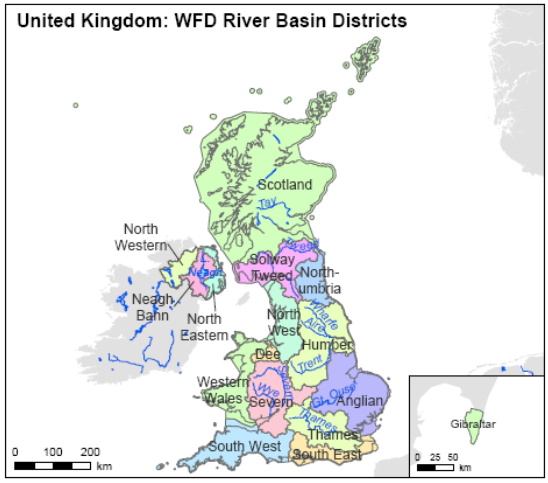
- Approach to Groundwater Monitoring for Northern Ireland, United Kingdom to meet the requirements of the Water Framework Directive'.

The Scottish report provided a link to a general overview report. No active links were provided to sources for England and Wales, and Northern Ireland.

### FACTS AND FIGURES

The United Kingdom has a population of 60.8 million (Eurostat, 2007) and an area of 315,516 km$^2$.

The United Kingdom shares three international river basin districts with the Republic of Ireland: Neagh Bann, North Western and Shannon.



**River basin districts and number of water bodies**

| River Basin District | Surface ($km^2$) | % National territory | Number of river water bodies | Number of lake water bodies | Number of transitional water bodies | Number of coastal water bodies | Number of groundwater bodies |
|---|---|---|---|---|---|---|---|
| Scotland | 113920 | 36 | 2009 | 309 | 40 | 449 | 275 |
| Humber | 29109 | 9 | 889 | 134 | 8 | 1 | 50 |
| Anglian | 27890 | 9 | 738 | 46 | 18 | 13 | 31 |
| Severn | 21590 | 7 | 744 | 71 | 6 | - | 40 |
| South West | 21244 | 7 | 924 | 60 | 23 | 28 | 44 |
| Solway Tweed | 17500 | 6 | 518 | 35 | 2 | 8 | 73 |
| Western Wales | 16653 | 5 | 669 | 62 | 27 | 24 | 25 |
| Thames | 16133 | 5 | 448 | 72 | 11 | 3 | 46 |
| North West | 13140 | 4 | 485 | 157 | 12 | 8 | 18 |
| South East | 10195 | 3 | 336 | 30 | 20 | 14 | 30 |
| Northumbria | 9029 | 3 | 363 | 73 | 7 | 7 | 9 |
| Neagh Bann | 6285 | 2 | 249 | 11 | 2 | 3 | 14 |
| North Western | 5497 | 2 | 192 | 15 | 2 | 1 | 45 |
| North Eastern | 5048 | 2 | 111 | 3 | 3 | 16 | 8 |
| Dee | 2251 | 1 | 86 | 21 | 1 | - | 6 |
| Gibraltar | 30 | 0.01 | - | - | - | 3 | 2 |
| Shannon | 2 | 0.0006 | - | - | - | - | - |
| ***United Kingdom*** | ***315516*** | ***100*** | ***8761*** | ***1099*** | ***182*** | ***578*** | ***716*** |

**Note:** number of water bodies differ from those presented in the draft river basin management plans due to splitting.

**Numbers of surveillance, operational and quantitative monitoring stations**

| River Basin District | Rivers | | Lakes | | Transitional waters | | Coastal waters | | Groundwaters | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Surv | Op | Surv | Op | Surv | Op | Surv | Op | Surv | Op | Quant |
| Scotland | 341 | 1118 | 41 | 106 | 49 | 153 | 207 | 374 | 192 | 162 | 24 |
| Humber | 128 | 1807 | 2 | 4 | 2 | 1 | 1 | 0 | 492 | 492 | 199 |
| Anglian | 95 | 858 | 3 | 16 | 3 | 15 | 2 | 5 | 451 | 451 | 170 |
| Severn | 97 | 1374 | 3 | 3 | 1 | 1 | - | - | 376 | 376 | 123 |
| South West | 138 | 802 | 3 | 4 | 6 | 16 | 7 | 16 | 408 | 408 | 78 |
| Solway Tweed | 95 | 378 | 6 | 24 | 5 | 21 | 17 | 27 | 164 | 158 | 30 |
| Western Wales | 93 | 757 | 14 | 13 | 5 | 9 | 6 | 12 | 133 | 133 | 24 |
| Thames | 109 | 854 | 1 | 14 | 1 | 3 | 1 | 3 | 602 | 602 | 284 |
| North West | 75 | 901 | 15 | 7 | 3 | 6 | 1 | 4 | 364 | 364 | 88 |
| South East | 60 | 436 | 1 | 21 | 2 | 8 | 4 | 11 | 256 | 256 | 206 |
| Northumbria | 70 | 356 | 3 | 0 | 1 | 4 | 3 | 4 | 145 | 145 | 15 |
| Neagh Bann | 30 | 289 | 7 | 17 | 19 | 0 | 26 | 0 | 21 | 16 | 9 |
| North Western | 52 | 286 | 4 | 20 | 13 | 12 | 12 | 7 | 13 | 0 | 9 |
| North Eastern | 19 | 148 | 1 | 2 | 20 | 0 | 96 | 0 | 11 | 20 | 10 |
| Dee | 21 | 141 | 2 | 0 | 1 | 1 | - | - | 37 | 37 | 10 |
| Gibraltar | - | - | - | - | - | - | 4 | 0 | 8 | 5 | 10 |
| Shannon | - | - | - | - | - | - | - | - | - | - | - |
| ***Total*** | ***1423*** | ***10505*** | ***106*** | ***251*** | ***131*** | ***250*** | ***387*** | ***463*** | ***3673*** | ***3625*** | ***1289*** |
| ***Total number of monitoring stations*** | ***11372*** | | ***314*** | | ***316*** | | ***709*** | | ***3698*** | | ***1289*** |

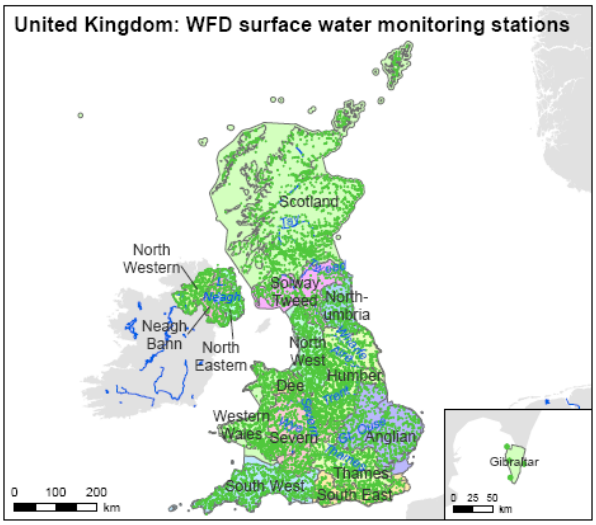
**Note:** Total number of monitoring stations is not necessarily the sum of surveillance and operational as there are stations that serve both purposes

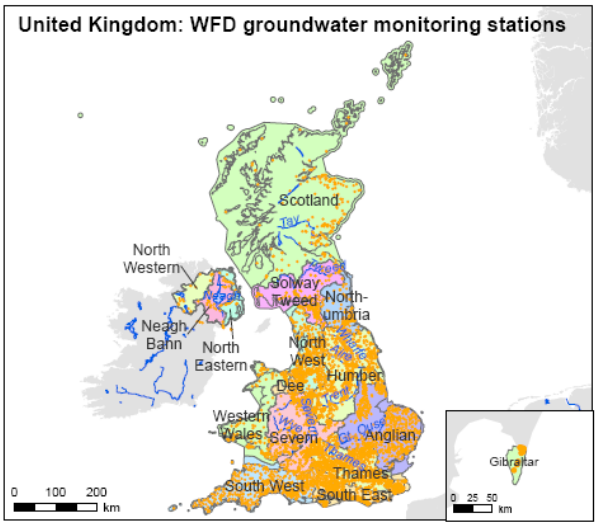
### Number of monitoring stations in protected areas reported under the WFD

| River Basin District | Surface water | | | | | | | Ground water |
|---|---|---|---|---|---|---|---|---|
| | Bathing Water | Habitats / Birds | Drinking Water | Fish | Shellfish | Nitrates | Urban waste water | Drinking Water |
| Scotland | 198 | 1375 | | 991 | 277 | 331 | 281 | |
| Humber | | | | | | | | |
| Anglian | | | | | | | | |
| Severn | | | | | | | | |
| South West | | | | | | | | |
| Solway Tweed | 27 | 184 | | 218 | 35 | 61 | 38 | |
| Western Wales | | | | | | | | |
| Thames | | | 10 | | | | | |
| North West | | | | | | | | |
| South East | | | 16 | | | | | |
| Northumbria | | | | | | | | |
| Neagh Bann | | 1 | | 230 | 9 | 311 | 290 | |
| North Western | | | | 259 | 10 | 306 | 271 | |
| North Eastern | | | | 91 | 14 | 150 | 96 | |
| Dee | | | | | | | | |
| Gibraltar | | | | | | | | 3 |
| Shannon | | | | | | | | |
| ***Total*** | ***225*** | ***1560*** | ***9*** | ***1792*** | ***345*** | ***1186*** | ***989*** | ***3*** |

**Note**: the reporting of monitoring of protected areas under the Water Framework Directive was due only if the information was not reported under other directives. A total of 9341 surface water monitoring stations for nitrates have been reported by the UK under the nitrates Directive in 2008 (reference period 2004-2007). 608 surface water monitoring stations were reported under the bathing water directive (bathing season 2007). Those figures are preliminary as quality checking is on-going at the time this report is written.

### Location of surface water and groundwater monitoring stations



## SURFACE WATER MONITORING PROGRAMMES

Design of Monitoring Programmes

Different approaches have been taken in the 3 main regions of the United Kingdom: Scotland, Northern Ireland, and England and Wales. For the Solway Tweed river basin district which is shared by Scotland and England separate approaches have been taken for the Scottish and for the English parts of the river basin district.

Scotland has separate programmes for *surveillance* and operational monitoring and for each of the four water categories (eight subprogrammes in total). In England and Wales subprogrammes have been defined based on a combination of water category and quality elements rather than programme type (operational or surveillance). This approach has resulted in ca. 600 subprogrammes. In Northern Ireland there are surveillance monitoring programmes for all water categories with a series of subprogrammes specified in terms of purpose, quality element or specific locations.

*Operational monitoring* in Northern Ireland tends to be associated with existing monitoring for specific purposes such as for OSPAR or the Nitrates Directive.

In terms of *investigative monitoring* no information was provided for Scotland and Northern Ireland whereas the strategy for investigative monitoring was described for England and Wales.

Monitoring of *protected areas* is incorporated in subprogrammes in Northern Ireland and also monitored in Scotland but no information was provided on monitoring of protected areas for England and Wales.

Little information on *international co-ordination* was provided in the Article 8 reports.

Development of Biological Assessment Methods

For Scotland, and England and Wales the methods for some quality elements are missing or reported to be under development, for example macrophytes in rivers. No method was reported for fish in Scotland, and a method for phytoplankton in lakes in England and Wales is under development. Methods for the monitoring of angiosperms in coastal and transitional waters were missing for Scotland and England and Wales. Morphological methods for lakes in Scotland and England and Wales are also under development. The reports of Northern Ireland river basin districts state that phytoplankton is not relevant in their rivers due to short retention time[2].

Information on the *levels of confidence and precision* was incomplete in all reports.

[2] This may be also the case in other parts of the UK, but this was not mentioned in the report.

**Summary of available biological assessment methods**

| | Rivers | | | | Lakes | | | | Transitional Waters | | | | Coastal Waters | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Phytoplankton | Macrophytes and Phytobenthos | Benthic invertebrates | Fish | Phytoplankton | Macrophytes and Phytobenthos | Benthic invertebrates | Fish | Phytoplankton | Macroalgae and Angiosperms | Benthic invertebrates | Fish | Phytoplankton | Macroalgae and Angiosperms | Benthic invertebrates |
| Scotland | | | | | | | | | | | | | | | |
| Humber | | | | | | | | | | | | | | | |
| Anglian | | | | | | | | | | | | | | | |
| Severn | | | | | | | | | | | | | - | - | - |
| South West | | | | | | | | | | | | | | | |
| Solway Tweed | | | | | | | | | | | | | | | |
| Western Wales | | | | | | | | | | | | | | | |
| Thames | | | | | | | | | | | | | | | |
| North West | | | | | | | | | | | | | | | |
| South East | | | | | | | | | | | | | | | |
| Northumbria | | | | | | | | | | | | | | | |
| Neagh Bann | - | | | | | | | | | | | | | | |
| North Western | - | | | | | | | | | | | | | | |
| North Eastern | | | | | | | | | | | | | | | |
| Dee | | | | | | | | | | | | | - | - | - |
| Gibraltar | - | - | - | - | - | - | - | - | - | - | - | - | | | |
| Shannon | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

*Method available* *Under development or incomplete information* *Not developed or no information* *Not relevant* -

**Note**: In the context of the WFD intercalibration exercise, UK has intercalibrated a range of national methods and parameters for the assessment of ecological status (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).

## Selection of Quality Elements and Frequency of Monitoring

The level of reporting quality elements was variable between regions. In some cases monitoring of biological quality elements as a whole without distinction of individual organisms groups was reported while in others - monitoring at the biological quality element level was reported.

Surveillance monitoring in rivers includes all quality elements except fish in Scotland river basin district. Fish in lakes is also not monitored in Scotland. Phytoplankton, priority substances and other specific pollutants are only monitored in lakes in the river basin districts of Northern Ireland, Scotland and Solway Tweed. In transitional waters all quality elements are monitored except phytoplankton in North Western and other aquatic flora and hydromorphology in Scotland. In coastal waters all quality elements are monitored except

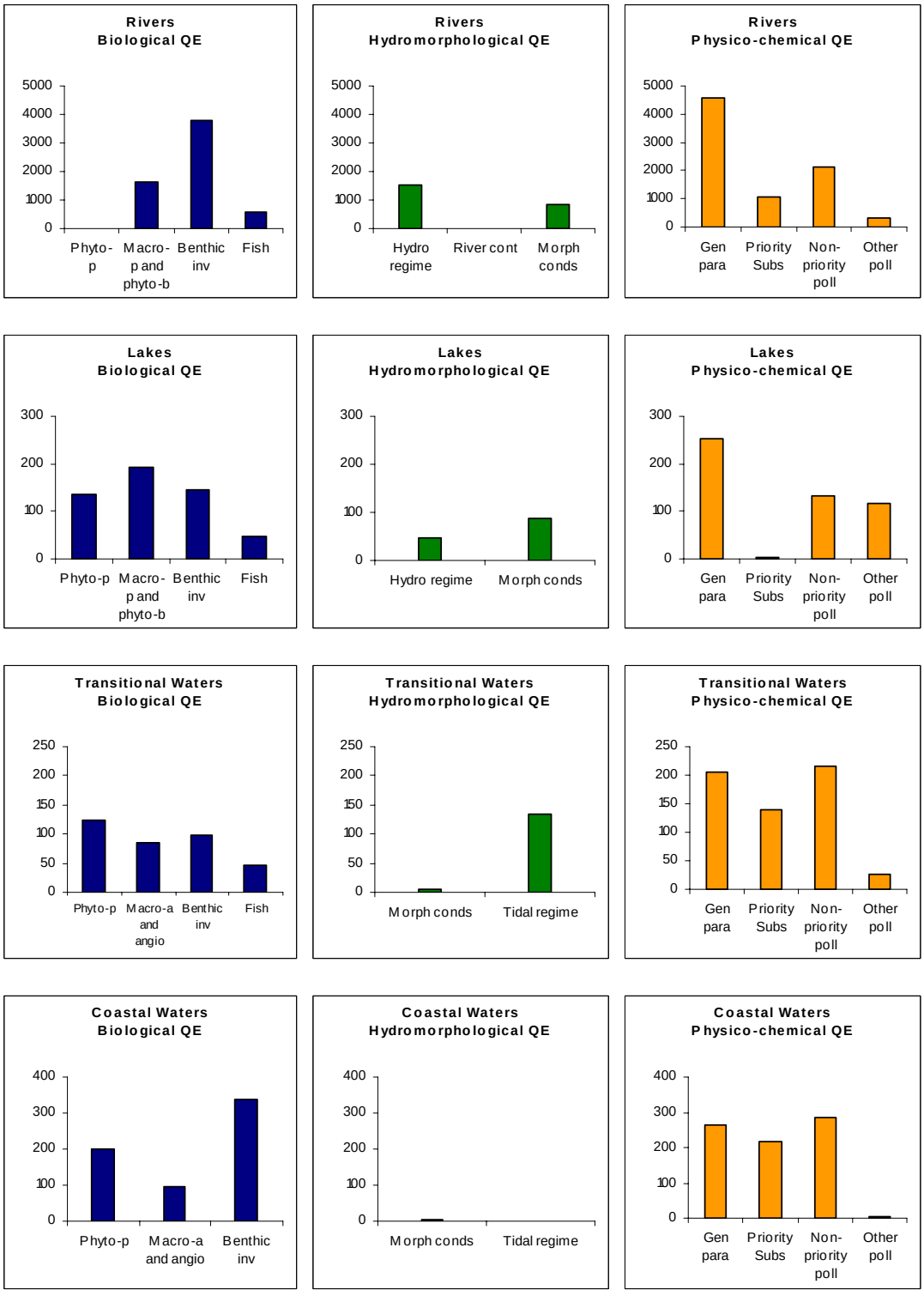
hydromorphology in Neagh Bann, hydromorphology and general physico-chemical parameters in North Western, hydromorphology and other aquatic flora in Scotland and Solway Tweed.

The reports for Scotland and England and Wales indicate that biological quality elements are focused to particular pressures within *operational monitoring*. The information from Northern Ireland was not clear.

A higher frequency than the minimum for *surveillance monitoring* is reported for all quality elements and water categories in Northern Ireland – 3 times a year. In Scotland the predominant frequency was once a year with no less frequency than once in 2 years. In England and Wales there were many differences between quality elements and water categories but with most having a greater frequency than once in 6 years.

The frequency of monitoring the biological quality elements for operational monitoring varies across regions. For England and Wales it was not possible to determine whether monitoring frequency varied between operational and surveillance monitoring since all subprogrammes are used for both purposes.

**Number of stations where quality elements are monitored (surveillance and operational monitoring) in rivers, lakes, transitional and coastal waters**




## GROUNDWATER MONITORING PROGRAMMES

### Design of Monitoring Programmes

Although all reports refer or mention the UK technical guidance for monitoring, different approaches have been adopted across the regions of the UK (Scotland, Northern Ireland and

England and Wales) and to some extent by Gibraltar. This is most evident in the Solway Tweed river basin district which is shared between Scotland and England.

In England and Wales two programmes have been defined for groundwater; one on *level of groundwater* and one on *quality of groundwater* which covers both *operational* and *surveillance monitoring.*

Gibraltar has also two programmes: one on groundwater level and one on quality. It has sub-divided these programmes per each of the 2 groundwater bodies. The difference between the two groundwater bodies quality programmes is that there is no operational monitoring for the Southern Quality groundwater body monitoring programme.

In Scotland, there are two separate programmes for the surveillance and operational monitoring, both including quantitative monitoring with the majority of ground water monitoring sites being part of both the surveillance and operational networks. In Scotland it is specifically reported that the bulk of the monitoring work is operational monitoring, targeted on water bodies at risk.

In Northern Ireland there are three programmes covering groundwater; surveillance, operational and quantitative monitoring. In Northern Ireland, monitoring is also reported to be focussing on groundwater bodies 'at risk' but also allows confirmation of risk assessments and detection of sustained and significant trends in 'not at risk' bodies.

Monitoring sites were selected with the aim of achieving a representative network and meeting the quality criteria set out in EU monitoring guidance.

All networks are designed by revising and building on the existing networks. In England and Wales, the existing ground water monitoring network is however more developed than in the other regions as England and Wales has historically relied more on ground water for public water supply. It is thus reported that in Scotland and Northern Ireland, the availability of suitable ground water abstraction boreholes is limited and that new purpose built monitoring sites will have to be drilled during the first River Basin Management Plan period.

All reports mention that additional monitoring requirements for protected areas have also been considered. However this only covers monitoring of *Drinking Water Protected Areas*. The situation is however not the same across the different regions with England and Wales relying more on groundwater aquifers for drinking water supply and thus all the groundwater bodies are reported to be Drinking Water Protected Areas while in Northern Ireland and Scotland, the public water supply from groundwater has historically been low.

In England and Wales, it is reported that all parameters relevant to Drinking Water Protected Areas objectives should be included in the quality monitoring programmes. In Scotland, it is reported that monitoring of other EU directives, European EIONET etc have all been incorporated into the new Water Framework Directive network. There is however no details provided. In Northern Ireland, it is intended that a representative selection of significant drinking water sources will be sampled at least once in six years as the minimum requirement of Water Framework Directive. A proportion of such sites will also be represented within the surveillance/operational networks.

In Scotland, operational monitoring will be undertaken where surface water interactions are significant.

In Northern Ireland, it is reported that there has been and there is ongoing *co-operation* between relevant organisations in Northern Ireland and the Republic of Ireland with respect to agreeing cross-border groundwater body boundary delineation and risk assessment. Information on proposed monitoring networks has been exchanged and co-operation with regard to sampling frequency and monitoring parameters selection is planned. Data from all relevant monitoring points will be shared between the two Member States.

Selection of Quality Elements and Frequency of Monitoring

Relevant core parameters are reported to be monitored in all river basin districts and for operational monitoring additional risk-based parameters are also reported to be monitored.
A higher frequency than the minimum is reported for all monitoring programmes In Scotland, England and Wales and Gibraltar the cycle for every programme was once a year while in Northern Ireland the cycle for quantitative and operational monitoring was 3 times a year and for surveillance monitoring it is not yet decided.

**FURTHER INFORMATION**

*http://www.sepa.org.uk/wfd/monitoring/index.htm*
*http://www.wfduk.org/tag_guidance/*
*http://www.ehsni.gov.uk/water/wfd/themes/mon_class.htm*

**SUMMARY OF TECHNICAL ASSESSMENT: STRENGTHS AND WEAKNESSES**

\+ High density of surface water monitoring stations (highest reported in EU)
\+ Monitoring of protected areas integrated in WFD programmes in Scotland
– No reporting of monitoring of protected areas in England and Wales
– Very complex reporting for England and Wales, with many sub-programmes