



**Brussels, 14.11.2012
SWD(2012) 379 final**

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COMMISSION STAFF WORKING DOCUMENT

Member State : Luxembourg

Accompanying the document

**REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND
THE COUNCIL**

on the Implementation of the Water Framework Directive (2000/60/EC)

River Basin Management Plans

{COM(2012) 670 final}

1. GENERAL INFORMATION

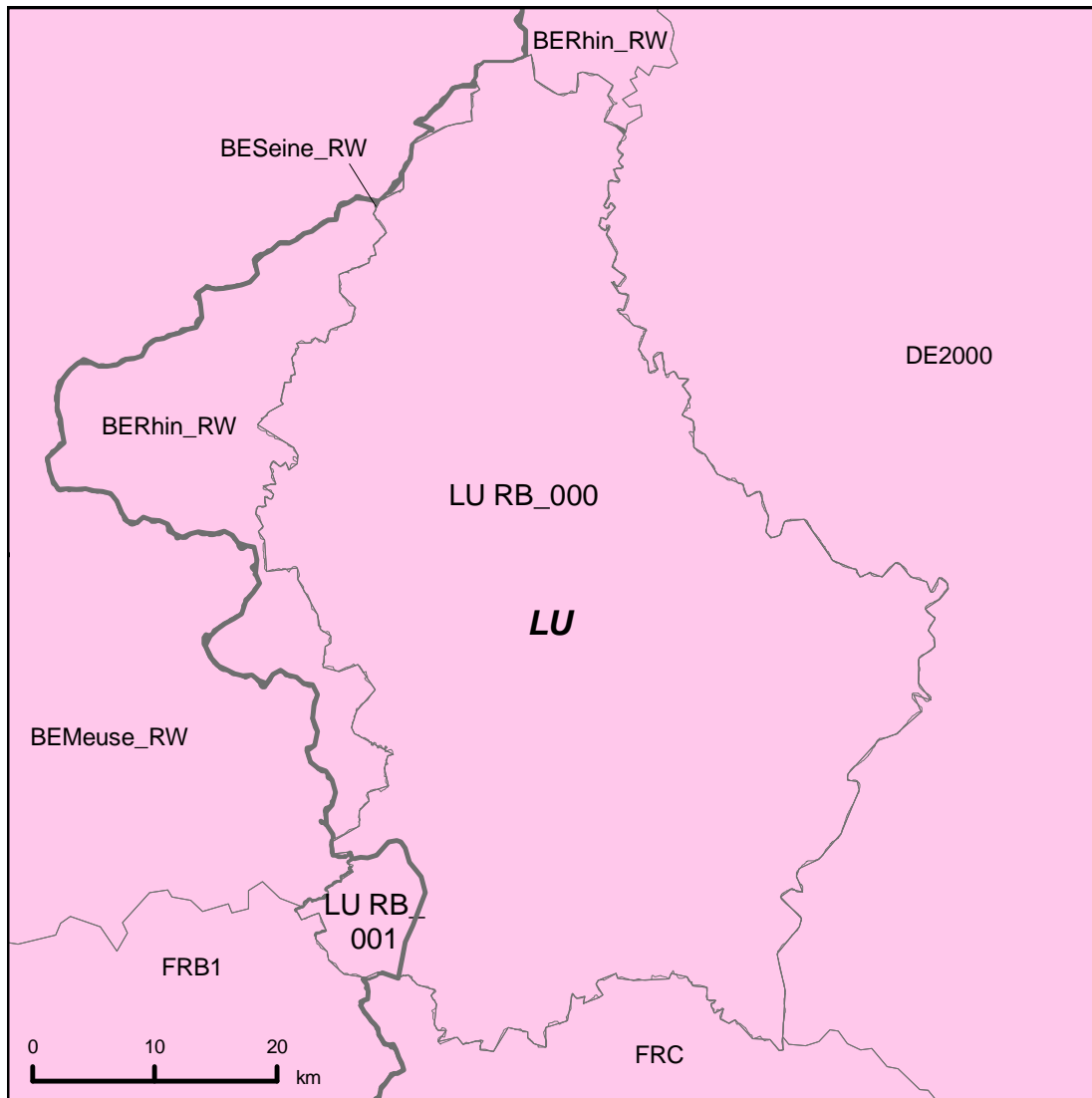
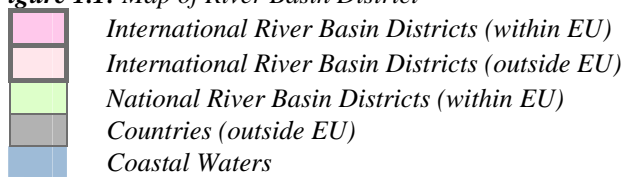


Figure 1.1: Map of River Basin District



Source: WISE

The Grand Duchy of Luxembourg is surrounded by Belgium, France and Germany. The total population is 0.5 million and the total surface area is 2.597 km². Most of Luxembourg (97.3%²) belongs to the International Rhine River Basin District (IRBD), or Saar-Mosel sub-basin of the Rhine IRBD. The remaining 2.7% (70 km²) are part of the International Meuse RBD.

Although there are 7 sub-basins ('study areas'), 6 of these belonging to the Rhine IRBD, there is one national River Basin Management Plan, focusing on the Rhine RBD, and providing some details of the Meuse RBD. There are no sub-basin or other sectoral plans.

RBD	Name	Size (km ²)	Countries sharing RBD
LU2000 (also LU RB_000)	Rhine (also Mosel)	2527	BE, CH, DE, FR, NL
LU7000 also (LU RB_001)	Meuse (also Chiers)	70	BE, DE, FR, NL

Table 1.1: Overview of Luxembourg's River Basin Districts

Note: RBD codes LU2000 and LU RB_000 are used for the Rhine RBD, also sometimes referred to as the Mosel RBD. RBD codes LU7000 and LU RB_001 are used for the Meuse RBD, also sometimes referred to as the Chiers RBD.

Source: River Basin Management Plans reported to WISE¹: <http://cdr.eionet.europa.eu/lu/eu/wfdart13>

Name international river basin	National RBD	Countries sharing RBD	Co-ordination category	
			1	
			km ²	%
Rhine	LU RB_000	BE, CH, DE, FR, NL	2350	1.0
Meuse-Maas	LU RB_001	BE, DE, FR, NL	65	0.2

Table 1.2: Transboundary river basins by category (see CSWD section 8.1) and % share in Luxembourg²

Category 1: Co-operation agreement, co-operation body, RBMP in place.

Category 2: Co-operation agreement, co-operation body in place.

Category 3: Co-operation agreement in place.

Category 4: No co-operation formalised.

Source: 'Pressures and Measures study'³

¹ This MS Annex reflects the information reported by the MS to WISE which may have been updated since the adoption of the RBMPs. For this reason there may be some discrepancies between the information reported in the RBMPs and WISE.

² Categorisation determined under the 'EC Comparative study of pressures and measures in the major river basin management plans in the EU' (Task 1b: International co-ordination mechanisms).

³ 'EC Comparative study of pressures and measures in the major river basin management plans in the EU'

2. STATUS OF RIVER BASIN MANAGEMENT PLAN REPORTING AND COMPLIANCE

The final national River Basin Management Plan (RBMP) was published on 22 December 2009 and submitted to the Commission on 26 November 2010 via the EIONET Central Repository (CDR)⁴. The Plan was adopted by the Government Council on 23 July 2010 but the legal procedure is still undergoing. No further information is available about its formal legal adoption (see Section 3.3).

The main strengths and weaknesses of the Luxembourg RBMP are listed below:

2.1 Strengths

- There have been considerable efforts to involve all relevant stakeholders and the general public in the consultation of the draft RBMPs. Important steps have been taken in order to ensure an adequate WFD implementation.
- There is a well established international co-ordination in both the Rhine and the Meuse RBDs, and Luxembourg plays an active role in such co-operation.
- There are specific monitoring networks for groundwater and protected areas.
- Several studies have been carried out over the past few years on issues related to water scarcity and droughts, with the focus on water planning. These have provided significant amount of trend data on intensity and frequency of precipitation, and may constitute a good complement for water management in future planning cycles.

2.2 Weaknesses

- The RBMP lacks structure and clarity. The plan has a national approach, with some separate paragraphs on the Rhine and Meuse RBDs. However, it is often unclear whether information relates to the Rhine or the Meuse RBD or both.
- The threshold for the adverse effects to the use in the designation of heavily modified water bodies have been set to zero. In addition to this, the methodology to establish the good ecological potential for heavily modified water bodies has not been defined in this first RBMP, as the assessment of biological elements had not been finalised and verified. These two issues have led to a lack of driver for restoration and improvement of the existing pressures from hydromorphological modifications.
- There are many discrepancies between the information in the RBMPs and what has been reported into WISE, both concerning figures and methodologies. Further efforts in the reporting in WISE will be advisable for the next cycle.

⁴ <http://cdr.eionet.europa.eu/lu/eu/wfdart13>

3. GOVERNANCE

3.1 Timeline of implementation

The national RBMP (covering Rhine and Meuse RBDs) was submitted on 26 November 2010. Publication and consultation information obtained from a combination of WISE data (1.3.2) and the RBMP (Chapter 9) is summarised below.

Date	Due date	Description
05/11/2007	22/12/2006	Publication of Timetable and Work Programme 1 st Public Hearing on draft overview of Significant Water Management Issues (SWMIs), and formation of 3 stakeholder working groups (WG), to address (i) physical environment of water courses, (ii) diffuse pollution sources and (iii) urban pressures
26/05/2008		2 nd Public Hearing on consolidated SWMIs and first draft of Measures, incl. meeting of the 3 WGs to co-ordinate their work, and to ensure co-ordination with International Commissions for the Protection of the Rhine (ICPR), the Meuse (ICM) and the Mosel-Saar (ICPMS)
02/12/2008 08/12/2008	22/12/2006	Publication of Statement on Consultation of Measures to be taken 3 rd Public Hearing on the Draft RBMP
22/12/2008	22/12/2008	Draft RBMP made available on internet for public comments (to be received by 22/06/2009)
16/12/2009		4 th Public Hearing on the final RBMP
22/12/2009	22/12/2009	Publication of final RBMP

Table 3.1: Timeline for work programme, consultations and publication of national RBMP

Source: WISE

3.2 Administrative arrangements

Only one competent Authority is listed in the RBMP, i.e. the Ministry for Home Affairs and the Greater Region (Ministère de l'Intérieur et à la Grande Région). This Ministry brought together all activities related to water management by setting up the Water Management Agency (Administration de la Gestion de l'Eau) in 2004.

However, the management of protected areas (PAs) under the Birds and Habitats Directives and Natura 2000 falls in the competence of a different authority, the Environment Department of the Ministry for Sustainable Development and Infrastructure (Ministère du Développement Durable et des Infrastructures). There is co-ordination between these authorities in terms of monitoring, but there is no information on specific measures for these PAs in the RBMP (see sections 11.1 and 12.7)

The overall approach is national and there is only one national RBMP, which covers both the Rhine and the Meuse RBDs. The RBMP only names one national competent authority, which has overall responsibility (except for PAs, see above) and there is no information on any regional or local authorities or their roles.

3.3 RBMP - Structure, completeness, legal status

The RBMP is not very well structured and generally the information is difficult to find. The plan has a national approach, with some separate paragraphs on the Rhine and Meuse RBDs. However, it is often unclear whether information relates to the Rhine or the Meuse RBD or both. Information in the WISE reporting system is particularly confusing as it frequently lists information for two RBDs but repeating the same information in both (mainly relating to the Rhine RBD). In some chapters (e.g. monitoring) it refers to the Mosel RBD (one of 6 sub-basins of the Rhine RBD), although it seems to relate to the entire Rhine RBD.

The RBMP includes Annexes but much detailed information is missing. For example the Methodology Annex includes many references to its own Annexes, which have not been reported to the Commission, nor are any links to further information provided. and on the whole it focuses on what needs to be done (based on a series of documents produced by the German Working Group on water issues of the Federal States and the Federal Government (Bund/Länder-Arbeitsgemeinschaft Wasser – LAWA – German guidance document) but it is often not clear what was actually done.

No supplementary information or links are provided (except for one government website referred to in WISE 1). Although both RBDs are part of International RBDs with International RBMPs (Rhine and Meuse), there is little information on how the international plans have been translated to the national plan, except from an indication that co-operation took place, and some monitoring in the Luxembourg national part of the IRBD is part of international monitoring programmes.

The RBMP does not contain any information on its **legal status**. However, EIONET CDR (26/11/2010) includes the following comment: '*RBMP plan approved by Government Council on 23rd July 2010 but still on legal procedure*'. The RBMP must be declared compulsory through a Grand-Ducal Regulation. However this does not mean that the RBMP acquires the legal status of Grand-Ducal Regulation⁵.

3.4 Consultation of the public, engagement of interested parties

Luxembourg has made a considerable effort to involve the public including four public consultation meetings between 2007 and 2009. The draft RBMP was sent to community administrations and available on a website for comment from December 2008 to June 2009.

The public consultation was done at two different levels, general public and interested stakeholders. On one hand, there has been a wide information exercise for the general public

There was an active involvement of stakeholders in the preparation of the PoM. This was done through the formation of three working groups comprising interested parties and stakeholders, to address the main water management issues (i) physical environment of water courses, (ii) diffuse pollution sources and (iii) urban pressures. These working groups were also involved in the public consultation meetings and the co-ordination of proposed measures between the groups. The outcome of this group was the proposed measures of a 'Catalogue of Measures', which was taken into account by the 'Water Management Agency' for the drafting of the RBMP and the preparation of the PoM.

⁵ More information may be found in the '*EC Comparative Study of Pressures and Measures in the major river basin management plans in the EU*'.

The RBMP states that consultation with interested parties and stakeholders generated many ideas, demands for changes and corrections and helped to develop the strategy. However, there are no details provided of the actual impact of this process on the final RBMP adopted by Luxembourg. Therefore, despite wide stakeholder and public involvement, the process has not been completely transparent as regards the changes that the consultation has brought about in the RBMP.

3.5 International cooperation and coordination

Both the Rhine and the Meuse RBDs in Luxembourg are part of the **International RBDs** Rhine (Mosel/Saar sub-basin) and Meuse, with neighbouring countries being Germany, France and Belgium.

Luxembourg has representatives in the **International Commissions** on these RBDs, but there is only a very brief mention of co-ordination of measures with the International Commissions for the protection of the Mosel/Saar (ICPMS), the International Commission for the protection of the Rhine (ICPR), and the International Commission for the Meuse (ICM), mainly in relation to the working groups producing the 'Catalogue of Measures'. Although there is no indication of shared management, some of the monitoring is part of international monitoring programmes and there is an indication that there was also co-ordination of the measures to be adopted in national Programmes of Measures (PoM).

Some procedures have been adopted from **those applied in Germany**, i.e. the Methodology and Typology Annexes are based on LAWA (Germany) documentation (see section 3.3).

3.6 Integration with other sectors

There is no reference to other sectoral plans in the RBMP, apart from voluntary agricultural measures relying on farmers' participation in agro-environment and regional development programmes.

4. CHARACTERISATION OF RIVER BASIN DISTRICTS

4.1 Water categories in the RBD

There is only one category of surface water, i.e. rivers. There is no distinction between river and lake water types, although there are a number of small lakes that are apparently included as river water bodies. Luxembourg is a land-locked country and therefore there are no coastal or transitional waters.

4.2 Typology of surface waters

The methodology to establish the typology of water bodies has been adopted from the German approach LAWA⁶, defining six river water types and all except one include reference sites in Germany. It is not clear whether the typology has been tested against biological data.

⁶ German Working Group on water issues of the Federal States and the Federal Government, Bund/Länder-Arbeitsgemeinschaft Wasser - LAWA.

RBD	Rivers	Lakes	Transitional	Coastal
LU RB_000	6	0	0	0
LU RB_001	1	0	0	0

Table 4.1: Surface water body types at RBD level

Source: WISE

The background document 'Participation aux travaux nécessaires à la mise en place de la Directive Cadre dans le domaine de l'eau au Grand-Duché de Luxembourg' describes the methodology for the assessment of macrophytes for the typology of surface waters. It also integrates other relevant scientific reports, in particular on analysis of diatoms related to the typology of water, and the typology developed at EU level.

Some of the methods were developed after the adoption of the first RBMP (i.e. macrophytes RC3, RC4 in 2010 and 2011) or are still under development (macrophytes RC6, RC1 in 2012), or the intercalibration at EU level has not been yet been finalised (RC5 in 2013).

The RBMP indicates that some reference conditions have been established and adapted to Luxembourg, but there is no information on methodology or validation with biological data (no national background/guidance document referred to or provided). All the other reference conditions have not been established in the first RBMP, but according to information received from Luxembourg, are being developed over the past few years, also integrating the results of the second phase of the intercalibration exercise.

4.3 Delineation of surface water bodies

Overall, 99 surface water bodies have been identified in the Rhine RBD, and 3 in the Meuse RBD (no lake water bodies have been identified; transitional and coastal are not relevant); there are 5 groundwater bodies, all in the Rhine RBD.

The RBMP states that **small water bodies** (catchments smaller than 10 km²) were not considered but the 99 water bodies in the Rhine and the 3 in the Meuse RBDs include 8 and 1 water bodies smaller than 10 km², respectively. It seems that there has been no **aggregation** of small water bodies, except from some small lakes that have been aggregated to river water bodies (see section 1.7).

RBD	Surface Water				Groundwater	
	Rivers		Lakes		Number	Average Area (sq km)
	Number	Average Length (km)	Number	Average Area (sq km)		
LU RB_000	99	0	0		5	535
LU RB_001	3	0	0		0	0
<i>Total</i>	<i>102</i>	<i>0</i>	<i>0</i>		<i>5</i>	<i>535</i>

Table 4.2: Surface water bodies, groundwater bodies and their dimensions

Source: WISE

4.4 Identification of significant pressures and impacts

The main pressures (national level) are point sources from urban (and to a lesser extent industrial) wastewater, diffuse sources from agriculture and hydromorphological alterations. The main impacts are nutrient (nitrogen, phosphorus and organic carbon) and pesticides inputs into surface water and groundwater, and modifications of the hydromorphological natural conditions, including lack of continuity of surface waters.

The assessment of **point source** pressures was based on urban wastewater and industrial effluent data, **diffuse source** pressures on soil usage and livestock units, and **water abstraction** on data from water meters for public water supply and 'other' (not defined).

There is only very general information on hydromorphological pressures in the RBMP. **Water flow regulation** and **morphological alterations** and ecological continuity were assessed as part of anthropogenic activities and the capacity for development of water courses (in relation to the designation of HMWB). Flow data was monitored as part of a monitoring network and continuity was assessed on the basis of the national continuity register (prepared in 2009). Standard parameters for the assessment of hydromorphological pressures will be included in the updated characterisation of water bodies in 2013.

Agriculture (diffuse sources) and urban wastewater (point sources) are the main sectors contributing to **chemical pollution**.

The evaluation of the pressures was carried out using calculation of weighted averages of the different pressures in relation to river length, followed by expert judgement. The definition on whether the pressures are '**significant**' has been done with expert judgment. The intensity of point source pollution has been established in relation to the necessary measures established in the PoM. The intensity of diffuse source pollution has been derived from the intensity of agriculture in the RBD.

There are no significant pressures related to surface and groundwater abstractions, given the climatology and meteorological characteristics of the country (the recharge of groundwater aquifers is enough to cover all anthropogenic extractions over the year).

The characterisation of 2004 was limited to the pressures at RBD level, and no information was provided on the significant pressures at water body level.

4.5 Protected areas

Protected areas (PA) as reported in WISE are summarised below.

Although WISE lists protected areas for drinking water abstraction (groundwater only) under Article 7 of the WFD, the RBMP makes it clear that these are provisional designations and legislation is expected to be in place by 2015. Moreover, the WISE monitoring information also lists monitoring stations for PAs at surface water abstraction sites.

The Protected Areas under the Nitrates (Vulnerable Zones) and UWWT (Sensitive Areas) Directives cover the whole area of Luxembourg (Note: the Nitrates Directive has not been fully implemented and Luxembourg is under an EU Court Proceedings⁷).

RBD	Number of PAs										
	Article 7 Abstraction for drinking water	Bathing	Birds	European Other	Fish	Habitats	Local	National	Nitrates ⁸	Shellfish	UWWT ⁹
LU RB_000	84	4	11			28			1		1
LU RB_001			2			2			1		1
<i>Total</i>	<i>84</i>	<i>4</i>	<i>13</i>			<i>30</i>			<i>2</i>		<i>2</i>

Table 4.3: Number of protected areas of all types in each RBD and for the whole country, for surface and groundwater¹⁰

Source: WISE

⁷ In December 2008 the Commission decided to refer Luxembourg to the Court of Justice for having in place a non-compliant nitrate action programme (case C- 526/08).

⁸ One PA covering all of Luxembourg.

⁹ One PA covering all of Luxembourg.

¹⁰ This information corresponds to the reporting of protected areas under the WFD. More/other information may have been reported under the obligations of other Directives.

5. MONITORING

5.1 General description of the monitoring network

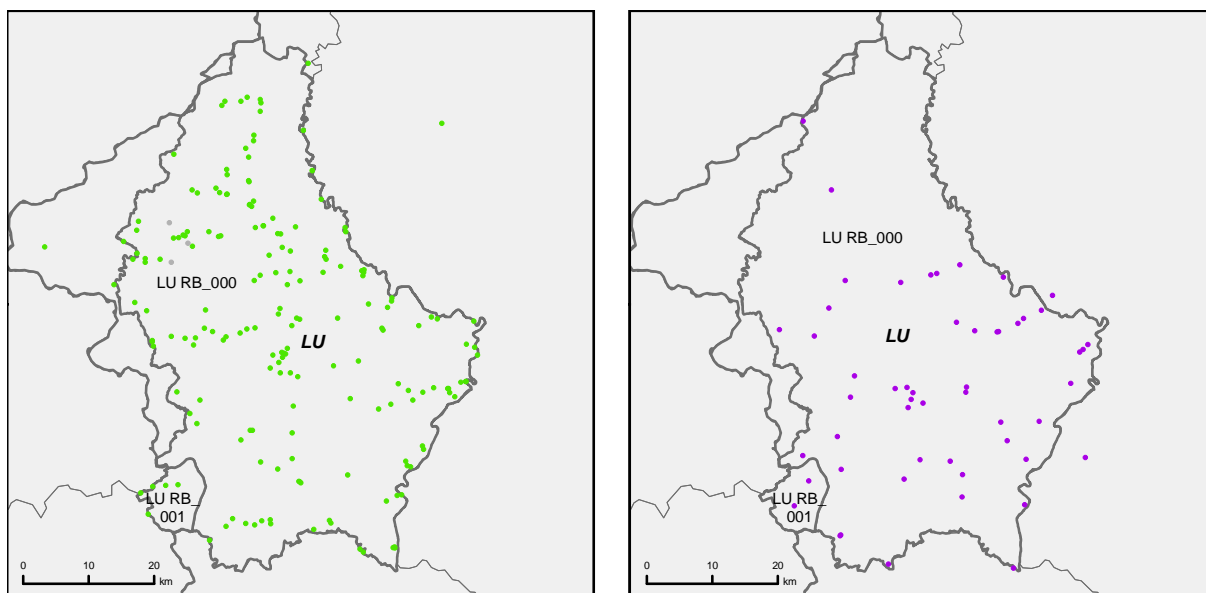


Figure 5.1: Maps of surface water (left) and groundwater (right) monitoring stations

- River monitoring stations
- Lake monitoring stations
- Transitional water monitoring stations
- Coastal water monitoring stations
- Unclassified surface water monitoring stations
- Groundwater monitoring stations

- River Basin Districts
- Countries outside EU

Source: WISE, Eurostat (country borders)

The monitoring networks have been expanded considerably since the 2009 implementation report, especially for operational monitoring, summarised below. The stations reported to WISE differ from those reported in the RBMP, and it is not clear how the total number of surface water monitoring sites can be much higher than the total surveillance and operational monitoring sites, unless other (special) programmes have been included. International monitoring programmes are also referred to (International Commissions for the Rhine - Mosel/Saar and Meuse IRBDs). All relevant quality elements are now monitored, including priority and non-priority specific pollutants.

RBD	Rivers		Lakes																						
	LU_RB_000	LU_RB_001	QE1.1 Phytoplankton	QE1.2 Other aquatic flora	QE1.2.3 Macrophytes	QE1.2.4 Phytobenthos	QE1.3 Benthic invertebrates	QE1.4 Fish	QE1.5 Other species	QE2 Hydromorphological QEs	QE3.1 General Parameters	QE3.3 on priority specific pollutants	QE3.4 Other national pollutants	QE1.1 Phytoplankton	QE1.2 Other aquatic flora	QE1.2.3 Macrophytes	QE1.2.4 Phytobenthos	QE1.3 Benthic invertebrates	QE1.4 Fish	QE1.5 Other species	QE2 Hydromorphological QEs	QE3.1 General Parameters	QE3.3 Non priority specific pollutants	QE3.4 Other national pollutants	
	Green	Red	Green	Red	Green	Green	Green	Red	Red	Green	Green	Green	Green	Red											

Table 5.1: Quality elements monitored

QE Monitored

QE Not monitored

Not Relevant

Source: WISE



RBD	Rivers		Groundwater		
	Surv	Op	Surv	Op	Quant
LU RB_000	4 (3)	128 (16)	54*	54	31 (19)*
LU RB_001	1	3 (-)	-	-	-
<i>Total by type of site</i>	8 (4)	131	54	54	31 (19)
<i>Total number of monitoring sites</i>	192 ¹¹		54 (31)		

Table 5.2: Number of monitoring sites by water category¹²

Surv = Surveillance

Op = Operational

Quant = Quantitative

Note: Numbers in brackets as reported in RBMP (different from those reported in WISE)

Source: WISE and RBMP

* For groundwater monitoring LU has, as described in the RBMP, 31 surveillance monitoring stations and 19 quantitative monitoring stations. For the surveillance monitoring stations, the remaining 23 stations are belonging to the supplementary monitoring programmes for nitrates and pesticides.

5.2 Monitoring of surface waters

All **relevant quality elements** (QEs) are being monitored, though not all of them at all sites. In addition to **surveillance monitoring**, an **operational monitoring programme** has been established. An explanation is given for the selection of QEs in terms of a matrix of pressures against the sensitivity of different QEs, although it is not clear how this has been applied.

Relevant **priority substances** and **other specific pollutants** are being monitored in surface water, but only one in sediment, and none in biota. These chemical parameters are selected on the basis of emission data, though only 7 sites, which are claimed to be representative, include such substances. It is not clear which substances are monitored, although some substances are listed as being monitored at specific sites and some in terms of causing failure to achieve good chemical status or associated to a relevant pressure.

The **EQS Directive**¹³ was transposed in the national law on 30 December 2010, and therefore later than the adoption of the RBMPs. According from information received from Luxembourg, targeted measurement is being carried out, and will serve to have checked chemical data for the update on the characterisation for next RBMP (to be done by 2013).

¹¹ Probably includes additional sites for special monitoring programmes, e.g. nitrate.

¹² Number of sites calculated from data reported at site level. If no data reported at site level, then table supplemented with data reported at programme level.

¹³ Directive 2008/105/EC of the European Parliament and of the Council of 16 December 2008 on environmental quality standards in the field of water policy, amending and subsequently repealing Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending Directive 2000/60/EC of the European Parliament and of the Council, *OJ L 348, 24.12.2008, p. 84–97*.

There is no information on whether there has been **grouping of water bodies** for the purpose of monitoring and status assessment, although Luxembourg has confirmed that no grouping of water bodies has been done, and that there are more than one monitoring sites for some of the water bodies.

Some programmes are indicated as part of **international monitoring programmes** (International Commissions for the Rhine, Mosel/Saar and Meuse, ICPR, ICPMS and ICM), but there is no detail on co-ordination with the relevant international commissions.

The **number of surface water monitoring stations** has **increased significantly** compared with the 2007 Monitoring Programme¹⁴, i.e. surveillance monitoring increased from 5 to 8 sites, and operational monitoring increased from 17 to 131 (nationally).

5.3 Monitoring of groundwater

Surveillance, operational and quantitative groundwater monitoring programmes have been established. It is not clear how parameters in the operational monitoring programme were chosen to detect existing pressures, since the operational programme includes all 5 groundwater bodies and all quality elements (except GE2-1 Oxygen), although the significant pressures (diffuse sources, agriculture and urban) only affect 2 groundwater bodies in terms of failing good chemical status. There are, however, some special, supplementary monitoring programmes for nitrate and pesticides, presumably aimed at monitoring the impact of the most significant pressures, and in support of the **exemptions** as applied to 2 groundwater bodies on the basis of nitrate and pesticides.

Some **trend information** on chemical parameters was reported, i.e. a significant upward trend in nitrate concentrations in 2 water bodies (classified as bad chemical status) and a downward trend since 2006 in one water body (of good chemical status); these results were obtained from 'trend analyses, including standard deviation, where sufficient time line data were available or supplemented by pollutant input data where data sets were limited', but there is no information on actual monitoring design to achieve the objective of trend analysis.

All 5 groundwater bodies are part of the international Rhine RBD. Both the quantitative and chemical monitoring programmes, as well as the supplementary nitrate monitoring programme, are referred to as part of **international programmes** (ICPR/ICPMS), but no details of co-ordination with the International Commission for the Protection of the Mosel/Saar (ICPMS) and the Rhine (ICPR) are presented. There is a brief reference to participation in the creation of a map of transboundary groundwater bodies (one in Luxembourg) with the ICPR, in relation to an exemption.

The **number of groundwater monitoring stations** seems to have **increased significantly** compared with the 2007 Monitoring Programme, i.e. from a total of 31 to 54 sites¹⁵, with surveillance monitoring increased from 31 to 54, operational monitoring increased from 0 to 54; and quantitative monitoring.

¹⁴ 2009 Commission report, available at:
http://ec.europa.eu/environment/water/water-framework/implrep2007/pdf/sec_2009_415_2_en.pdf

¹⁵ There are still 31 monitoring stations including 19 quantitative monitoring stations. The other 23 stations are belonging to the supplementary monitoring programmes for nitrates and pesticides, which have not been reported 2007

5.4 Monitoring of protected areas

Specific monitoring programmes for protected areas (PAs) are in place for **Bathing Waters** (bacterial pollution), the **Birds and Habitats Directives and Natura 2000** (no details given, responsibility of the Ministry for Sustainable Development and Infrastructure, Department of the Environment), **Fish** (salmonid and cyprinid waters), **Nitrate** (surface water and groundwater) and **Drinking Water Abstraction** (groundwater PA provisional designation). The latter focuses on compliance with the Drinking Water Directive.

However, there is little information on additional monitoring for the above, except for bathing waters which focus on bacteria, and drinking water abstraction sites, where monitoring focuses on drinking water standards; it is not possible to comment on compliance with the provisions of Annex V 1.3.5 of the WFD.

The number of surface water monitoring stations associated with PAs is shown below. In addition, there are 18 groundwater monitoring sites at drinking water abstraction points (provisionally designated PAs). The number of monitoring stations has increased significantly since 2007 Monitoring Programme, but there is conflicting information between different parts of WISE and the RBMP, e.g. monitoring sites for fish and surface water abstraction PAs are listed, although no PAs seem to have been designated.

RBD	Surface waters									Ground-water drinking water ¹⁶
	Surface drinking water abstraction	Quality of drinking water	Bathing water	Birds sites	Fish	Habitats sites	Nitrates	Shellfish	UWWT	
LU RB_000	6	0	20	56	0	147	189	0	189	18
LU RB_001	0	0	0	4	0	10 ¹⁷	5	0	5	0
<i>Total</i>	<i>6</i>	<i>0</i>	<i>20</i>	<i>60</i>	<i>83</i>	<i>157</i>	<i>194</i>	<i>0</i>	<i>194</i>	<i>18</i>

Table 5.3: Number of monitoring sites in protected areas¹⁸

Source: WISE

Note: Please note that these data are the monitoring stations located *IN* PAs and not *FOR* PAs especially for Nitrates and UWWT Directives as the whole country is declared as sensitive area

¹⁶ Monitoring sites listed although no protected areas seem to have been designated.

¹⁷ Number of monitoring sites reported at programme level.

¹⁸ Number of sites calculated from data reported at site level. If no data reported at site level, then table supplemented with data reported at programme level.

6. OVERVIEW OF STATUS (ECOLOGICAL, CHEMICAL, GROUNDWATER)

The ecological and chemical status of surface water bodies (Rhine and Meuse RBD, no lake, transitional or coastal water bodies), chemical and quantitative status of groundwater bodies (all in Rhine RBD), and overviews of the status for surface water and groundwater expected in 2005 are shown in the tables below.

It is clear that the highest proportion of river water bodies are in moderate, poor or bad ecological status, whilst a small proportion are in good status and none in high status. Similarly, there are no river water bodies of high chemical status, but a higher proportion are of good status (around two third of water bodies) and about one third in less than good status.

RBD	Total	High		Good		Moderate		Poor		Bad		Unknown	
		No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
LU RB_000	88	0	0	6	6.8	46	52.3	25	28.4	11	12.5	0	0
LU RB_001	2	0	0	0	0	2	100	0	0	0	0	0	0
<i>Total</i>	<i>90</i>	<i>0</i>	<i>0</i>	<i>6</i>	<i>6.7</i>	<i>48</i>	<i>53.3</i>	<i>25</i>	<i>27.8</i>	<i>11</i>	<i>12.2</i>	<i>0</i>	<i>0</i>

Table 6.1: Ecological status of natural surface water bodies

Source: WISE

RBD	Total	High		Good		Moderate		Poor		Bad		Unknown	
		No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
LU RB_000	11	0	0	1	9.1	4	36.4	2	18.2	4	36.4	0	0
LU RB_001	1	0	0	0	0	0	0	0	0	1	100	0	0
<i>Total</i>	<i>12</i>	<i>0</i>	<i>0</i>	<i>1</i>	<i>8.3</i>	<i>4</i>	<i>33.3</i>	<i>2</i>	<i>16.7</i>	<i>5</i>	<i>41.7</i>	<i>0</i>	<i>0</i>

Table 6.2: Ecological potential of artificial and heavily modified water bodies

Note: ecological potential for HMWBs, GEP not established (see Section 8)

Source: WISE

RBD	Total	Good		Poor		Unknown	
		No.	(%)	No.	(%)	No.	(%)
LU RB_000	88	65	73.9	23	26.1	0	0
LU RB_001	2	2	100	0	0	0	0
<i>Total</i>	<i>90</i>	<i>67</i>	<i>74.4</i>	<i>23</i>	<i>25.6</i>	<i>0</i>	<i>0</i>

Table 6.3: Chemical status of natural surface water bodies

Source: WISE

RBD	Total	Good		Poor		Unknown	
		No.	%	No.	%	No.	%
LU RB_000	11	4	36.4	7	63.6	0	0
LU RB_001	1	0	0	1	100	0	0
<i>Total</i>	<i>12</i>	<i>4</i>	<i>33.6</i>	<i>8</i>	<i>66.7</i>	<i>0</i>	<i>0</i>

Table 6.4: Chemical status of artificial and heavily modified water bodies

Source: WISE

For groundwater (all groundwater bodies are in Rhine RBD), 3 water bodies (of total of 5) are in good chemical status and the other 2 are in poor status. In terms of total surface area the proportions are different, i.e. only 38.4% good status, and 61.6% poor status. All groundwater bodies are of good quantitative status.

RBD	Total	Good		Poor		Unknown	
		No.	%	No.	%	No.	%
LU RB_000	5	3	60	2	40	0	0
LU RB_001	0	0	0	0	0	0	0
<i>Total</i>	<i>5</i>	<i>3</i>	<i>60</i>	<i>2</i>	<i>40</i>	<i>0</i>	<i>0</i>

Table 6.5: Chemical status of groundwater bodies

Source: WISE

RBD	Total	Good		Poor		Unknown	
		No.	%	No.	%	No.	%
LU RB_000	5	5	100	0	0	0	0
LU RB_001	0	0	0	0	0	0	0
<i>Total</i>	<i>5</i>	<i>5</i>	<i>100</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>

Table 6.6: Quantitative status of groundwater bodies

Source: WISE

An improvement in overall status for surface water to good or better is expected by 2015; this is expected to rise to 28% in the Rhine RBD (from 7 to 28 water bodies), and 67% in the Meuse RBD (from zero to 2 water bodies); the proportion in terms of surface area considerably lower, i.e. 22 and 23% surface area good or higher status for the rhine and Meuse, respectively.

For groundwater bodies no improvements are expected by 2015.

RBD	Total	Global status (ecological and chemical)					Good ecological status 2021	Good chemical status 2021	Good ecological status 2027	Good chemical status 2027	Global exemptions 2009 (% of all SWBs)						
		Good or better 2009		Good or better 2015		Increase 2009 - 2015					Art 4.4	Art 4.5	Art 4.6	Art 4.7			
		No.	%	No.	%	%					%	%	%	%	%		
LU RB_000	99	7	7.1	28	28.3	21.2								70	2	0	0
LU RB_001	3	0	0.0	2	66.7	66.7								0	33	0	0
<i>Total</i>	<i>102</i>	<i>7</i>	<i>6.9</i>	<i>30</i>	<i>29.4</i>	<i>22.5</i>								<i>68</i>	<i>3</i>	<i>0</i>	<i>0</i>

Table 6.7: Surface water bodies: overview of status in 2009 and expected status in 2015, 2021 and 2027¹⁹

Waterbodies with good status in 2009 fall into the following category:

1. Ecological status is high or good and the chemical status is good, exemptions are not considered

Waterbodies expected to achieve good status in 2015 fall into the following categories:

1. Ecological status is high or good and the chemical status is good, exemptions are not considered

2. Chemical status is good, and the ecological status is moderate or below but no ecological exemptions

3. Ecological status is high or good, and the chemical status is failing to achieve good but there are no chemical exemptions

4. Ecological status is moderate or below, and chemical status is failing to achieve good but there are no ecological nor chemical exemptions

Note: Waterbodies with unknown/unclassified/Not applicable in either ecological or chemical status are not considered

Source: WISE (for data on status in 2009, 2015 and exemptions) and RBMPs (for data on status in 2021 and 2027)

¹⁹ Data for 2009 and 2015 extracted from WISE. Data for 2021 and 2027 established during the compliance assessment of the RBMPs.

RBD	Total	Ecological status					Good ecological status 2021		Good ecological status 2027		Ecological exemptions (% of all SWBs)			
		Good or better 2009		Good or better 2015		Increase 2009 -2015	No.	%	No.	%	Art 4.4	Art 4.5	Art 4.6	Art 4.7
		No.	%	No.	%	%					%	%	%	
LU RB_000	88	6	6.8	26	29.5	22.7					69.3	1.1	0	0
LU RB_001	2	0	0	2	100	100					0	0	0	0
<i>Total</i>	<i>90</i>	<i>6</i>	<i>6.7</i>	<i>28</i>	<i>31.1</i>	<i>24.4</i>					<i>67.8</i>	<i>1.1</i>	<i>0</i>	<i>0</i>

Table 6.8: Natural surface water bodies: ecological status in 2009 and expected status in 2015, 2021 and 2027²⁰

Source: WISE (for data on status in 2009, 2015 and exemptions) and RBMPs (for data on status in 2021 and 2027)

RBD	Total	Chemical status					Good chemical status 2021		Good chemical status 2027		Chemical exemptions (% of all SWBs)			
		Good or better 2009		Good or better 2015		Increase 2009 -2015	No.	%	No.	%	Art 4.4	Art 4.5	Art 4.6	Art 4.7
		No.	%	No.	%	%					%	%	%	
LU RB_000	88	69	69.7	74	74.7	5.1					20.5	1.1	0	0
LU RB_001	2	2	66.7	2	66.7	0.0					0	0	0	0
<i>Total</i>	<i>90</i>	<i>71</i>	<i>69.6</i>	<i>76</i>	<i>74.5</i>	<i>4.9</i>					<i>20.0</i>	<i>1.1</i>	<i>0</i>	<i>0</i>

Table 6.9: Natural surface water bodies: chemical status in 2009 and expected status in 2015, 2021 and 2027²¹

Source: WISE (for data on status in 2009, 2015 and exemptions) and RBMPs (for data on status in 2021 and 2027)

²⁰ Data for 2009 and 2015 extracted from WISE. Data for 2021 and 2027 established during the compliance assessment of the RBMPs.

²¹ Data for 2009 and 2015 extracted from WISE. Data for 2021 and 2027 established during the compliance assessment of the RBMPs.

RBD	Total	GW chemical status					Good chemical status 2021		Good chemical status 2027		GW chemical exemptions (% of all GWBs)			
		Good or better 2009		Good or better 2015		Increase 2009 -2015	No.	%	No.	%	Art 4.4	Art 4.5	Art 4.6	Art 4.7
		No.	%	No.	%	%					%	%	%	
LU RB_000	5	3	60.0	3	60.0	0					40	0	0	0
LU RB_001	0	0	0	0	0	0					0	0	0	0
<i>Total</i>	<i>5</i>	<i>3</i>	<i>60.0</i>	<i>3</i>	<i>60.0</i>	<i>0</i>					<i>40</i>	<i>0</i>	<i>0</i>	<i>0</i>

Table 6.10: Groundwater bodies: chemical status in 2009 and expected status in 2015, 2021 and 2027²²

Source: WISE (for data on status in 2009, 2015 and exemptions) and RBMPs (for data on status in 2021 and 2027)

RBD	Total	Groundwater quantitative status					Good quantitative status 2021		Good quantitative status 2027		GW quantitative exemptions (% of all GWBs)			
		Good or better 2009		Good or better 2015		Increase 2009 -2015	No.	%	No.	%	Art 4.4	Art 4.5	Art 4.6	Art 4.7
		No.	%	No.	%	%					%	%	%	
LU RB_000	5	5	100	5	100	0					0	0	0	0
LU RB_001	0	0	0	0	0	0					0	0	0	0
<i>Total</i>	<i>5</i>	<i>5</i>	<i>100</i>	<i>5</i>	<i>100</i>	<i>0</i>					<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>

Table 6.11: Groundwater bodies: quantitative status in 2009 and expected status in 2015, 2021 and 2027²³

Source: WISE (for data on status in 2009, 2015 and exemptions) and RBMPs (for data on status in 2021 and 2027)

²² Data for 2009 and 2015 extracted from WISE. Data for 2021 and 2027 established during the compliance assessment of the RBMPs.

²³ Data for 2009 and 2015 extracted from WISE. Data for 2021 and 2027 established during the compliance assessment of the RBMPs.

RBD	Total HMWB and AWB	Ecological potential					Good ecological potential 2021		Good ecological potential 2027		Ecological exemptions (% of all HMWB/AWB)			
		Good or better 2009		Good or better 2015		Increase 2009 -2015	No.	%	No.	%	Art 4.4	Art 4.5	Art 4.6	Art 4.7
		No.	%	No.	%	%					%	%	%	%
LU RB_000	11	1	9.1	3	27.3	18.2					63.6	9.1	0	0
LU RB_001	1	0	0	0	0	0					0	100	0	0
<i>Total</i>	<i>12</i>	<i>1</i>	<i>8.3</i>	<i>3</i>	<i>25.0</i>	<i>16.7</i>					<i>58.3</i>	<i>16.7</i>	<i>0</i>	<i>0</i>

Table 6.12: Heavily modified and artificial water bodies: ecological potential in 2009 and expected ecological potential in 2015, 2021 and 2027²⁴

Source: WISE (for data on status in 2009, 2015 and exemptions) and RBMPs (for data on status in 2021 and 2027)

RBD	Total HMWB and AWB	Chemical status					Good chemical status 2021		Good chemical status 2027		Chemical exemptions (% of all HMWB/AWB)			
		Good or better 2009		Good or better 2015		Increase 2009 -2015	No.	%	No.	%	Art 4.4	Art 4.5	Art 4.6	Art 4.7
		No.	%	No.	%	%					%	%	%	%
LU RB_000	11	4	36.4	5	45.5	9.1					45.5	9.1	0	0
LU RB_001	1	0	0	0	0	0					0	100	0	0
<i>Total</i>	<i>12</i>	<i>4</i>	<i>33.3</i>	<i>5</i>	<i>41.7</i>	<i>8.4</i>					<i>41.7</i>	<i>16.7</i>	<i>0</i>	<i>0</i>

Table 6.13: Heavily modified and artificial water bodies: chemical status in 2009 and expected status in 2015, 2021 and 2027²⁵

Source: WISE (for data on status in 2009, 2015 and exemptions) and RBMPs (for data on status in 2021 and 2027)

²⁴ Data for 2009 and 2015 extracted from WISE. Data for 2021 and 2027 established during the compliance assessment of the RBMPs.

²⁵ Data for 2009 and 2015 extracted from WISE. Data for 2021 and 2027 established during the compliance assessment of the RBMPs.

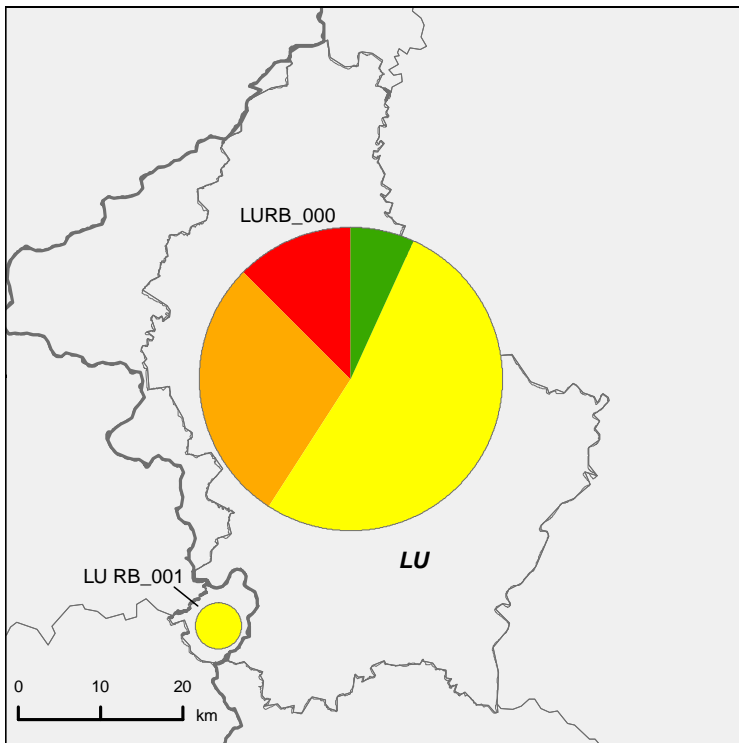


Figure 6.1: Map of ecological status of natural surface water bodies 2009

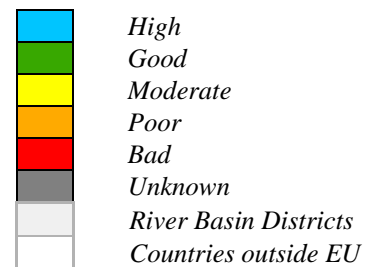
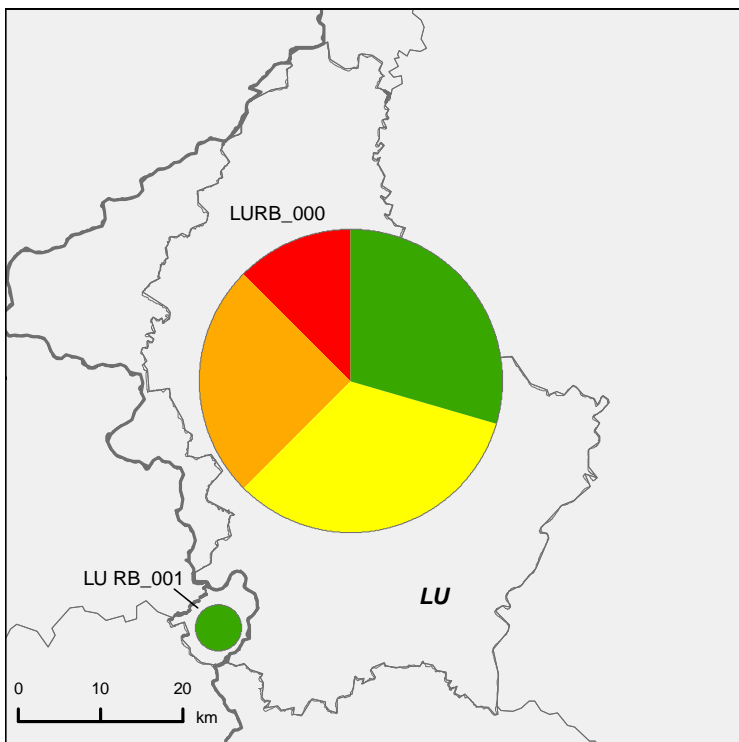


Figure 6.2: Map of ecological status of natural surface water bodies 2015
Note: Standard colours based on WFD Annex V, Article 1.4.2(i).
Source: WISE, Eurostat (country borders)

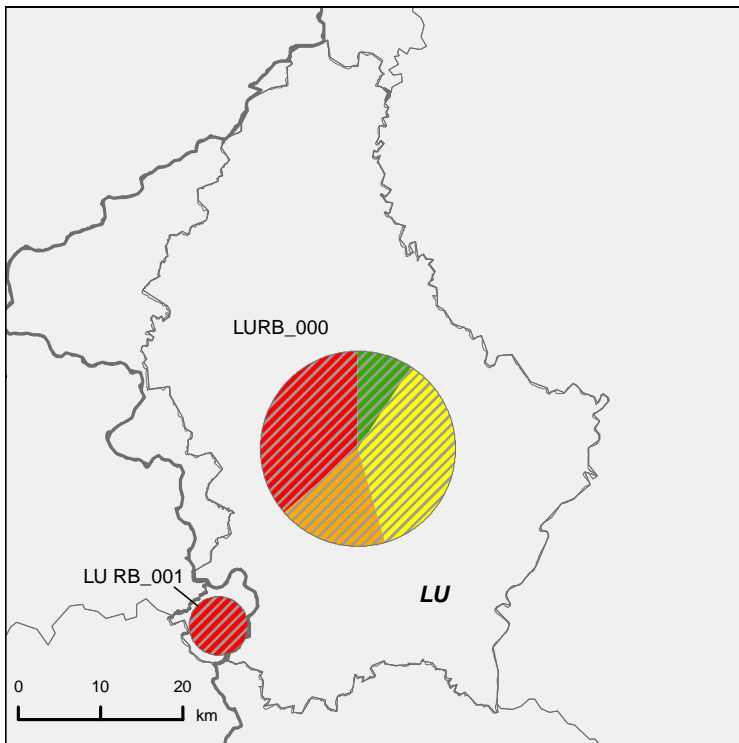


Figure 6.3: Map of ecological potential of artificial and heavily modified water bodies 2009

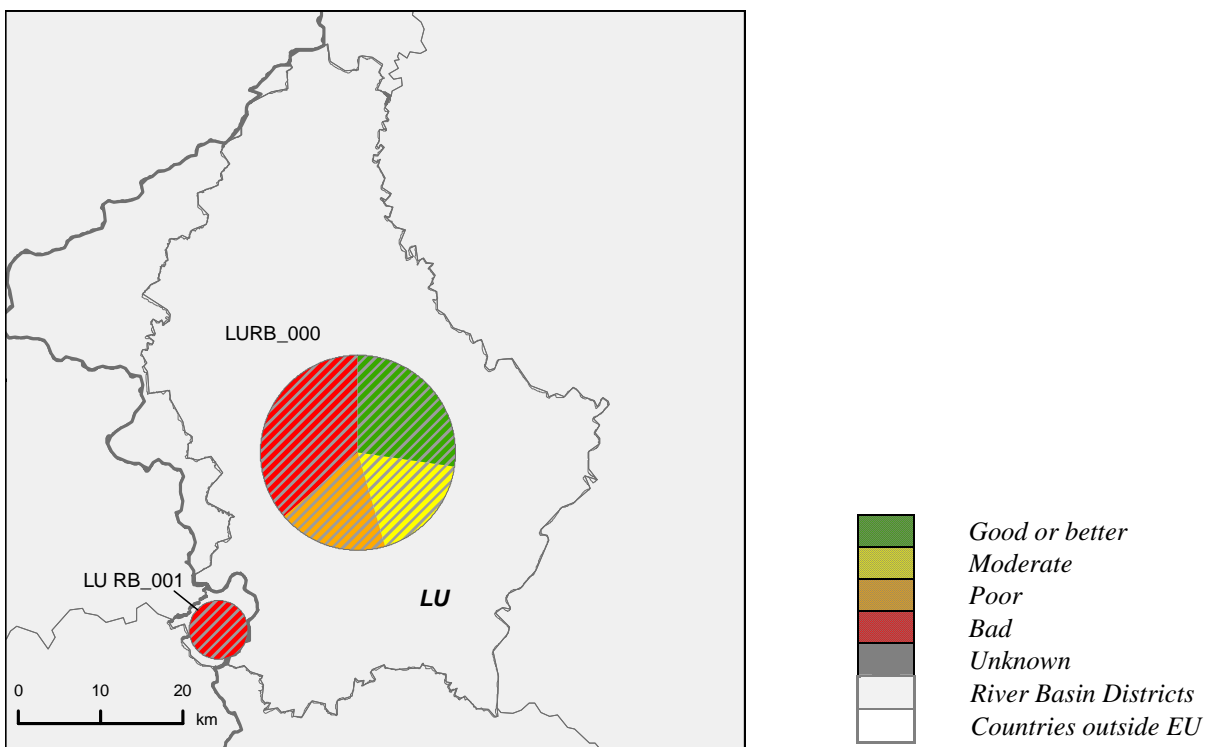


Figure 6.4: Map of ecological potential of artificial and heavily modified water bodies 2015

Note: Standard colours based on WFD Annex V, Article 1.4.2(ii).

Source: WISE, Eurostat (country borders)

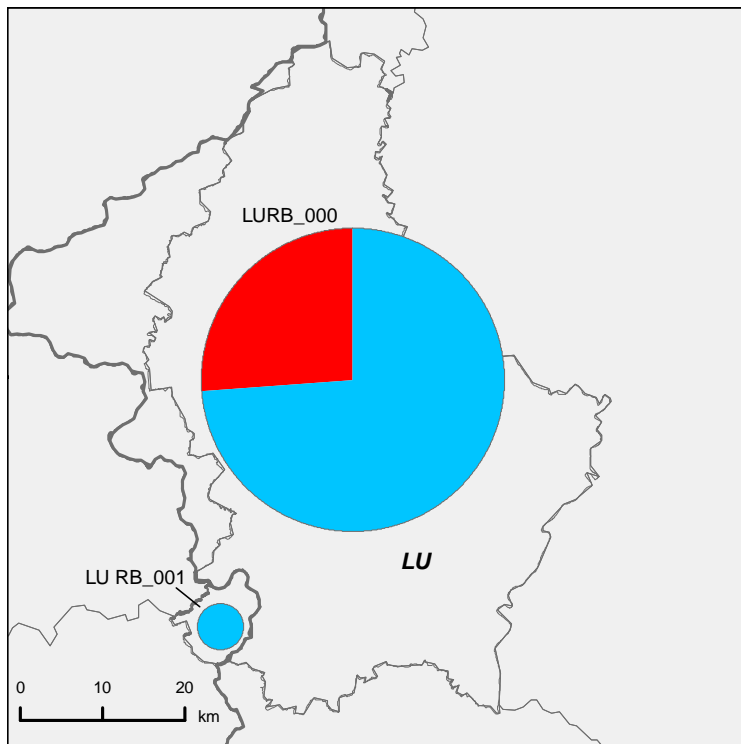


Figure 6.5: Map of chemical status of natural surface water bodies 2009

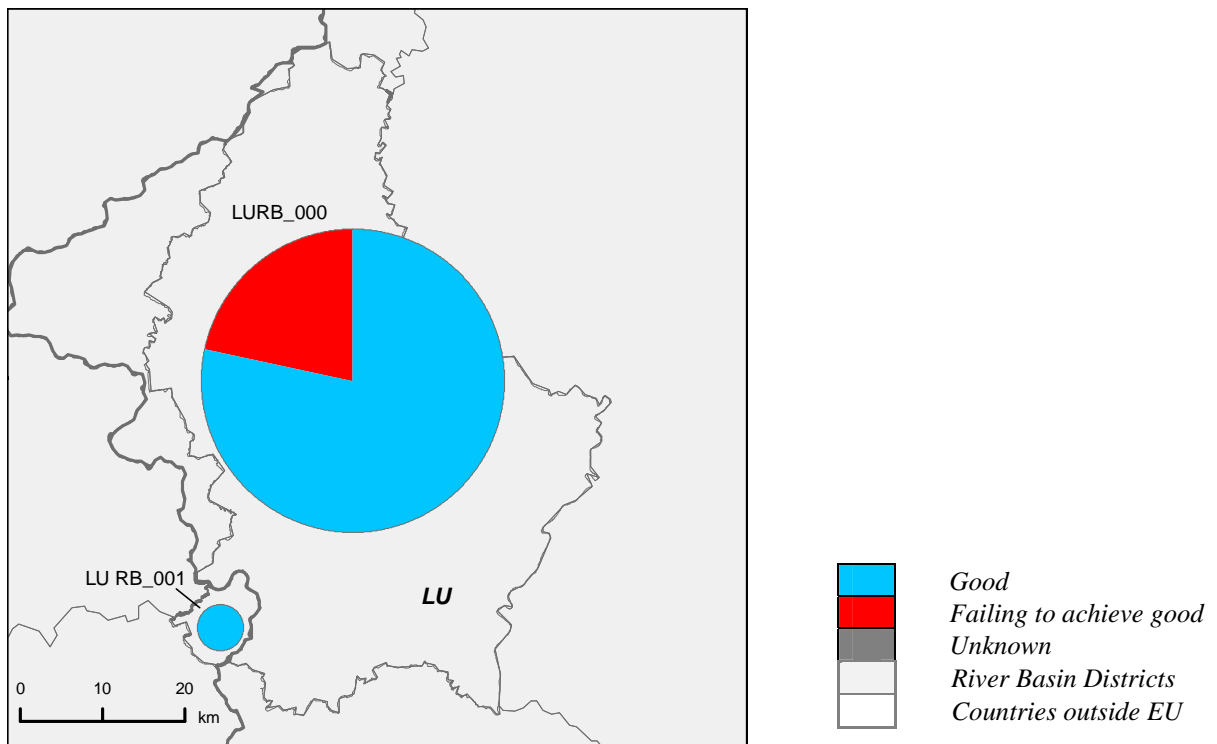


Figure 6.6: Map of chemical status of natural surface water bodies 2015

Note: Standard colours based on WFD Annex V, Article 1.4.3.

Source: WISE, Eurostat (country borders)

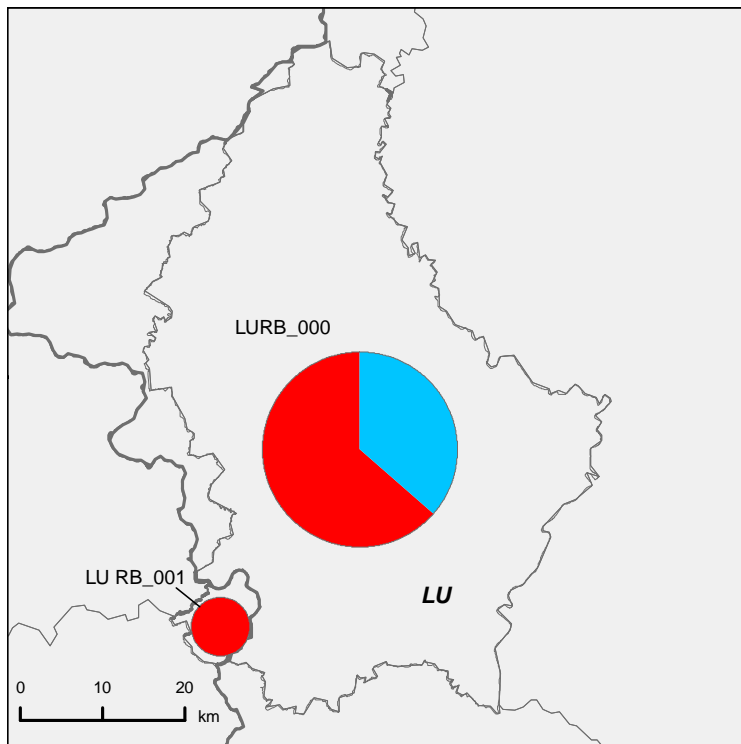


Figure 6.7: Map of chemical status of artificial and heavily modified water bodies 2009

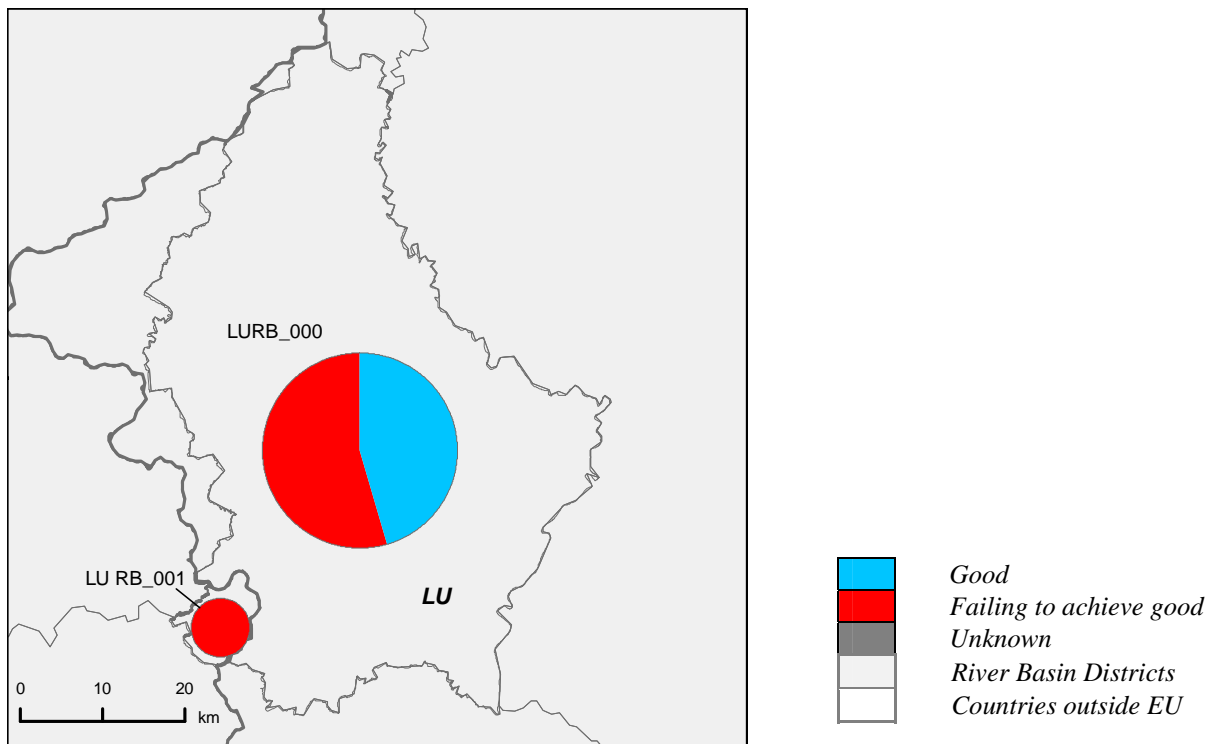


Figure 6.8: Map of chemical status of artificial and heavily modified water bodies 2015

Note: Standard colours based on WFD Annex V, Article 1.4.3.

Source: WISE, Eurostat (country borders)

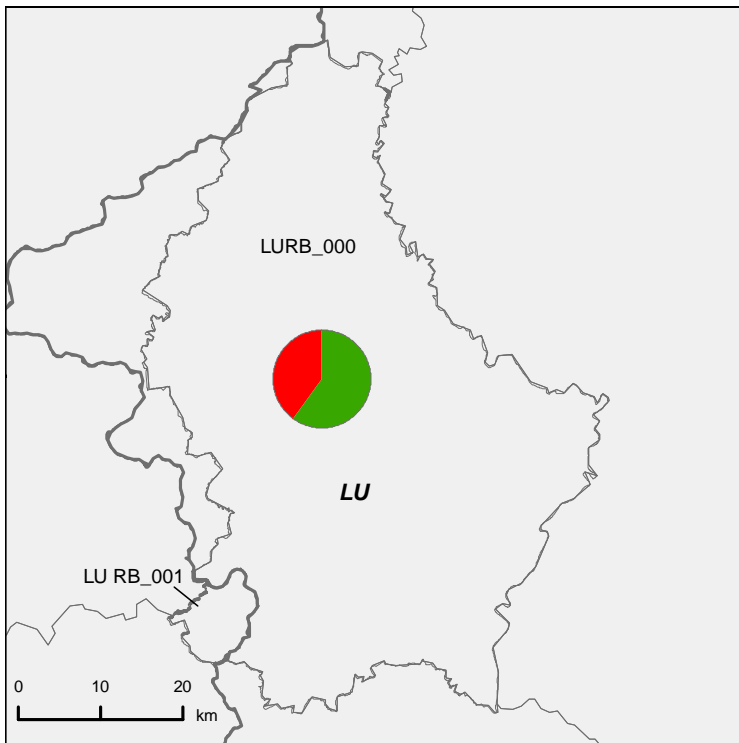


Figure 6.9: Map of chemical status of groundwater bodies 2009

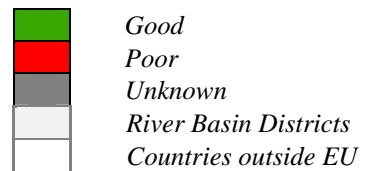
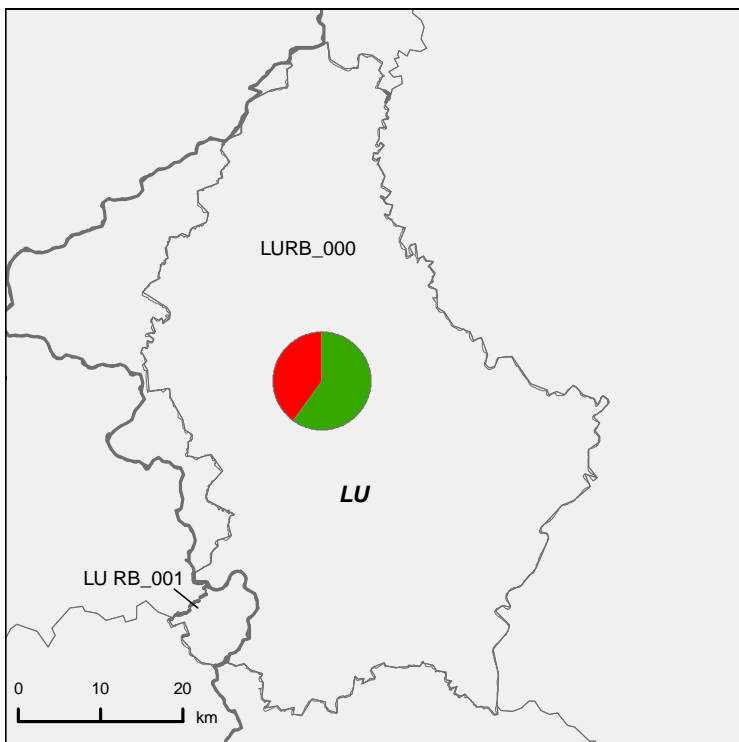


Figure 6.10: Map of chemical status of groundwater bodies 2015
Note: Standard colours based on WFD Annex V, Article 2.4.5.
Source: WISE, Eurostat (country borders)

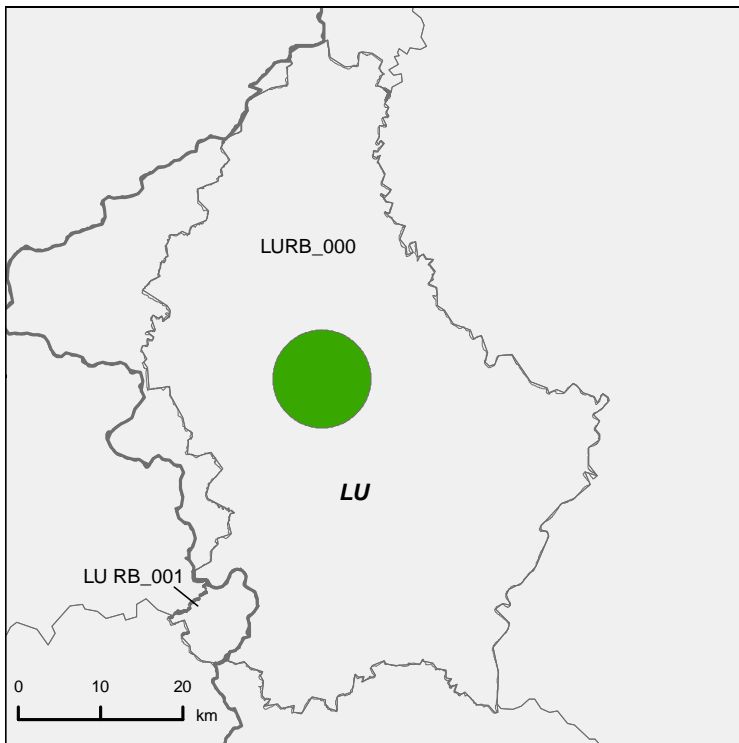


Figure 6.11: Map of quantitative status of groundwater bodies 2009

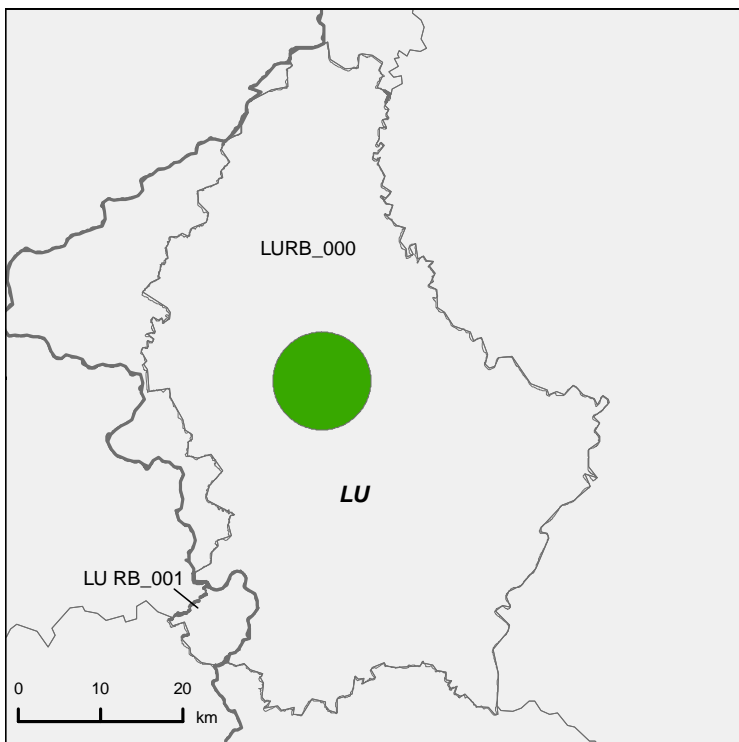


Figure 6.12: Map of quantitative status of groundwater bodies 2015
Note: Standard colours based on WFD Annex V, Article 2.2.4.
Source: WISE, Eurostat (country borders)

7. ASSESSMENT OF ECOLOGICAL STATUS OF SURFACE WATERS

There is only one RBMP for the two RBDs, and a national approach is applied for the methodology for the assessment of ecological status.

As mentioned in section 2 on monitoring, significant **progress** have been made since 2007 (as reported in 2009 implementation report), e.g. all **biological quality elements** (BQEs) are now included, though not all of them at all monitoring sites. However, there is inadequate information on the assessment methods. The RBMP indicates that there are **uncertainties** because some biological methods are still to be adapted, but there is no indication of the expected timeline for this. In addition, the **class boundaries** for ecological status assessment provided in the RBMP, are inconsistent with the results of the **intercalibration of phase 1**²⁶ (see below).

7.1 Ecological status assessment methods

All biological quality elements (QE) are monitored (only river water bodies are relevant in RBMPs of Luxembourg), and the methods for the assessment have also been developed for all QEs, although there are some biological methods that still need to be adapted to the results of the Intercalibration exercise. When the methods are not available at EU level, they have been based on those of neighbouring countries.

²⁶ Decision 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 (notified under document number C(2008) 6016) (2008/915/EC).

RBD	Rivers						Lakes					Transitional					Coastal					
	Phytoplankton	Macrophytes	Phytobenthos	Benthic invertebrates	Fish	Physico-Chemical	Hydromorphological	Phytoplankton	Macrophytes	Phytobenthos	Benthic invertebrates	Fish	Physico-Chemical	Hydromorphological	Phytoplankton	Macroalgae	Angiosperms	Benthic invertebrates	Fish	Physico-Chemical	Hydromorphological	
LU2000																						

Table 7.1: Availability of biological assessment methods
 Assessment methods fully developed for all BQEs
 Assessment methods partially developed or under development for all or some BQEs
 Assessment methods not developed for BQEs, no information provided on the assessment methods, unclear information provided
 Water category not relevant
 -
 Source: RBMPs

A sensitivity table for biological QEs to certain **pressures/impacts** is provided in the RBMP (river water only relevant) but there is no information on how this has been applied in relation to the overall status assessment.

Standards (indicative values) have been set for **physico-chemical QEs**, but there is no specific information for **hydromorphological QEs**, although they are monitored. There is a general statement in the plan that the physico-chemical QEs (as well as specific pollutants) were used in conjunction with BQEs to assess overall ecological status (one-out-all-out principle and expert judgement). Some water bodies were classified predominantly on the basis of physico-chemical QEs, due to the unavailability and uncertainty of some results of BQEs.

The **hydromorphological parameters** are not included in the RBMP, but the methodology for rivers is explained in a background document and is compiled in the Annex II (4.1.3) of the guidance document on methodologies²⁷. The methodology is based on individual assessments, which are later verified by expert judgment, including hydromorphological characteristics, river continuity, water abstraction in urban areas and drainage activities.

The **one-out-all-out principle** has been applied, followed by expert assessment, to derive the overall ecological status. This principle has been transposed to the national legislation²⁸

The RBMP indicates that there are uncertainties because some biological methods are still to be adapted (no indication of timescale), and that it is important therefore to consider all the measurable elements.

Classification boundaries are given for all **six river water types**. It is stated that, where classification limits have not yet been established at European level, they have been determined either by relying on those of neighbouring countries or as fixed by the existing methods applied (biological QEs).

However, close examination of the class boundaries for ecological status assessment for phytobenthos and benthic invertebrates, shows these to be inconsistent with the results of the **intercalibration of phase 1**²⁹. Luxembourg has confirmed that for this first RBMP it has applied the existing boundaries defined in existing rules (prior to the 2008 decision on intercalibration), as the boundaries for biological parameters will be revised (as decided in the second phase of intercalibration).

It is stated that the results of the Intercalibration Decision were applied in relation to the biological quality elements QE 1-2-4 Phytobenthos and QE1-3 Benthic invertebrates, and that these are 'Good moderate intercalibration compliant'. However, the boundary values given in WISE 3.1.1.1 (High-Good boundary: 17 for phytobenthos and 16 for benthic invertebrates; Good-Moderate boundary: 13 and 12, respectively; and Moderate-Poor boundary 9 for each; matrix indicated as biota, and no units given) are not in agreement (as values or converted to

²⁷ 'Identification et évaluation de la capacité de développement des cours d'eau luxembourgeois en tant que base à l'élaboration des plans de gestion pour atteindre l'objectif de bon état de la DCE', (Physische Geographie und Umweltforschung der Universität des Saarlandes, 2006).

²⁸ Règlement Grand-Ducal 30 décembre 2010 relatif à l'évaluation de l'état des masses d'eau de surface.

²⁹ Decision 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 (notified under document number C(2008) 6016) (2008/915/EC)

ratios) with the ratios given for Luxembourg for the High-Good and Good-Moderate boundaries for these QEs (Phytobenthos 0.85 and 0.70; Benthic invertebrates 0.96 and 0.72, respectively) in the Decision 2008/915/EC. No other information is provided.

According to information received from Luxembourg, it was not possible to provide detailed information in the RBMP on the **uncertainties** and the **confidence** level in the classification methods. There are some programmes that are currently or will soon be carried out to assess the confidence of monitoring and assessment methodologies applied in the first RBMP.

No **background document or national/regional guidance document** has been provided (no link). However, RBMP Annex VII - Methodology refers to an annex containing a German concept paper by LAWA (status 2005) for details of the assessment and classification method for surface waters, but these are not provided in the RBMP.

7.2 Application of methods and ecological status results

All **relevant quality elements** have been used in the ecological status assessment of surveillance monitoring sites, but there is no detail on the methods applied.

There is **insufficient information** to judge whether the **most sensitive biological quality elements** have been selected for ecological status assessment for operational monitoring sites and whether the existing pressures are being sufficiently detected, although there are special monitoring programmes for nitrate and pesticides.

There is no information on confidence and precision or **uncertainty** for the ecological status results.

7.3 River basin specific pollutants

The **river basin specific pollutants** are considered to be responsible for causing failure of good status, as the one-out-all-out-principle is used in the assessment ecological status. The specific pollutants have been established based on scientific papers and on the assessment of ecological status in neighbouring countries. Only one substance is monitored in suspended solids (CAS 1336-36-3 PCBs, which is not in Annex 1), all others are monitored in water only.

The list of substances and an updated methodology for assessment of ecological quality standards have been included in the national legislation in December 2010³⁰. There is indication in the plan that additional EQS were being developed as national standards.

³⁰ Règlement Grand-Ducal du 30 décembre 2010 relatif à l'évaluation de l'état des masses d'eau de surface.

RBD	CAS Number	Substance	Percentage Water Bodies Failing Status (%)
LU2000		Ammonia	7
LU2000		Heavy metals - aggregated	5
LU2000	7439-89-6	Iron	2
LU2000	7439-96-5	Manganese	3
LU2000		Nitrate	4
LU2000		Nitrite	11
LU2000		Orthophosphate	14
LU2000		Pesticides - aggregated	20
LU2000	7440-66-6	Zinc	4

Table 7.1: River basin specific pollutants causing failure of status
Source: RBMPs

8. DESIGNATION OF HEAVILY MODIFIED WATER BODIES (HMWB) AND ASSESSMENT OF GOOD ECOLOGICAL POTENTIAL

The number of HMWBs (11) seems to be in agreement with those provisionally identified in 2007³¹ and have now been confirmed, of which 10 are in the Rhine RBD and 1 in the Meuse RBD. No artificial water bodies (AWBs) have been designated in Luxembourg RBMP.

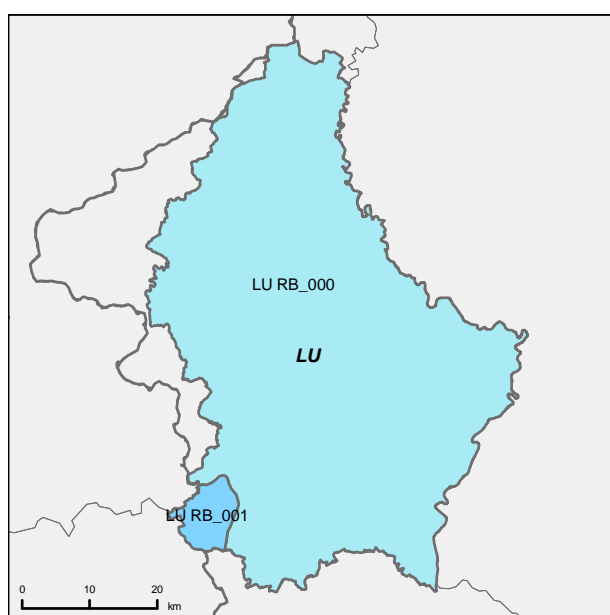
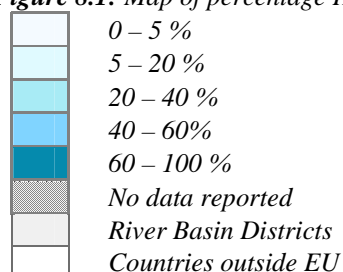


Figure 8.1: Map of percentage Heavily Modified and Artificial water bodies by River Basin District



Source: WISE, Eurostat (country borders)

8.1 Designation of HMWBs

In total 11 (10.7% of total water bodies) HMWBs have been designated (10 in the Rhine RBD and 1 in the Meuse RBD).

The water uses and physical modifications of the HMWB are described fully; uses include storage for power generation and for drinking water supplies, navigation and canalisation

³¹ Figure 5, page 27 of the 2007 Implementation Report, available at: http://ec.europa.eu/environment/water/water-framework/implrep2007/pdf/sec_2007_0362_en.pdf

through urban areas. Physical alterations include weirs, dams, reservoirs, canalisation, straightening, bed stabilisation, and bank reinforcement and embankment.

The stepwise evaluation scheme of the **CIS Guidance n°4³²** has been partially followed, i.e. **up to step 9** (designation of HMWB), but the Good Ecological Potential has not been defined (see below).

The mitigation measures needed to reach good ecological status were evaluated. Following establishment of significance criteria and significant (unacceptable) negative effects of mitigation measures on the water use needed to achieve good ecological status, and including consideration of possible alternative means to achieve the beneficial water uses of the HMWBs, the mitigation measures were considered inappropriate and the provisional designation of HMWBs was confirmed.

However, the value to define '**significant adverse effect**' on the use has been set at **zero**. For example, if any measure would cause any reduction in electricity output or navigation capacity, the adverse effect would be considered as 'significant', and therefore the measure would not be enforceable. For electricity production, the plan justification is in terms of contravention of global warming mitigation policy. This reason is also used for the justification on navigation, which also includes compliance with international agreements on navigation. Similarly any destruction of private property or historic public building, in order to re-naturalise river sections, would be deemed unacceptable on the basis of citizens' rights to property.

It seems that the **uncertainties** in the designation process have not been taken into account, and that there is no plan foreseen to improve the methodology for the next round of RBMPs, other than to review the need for less stringent environmental objectives in future RBMPs.

8.2 Methodology for setting good ecological potential (GEP)

HMWBs have been designated but **GEP has not been defined**. There is no explanation of steps 10 and 11 of the CIS Guidance n°4 on GEP, which have been omitted on the basis that the necessary measures could not be implemented in any case.

The methodology for defining GEP for HMWBs is included in one of the guidance documents³³. However, the good ecological potential has not been defined in this first RBMP, as the assessment of biological elements had not been finalised and verified. Improved characterisation of the pressures affecting HMWBs is expected to be done for the next cycle (or even before by 2013). The methodology for the assessment of GEP and of biological QEs related to hydromorphological conditions has now been integrated in the national law (in 2010)³⁴.

As a result of the two issues mentioned before (the significance of the adverse effect to the use defined at zero and the lack of definition of GEP), the current situation appears to be equated with the objectives, i.e. **there is no driver for restoration and for improvement of**

³² http://circa.europa.eu/Public/irc/env/wfd/library?l=/framework_directive/guidance_documents/gds04shmwbspolicysummar/EN_1.0_&a=d

³³ Umsetzung der EG-Wasserrahmenrichtlinie Methodenhandbuch für das Großherzogtum Luxemburg, 2009

³⁴ Règlement Grand-Ducal du 30 décembre 2010 relatif à l'évaluation de l'état des masses d'eau de surface

existing pressures from hydromorphological modifications. This is important as the RBMP indicates that there are significant hydromorphological pressures in many water bodies. Nevertheless, **hydromorphological measures** have been proposed for water bodies not designated as HMWBs, as well as for those designated as HMWBs.

8.3 Results of ecological potential assessment in HMWB and AWB

There are no Artificial Water Bodies designated in Luxembourg.

Although the good ecological potential (GEP) has not been defined in the Luxembourg RBMPs, recent information from the Luxembourg authorities have confirmed the HMWBs were assessed in terms of their ecological potential, as follows:

Status classification	LU RB_000	LU RB_001
High		
Good	1	
Moderate	3	
Poor	2	
Bad	4	1
<i>Total</i>	<i>10</i>	<i>1</i>

Table 8.1: Ecological potential of heavily modified water bodies
Source: WISE

9. ASSESSMENT OF CHEMICAL STATUS OF SURFACE WATERS

9.1 Methodological approach to the assessment

The RBMP refers to the Environmental Quality Standards (EQS) of the EQS Directive³⁵ for the **assessment of chemical status**, and that these are used to support the assessment of ecological status and overall status, but there is little information on the assessment method.

All **priority substances** and other substances of **Annex 1 of the EQSD** are monitored and used in the assessment of chemical status, but currently only at seven monitoring sites which are considered to be representative. The emphasis is on 'relevant substances', though there are plans to expand monitoring to all priority substances but no details are provided in the RBMP. According to information received from Luxembourg, in 2010, the list of QEs for priority substances in accordance with the provisions of the EQS Directive was approved in a Regulation³⁶. The limits established in the 2009 RBMP would not exceed those of the 2010 Regulation, even if the plan was approved before.

Specific pollutant	LU RB_000		LU RB_001		Total	
	Number	%	Number	%	Number	%
Diuron	3	3	1	33.3	4	4
Isoproturon	3	3	-	-	3	3
Di(2-ethylhexyl)phthalate (DEHP)	2	2	1	33.3	3	3
Benzo(g,h,i)perylene	2	2	-	-	2	2
Indeno(1,2,3-cd)pyrene	5	5	-	-	5	5

*Table 9.1: Substances responsible for causing failure of good chemical status
Source: WISE*

As the EQS on **sediment** or **biota** are concerned, Luxembourg has recently confirmed that it has established biota EQS values for hexachlorobenzene, hexachlorobutadien and mercury³⁷.

There is however no information on **background concentrations**, except in relation to indicative values for physico-chemical parameters, it is mentioned that existing conditions were taken into account.

There is no information on whether or how **bioavailability** is taken into account in the assessment of compliance with the EQS for metals.

³⁵ Directive 2008/105/EC. OJ L 348, 24.12.2008, p 84-97.

³⁶ Règlement Grand-Ducal du 30 décembre 2010 relatif à l'évaluation de l'état des masses d'eau de surface.

³⁷ See Annex III of the 'Règlement grand-ducal du 30 décembre 2010 relatif à l'évaluation de l'état des masses d'eau de surface'.

9.2 Other issues

There is no information on the use of mixing zones (Article 4 of the Directive 2009/105/EC permits the designation of such zones adjacent to points of discharge Concentrations of one or more substances listed in Part A of Annex I may exceed the relevant EQS within such mixing zones if they do not affect the compliance of the rest of the body of surface water with those standards).

10. ASSESSMENT OF GROUNDWATER STATUS

All 5 groundwater bodies have good quantitative status, 3 have good chemical status.

The main risks are diffuse pollution affecting chemical status (mainly nitrate and pesticides). In some cases (3 groundwater bodies) individual pesticide threshold values were exceeded only once, but these were considered very localised and temporary and not representing an environmental risk in terms of the whole groundwater body. Additional monitoring programmes are in place for those pollutants, which cause failure to achieve good chemical status, i.e. pesticides and nitrate.

10.1 Groundwater quantitative status

All 5 groundwater bodies are in good quantitative status.

Since quantitative status is not an issue, effects on surface waters, including terrestrial ecosystems dependent on groundwater, are not considered at risk.

Groundwater recharge exceeds by far the levels of abstraction, as estimated from abstraction, rainfall and piezometric data. However, there seems to be no consideration of future trends in water demand or climate change.

10.2 Groundwater chemical status

Chemical status of groundwater is assessed in terms of quality standards (largely based on drinking water standards) and for some cases consideration is given to naturally occurring concentrations (relatively high chloride and sulphate concentrations in one groundwater body).

A detailed assessment of groundwater dependent terrestrial ecosystems was not carried out for the current RBMP, it is merely stated that these have been placed under 'orders of no deterioration' and there are no significant risks associated with these. They are the responsibility of a different authority, i.e. the Ministry for Sustainable Development and Infrastructure, Department of the Environment and monitored by this authority, which would inform the Water Management Agency, if there were any problems.

There is a general statement that the quality standards are based on the Groundwater Directive³⁸ and have been elaborated according to the quality of the groundwater in Luxembourg and based mainly on drinking water standards. The RBMPs contain a list of substances and their quality standards. It includes all substances listed in Annex II Part B of

³⁸ Directive 2006/118/EC. OJ L 372, 27.12.2006 , p. 19–31

the Groundwater Directive. The conductivity is taken into account in order to determine the chemical quality of groundwater bodies. Furthermore, the assessment includes nitrates and pesticides, which relate to the main pressures on groundwater chemical status (diffuse pollution from agriculture).

All groundwater bodies identified are part of the Rhine RBD, including one transboundary groundwater body, and co-ordination with other RBD Member States in respect of quality standards (or threshold values) in transboundary groundwater body is mentioned, but no details are provided.

Threshold values for groundwater have been established taking into consideration natural background concentrations.

The methodology for TV exceedances has been established; i.e. poor status is assigned if more than one third of sampling points exceed 75% of the quality standard, or less than one third if there is a significant pressure from the pollutant concerned. The relevant pollutants are nitrates, active substances of pesticides, and metabolites and associated products.

A method of trend analysis has been established and a limited amount of trend assessments and trend reversals have been reported, where sufficient data were available.

10.3 Protected areas

There are provisionally designated protected areas for groundwater under Article 7 Drinking Water Abstraction, in total 85. Only 18 of these provisional protected areas seem to be monitored and the status of all of them is given as unknown.

RBD	Good	Failing to achieve good	Unknown
LU RB_000			82
<i>Total</i>	<i>0</i>	<i>0</i>	82

Table 10.1: Number and status of groundwater drinking water protected areas

Source: WISE

11. ENVIRONMENTAL OBJECTIVES AND EXEMPTIONS

There is an indication of **transboundary co-operation** with the ICPR in terms of producing a map for exemptions on one transboundary groundwater body with poor chemical status. No other information is available in the RBMP.

The estimates of achieving the environmental objectives for the different planning cycles is presented as percentage of water bodies on a national basis (including Rhine RBD: 89 natural surface water bodies and 10 HMWBs, and Meuse RBD: 2 natural surface water bodies and 1 HMWB) and in terms of overall status only.

Type of water body (total No.)	Status	Total No. (%) water bodies			
		2009	2015	2021	2027
Surface water bodies (91)	Good overall status	7 (7%)	25 (25%)	77 (77%)	90 (99%)
HMWBs (11)	Good ecological status	1 (9%)	2 (18%)	5 (46%)	9 (82%)
Groundwater bodies (5)	Good quantitative status	5 (100%)	5 (100%)	5 (100%)	5 (100%)
Groundwater bodies (5)	Good chemical status	3 (60%)	3 (60%)	3 (2 unknown)	3 (2 unknown)

Table 11.1: Summary of status 2009 / expected status 2015 of water bodies at national level
(Note: 'Good ecological status' seems to be used for HMWBs, rather than 'Good ecological potential', which has not been established – see Section 5.2)

Source: WISE and RBMP

11.1 Additional objectives in protected areas

Drinking Water protected areas are in the process of being designated (provisional at present), together with additional stricter objectives that will apply, and incorporation into legislation is expected to be complete by 2015. The stricter objectives are expected to be in line with the quality standards of the Drinking Water Directive 98/83/EC.

The additional objective for **Bathing Water protected areas** is given as 'protection of human health in relation to bacterial pollution', but no further details are provided in the RBMP.

The RBMP states that the Ministry for Sustainable Development and Infrastructure, Department of the Environment, is responsible for objectives in **Natura 2000** sites and will shortly specify any measures needed to protect these areas, but the plan does not give any further information.

There are **no shellfish protected areas**.

In addition, there is a general statement that basic measures for specific water bodies (surface water) and nationwide supplementary measures are expected to also benefit PAs.

11.2 Exemptions according to Article 4(4) and Article 4(5)

For surface water, most of the exemptions (96%) have been applied under Article 4(4) (longer timeline) have been applied so far, for 65 surface water bodies and 9 HMWBs which are not expected to reach good status by 2015³⁹. Only in 3 cases, the exemption under Article 4(5) has been used.

There is however no detailed information relating the exemptions to impacts and drivers, but the information is provided in terms of chemical status (pollutants responsible for less than good status by 2015). For groundwater, the only information relates to two groundwater bodies to which extensions under Article 4(4) apply on the basis of natural conditions (due to long residence time of pollutants in aquifers), and the exemptions relate to chemical status due to pollution with nitrate and pesticides for both groundwater bodies.

On the reasons for exemptions, the RBMP states that the majority of time extensions needed are due to either '**technical feasibility**' or '**natural conditions**'. No exemptions have been used on the basis of **disproportionate costs**.

Technical feasibility has only been applied for exemptions concerning time extensions. However, there is no clear definition of technical feasibility, but an example to justify extension of deadlines on the basis of technical feasibility is given as 'the necessary time for implementation of technical solutions is too long'.

RBD	Global ⁴⁰					
	Technical feasibility		Disproportionate costs		Natural conditions	
	Article 4(4)	Article 4(5)	Article 4(4)	Article 4(5)	Article 4(4)	Article 4(5)
LU_RB_000	62	2	0	0	10	-
LU_RB_001	0	1	0	0	0	-
<i>Total</i>	<i>62</i>	<i>3</i>	<i>0</i>	<i>0</i>	<i>10</i>	<i>-</i>

Table 11.2: Numbers of Article 4(4) and 4(5) exemptions

Source: WISE

³⁹ There is conflicting information between WISE and the RBMP (in the number of exemptions, those under Article 4(5) and on the reasons of exemptions. Luxembourg has confirmed that the WISE information is not correct and will be amended.

⁴⁰ Exemptions are combined for ecological and chemical status.

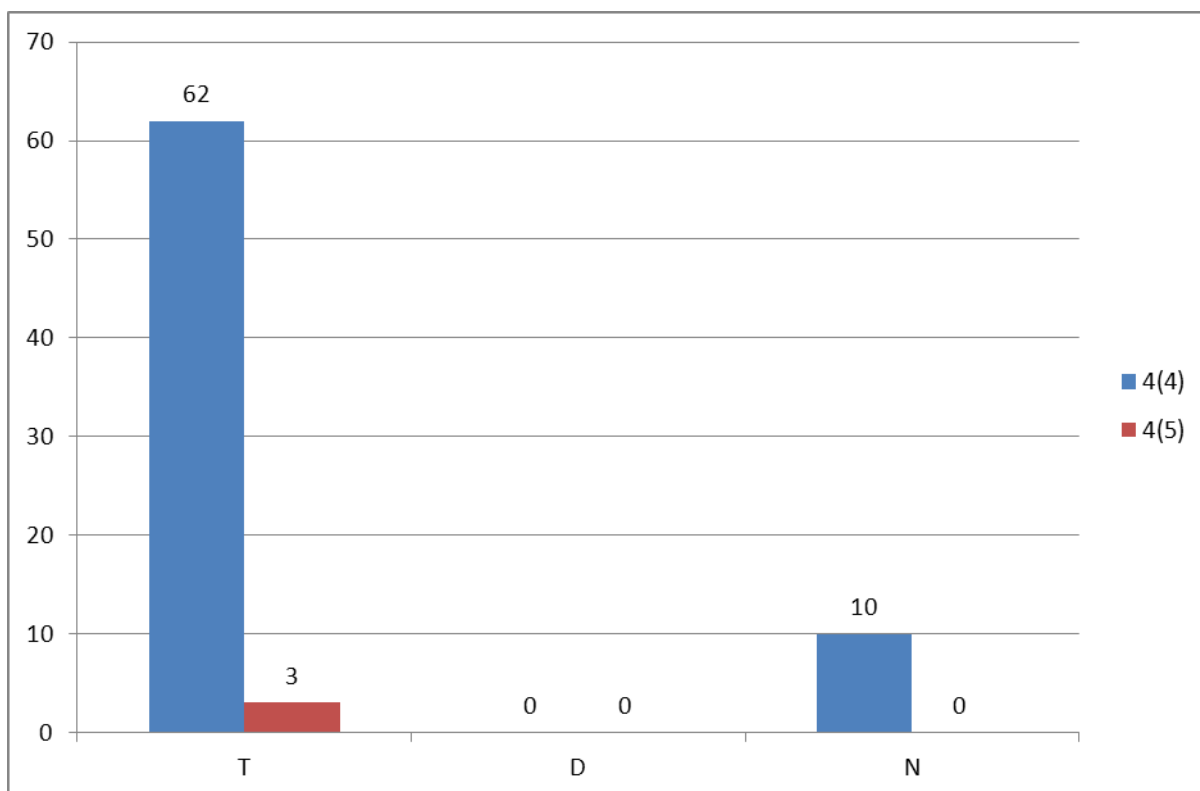


Figure 11.1: Numbers of Article 4(4) and 4(5) exemptions

T = Technical feasibility

D = Disproportionate costs

N = Natural conditions

Blue = Article 4(4) exemptions

Red = Article 4(5) exemptions

Source: WISE

11.3 Exemptions according to Article 4(6)

There are no exemptions under Article 4(6).

11.4 Exemptions according to Article 4(7)

There are no exemptions under Article 4(7).

11.5 Exemptions to Groundwater Directive

There is no information on exemptions to the Groundwater Directive.

Exemptions are listed for **2 groundwater bodies** (poor chemical status) under Article 4(4) of the WFD only, on the basis of natural conditions, i.e. due to long residence time of the pollutants responsible (**nitrates and pesticides**).

No exemptions are listed for **drinking water protected areas** in the preliminary designation.

12. PROGRAMMES OF MEASURES

According to Annex VII of the WFD, the RBMPs should contain a summary of the programmes of measures (PoM), including the ways in which Member States expect to achieve the objectives of Article 4 WFD. The programmes should have been established by 2009, but are required to become operational only by December 2012. The assessment in this section is based on the PoM as summarised by the Member State in its RBMP, and the compliance of this with the requirements of Article 11 and Annex VII of the WFD.

It therefore does not include a comprehensive assessment of compliance with the requirements of Article 11(3)⁴¹ on basic measures. It focuses in particular on key sets of measures. Member States will report to the Commission by December 2012 on the full implementation of their PoMs, including on the progress on the implementation of basic measures as required by Article 11(3). The Commission will assess what Member States report and will publish its assessment in accordance with Article 18 WFD.

12.1 Programme of measures – general

According to Annex VII of the WFD, the RBMPs should contain a summary of the programmes of measures (PoM), including the ways in which Member States expect to achieve the objectives of Article 4 WFD. The programmes should have been established by 2009, but are required to become fully operational only by December 2012. The assessment in this section is based on the PoM as proposed by the Member States in their RBMPs, and the completeness and compliance of such programmes with the requirements of Article 11 of the WFD.

Member States will report to the Commission by December 2012 on the full implementation of their PoMs, including on the progress on the implementation of basic measures as required by Article 11(3). The Commission will carefully assess what Member States will report by then and will decide thereafter on the most appropriate follow-up of the implementation of the measures.

Measures have been developed on the basis of the **status assessments** (chemical and overall ecological status for river water (lakes and transitional/coastal not relevant), and there are three groups of measures: urban wastewater management (relating mainly to urban wastewater), hydromorphological, and agricultural (diffuse sources).

There is only general information on co-ordination with other Member States, i.e. neighbouring countries, and international co-operation with the Commissions for the Protection of the Rhine, Mosel/Saar and Meuse (ICPR, ICPMS and ICM), but there are no further details provided in the plan.

Basic measures and some supplementary measures have been established at **RBD level**, other supplementary measures apply **nationally**, under the responsibility of the **national authority** (Administration de la Gestion de l'Eau), which is in charge of the implementation of the WFD (see Section 3).

⁴¹ These are the minimum requirements to be complied with and include the measures required under other Community legislation as well as measures to achieve the requirements of other WFD Articles and to ensure appropriate controls on different activities affecting water management

The **costs of measures** have been clearly identified as investment costs and maintenance costs up to 2027, except for agriculture, which is for compensation costs estimated up to 2013-15, when the relevant legal framework will end/need to be renewed.

The Water Law of 2008 regulates the financing of the measures; in practice financing of urban waste water and hydromorphological measures are largely covered by the **national fund for water management**, funded from abstraction and wastewater disposal licences, and topped up by state budgetary contributions, and possibly loans from the European Investment Bank. Maintenance costs are financed by local authorities through water service revenues. And agricultural measures are funded under existing programmes, such as Agri-Environment and agriculture/environmental protection programmes (including the European Agricultural Fund for Rural Development).

Basic measures are clear and already in place, whilst there is uncertainty about the extent of the implementation of the supplementary measures. There is no information on when the measures will become operational, except that some measures seem to be already part of ongoing programmes, e.g. the agricultural measures to control diffuse sources of pollution and the introduction of water protection zones and restrictions associated with these. Other measures, which are mainly basic measures relating to urban waste water and hydromorphological alterations, have been prioritised and the costs have been spread over the three periods up to 2015, 2015-2021 and 2021-2027, although some of these are already in place.

There has been a prioritisation of the measures based on an economic analysis and have been spread over the three planning periods (2009-2015, 2015-2021 and 2021-2027). The measures that will be implemented up to 2015 will be the most urgent basic measures (to implement existing directives) and those measures necessary to achieve good status in 2015 that are the most cost-efficient (priority P1). During the second cycle, Luxembourg will implement those measures defined to achieve good status by 2021 and measures with a positive impact in several water bodies (priority P2). Finally, the measures planned to achieve good ecological status by 2027 and those measures designed to maintain the good status will be implemented during the third cycle (priority P3). These three priorities have been assigned to all water bodies, except for water bodies with good or higher status. This prioritisation together with the estimated costs of the measures has provided for a planning in the funding of all measures to be applied until 2027.

12.2 Measures related to agriculture

Diffuse sources from agriculture represent the main pressure on groundwater quality and a significant pressure on surface water quality, mainly from pesticide and fertiliser application, resulting in bad chemical status due to nitrates and pesticides. There is no significant pressure from agriculture on hydromorphology or quantitative status.

Farmers were participants in the working groups preparing a catalogue of measures, including agricultural measures relating to diffuse sources (see also Section 3).

Agricultural measures selected are supplementary measures aimed mainly at reducing diffuse pollution, and addressed on a **nationwide basis** and mainly through **voluntary participation** of farmers, though encouraged through compensation payments.

The non-technical measures have merely been proposed for future development and application.

Some measures are already ongoing as part of existing programmes (Agri-Environment Programme and Countryside Protection Programme) but improvement in farmer participation is expected with the agriculture measures.

The time scale for agricultural measures is currently set up to 2013 or 2015 (depending on the programme concerned) when the legal framework for compensation payments will have to be reviewed in terms of possibilities to link them to a national environment plan (e.g. including non-use of fertiliser, water protection measures). In addition, compensation payments may be made to farmers by water suppliers for loss of productivity in water safeguard zones.

Measures	LU RB_000
Technical measures	
Reduction/modification of fertiliser application	✓
Reduction/modification of pesticide application	✓
Change to low-input farming (e.g. organic farming practices)	✓
Hydromorphological measures leading to changes in farming practices	
Measures against soil erosion	✓
Multi-objective measures (e.g. crop rotation, creation of enhanced buffer zones/wetlands or floodplain management)	✓
Technical measures for water saving	
Economic instruments	
Compensation for land cover	✓
Co-operative agreements	✓
Water pricing specifications for irrigators	✓
Nutrient trading	
Fertiliser taxation	
Non-technical measures	
Additions regarding the implementation and enforcement of existing EU legislation	
Institutional changes	
Codes of agricultural practice	✓
Farm advice and training	✓
Raising awareness of farmers	
Measures to increase knowledge for improved decision-making	
Certification schemes	
Zoning (e.g. designating land use based on GIS maps)	
Specific action plans/programmes	
Land use planning	
Technical standards	
Specific projects related to agriculture	
Environmental permitting and licensing	

Table 12. 1: Types of WFD measures addressing agricultural pressures, as described in the PoM⁴²
Source: RBMPs

⁴² Results only available for LU RB_000 (Rhine).

Note on non-technical measures: *Examples of additional measures needed in the future include a Code of Practice for the Agricultural Sector, and advice to farmers and local government on the use of fertilisers and pesticides, but these are not currently implemented.

Source: RBMP

12.3 Measures related to hydromorphology

The overall objective for all hydromorphological measures is to improve ecological continuity and restore more natural conditions, and thereby achieving or at least improving **ecologically based flow regime** and **river continuity**. There is no information on the proposed measures or on any assessment of **expected effects** of the proposed measures, nor is it clear whether all of these measures will be implemented.

Specific hydromorphological measures for **HMWBs** have been included in the Programme of Measures. The evaluation of possible measures for the provisionally designated HMWBs showed significant long-term negative effects for all, with no viable alternatives for their usage (drinking water supplies, energy production, navigation and urban settlements incl. historic buildings).

There are three main types of measures: agriculture measures, urban waste water management and hydromorphological measures. HMWBs benefit from UWWT and hydromorphological measures.

Measures	LU RB_000
Fish ladders	✓
Bypass channels	
Habitat restoration, building spawning and breeding areas	
Sediment/debris management	
Removal of structures: weirs, barriers, bank reinforcement	✓
Reconnection of meander bends or side arms	✓
Lowering of river banks	✓
Restoration of bank structure	✓
Setting minimum ecological flow requirements	
Operational modifications for hydropeaking	
Inundation of flood plains	
Construction of retention basins	
Reduction or modification of dredging	
Restoration of degraded bed structure	✓
Remeandering of formerly straightened water courses	✓

Table 12.2: Types of WFD measures addressing hydromorphological pressures, as described in the PoM

Source: RBMP

12.4 Measures related to groundwater

The main risks, impacts and pressures relate to diffuse sources from agriculture (mainly pesticides and nitrates), both of which have exceeded quality standards at several monitoring sites in two groundwater bodies.

Nationwide supplementary measures are in place to reduce their inputs; these measures are voluntary, but linked to compensation payments as part of environmental/agricultural schemes. In addition, the designation of water protection zones (around drinking water abstraction wells) and appropriate restrictions are under development.

Measures on surface water bodies, most in relation to the full implementation of the Urban Waste Water Treatment Directive, are also considered to benefit groundwater quality, especially in respect of nitrates concentrations.

No measures are considered necessary in relation to quantitative status (groundwater over-exploitation is not considered an issue; the quantitative status of all groundwater bodies is good, and authorisation of abstractions with limits on volume abstracted is already in place).

International co-ordination of measures is referred to only in general terms. The international co-ordination for accidental pollution and measures only relates to surface waters.

12.5 Measures related to chemical pollution

There is a **national point source pollution register**. The RBMP indicates that this includes Priority and Priority Dangerous Substances from Annex X of the WFD and 8 substances from the Dangerous Substances Directive. There is also a reference to the Pollutant Release Transfer Register (PRTR) in the case of the two relevant industrial installations (releasing organic carbon, nutrients N and P, and the metals copper and zinc).

There is no inventory for **diffuse source pollution**.

The **main basic measures** on surface water bodies are clearly defined when they relate to improving urban waste water treatment and collection (due to non-compliance with the Urban Waste Water Treatment Directive 91/271/EEC) and to achieve full compliance with the IPPC Directive 96/61/EC.

Information on **substance-specific measures** is provided mainly in general terms, for example reductions in emissions of WFD Annex VIII, IX and X substances, including reduced application and emission of pesticides, and specifically reductions in emissions of Indeno(1,2,3-cd)pyrene and metazaclor in one water body.

Supplementary measures for all other substances relate mainly to diffuse agricultural sources, and include for example reduced application of pesticides and control of fertiliser application (to reduce nutrient input N, P) on a nation-wide, although voluntary basis.

12.6 Measures related to Article 9 (water pricing policies)

In the Article 2 of the Water Law form 19 December 2008 a broad definition of water services, being in line with WFD definition, was applied.

Based on water legislation, **3 sectors – households, industry and agriculture** – have been defined as water users.

Cost recovery for water services is calculated including: operational and maintenance costs, and depreciation of investment costs. Luxembourg authorities reported that EU subsidies and some national subsidies (related to [Article 17](#) of the Water Law form 19 December 2008) for water infrastructure were not taken into account within cost recovery calculation.

The calculation includes environmental and resource costs internalised through abstraction and discharge tax (environmental/resource taxes). This tax financial resources feed into a National Fund for Water Management, which is used to finance measures under the WFD.

Cost recovery is calculated at the level of 84% for the 3 sectors combined. The contribution to cost recovery of water services is not disaggregated into different water uses (at least households, agriculture and industry), which is not in line with WFD and makes cross-subsidies among different sectors invisible.

Luxembourg authorities reported that flexibility provisions: social, environmental and economic effects of the recovery as well as geographic and climatic conditions were taken into account setting up water tariffs, but no precise justification in relation to different water uses was done to prove that their contribution to cost recovery is adequate.

It is reported that Luxembourg legislation is based on the '**polluter-pays principle**' for water quality and the **resource user principle** for quantity, which is implemented through a combination of charging for water services (at community level) and a national tax on abstraction (surface water and groundwater, charged by volume) and on discharges (charged by pollutant load). The intention of this system of charging is to structure pricing to encourage pollution reductions and efficient water use. Above mentioned rules prove that incentive pricing policy for efficient water use is implemented.

Abstraction and discharge taxes are set and charged at national level, in **co-operation between national and local authorities**, to set and charge abstraction and discharge taxes, and water service costs, respectively. There is no information on international co-operation specifically in this context.

12.7 Additional measures in protected areas

The protected areas have been identified, but there are no details of the additional measures identified in those areas to achieve the more stringent objectives of other Community legislation. There is however a general statement that basic measures for specific surface water bodies and nationwide supplementary measures are expected to also benefit protected areas.

The **Drinking Water Protected Areas** and measures to be applied are in the process of being established, although some protected areas have been designated on a preliminary basis. Some restrictions on pesticide and fertiliser applications seem to apply on a voluntary basis at present.

13. CLIMATE CHANGE ADAPTATION, WATER SCARCITY AND DROUGHTS AND FLOOD RISK MANAGEMENT

13.1 Water Scarcity and Droughts

Water scarcity and drought are **not considered relevant**, as based on replenishment/recharge far exceeding water abstraction, and no **measures** are considered necessary in this planning cycle.

No data on future water demand and water availability **trend scenarios** are provided, probably due to the high level of surplus water replenishment, which renders the question irrelevant. In some cases, there are occasional technical issues during short periods in summer due to heavy consumption.

However, research has been ongoing over many years, focusing on water planning issues; this has yielded trend data on intensity and frequency of precipitation, and may have been used as a basis for the above conclusions.

Luxembourg is also collaborating with the International Commissions for the protection of the Rhine (ICPR), the Meuse (ICPM) and the Mosel/Saar (ICPMS) in the area of sustainable water use and flood risk (see below).

In 2008, the Ministry for Home Affairs approved a plan for raising awareness and restrictions on the drinking water in order to assure the supply of drinking water during the summer periods.

13.2 Flood Risk Management

Flood prevention is included in some cases as part of the reason for designation of HMWBs, but no new measures seem to be directly aimed at flood prevention.

Ongoing measures include re-naturalisation of rivers, retention basins, separate rainwater collection and encouraging infiltration in newly developed areas. These relate mainly to flood prevention as part of national policy, but are not specifically part of the RBMP, and are indirectly also related to climate change adaptation.

The Floods Directive is referred to in the RBMP, as well as a flood risk map of the Mosel.

13.3 Adaptation to Climate Change

Climate change issues are mentioned in general terms, but there is no specific mention of a 'climate check' of the PoMs or specific climate change adaptation measures, although reference is made to benefits from ongoing re-naturalisation measures (e.g. prevention of flood risk, see above).

It is stated that a considerable amount of preparatory work has been done (research, information on precipitation, drought and flood risks, and including international co-operation) to produce a future national Climate Change Strategy and to develop it further through future RBMPs. For example, a study by the ICPR includes data provided by Luxembourg and is expected to provide information on regional climatic projections for the Rhine IRBD and sub-basins including most of Luxembourg.

14. RECOMMENDATIONS

Following the steps of river basin planning as set out in the WFD should ensure that water management is based on a better understanding of the main risks and pressures in a river basin and as a result, interventions are cost effective and ensure the long term sustainable supply of water for people, business and nature.

To deliver successful water management requires linking these different steps. Information on **pressures** and risks should feed into the development of **monitoring programmes**, information from the monitoring programmes and the **economic analysis** should lead to the identification of **cost effective programmes of measures** and justifications for exemptions. **Transparency** on this whole process within a clear governance structure will encourage **public participation** in both the development and delivery of necessary measures to deliver sustainable water management.

To complete the 1st river basin management cycle, and in preparing for the second cycle of the WFD, it is recommended that:

- The RBMPs should be clearly structured and accessible to the public and relevant stakeholders. It would also be advisable to clearly distinguish the information and the measures that are relevant for the Rhine RBD, for the Meuse or for both. This transparency within a clear governance structure will encourage public participation in both the development and delivery of necessary measures to deliver sustainable water management.
- The assessment methods for ecological and chemical status need to be further developed, in particular for the hydromorphological quality elements. Some biological quality elements still need to be adapted to the Decision on Intercalibration.
- Only little improvement of the water status is expected by 2015 and the objectives for subsequent planning deadlines are not always clear. Objectives should be clearly indicated and transparent in order to be able to reach good status of waters in a reasonable timeframe.
- Where there are currently high uncertainties in the characterisation of the RBDs, identification of pressures, and assessment of status, these need to be addressed in the current cycle, to ensure that adequate measures can be put in place before the next cycle.
- There are significant gaps in the designation of HMWBs. The methodology of this first RBMP does not provide for any driver for restoration and improvement of the existing pressures from hydromorphological modifications. Furthermore, the methodology to define good ecological potential was not yet defined in this plan, and there is therefore a significant gap in the objectives to be defined for the HMWBs. The designation of HMWBs should be brought in line with all the requirements of Article 4(3).
- A large number of exemptions has been applied in the first cycle of RBMPs. While the WFD does provide for exemptions, there are specific criteria that must be fulfilled for their use to be justified. The application of exemptions needs to be more transparent and the reasons for the exemptions should be clearly justified in the plans, in particular

the justification for technical infeasibility and the expected timeline for the achievement of the objectives.

- The high number of exemptions applied in these first RBMPs is a cause for concern. Luxembourg should take all necessary measures to bring down the number of exemptions for the next cycle, including the needed improvements in the characterisation process, monitoring networks and status assessment methods, as well as reducing significantly the degree of uncertainty.
- It is unclear whether there are any new physical modifications planned in RBMPs. If this is the case, the use of exemptions under Article 4(7) should be based on a thorough assessment of all the steps as requested by the WFD, in particular an assessment of whether the project is of overriding public interest and whether the benefits to society outweigh the environmental degradation, and regarding the absence of alternatives that would be a better environmental option. Furthermore, these projects may only be carried out when all possible measures are taken to mitigate the adverse impact on the status of the water. All conditions for the application of Article 4(7) in individual projects must be included and justified in the RBMPs as early in the project planning as possible.
- The reporting into the WISE should be significantly improved for the next cycle. There are numerous discrepancies between the information in the RBMPs and what has been reported into WISE.
- The identification of river basin specific pollutants needs to be more transparent, with clear information on how pollutants were selected, how and where they were monitored, where there are exceedances and how such exceedances have been taken into account in the assessment of ecological status. It is important that there is an ambitious approach to combatting chemical pollution and that adequate measures are put in place.
- More information on the monitoring of priority substances, specifying for more sites which substances have been monitored and which have caused failure, will be expected in the next RBMP.
- Mercury, hexachlorobenzene and hexachlorobutadiene should be monitored in biota for comparison with the biota standards in the EQSD, unless water EQS providing an equivalent level of protection are derived. The requirement for trend monitoring in sediment or biota as specified for several substances in Directive 2008/105/EC Article 3(3) will also need to be reflected in the next RBMP.
- Meaningful information regarding the scope, the timing and the funding of the measures should be included in the PoM so that the approach to achieve the objectives is clear. All the relevant information on basic and supplementary measures should be included in the summary of the PoM to increase transparency on the planned actions for the achievement of the environmental objectives set out in the WFD.
- Agriculture is indicated as exerting a significant pressure on the water resource in Luxembourg RBDs. However, the measures related to agriculture are mainly on a voluntary basis, which makes the strategy unlikely to deliver. A right balance between voluntary actions and a strong baseline of mandatory measures and rules needs to be set up. This should be developed with the farmers' community to ensure technical feasibility and acceptance.

- There needs to be a very clear baseline in the agriculture sector so that all farmers know the rules this can be adequately advised and enforced and so that the authorities in charge of the CAP funds can adequately set up Rural Development programmes and cross compliance water requirements.
- Luxembourg should provide the calculation of contribution of different water uses disaggregated into at least households, agriculture and industry to cost recovery of water services, in accordance with the requirements of Article 9. In case Luxembourg applies the flexibility provisions of Article 9(4), Luxembourg authorities should provide required justifications.
- The cost-recovery should address a broad range of water services, including impoundments, abstraction, storage, treatment and distribution of surface waters, and collection, treatment and discharge of waste water, also when they are 'self-services', for instance self-abstraction for agriculture. The cost recovery should be transparently presented for all relevant user sectors, and environment and resource costs shall be included in the costs recovered. Information should also be provided on the incentive function of water pricing for all water services, with the aim of ensuring an efficient use of water. Information on how the polluter pays principle has been taken into account should be provided in the RBMPs.