



EUROPEAN
COMMISSION

Brussels, 4.2.2025
SWD(2025) 35 final

COMMISSION STAFF WORKING DOCUMENT

**Third River Basin Management Plans
Second Flood Hazard and Risk Maps and Second Flood Risk Management Plans
Member State: Luxembourg**

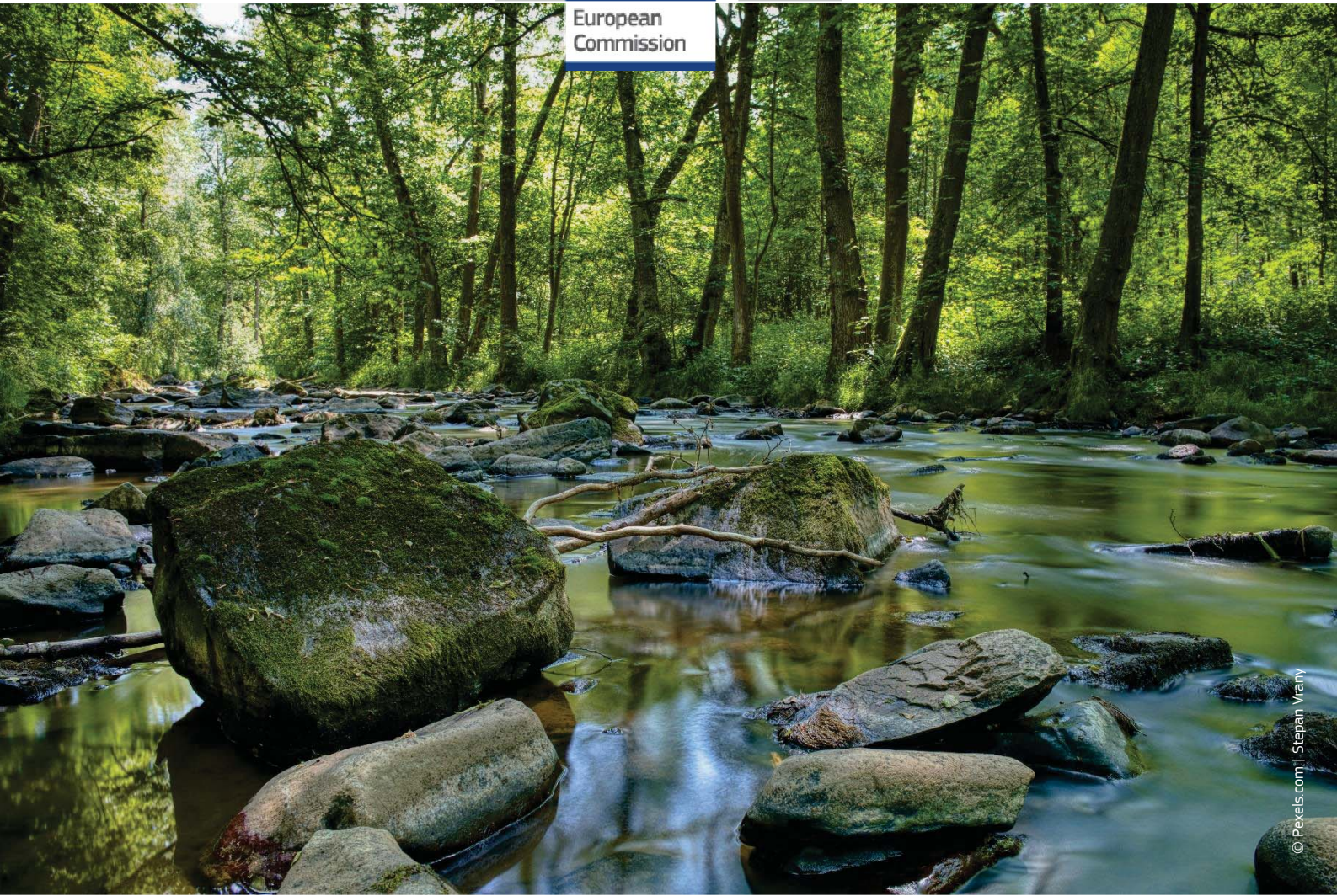
Accompanying the document

REPORT FROM THE COMMISSION TO THE COUNCIL AND THE EUROPEAN PARLIAMENT

**on the implementation of the Water Framework Directive (2000/60/EC) and the Floods
Directive (2007/60/EC)**

**Third River Basin Management Plans
Second Flood Risk Management Plans**

{COM(2025) 2 final} - {SWD(2025) 13 final} - {SWD(2025) 14 final} -
{SWD(2025) 15 final} - {SWD(2025) 16 final} - {SWD(2025) 17 final} -
{SWD(2025) 18 final} - {SWD(2025) 19 final} - {SWD(2025) 20 final} -
{SWD(2025) 21 final} - {SWD(2025) 22 final} - {SWD(2025) 23 final} -
{SWD(2025) 24 final} - {SWD(2025) 25 final} - {SWD(2025) 26 final} -
{SWD(2025) 27 final} - {SWD(2025) 28 final} - {SWD(2025) 29 final} -
{SWD(2025) 30 final} - {SWD(2025) 31 final} - {SWD(2025) 32 final} -
{SWD(2025) 33 final} - {SWD(2025) 34 final}



© Pexels.com | Stepan Vraný

Country specific staff working document

Luxembourg



Content

Content.....	2
SECTION A: WATER FRAMEWORK DIRECTIVE.....	3
1. General info, member state characterisation.....	4
2. Horizontal aspects.....	9
2.1 Governance.....	9
2.2 Characterization of River Basin District.....	9
3. Policy elements contributing to biodiversity and climate change adaptation.....	11
3.1 Surface Water: what is their ecological status or potential.....	11
3.2 Hydromorphological changes and artificialization (HMWBs and AWBs).....	12
3.3 Groundwater bodies - have they sufficient water – quantitative status.....	14
3.4 Protected Areas (identification, monitoring, objectives and measures).....	14
3.5 What is being done to prevent/reduce hydromorphological pressures.....	15
3.6 What Luxembourg is doing for abstractions and water scarcity.....	17
3.7 Adaptation to climate change.....	18
4. Policy elements contributing to zero pollution.....	19
4.1 Surface Water: what is their chemical status.....	19
4.2 Groundwater Bodies: what is their chemical status.....	20
4.3 What Luxembourg is doing to combat pollution from agriculture.....	21
4.4 What Luxembourg is doing to combat pollution from other sectors.....	22
4.5 What Luxembourg is doing to combat significant pressures – overall assessment of the Programmes of Measures.....	23
5. Exemptions and economics.....	23
5.1 To what extent are exemptions applied in Luxembourg.....	23
5.2 Use of economic analysis and water pricing – cost recovery.....	25
6. WFD recommendations.....	25
SECTION B: FLOODS DIRECTIVE.....	28
7. Flood risk management under floods directive (FD).....	29
7.1 Flood hazard and risk maps.....	29
7.2 Flood risk management plans.....	30
8. FD recommendations.....	32

SECTION A:

WATER FRAMEWORK DIRECTIVE

1. General info, member state characterisation

Luxembourg is a landlocked hilly country (2.597 km²) with large mixed forests in the north and a relatively urbanized area in the south, with a long industrial tradition. Luxembourg has ca 650 000 inhabitants, of which ca 20% in Luxembourg city. Population growth is relatively high. This explains an increasing soil sealing and urban sprawl. It is the wealthiest country in the EU with the financial sector being the main driving force of its economy. Shipping in the Moselle is also an important engine of the economy.

It must be noted that given the size of Luxembourg, it shares many of its water bodies with other countries and surface water bodies are mainly upstream river tributaries. The country has 6

groundwater bodies and 106 surface water bodies. Most are tributaries to the Moselle (itself a tributary to the Rhine). One upstream tributary (the Korn/Chiers) flows to the Meuse River basin. Protected areas under the Natura 2000 network represent 27% of Luxembourg's surface. The N2000 area status is reported as unfavourable or poor, but no additional water objectives nor measures are set. Trout is considered an important fish, also for tourism and sport angling. While agriculture represents 1% of the country's GDP, it covers 53% of the land use and most of the farmland is around the floodplain of the Moselle River. Livestock production (and particularly the dairy sector) accounts for 80% of agricultural profits. Forest area accounts for 36%.



Reporting

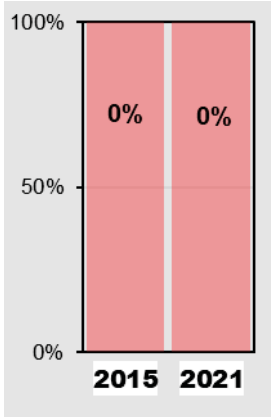
The deadline for reporting the 3rd RBMPs was in March 2022. The Commission and the EEA together with Member States developed an electronic reporting system in WISE (Water Information System for Europe). Its use was voluntary. Some Member States used it to fulfil their obligations, others reported the plans in pdf format. The cut-off date for the WISE e-reporting was September 2023 and the MS were assessed based on the datasets available by this date.

By September 2023 Luxembourg had not submitted full electronic reporting. Therefore, the assessment is based on the data mining of the pdf RBMPs.

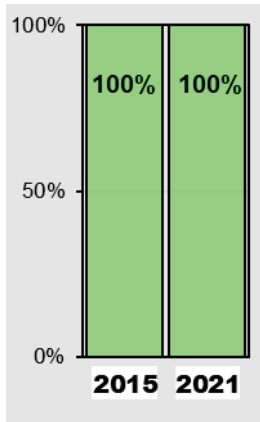
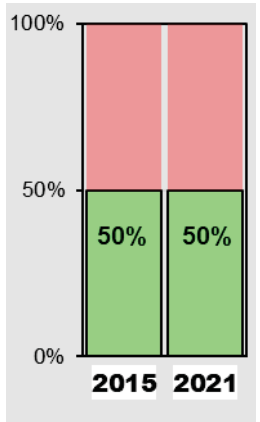
Despite the cut off dates for the production of this report, reporting continued, and, for the State of Water report, the EEA aggregated the results available by July 2024 in their products and dashboards available at WISE Freshwater web portal.

Changes in Status, Pressures, Exemptions & Measures

Surface Water Bodies (106)	Trend (% good status/potential)	Main Pressures & Changes & Exemptions						
ECOLOGICAL STATUS	<table><tr><th>Year</th><th>% good status/potential</th></tr><tr><td>2015</td><td>3%</td></tr><tr><td>2021</td><td>0%</td></tr></table>	Year	% good status/potential	2015	3%	2021	0%	<p>Since 2015, a further deterioration of ecological status is reported in Luxembourg. 0% of SWBs are expected to achieve good ecological status by 2027. The main pressures are nutrients and pesticides of agricultural origin, as well as hydromorphological pressures that affect 101 of the 106 SWBs.</p> <p>Exemptions under Article 4(4) have increased from 97% to 100%</p> <p>The apparent deterioration can be mainly attributed to improved compliance with monitoring and assessment methodologies by Luxembourg.</p>
Year	% good status/potential							
2015	3%							
2021	0%							

CHEMICAL STATUS	 <p>A bar chart with a vertical axis labeled from 0% to 100% in increments of 50%. There are two red bars, one for the year 2015 and one for 2021. Both bars reach the 0% mark on the axis. The text '0%' is printed inside each bar. The years '2015' and '2021' are printed below their respective bars.</p>	<p>The poor chemical status of Luxembourg's SWBs is mostly caused by a limited number of mainly uPBT substances, among them airborne PAHs and scrubber water discharges and air born deposition of mercury from combustion processes. Excluding these substances, still only 8% of SWBs are in good status as fluoranthene is frequent above its thresholds in Luxembourg. Cadmium and the banned pesticide cypermethrin are the main other pollutants.</p> <p>Exemptions under Article 4(4) continue to apply for all surface water bodies (100%)</p> <p>Comparing the status in 2015 to the status in 2021 is not simple since the monitoring has changed substantially. New priority substances are monitored, new thresholds were set (now stricter for 2 frequent pollutants in Luxembourg) and more RBSPs were included.</p>
-----------------	---	--

Ground Water Bodies (6)	Trend (% good status/potential)	Main Pressures & Changes & Exemptions
-------------------------	---------------------------------	---------------------------------------

QUANTITATIVE STATUS	 <table><tr><th>Year</th><th>Good Quantitative Status (%)</th></tr><tr><td>2015</td><td>100%</td></tr><tr><td>2021</td><td>100%</td></tr></table>	Year	Good Quantitative Status (%)	2015	100%	2021	100%	<p>100% of the groundwater bodies is in good quantitative status in 2021. No water bodies are reported at risk of failing good status in 2027. However, Groundwater-dependent terrestrial ecosystems (GWDTEs), relevant for 5 groundwater bodies, and groundwater-associated aquatic ecosystems (GWAAEs), relevant for 2 groundwater bodies, are not yet considered in the quantitative status assessment. Reported Natura 2000 data show mostly poor nature status. Relation of the poor N2000 nature status with dependence of associated groundwater is unclear. Risk is high that one or more concerned groundwater bodies are not in 100% good quantitative status. Furthermore, water balances are not yet used to evaluate the status.</p>			
Year	Good Quantitative Status (%)										
2015	100%										
2021	100%										
CHEMICAL STATUS	 <table><tr><th>Year</th><th>Good Chemical Status (%)</th><th>At Risk of Failing Good Status (%)</th></tr><tr><td>2015</td><td>50%</td><td>50%</td></tr><tr><td>2021</td><td>50%</td><td>50%</td></tr></table>	Year	Good Chemical Status (%)	At Risk of Failing Good Status (%)	2015	50%	50%	2021	50%	50%	<p>3 Groundwater Bodies fail to achieve good chemical status and maintain to be at risk of failing good status by 2027. This is mostly due to diffuse agricultural pollution of nutrients and pesticides. This is reflected in the top 3 pollutants in groundwater bodies, which are nitrates, a herbicide and its metabolites (metolachlor-ESA and metazachlor-ESA). Additionally, two groundwater bodies fail to pass the drinking water protected area test due to pesticides.</p> <p>LU uses exemptions under Article 4(4) (natural conditions based on a migration time study for one ground water body).</p> <p>2044 is indicated as expected date to achieve good status for these 3 pollutants. GWDTEs (for 5 groundwater bodies) and GWAAEs (for 2 groundwater bodies) needs are not considered in the chemical assessments.</p>
Year	Good Chemical Status (%)	At Risk of Failing Good Status (%)									
2015	50%	50%									
2021	50%	50%									

2. Horizontal aspects



2.1 Governance

Luxembourg has two competent authorities: the Ministry of Environment, Climate and Biodiversity responsible for enforcement and coordination of implementation and the Water Management Agency responsible for the supervision of drinking water supply and most of the other water related tasks including the preparation of the River Basin Management Plan and reporting to the EU Commission. Luxembourg reported the 3rd River Basin Management Plan as documents in July 2022 and no electronic reporting was done before the cut-off date.

Luxembourg participates since its start in the International Commission for the Protection of the Rhine (ICPR) as 97.3% of the country belongs to the Moselle-Saar sub-basin of the Rhine River Basin District (RBD). It also participates in the International Meuse Commission because of one river (0.2% of the territory) in the Meuse RBD. Luxembourg participates as a landlocked country in the OSPAR Convention for the protection of the Marine Environment of the North-East Atlantic.

It is worth highlighting that the public participation on the RBMP has been organized around several round tables with various types of stakeholders, including agriculture, energy and industry. The outcomes of such discussions led to correcting errors and contributed to adding new information, adjustment of specific measures, changes to the selection of measures and commitment to action in the next planning cycle.



2.2 Characterization of River Basin District

Luxembourg has 106 surface water bodies; all are considered river water bodies except for two reservoirs, and six groundwater bodies. This means that no water bodies are assessed as lakes, except for two reservoirs that are still in a process to be assessed as lakes. The word lake is not used by Luxembourg, but the two reservoirs are (still) to be assessed as lakes. According to guidance all Heavily Modified Water Bodies (HMWBs) with a dam can be considered lakes.

It is important to note that the very large majority of the surface water bodies are natural, and a small proportion (8, less than 9%) is considered to be heavily modified by human intervention.

Table 1. Overview of Luxembourg 's River Basin Districts (RBDs)

RBD	Name	Rivers	Groundwater bodies
LU000	Rhine	103	6
LU001	Meuse	3	0
TOTAL		106	6

Source: 3rd RBMPs electronic reporting

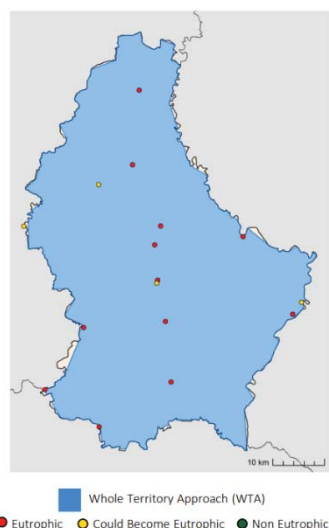
Pressures

Surface water bodies

Various significant pressures are reported as being equally responsible for the failures to achieve good ecological and/or chemical status. Diffuse pollution, point sources of pollution (industrial discharges, urban wastewater plants, historical contaminated sites), hydromorphological pressures (alteration of the riverbed, shores or riparian areas and various forms of barriers) and historic anthropogenic pressures are all reported to impact all surface water bodies.

Diffuse pollution from agriculture is identified as a significant pressure on nearly all water bodies. Luxembourg is having in 2021 a 6% coverage of organic agriculture¹, which is relatively low as 9.9% of total agricultural land in the EU is organic in 2021. The 2019 report on the implementation of the Nitrates Directive (figure 1) shows that most waters in Luxembourg are eutrophic, and the few remaining are at risk to become eutrophic.

Figure 1. Luxembourg Trophic Status reported 2019



Source: JRC Nitrates Directive reporting at NUTS level (eutrophication)

Note : 0% of the monitoring stations are above the threshold of 50mg/l

Moreover, point source and hydromorphological changes are the most significant pressures.

Luxembourg is facing also increasingly the pressure of invasive alien species (IAS), impacting the ecology and/or the economy and even the social well-being. In Luxembourg, 10 of the 21 IAS of national concern species are shellfish, fish or macroinvertebrates relevant which hamper the achievement of good ecological status. The Asian clam (*Corbicula fluminea*), Zebra mussel (*Dreissena polymorpha*), killer shrimp (*Dikerogammarus villosus*) and Japanese knotweed (*Fallopia japonica*) are included. Another sign of a pressure is the disappearance of native freshwater mussels that have a key role on improving water quality. Indeed, of the former seven species found in Luxembourg, two species are now considered extinct in the wild. Fortunately, the situation has improved in recent years. The highly protected thick shelled river mussel (*Unio crassus*) has recovered slightly, so this pressure might be decreased in time and the projects such as the LIFE Unio Project (www.unio.lu) has certainly contributed to an improvement of this species in the river Our.

¹ [Developments in organic farming - Statistics Explained \(europa.eu\)](https://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&plugin=1)

Groundwater bodies

A similar situation is depicted here, whereby the most significant pressures were diffuse pollution from agriculture (nitrates and pesticides) and from local pollution (contaminated sites).

Luxembourg did a good analysis setting up thresholds of significance for almost all identified pressures to establish what constitutes a significant pressure. Thus, the Plan indicates the pressures which are so significant that they are likely to prevent achieving the environmental objectives. On that basis, by 2027, Luxembourg does not expect to reach good status for all its surface water bodies and expects no significant improvement for the three groundwater bodies that were not in good status in 2021.

3. Policy elements contributing to biodiversity and climate change adaptation



3.1 Surface Water: what is their ecological status or potential

Monitoring

Surface water monitoring is undertaken every four weeks at 17 locations in 16 % of the surface water bodies. These sites include the 3 surveillance monitoring sites and the 14 operational monitoring sites. Operational monitoring is done to determine the status and covers all water bodies at risk and surveillance monitoring based on sufficient representative monitoring sites is aimed rather at identifying impacts and long-term changes.

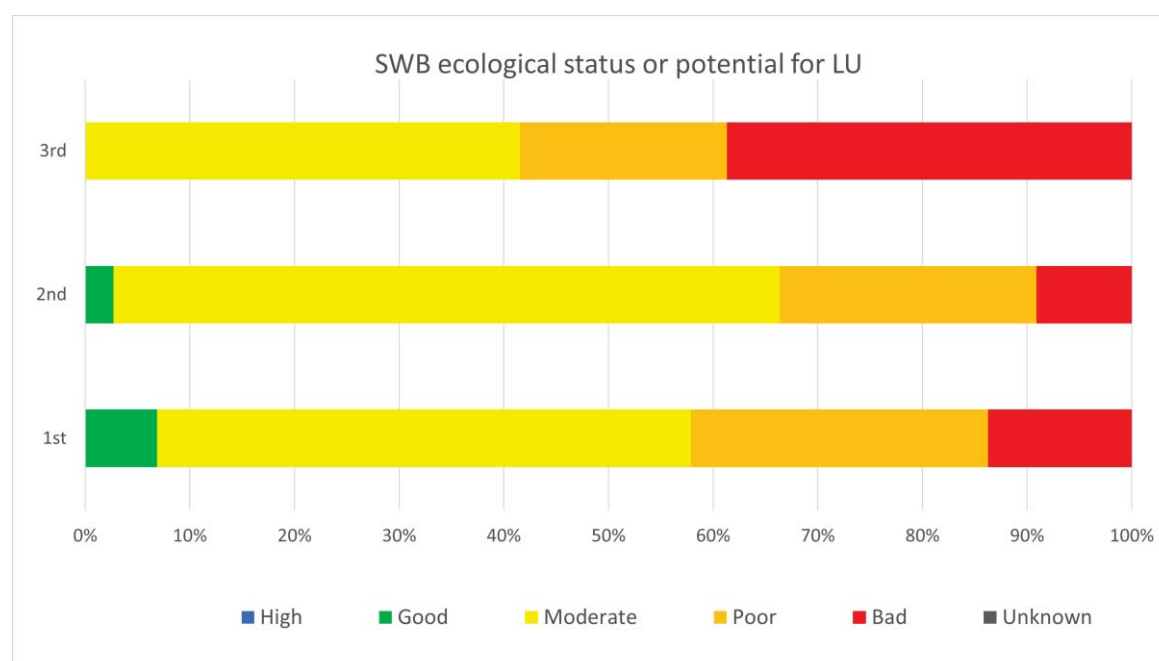
The low proportion of covered water bodies entails that the rest of the water bodies are appraised through extrapolation, modelling and grouping approaches. Hence there is a significant reliance on grouping, extrapolation and/or modelling for the assessment of status of surface waters.

It is worth praising that in this Plan Luxembourg has increased the number of parameters monitored and included in the assessment of the status: namely water hardness and impacts on bioavailability of metals and in some locations also biota (largely based on fish), and suspended sediments at one location, in order to support the international work of the Rhine Commission. The increased number of parameters checked and increased frequency in monitoring physico-chemical quality elements may have had an impact on the lack of significant positive progress. Luxembourg informs that the 3rd RBMP provides information on the methods used to assess the reliability and accuracy of the ecological status classification. However, detailed results on the robustness of the assessment are not provided.

To assign different classes to a water body, clear thresholds are needed for the poor, moderate, good and high ecological status based on the various biological quality elements (e.g. snails, worms, dragon fly larvae, nematodes, daphne, fish, water plants, algae) that are expected to be present. But the supporting conditions for these life forms, i.e. physico-chemical quality elements (e.g. temperature, presence of O₂ in the water, nutrients, transparency) and River Basin Specific Pollutants are co-determining the ecological status of the water bodies. Reference conditions must be set for good status, underpinned by similar ecologically healthy natural water bodies having high and good status. Luxembourg established these reference conditions for various groups of aquatic life (water plants, fish, etc) for their five river types and also adopted the thresholds set by Germany for one group of aquatic life (phytobenthos = algae) that is not frequent in Luxembourg's rivers.

Figure 2 illustrates the evolution of the ecological status /potential of the 106 surface water bodies between the 1st, 2nd, and 3rd RBMPs. It shows that from the 2nd RBMP to the 3rd RBMP the few water bodies in good ecological status (or potential) lost this quality (from 3 % to 0 %). In the 3rd RBMP, roughly almost half of water bodies are in moderate ecological status and over a half is even worse (41 % in moderate, 20 % in poor and 39% in bad ecological status². All added, this means regrettably, that 100% of the water bodies are in less than good ecological status (or potential). This failure to reach good ecological status is mostly due to diffuse and point source pollution, producing high amounts of nutrients and thus causing the eutrophication of all water bodies in Luxembourg. The new plan includes now a more accurate and WFD-compliant delineation of the water bodies that no longer makes a distinction (as it was in the previous cycles) between the upstream part of certain streams that were showing good status and the downstream part. This change in methodology entails that the newly combined water body is not qualifying for good ecological status anymore. While there seems to be an overall deterioration for the third cycle, it needs to be noted that this may be due, at least partially, to the increase in diversity of monitored quality elements and the frequency of the monitoring since Luxembourg improved their monitoring substantially. Another reason that could partially explain the lack of progress is the new delineation methodology mentioned above.

Figure 2. Ecological status or potential of surface water bodies, as reported in 1st, 2nd and 3rd RBMPs



Source: WISE electronic reporting

² Numbers are based on pdf data mining of the RBMP



3.2 Hydromorphological changes and artificialization (HMWBs and AWBs)

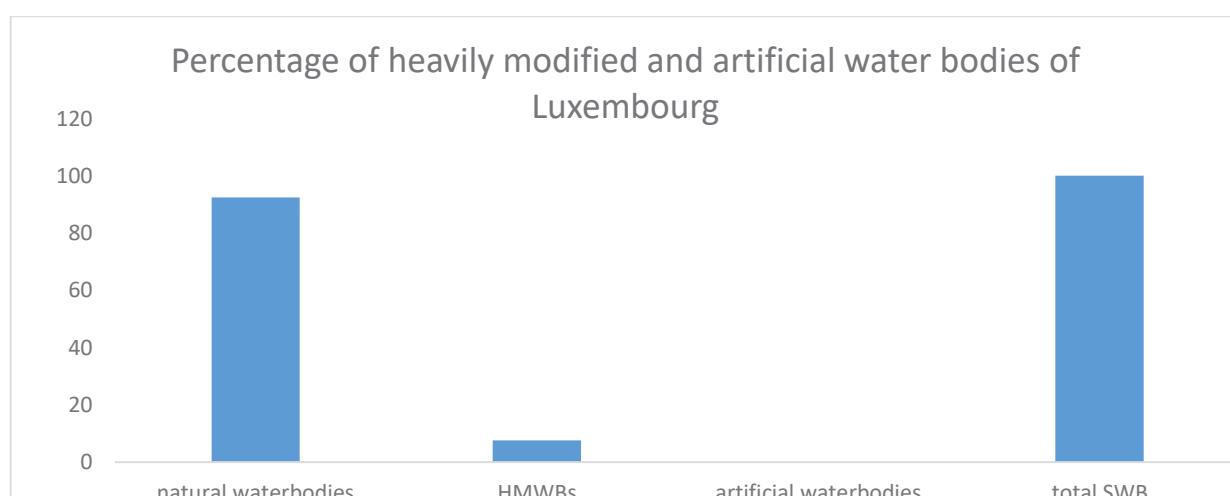
The level of human intervention in the water systems is quite low as can be seen in the table below.

Table 2. Modifications of surface water bodies (2021)

Modifications	Rivers	Lakes
HEAVILY MODIFIED (8 SWBs, 7% out of all SWBs)	6% (6 HMWBs preliminary assessed as natural rivers)	1% (2 reservoirs HMWBs are under study to get a GEP)
ARTIFICIAL (total 0%)	0%	0%

Out of the 106 surface water bodies, 98 are designated as natural and eight are designated as heavily modified. Despite of their designating, six HMWBs are being assessed on the base of thresholds set for “natural rivers” and classified to good ecological status (and not potential). The two remaining HMWBs considered as (hydroelectricity) reservoirs, are still in a study process for getting their Good Ecological Potential (GEP) defined. The Dutch approach was used in a study to establish a GEP for all HMWBs. The selection and implementation of targeted measures should subsequently enable this GEP to be achieved. However, during its application for the 3rd Plan, it turned out the Dutch method was not fit for the circumstances in Luxembourg. As a result, assessment used the natural river water body assessment. Just as it was the case for the 2nd RBMPs, eight water bodies are considered heavily modified water bodies because of dams (Mosel, Sauer and Our), shipping (Mosel), construction (all HMWB) and urban development (Alzette, Chier. Didelengerbaach). To be noted that urban developments and constructions are more frequently the cause of modifications than hydropower.

Figure 3. Percentage of heavily modified and artificial water bodies



Source: datamining 3rd RBMP

All Luxembourg's heavily modified water bodies are considered to belong to the river category by Luxembourg, while a HMWB may according to reporting guidance should be delineated as a lake or reservoir and the two hydroelectricity reservoirs certainly do not function as rivers. Hydrological and morphological alterations (changes in flow, lateral and transverse barriers, etc.) are for the first time integrated in the assessment for ecological status in the 3rd RBMP. None of the HMWBs have good ecological status/potential in 2nd RBMP nor in the 3rd RBMP and Luxembourg does not expect them to reach a GES/GEP in 2027. All of the HMWBs are classified on the basis of the biological quality elements (like water plants, fish, crayfish) sensitive to hydro morphological alterations and these are monitored and have at least one operational monitoring point per HMWB.

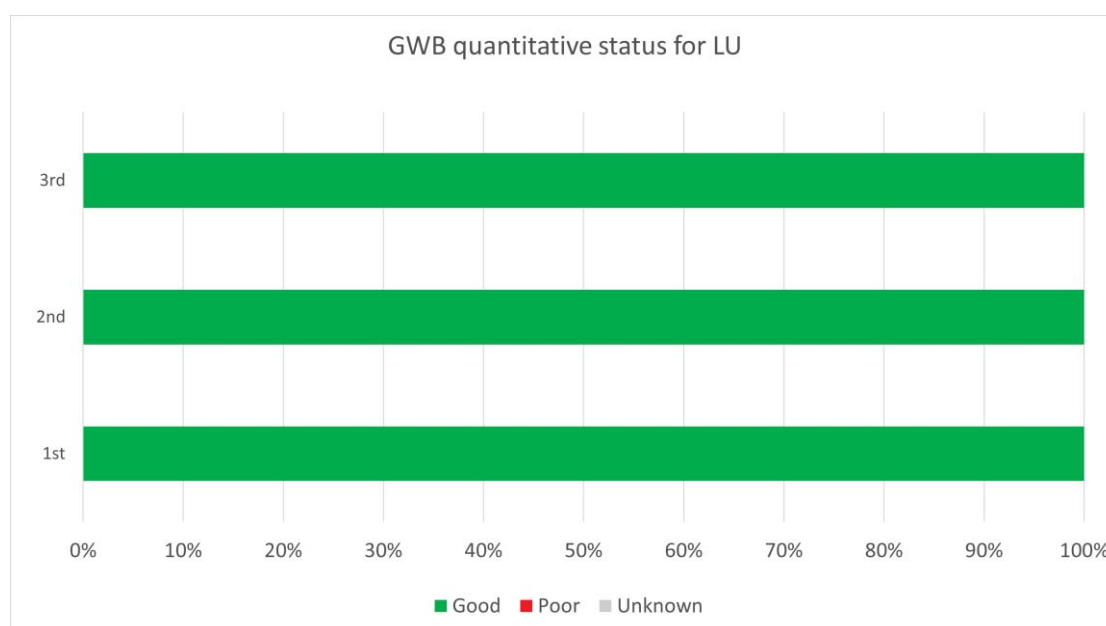
For 28 surface water bodies (14%) there is not enough flow in the river to have good functioning water life and options for human use of the water downstream (minimum ecological flow). This is mentioned as a cause for 28 water bodies to not achieve good ecological status.



3.3 Groundwater bodies - have they sufficient water – quantitative status

It is positive to note that the levels of all but one of the groundwater bodies are monitored, and that when including expert judgement, they all have good quantitative status as shown in the graph below. For the groundwater that is not yet monitored, its status is assessment has moderate uncertainty.

Figure 4. GWB quantitative status



Source: WISE electronic reporting

It is noted with concern that the status assessment does not yet consider the necessary water needs for the ground water associated ecosystems (GWAAEs) in the water (this is relevant for 2 groundwater bodies) and the groundwater dependant ecosystems on the land (GWDTEs) (this is relevant for 5 groundwater bodies). As N2000 network is occupying a considerable share of the territory, this is an important element that is missing. According to the N2000 monitoring data the protect habitats and species in Luxembourg are not in a favourable conservation status, though this is not making yet a direct link with groundwater availability. The RBMP states that studies are underway to determine the groundwater related needs of the ecosystems that are possibly not in good conservation status

because of lack of sufficient groundwater. This River Basin Management Plan does not yet include water balance calculations, but this is now programmed by the end of the 3rd River basin Management Plan (2021-2027). Despite the missing insights, that present risks for a decreased quantitative status in 2027, Luxembourg expects to maintain the good quantitative status of all groundwater well beyond 2027.



3.4 Protected Areas (identification, monitoring, objectives and measures)

There are different types and reasons why certain water bodies are protected under the law. For surface water bodies, protected areas have been designated under the Drinking Water, Bathing Water, Habitats and Birds Directives as well as for areas designated for the protection of economically significant aquatic species (e.g. aquaculture). Several areas have been designated. We note with concern, that this Plan has a small reduction of number of protected areas compared to the previous plan.

The country has designated 45 protected areas for the purpose of drinking water abstraction. Only one of those is in a surface waterbody. The others are in five groundwater bodies (in a total of six). The protected drinking water areas include mandatory and voluntary measures, including a ban on specified pesticides, that are currently being implemented. The designation of drinking water related protected areas is not yet fully completed. After the first five protected areas for groundwater regulated in 2015, 39 more have been delineated over the years until 2022. Luxembourg relies almost entirely on groundwater for its drinking water supply. Indeed, there are now 45 drinking water protected areas, out of which only one is related to surface water. It is worth noting that these 45 areas cover around 80% of the relevant area necessary to protect the source of drinking water production. The area around an abstraction point to produce drinking water is divided in several zones: the core being the part where only activities related to the abstraction and maintenance of the infrastructure is permitted. Around the core, there are zones where the application of fertilisers and pesticides are prohibited. The voluntary measures focus on the existing activities in the newly designated protected areas with a special focus on agriculture. As the protection of the drinking water protected areas is relatively recent, no change in status of the water bodies is noted.

There are 18 bird protection sites designated under the Birds Directive and 48 sites designated under the Habitats Directive. The share of surface water bodies that are relevant for these protected habitats and species is not clear in the Plan. The Plan indicates that the conservation status of all water-dependent habitats and species is unfavourable and, in some cases, even poor. Since Luxembourg considers that achievement of a good ecological status is sufficient to meet the requirements of the Birds and Habitats Directives, no additional objectives have been set. The Plan indicates that measures related to water bodies and ecosystems dependent on groundwater are developed jointly between the nature and forest administration and the water management administration and thus possible conflicts in objectives can be addressed from the start. As mentioned earlier, the quantitative and qualitative status of groundwater bodies does not consider the water needs for depending sensitive ecosystems. As regards bathing waters, Luxembourg indicates that two additional bathing areas are in the process of being designated, on top of the three areas already designated in the 2nd Plan and maintained in the 3rd Plan. The process of designation has not been completed because the monitoring for these new bathing areas only started in 2020. The status of bathing waters has been found to be excellent for all twelve monitoring stations in the existing three bathing areas. There is one more monitoring point for these areas since the 2nd Plans.

The entire country is designated as sensitive area under the Urban Wastewater Treatment Directive and as Nitrates Vulnerable Zone under the Nitrates Directive. It is worth noting that all surface waters having problems with high concentrations of nutrients or at risk to be eutrophic as will be touched upon later in the measures to combat diffuse pollution. The challenge now is to maintain and to keep up with the population growth.



3.5 What is being done to prevent/reduce hydromorphological pressures

The 3rd RBMP includes 2,133 measures related to hydro morphology. Of those 231 measures are being implemented and 1,902 are listed as possible measures. Out of those that are started, 77 are described as implemented in the RBMP during the 2015-2021 period. Half of these 77 measures are focused on restoring ecological continuity (fish ladders and establishment of near natural flow regime). There are 3 new basic measures implemented from 2021 concerning the assessment of the present hydrological regime, restoration and securing near natural flows and restoration and securing of near natural water balances; but no methodology to define near natural flows, or balances is reported yet nor is a clear link to permitting integrated.

Particularly highlighted is the renaturalisation of the River Pétrusse, co-funded by the EIB, listed as an example of a measure that is currently being implemented to tackle hydro morphological pressures. Canalized in the 1930s, this stream goes through the city of Luxembourg. Renaturalisation will help reducing the flood risks, increase biodiversity and help in climate change adaptation of the city's atmosphere.

Furthermore, Luxembourg introduces measures to reduce the flow rate during floods and increase the infiltration capacity both of which are beneficial for reducing further pollution in the catchment area. Flood-reducing measures in rural areas can achieve multiple synergies with other policy objectives, such as soil protection through erosion reduction or reducing low water levels through increased retention and infiltration. Other measures include removing bed and bank protection and restoration of floodplains.

All impoundments and other crossing structures are now included in the hydro morphological monitoring carried out for the improvement of the assessment for ecological status. It is still unclear if this is going to have repercussions in permits or measures. Information (e.g. using CIS Guidance), how e-flows have been derived and implemented on ecological flow was announced in the 2nd RBMP but is not identified in this plan. Furthermore, the implementation of measures related to hydro morphology remains low and the analysis of gaps to be closed is missing.

Luxembourg decided in 2023 to renew all permits, even those that had no limited time of being valid. In the updating, the latest insights regarding necessary steps to reach good ecological status are included. In the RBMP, this is already mentioned as under discussion. On the other hand, the WFD objectives have been taken into account in the design of new and existing structural measures, such as flood defences, storage dams and barriers in both RBDs for the future.

The mitigation measures for the two reservoirs in the Sûre and in the Our are linked to the identified pressures but are limited by the need to preserve their use for hydroelectricity. The elaboration of these measures implies the involvement of economic and energy technology experts to ascertain the costs and ensure that the measures maintain the mode of operation. The HMWB of the Moselle (mainly related to shipping and urban developments) is in the meantime also the subject of a feasibility study to identify the pressures and the possible mitigation measures. Conclusion is that

Luxembourg is finally setting more emphasis on assessing and mitigating hydro morphological pressures, however, the two reservoirs which are heavily modified because of hydropower are still not assessed in a definitive way and have no defined good ecological potential including the mitigation measures considered feasible. For the six other HMWBs with modifications related to shipping and urban developments or constructions, the ecological potential has not yet been assessed. These six are assessed preliminarily as natural rivers. The options to improve the status of these water bodies and the way they are managed in relation to ecological continuity and e-flow on the one hand and the maintaining of the other functions they serve, are not clear yet. It remains unclear whether achieving the (still not defined) objectives for these water bodies in 2027 will be possible.

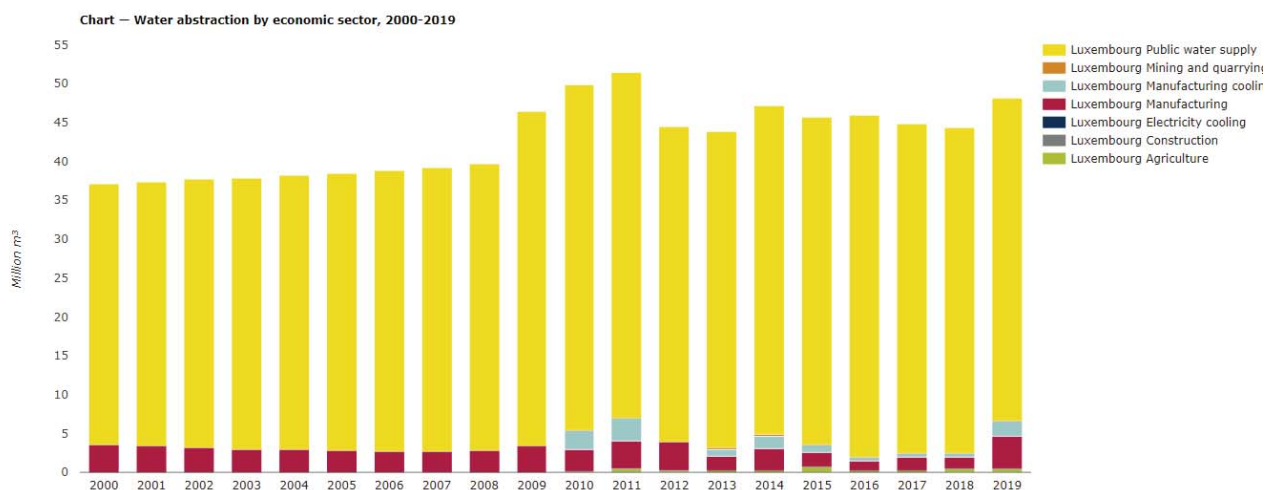


3.6 What Luxembourg is doing for abstractions and water scarcity

Water scarcity is not recognized as an issue at the national level and water abstraction from the groundwater is locally significant only for one groundwater body in the Rhine RBD. This is rather normal for an upstream country receiving enough rains but given the long-lasting international collaboration in the international Rhine and Meuse districts, transboundary issues could rise to influence Luxembourg, because of downstream needs. Luxembourg delineates the groundwater bodies exactly on the borders, while hydrology continues and is subject to bilateral cooperation. This could call for enhanced transboundary cooperation as regards chemical pollution and quantitative aspects.

Relevant basic measures for the control and management of water abstraction and impoundments, as well as water efficiency measures in all sectors were implemented since the previous cycles. Luxembourg conveys that the introduction of higher drinking water prices in 2010 immediately showed results.

Figure 5. Water abstraction by economic sector



Source: EEA WISE Water abstraction by source and economic sector in Europe, June 2022

As regards the review of permits for abstractions, authorizations, given by the Minister since 2019, are valid for a maximum period of seven years. Authorizations for groundwater issued since 2015 are limited in time and are valid until December 2024 at the latest. Luxembourg has pre-established inspection plans for groundwater abstractions, unexpected inspections for surface water. These

inspections do not guarantee a review of the authorizations more frequently than once every seven years. Luxembourg stresses that the water law explicitly allows for Authorities to review when deemed needed. The various authorizations specify the maximum flow rates that can be taken, and which have been determined based on the results of pumping tests. Regarding the authorizations issued before 2015 (not limited in time), Luxembourg is having internal discussions currently concerning the option of legislative modification of the water law, that enables to invalidate or review the authorizations issued to ensure that the sum of abstractions does not jeopardize the quantitative status of groundwater bodies. Increase of awareness on water abstractions is growing also due to the increasing population. From January 2023 agricultural abstractions from surface water are to be registered and water metering for all sectors is introduced in the planned new permits. By end of the 3rd RBMP period, Luxembourg has the intention to calculate water balances instead of using only old data.



3.7 Adaptation to climate change

Just as it was the case in the previous cycle, no waterbody is identified as being particularly hit by the impacts of climate change. Considering the close relationship between overall water management and floods management and the importance of climate change effects on both, climate change effects are jointly addressed in this section.

Flood management

Luxembourg considered initially climate change impacts in 2014, at the time of the first preliminary flood risk assessment; there was no new mention of climate change considerations in the second PFRA.

The second FRMP indicates that potential changes in flood risk as a consequence of climate change have been taken into account in protection measures, but further details are not provided. The FRMP refers to coordination with the National Climate Change Adaptation Strategy 2017-18, with some common measures to both. Climate change is also considered in the design of technical measures. The FRMP provides information³ on how climate change is affecting Luxembourg, based on research carried out in the last 15 years. It is assumed that in the future, Luxembourg's annual amount of precipitation will remain constant, but distributed differently across the year, i.e. more precipitation expected in winter and less in summer, with the intensity of precipitation increasing in summer. Heavy rain⁴ is considered⁵ a key risk for future flooding in the context of climate change. Given the remarkable increase in heavy rain events, Luxembourg's water management agency drew up a heavy rain strategy⁶ in autumn 2018.

In July 2021 Luxembourg also had to evacuate dozens of people because of heavy rains causing flash floods that caused fatalities and had heavy impact in Germany, Belgium, and the Netherlands. The material damage of the flooding was significant in Luxembourg, but no fatalities were reported in Luxembourg⁷.

³ Chapter 6.11.

⁴ This could be referred to as flash floods.

⁵ Chapter 6.12.

⁶ AGE, Starkregenrisikomanagement in Luxemburg von Starkregengefahrenkarten zum integralen, kommunalen Maßnahmenkonzept, n.d., https://enquetes-download.public.lu/enquiryFile_1680/Anhang_1_Starkregenrisikomanagement_in_Luxemburg_aktualisiert.pdf

⁷ [Luxembourg – Dozens Evacuated After Record Rainfall Causes Rivers to Break Banks – FloodList](#)

Studies have been conducted, including, by means of a pilot project, to ascertain potential effects of heavy rain events on fluvial flooding (flash floods), even if this source is not yet considered as significant.

Droughts and water scarcity management

Drought is not considered as a current challenge in Luxembourg, but nevertheless they are planning to develop a drought management plan. To this end there is a national working group integrating irrigation agriculture actors (Waasserdësch) and there are several pilot projects dealing with water availability issues for that sector. In addition to that, there is a technical working group on e-flows. It is worth noting that the 3rd River Basin Management Plan integrates water-related climate change adaptation considerations and possible future measures defined in the National Climate Change Adaptation Strategy in the Program of measures. This is done with the intention to improve or maintain the present status, but also to enhance resilience against natural disasters (floods). These measures are climate-proofed and focused on securing quality and quantity of surface water, and quantity of groundwater.

Yet the 3rd river basin management plan does not seem to contain a detailed analysis of future climate change impacts on water balance. However, a project is planned in 2024 and 2025 to identify climate change induced changes on water balance, discharge, and water temperature for the near and for the far future.. This project will help to detect possible future climate change-based impacts on the water bodies and develop adaptation measures.

4. Policy elements contributing to zero pollution



4.1 Surface Water: what is their chemical status

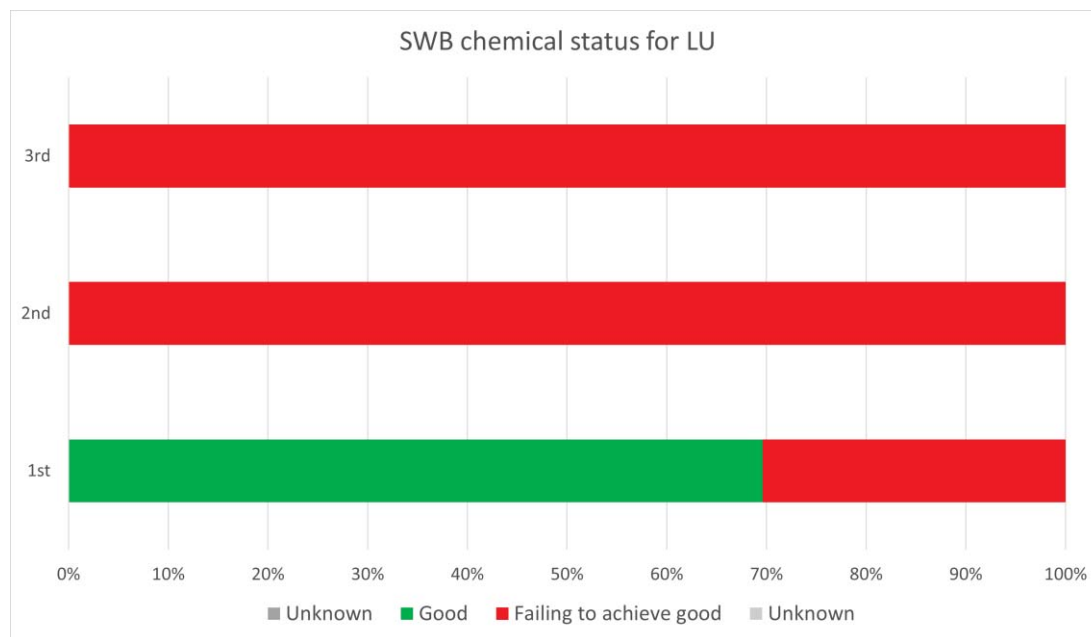
Monitoring

Luxembourg reports that a dedicated monitoring network is in place to meet the requirements of the WFD that includes monitoring for all priority substances. However, due to analytical and economic constraints, for the period 2015 -2020, only 24 out of 45 priority substances were monitored. In terms of approach to monitoring strategies, surface water monitoring is undertaken monthly at approximately 10 % of the water bodies with grouping and extrapolation used to determine chemical status for the remainder. Luxembourg indicates that for 16% of the surface water bodies monitored the assessment featured a high confidence of the chemical status. For the other 84%, which were assessed by using extrapolation and grouping through modelling, the level of confidence was medium.

Status Assessment

All 106 surface water bodies are in poor chemical status. Figure 6 shows the evolution over the different cycles.

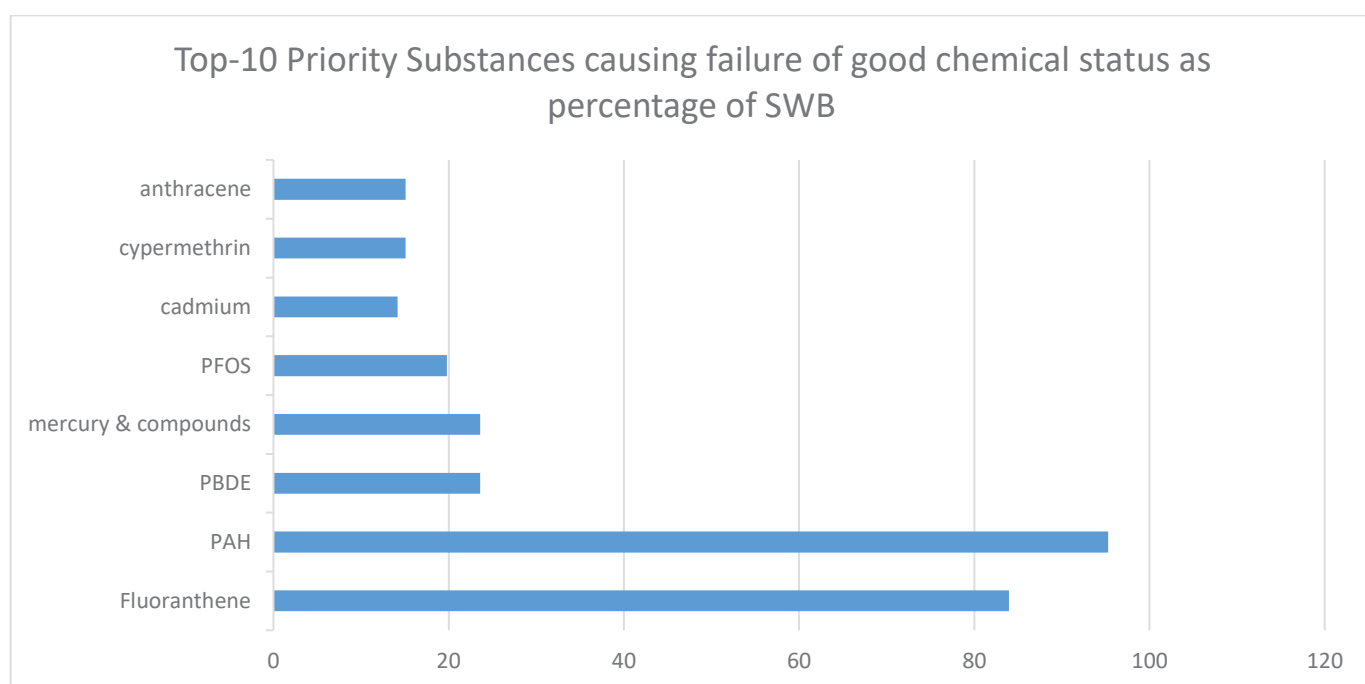
Figure 6. SWB chemical status



Source: WISE electronic reporting

This is partly due to a small number of a group of substances that are present everywhere in some concentration, because they are also transported far as air-pollution, before coming in the water system through rain or dust deposits (uPBT). If ubiquitous substances were not taken into account, 8% of the surface water bodies would be in good chemical status. In 2015, this number was 10%. A reason for that is the significant presence of fluoranthene which is not a uPBT but which has a very strong impact on the good chemical status in the 3rd RBMP. Figure 4.2 depicts which ones are the substances causing the highest numbers of failures (mercury and brominated diphenyl ethers, PAH and fluoranthene but also cadmium, PFOS and the herbicide cypermethrin).

Figure 7. Top-10 of water polluting substances causing failure to achieve good chemical status⁸



Source: datamining PDF 3rd RBMP



4.2 Groundwater Bodies: what is their chemical status

Monitoring

All of the groundwater bodies are subject to surveillance monitoring. The 31 surveillance monitoring sites have not changed between the three RBMPs. The WFD monitoring network has recently been reviewed and adapted to include 38 monitoring sites, to be used from 2021 onwards. These sites are also part of the operational network. Monitoring includes all the substances listed on Annex I and Annex II of the GWD.

Status Assessment

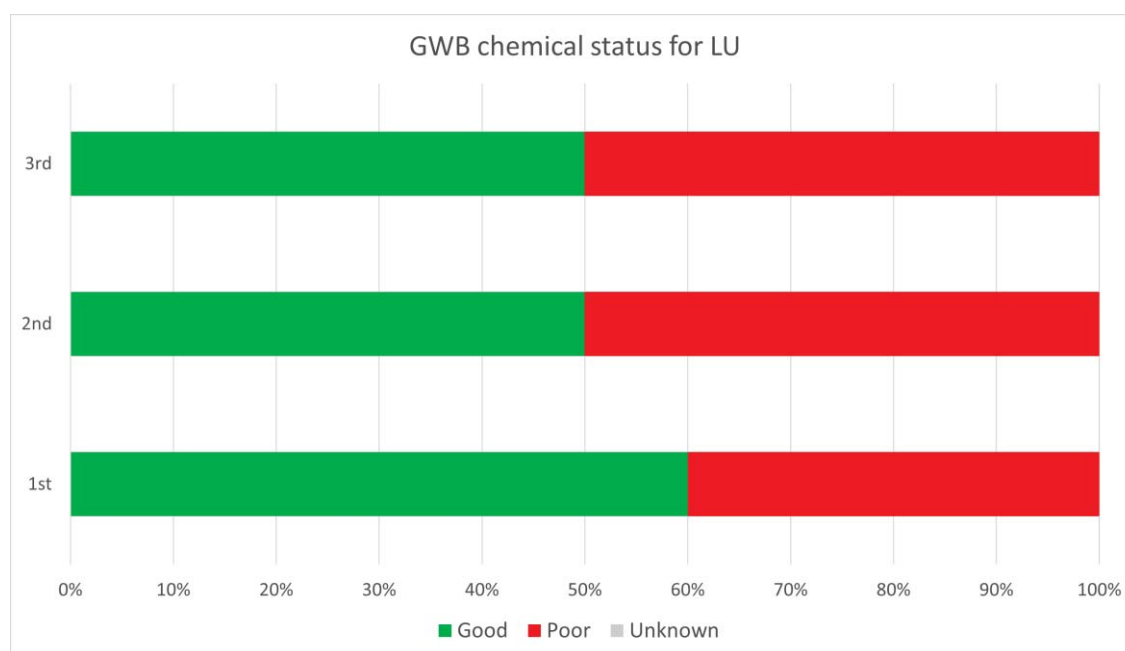
It is a source of concern that 50% of the groundwater bodies (which represent 79% of the area of groundwater bodies) are in poor chemical status because of nitrates and pesticides. A significant deteriorating trend has been identified for the Devonian groundwater body in the North and for the chemical substance metazachlor-ESA. Given the groundwater residence times estimated, the status for the other five groundwater bodies therefore is expected to remain the same.

The assessment of the chemical status of groundwater bodies has not taken into account the needs of nature (Groundwater Associated Aquatic Ecosystems, or GWAAEs) due to the lack of information. Similarly, five of the six groundwater bodies are linked to Groundwater Dependant Terrestrial Ecosystems (GWDTEs), but a lack of understanding of the influence of groundwater quality on their poor condition meant that this has not been considered in the chemical status assessment. Although there was an engagement to do this assessment for the 3rd RBMP, this is still lacking. This seems to

⁸ These Priority Substances include the PS added in 2013. LU included them in their chemical status assessment, in spite of the fact only monitoring was obligatory.

be now envisaged for the 4th RBMP. The following figure shows the evolution of groundwater chemical status as reported in 2009, 2015 and 2021 RBMPs.

Figure 8. GWB chemical status



Source: WISE electronic reporting



4.3 What Luxembourg is doing to combat pollution from agriculture

The RBMP does not include the gap to target by 2027 for the necessary reductions of N, P or pesticides. Thus, the plan does not include an estimation of the necessary contribution by agriculture to the reduction of nitrogen and phosphorous, although the meat and dairy sector contribute to 80% of the agricultural profits. This also holds true for the necessary reductions in nutrient (N/P) pollution in the flow of surface water from Luxembourg towards the various neighboring member states, participating in the International Rhine and Meuse Commissions. The Programme of Measures includes, in addition to the measures of the Nitrate Action Plans, a list of voluntary agricultural measures (supported under the Common Agricultural Policy) to reduce diffuse pollution. In the CAP Strategic Plan⁹ for the period 2023-2027 it is planned that 92% of LU's agricultural area will be covered with commitments to protect water quality, 91% of the agricultural area will benefit from support for sustainable nutrient management, and 36% of the area will be covered with commitments for the sustainable use of pesticides. The EU average for such support is 21%, 15% and 27% respectively. In the 3rd RBMP LU is reporting voluntary CAP 2023-2027 measures targeting of the agriculturally used land Luxembourg notes that in the 2nd period for the WFD (2015-2021) the uptake of farmers of voluntary measures under de CAP 2014-2022 ^[OBJ] Luxembourg intends to apply

⁹ "Mapping and analysis of CAP strategic plans" (2023-2027) the link [Mapping and Analysis of CAP Strategic Plans - European Commission \(europa.eu\)](https://ec.europa.eu/eip/agriculture/en/mapping-and-analysis-of-cap-strategic-plans)

more control and higher financial incentives to increase the voluntary uptake and achieve more agricultural reduction of pollution.

Luxembourg included a WFD payment intervention in its CAP Strategic Plan to compensate farmers for the reduced yields related to the ban of the use of a selected set of pesticides in drinking water protected areas. There are six relevant CAP eco-schemes and agri-environment climate (AEC) interventions to limit nutrient and pesticide losses. One of the AEC interventions supports farmers which move to less intensive livestock systems (i.e. reduction of livestock density by at least 15% within the first three years). Luxembourg states that most agricultural measures, both mandatory and voluntary, are paid by the agricultural sector or from CAP funding. Luxembourg flags that some of the measures proposed in the 3rd RBMP, could not be integrated in the CAP Strategic Plan but that discussions on the topic continue.

Luxembourg also mentions the development of tools for a leaching risk-based approach to assess agrochemical release to waters.

There is no information about the effectiveness of the voluntary agricultural measures in the Plan.



4.4 What Luxembourg is doing to combat pollution from other sectors

Luxembourg indicates that most chemical pollutants causing failure are diffuse pollutants coming from air depositions (also coming in from great distances) and thus concludes that there are no possibilities to reduce these pollutions at the source through the River Basin Management Plan's measures.

Luxembourg reached fully implemented the Urban Wastewater Treatment Directive in 2018, so wastewater has been another important source of nutrients (N and P). Luxembourg programmed 1269 measures related to the management of urban wastewater and its treatment in the 2nd RBMP. The Plan states that a little more than 60% of these measures have been implemented and around 350 urban wastewater management measures are in progress. It is stated that the rest of the measures are part of this 3rd plan. There are no details of how many measures are expected to be fully implemented by the end of the 3rd planning period. The use of an authorization and/or permitting regime to control wastewater point source discharges is reported for surface and groundwater in both RBDs. Wastewater treatment plants are subject to registration in an internal register and, when meeting the reporting thresholds, in E-PRTR. This is due to the fact that in Luxembourg all discharges from wastewater treatment plants irrespective of size are all subject to a discharge permit. Some direct discharges to groundwater are authorised in accordance with the law in both RBDs in Luxembourg.

Luxembourg still has a few production sites of a steel group but had important steel industry in the past (till 1997)¹⁰ which has certainly contributed to the nitrogen pollution in the country. The high levels of traffic and road transport probably contribute also to the nitrogen pollution.

Mercury and PAHs are closely related to combustion of wood at homesteads (close by) or biomass, lignite, and charcoal energy production. Reduction of these emissions through measures at the Member State level do exist like stimulating the reduction in combustion of fossil fuels.

¹⁰ [The steel industry and Luxembourg - Luxembourg \(public.lu\)](#) and [The transformation of ARBED: 1973-2001. A European business and labour history \(TransARB\) - C²DH - University of Luxembourg I Uni.lu](#) and [ARBED - Wikipedia](#)

It needs to be stressed that the plan does not include a gap analysis on distance to target for pollutants from non-agricultural sectors. Without a proper assessment of the effort to be made, the choice of measures for these other sectors is made more difficult.



4.5 What Luxembourg is doing to combat significant pressures – overall assessment of the Programmes of Measures

The absence of clear gaps analyses and absence of information about the effectiveness of the earlier programmed measures do not allow to conclude if the programmed measures are sufficient to bridge the gaps. The links between the Key Type Measures and pressures do not appear explicitly present in the RBMP documents although the Plan describes a detailed process of measure selection based on knowledge of pressures. This plan has added a focus on the identification of significant pressures for morphological alterations and modifications of flow regimes through abstractions or regulations of the flow. Consequently, the plan includes measures to mitigate or compensate these alterations. The Cost Effectiveness Analysis is mentioned in the RBMP, but the Plan does not clarify how the evaluated cost effectiveness is used to select and prioritize measures. The funding does not seem to be a barrier for the implementation of the measures. The percentage of measures which are new compared to the 2nd RBMP (to ascertain how much of a business-as-usual approach has been taken) remains unclear.

5. Exemptions and economics



5.1 To what extent are exemptions applied in Luxembourg

In the second cycle, 97% of surface water bodies were exempted from good ecological status. This has increased to 100% in the third cycle. This means that all surface waterbodies are exempted from achieving good ecological status in the country.

As it was already the case for the previous cycle, 50% of the groundwater bodies are subject to exemptions pursuant to Article 4 (4) of the WFD as regards chemical status.

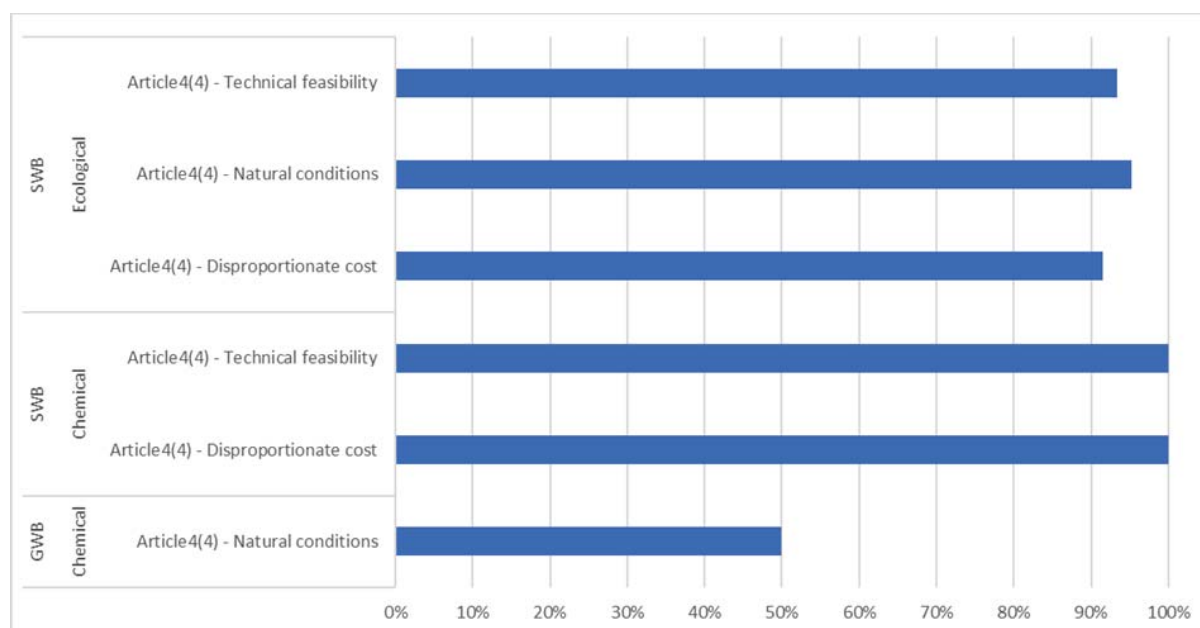
On grounds of technical feasibility, 99 of the surface waterbodies are subject to reach less than Good Ecological Status (GES)/Good Ecological Potential (GEP) and all the 106 surface waterbodies (100%) to subject to reach less than good chemical status.

On grounds of disproportionate costs, 91,5% of the surface waterbodies are exempted from achieving good ecological status. Whereas natural conditions are evoked to justify that 101 surface waterbodies are not achieving a GES/GEP and for 106 SWB to achieve a less than good chemical status).

This means that a significant number of water bodies benefit from more than one exemption.

For groundwater, natural conditions are evoked as a reason not to achieve good chemical status for 50% of the water bodies. Natural conditions underlying the exemptions concern natural hydrogeological conditions and the long time needed for the re-establishment of flora and fauna. Technical feasibility refers to a lack of, or insufficient information on, the cause of the problem or the absence of an appropriate technical solution. Disproportionate costs refer to affordability, benefits to be achieved versus consequences of non-action, distribution of costs, social and sectoral impacts, and other reasons.

Figure 9. Type of exemptions reported to be applied to surface water and groundwater bodies for the 3rd RBMPs



Source: 3rd RBMP data mining

It is seen positively that for each water body there is a reasoned justification based on a transparent set of criteria. However, only for one groundwater body Lower Lias a specific study on residence times is provided to underpin the natural conditions justification. There are no further specific references to individual water body studies included in appendix 15 and 16 to specify in more detail, as required by the WFD, natural conditions involved, or the technical feasibility, or the disproportionate costs. Moreover, the detailed underpinning studies are not referenced.

It is noted in the plan, that there is no intention to set lower environmental objectives for these water bodies, but rather to achieve environmental objectives after 2027. In their view, all measures which, according to the current state of knowledge, are needed to achieve good status/potential, are already provided for in the program of measures. It is clear however that not all measures will be implemented by the end of 2027. This approach is referred to as 'water bodies with special regime' and is based on maintaining the environmental objectives of the WFD but acknowledging that it will take longer to achieve these objectives. This approach might not be compatible with the WFD. After 2027, exemptions under Article 4(4) may only be possible if justified on the basis of natural conditions, i.e. where it can be demonstrated that all measures are in place and implemented prior to the end of the third cycle (end 2027), but that nature takes more time to recover.

For all exempted water bodies, programs of measures are in place, with a clear timeline and estimated costs of measures. However, the timeline goes beyond 2027. Where the latter cannot be justified by 'natural conditions' (i.e. measures will start to be implemented before the end of 2027, but 'nature takes more time to recover'), this will not be compatible with the WFD, which only provides for such time extensions up to the 3rd RBMPs, namely until end 2027.

No exemptions according to Article 4(7) have been applied. The plan notes that the use of this type of exemption may become relevant in the future in light of new development activities and sets out principles for applying this type of exemption but without laying down specific set of application criteria. This may point to an under-implementation of the requirements of Article 4(7) according to

which any new project potentially affecting water body status should be assessed upon its impacts and, where so required because of potential deterioration or preventing the achievement of good status, be justified in accordance with the detailed criteria set out in Article 4(7) WFD.



5.2 Use of economic analysis and water pricing – cost recovery

The updated economic analysis (as required by WFD Annex III) appears incomplete. The forecasts for water supply and demand run only until 2027, and consequently the analysis lacks the necessary long run perspective and thus an explicit / corroborated link with climate adaptation / the climate adaptation perspective. Neither is there a clear investment planning. There is extensive reporting on variable and fixed cost components of the broad water services water supply and sanitation services, split over the broad water user sectors agriculture, industry, and households.

LU has carried out a combination of qualitative and quantitative cost-effectiveness analysis, but the applied multi-criteria analysis renders it hard to track whether the set of measures is indeed cost-effective.

The extensive quantitative information on cost price components and quantitative descriptions of the pricing suggest that the pricing policy has been more informed by the 'revenue raising' motive with adequate sectorial contributions rather than the incentive motive. Unfortunately, the account on the adequacy of price incentives appears incomplete and implicit. A reference to a fall in water consumption over time is presented as evidence of the incentives of the volumetric components in cost-based pricing. Yet, the disparity of price levels over user sectors, the lack of increasing unit rates over consumption volume as well as of a variation of abstraction tariffs with scarcity conditions suggests there is an unused potential in applying price incentives.

There is a qualitative account on the adequacy of sectorial contributions (although not clearly named as such). Water tariffs reportedly reflect the varying need of security of supply, which is reflected in a different cost profile for water distribution. The latter is also cited as a mitigating factor to the water services' cost recovery in areas with lower population density and challenging geographical conditions. In addition, a "social cap" on prices is reported. It is not clear whether these factors amount to lower cost recovery or rather a pooling of costs over larger areas and user categories. The PP is applied but with a limited scope. There is an explicit system to account for the environmental costs of water services provision. It leads to a variation in prices depending on the users in relation to their contribution to the pressures.



6. WFD recommendations

Recommendations - Luxembourg should:

1. Step up its level of ambition and accelerate action to achieve as much as possible to bridge the big gap to reach good ecological status/potential and good chemical status for its surface water and good chemical and good quantitative status (including the needs of depending or associated ecosystems) for groundwater bodies. This includes specifically that Luxembourg considerably increases its efforts to
 - a) limit nutrient (nitrogen and phosphorous) pollution from agriculture, wastewater plants, overflows of sewage systems, and industry.

- b) limits the pesticide use to prevent further contamination of groundwater or surface water.
 - c) adapt its legal instruments to implement ecological flows as fast as possible.
 - d) define the Good Ecological Potential and adopt urgently the measures to achieve it.
 - e) mitigate hydromorphological pressures.
 - f) enhance quantitative water management establishing water balances including climate change projections and the necessary regular review of abstraction permits, including agricultural abstractions too.
2. Identify and put in place, as appropriate, additional measures to reduce existing persistent environmental challenges (pressures) preventing the achievement of good status based on robust gap analyses.
 - a) Luxembourg should do a thorough gap analysis per river basin, including the analyses about the needed load reductions in pollutants to be achieved by various economic sectors. This concerns all types of pollution, pesticides and nutrients and hydromorphological pressures. This will contribute to a better targeted PoM, having the necessary effectiveness and targeting in the most responsible sectors.
 - b) Luxembourg should evaluate the effectiveness of measures put in place in earlier PoMs to warrant the success of the new programmed measures. This is especially important for the nutrients and pesticides.
 - c) Measures in the PoM for the chemical pollution are limited to review of industrial permits. There is however no reason to avoid national or regional measures for airborne uPBT pollutants. The River basin Management Plans should consider all measures preventing the achievement of good status. Phasing out of the emissions of uPBTs must be carried out.
 3. Improve funding, cost-recovery and price incentives and ensure the proper implementation of Article 9 and the economic analysis to underpin the PoM, including the long-term perspective considering climate change. Luxembourg should provide a transparent account of the cost recovery, including the calculation and internalization of environment and resource costs for all activities with a significant impact on water bodies. In addition, Luxembourg should clarify the way cost effectiveness analyses are used in prioritizing measures including the long-term perspective. There seems to be an untapped potential in applying pricing as an incentive given the disparity of price levels over user sectors. This could be done by increasing unit rates over consumption volume as well as of a variation of abstraction tariffs with scarcity conditions.
 4. Step up the pace of implementation of the present PoM as climate change is increasingly creating (seasonal) water shortages (entailing higher pollution levels), risks for flash floods and is increasingly creating algae blooming in eutrophic water. It is important to reiterate that the current assessment of the quantitative status of the ground water bodies does not yet include, as required by the law, the water needs of aquatic and terrestrial dependent ecosystems. This may lead to an assessment that is an overestimation of the good quantitative status. The calculation of water balances should be started as soon as possible.
 5. Where the objectives of the Directive for a specific water body cannot be met and exemptions are invoked, Luxembourg should do so in line with ECJ jurisprudence on the restrictive interpretation of exemptions and better justify the use of exemptions, providing sufficiently detailed justifications at the level of the specific water body and ensure that their application is regularly reviewed. This implies:
 - a) Ensuring that all measures necessary for achieving good status or potential by end of 2027 are identified and initiated (implemented) during this cycle, to avoid unjustified time exemptions beyond 2027 (i.e. other than exemptions based on natural conditions) or an unjustified conversion to Article 4(5) exemptions in 2027 (i.e. other than based on objectively established disproportionate costs/unfeasibility after identification of all measures necessary to achieve good status)

- b) Recognising that the possibilities for time extensions (Article 4 (4)) are extremely limited and will no longer be allowed after 2027 (except if duly justified for natural conditions) and taking action appropriately,
 - c) Clearly informing in a transparent manner about the application of Article 4(7) exemptions and apply it correctly with sound and thorough justifications in the RBMPs for new projects implying water transfers, water reservoirs or important abstractions
 - d) laying down a specific set of criteria for applying Article 4(7), taking into considering the restrictive interpretation of the Court of Justice of the concept of deterioration, requiring Member States to assess impacts and potential deterioration of new modifications/projects.
6. As regards monitoring, assessment, data management and reporting, Luxembourg has made some considerable progress in several aspects, particularly on monitoring, but should:
- a) accelerate the reporting of the electronic data
 - b) create clarity about the environmental objectives (good ecological potential (GEP) for the 8 Heavily Modified Water Bodies (HMWBs as soon as possible. Well targeted action for possible improvements is urgent to still have a chance to get implemented in time.
 - c) Increase the number of the water bodies being monitored and reducing the reliance on grouping and modelling for the 84% of water bodies that are not monitored for biological quality elements. This will improve the certainty of the status assessments.
 - d) complete the identification of the hydromorphological pressures. The envisaged implementation of hydromorphological quality elements however is still very limited. There is a need to accelerate the implementation of mitigation/compensation for the hydromorphological pressures.
 - e) expand the monitoring of priority substances as most priority substances are monitored in only 16% of the water bodies, to increase the certainty of the assessments. Moreover, not all the substances are monitored at all sites.
 - f) absolutely include the water needs of associated or dependent ecosystems in water and on land to the quantitative assessment of ground water bodies and ensure protected areas in particular are afforded adequate objectives and measures to ensure their protection. This is also needed to ensure favourable conservation status under the Birds and Habitats Directives. Moreover, Luxembourg should overcome the last unknown groundwater body that is still not monitored quantitatively and chemically despite the commitment taken in the 2nd RBMP
7. As regards transboundary cooperation, Luxembourg should quantify its possible impact downstream and adjust its national PoM accordingly. Despite the excellent and long-established transboundary collaboration in the International Rhine and in the International Meuse Commissions, Luxembourg provided very limited information in the River Basin Management Plan on the necessary reductions in nutrient (N/P) pollution in the flow of surface water from Luxembourg towards the various neighbouring Member States.

SECTION B:

FLOODS DIRECTIVE

7. Flood risk management under floods directive (FD)

The Flood Directive requires each Member State (MS) to scan its territory for flood risks, assess the potential adverse consequences of future floods for human health, the environment, cultural heritage and economic activity, identify the significant risks, map the flood extent and the potential adverse consequences, and take measures to reduce the flood risk. These activities are reflected in (a) the preliminary flood risk assessments, or PFRAs (including the identification of areas of potential significant flood risk, or APSFRs), (b) the preparation of flood hazard and risk maps, or FHRMs, and (c) the establishment of flood risk management plans, or FRMPs. The preliminary assessments, mapping and planning for flood risk are repeated in six-yearly cycles.

There are two Units of Management (UoMs) in Luxembourg, which are the same as the Water Framework Directive's River Basin Districts (RBD). Fluvial, pluvial, groundwater, and Artificial Water Bearing Infrastructure floods are considered as potentially significant sources of flooding. 17 Areas of Potential Significant Flood Risk (APSFRs) have been designated.



7.1 Flood hazard and risk maps

Luxembourg is using a GIS-based geoportal¹¹ at national level for their FHRM and showing the whole country. Maps for floods with low probability (1/1 000 years), with medium probability (1/100 years) and with high probability (1/10 years) are provided. The maps show: flood extent, water depth, number of inhabitants, type of economic activity and industrial installation covered by the Industrial Emissions Directive. The maps equally show the potentially affected protected areas, except for the single potentially impacted recreational water body (on the Moselle River). Luxembourg has produced maps for two additional APSFRs designated in the second PFRA.

¹¹ <http://eau.geoportail.lu/>

In terms of changes in the way in which information about the maps is conveyed to the public, overall, there has been an improvement compared to the previous cycle, this includes: (a) a separate section on the geoportal which allows visualisation of all water courses designated as APSFRs, (b) the Hazard maps include areas of potential flooding not directly linked to the river, but due to pressurised groundwater from a nearby flooded river, (c) Hazard maps show mobile flood protection and areas flooded if this protection fails.

For the first FHRMs, the Commission pointed to the need to include more details on the methodologies used to prepare flood hazard maps. The preparation of the first FHRMs was based on INTERREG projects whereas Moselle River mapping is based on the German Federal working group on water (LAWA)¹². A brief summary was provided in the second PFRA for the LAWA method^{13 14}.

As regards the consideration of climate change effects in the preparation of flood hazard and risk maps, reference is made to section 3.7 on 'adaptation to climate change'.



7.2 Flood risk management plans

Objectives and measures

On the Luxembourg government's website dedicated to water management¹⁵ there is no section for flood risk management, and the FRMP is only found via webpages on EU Directives¹⁶. Luxembourg set four objectives in its second FRMP which are the same as in the previous cycle but more elaborated: i) reducing the impact of flood, ii) reducing flood risks via prevention actions, such as early warning systems, evacuation plans and public awareness; iii) recovery and iv) review actions, including the development of new strategies to address risks.

Such objectives do not refer to the types of adverse consequences to be addressed. Luxembourg reported 313 measures which include former measures and new ones. It also established a level of priority for each measure: 25 % were reported as high priority, 39 % as moderate and 36 % as low. To be noted that no measures were reported as very high priority or critical. The FRMP describes the approach used to establish the prioritisation of the measures. To measure progress in implementation of the measures, Luxembourg has set up a database or a type of scoreboard showing the level of progress in implementation (from proposed, to under implementation, to implemented).

As regards funding, the second FRMP does not provide information on the costs of the measures, but specific funding sources are included. According to the FRMP¹⁷, flood protection measures are financed by the municipalities or by municipal special purpose associations, which are entitled to state subsidies. Subsidies are provided via the national government's fund for water management (*Fonds pour la gestion de l'eau*, FGE).

¹² <https://www.lawa.de/>

¹³ Luxembourg has subsequently clarified that "There have been updates on the land use data (from Corine to the national Land Use Database, which has a higher Resolution) and changes were made on the presentation (see Legend) of the maps. Of course, the data has been updated."

¹⁴ Section 2.6. in <https://eau.gouvernement.lu/dam-assets/administration/documents/projekthochwasserkaarten2021/hwrm2021/Entwurf-Hochwasserrisikomanagementplan-2021-2027.pdf>

¹⁵ <https://eau.gouvernement.lu/de.html> and <https://eau.gouvernement.lu/fr.html>

¹⁶ <https://eau.gouvernement.lu/fr/administration/directives/directiveinondation/2ieme-cycle.html>

¹⁷ Chapter 7.7.

The plan mentions that a Cost Benefit Analysis is required for structural measures.

As regards the integration with the WFD, it is mentioned that coordination with the WFD takes place at several levels, including between authorities and the environmental objectives of the WFD are considered in the implementation of FRMP measures. Indeed, Luxembourg reported WFD measures as part of the FRMP.

The FRMP describes how nature conservation aspects, particularly Natura 2000 sites, need to be considered when implementing measures. The plan also includes natural water retention measures (NWRMs), for instance to preserve natural floodplains.

Luxembourg reported 19 prevention measures (all in the Rhine UoM) and 142 protection measures (most in the Rhine UoM). One of the objectives includes a call for the development of early warning systems. Luxembourg reported 24 preparedness measures (23 in the Rhine UoM, one in the Meuse UoM). There is a type of measure called 'local flood risk management concept', which contains several spatial planning/land use measures.

There is progress in linking measures to the objectives, which is clearly presented in the second FRMP. While the second FRMP states that its development involved an assessment of the progress towards the objectives of the first FRMP¹⁸, a description of the results of this assessment was not found. However, the plan provides some information on the progress in the implementation of the measures under the first FRMP, including a table¹⁹ with the number of measures implemented under the first FRMP. A description on the progress in implementation of measures under the first FRMP is provided but it appears that in early 2021, a majority of the measures under the first FRMP had not been started.

Governance

The FRMP provides information on coordination at the FHRM stage, via the International Commissions to protect Moselle and Saar (IKSMS). No links are provided to international FRMPs, such as those for the international Meuse and Rhine basins.

The FRMP was published on the websites of the AGE and the Ministry of the Environment, Climate and Sustainable Development, as well as on the national portal for participation procedures. The public hearing lasted three months for individuals, with municipalities given an additional month²⁰. The Minister for the Environment also invited people to a public video conference. It is said that stakeholders are also involved via local flood partnerships, but no more details are provided.

Consideration of climate change

As regards the consideration of climate change effects in the preparation of flood risk management plans, reference is made to section 3.7 on 'adaptation to climate change'.

¹⁸ Chapter 1.2.

¹⁹ Chapter 4.3.1 FRMP.

²⁰ Article 56 Luxembourg Water Law sets out the modalities of this consultation.

Progress identified in the second FRMPs

The objectives in the second FRMP are more specific, and there is a clear link between measures and objectives, but they are not measurable. For some objectives, the type of measures and number of actions are mentioned. Moreover, a damage potential study was commissioned based on the FHRMs, which identified the potential monetary damage. In addition, specific funding sources are included now. The second FRMP and Luxembourg's reporting also provide information on the prioritisation of individual measures. In other areas of progress, the FRMP's list of new and adapted measures to be implemented identifies the responsibilities of authorities, which was not the case in the first FRMP. Some progress was seen in estimating potential damage, which could provide the basis for future Cost Benefit Analysis for structural measures. The second FRMP describes coordination with the National Climate Change Adaptation Strategy 2018-2027 and links measures between the two.



8. FD recommendations

On the basis of the assessment performed, in addition to the good progress on a number of points, Luxembourg should:

1. As regards the Flood Hazard and Flood Risk Maps
 - provide more details on the methodologies employed to prepare them;
 - include the consideration of pluvial flooding and consider climate change;
 - display bodies of water designated as recreational waters, including areas designated as bathing waters under Directive 76/160/EEC potentially impacted by flooding;
 - provide detail on how the FHRM was used in the choice of objectives and measures;
2. As regards the Flood Risk Management Plans
 - make objectives specific and where possible linked to quantitative indicators and be timebound. An assessment of the progress made towards the achievement of the objectives should be included;
 - provide information on the costs of all measures
 - offset out the method to monitor the implementation of the measures;
 - where relevant, incorporate CBA for the prioritisation of measures that lend themselves to it and provide a clear description of the methodology used;
 - base the likely impact of climate change also on future climate scenarios;
 - provide more detail on the public consultation, especially the comments received, and how they were taken into account;
 - where appropriate, consider in the FHRM flow velocity or relevant water flow and in the FRMP flood conveyance routes, as these are relevant to emergency response.
 -