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

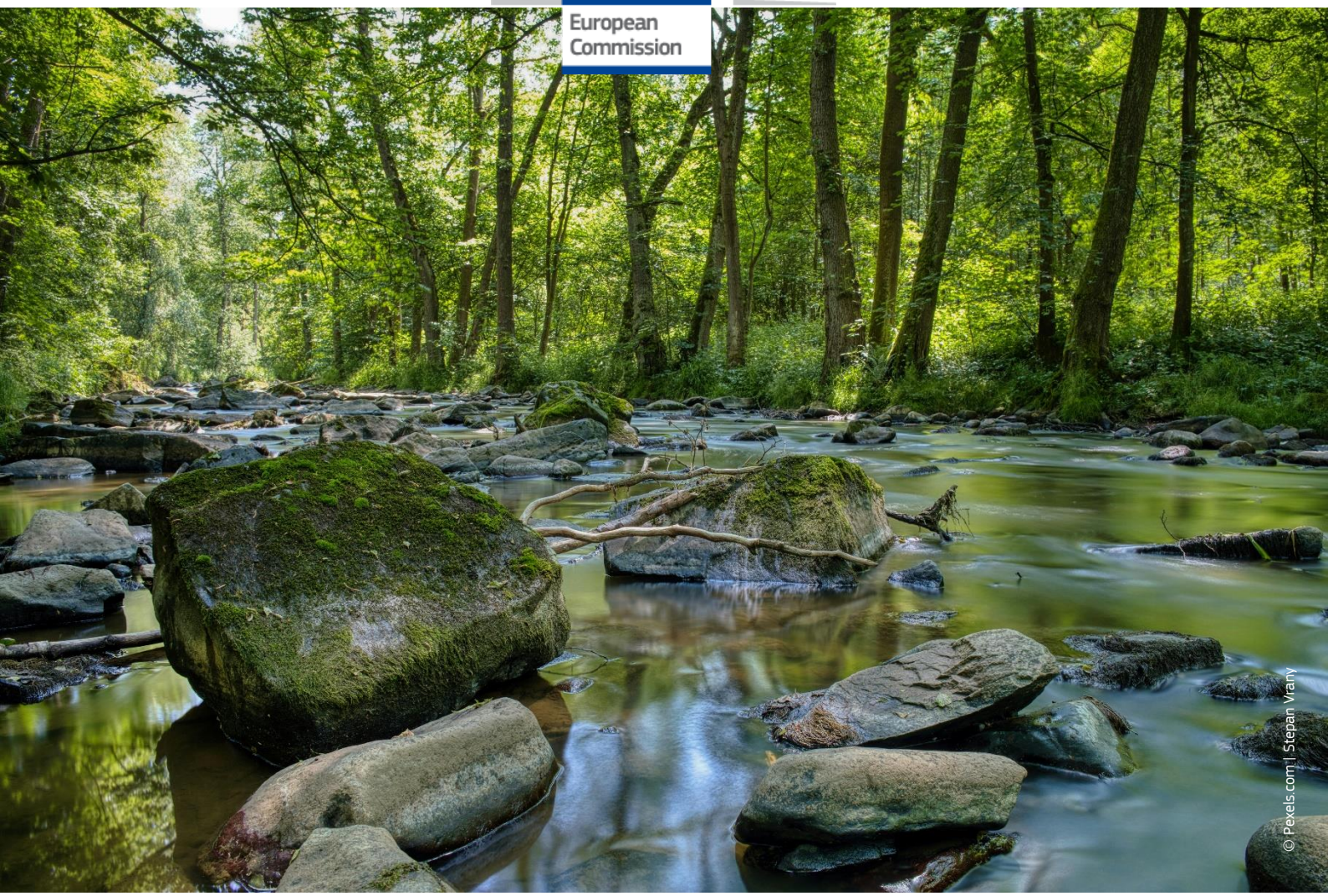
Accompanying the document

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

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Country specific staff working document

Slovakia

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SECTION A:

WATER FRAMEWORK DIRECTIVE

1. General info, member state characterisation

Slovakia is a landlocked country (49 034 km^2) located in the region of Central Europe, bordering 5 other countries. Slovakia has a population of about 5.4 million people, with a population density just slightly higher than the EU average and rather concentrated in the southern plains. The Carpathian Mountains cover a large portion of the country with the southern part of the country consisting of the lowlands adjacent to the Danube River. The highest point is Gerlachovský štít at 2,655m. Many mighty rivers flow from these mountains, such as the longest Váh with a length of about 403 km. In the south of Slovakia around the Danube River are the Danubian Lowlands and hilly areas. Another flat area is located to the east, the East Slovak flat.



Due to the mountainous geography, there are more than 6,000 known caves and more than 1300 mineral springs and hot springs. After Austria, Slovakia has the second largest reserves of fresh drinking water in Europe. Slovakia has two river basin districts, which are both international: the Danube and the Vistula.

The country features a very high share (37.4%) of land designated as nature protected areas. There are 9 national parks, mainly located in central Slovakia.

Most agriculture is also produced concentration in the southern plains. Industry accounts for 30% of the total Slovak GDP, the largest provider being the automotive industry.

The Danube RBD is the major RBD in Slovakia and it is shared with 18 countries. The Vistula RBD is shared with Poland, Czech Republic, Belarus and Ukraine.

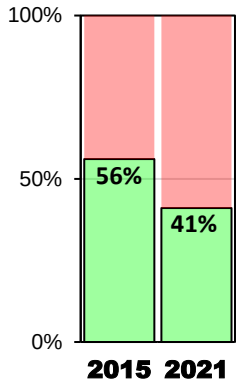
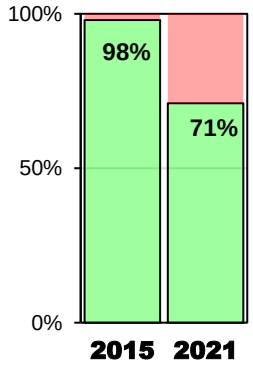
Reporting

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.

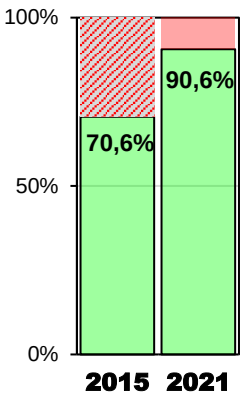
By September 2023 Slovakia have not submitted full electronic reporting. Therefore, the assessment is based on the data mining of the pdf RBMPs. However, Slovakia reported electronically shortly after, and this information has been partially used in this assessment report.

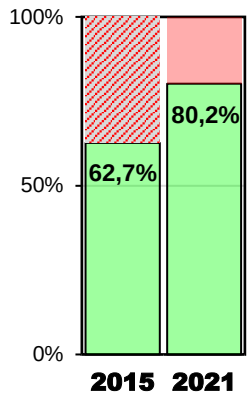
Despite the cut off dates for the production of this report, reporting continued and, for the State of Water report, the EEA aggregated the results available by July 2024 in their products and dashboards available at WISE Freshwater web portal.

Changes in Status, Pressures, Exemptions & Measures

Surface Water Bodies (1351)	Trend (% good status/potential)	Main Pressures & Changes & Exemptions
ECOLOGICAL STATUS		Since 2nd RBMP, the number of SWBs in good and high ecological status have decreased significantly from 56% to 41%. By 2027, 67.7% of SWBs are expected to be in good ecological status, with many in high status. Although data suggests that nutrient pollution is decreasing, agricultural eutrophication still exerts high pressure on SWBs. Further impactful are hydromorphological alterations, such as disruption of longitudinal continuity (1066 impassable barriers). Emerging issues are invasive species, sediment management, and fish management. Slovakia claims that the recent deterioration is solely an apparent trend, as the number of SWBs has been reduced by merging, and monitoring has developed strongly since the last cycle. There are three times as many monitoring sites, hydromorphological criteria now taken into account, less rivers in unknown status, and more Biological Quality Elements monitored. However, 71% of classifications are under low confidence. 57% of SWBs have been assessed by grouping for BQEs. Article 4(4) exemptions have been applied to 58 % of SWBs for ecological status, most on technical feasibility and disproportionate cost. 1 SWB was exempted under Article 4(5) on technical feasibility and disproportionate costs. 5 SWBs were exempted under 4(7).
CHEMICAL STATUS		The strong decrease of SWBs in good chemical status is reported to be mostly due to an improved monitoring. The coverage of chemical monitoring has expanded from 26% of SWBs to 40% since the 2nd RBMPs. Additionally, all priority substances are included in monitoring now, and biota and sediment are monitored. Confidence in classification has grown, yet 56% of SWBs are still classified with low confidence (most of them with good status). Most SWBs fail due to a small set of ubiquitous persistent toxins (uPBTs), namely mercury and PBDEs in biota, and PAHs in the water. These priority substances are mostly released during fossil fuel combustion and mining activities, and reach surface waters through atmospheric deposition. When excluding these uPBT substances only 4% of SWBs remain in poor chemical status. Besides uPBTs, PFOS and lead cause SWBs to fail. Pollution from industrial point sources is higlighted as a significant pressure, as well as organic pollution from municipal point sources and industry/agriculture.

		Article 4(4) exemptions have been applied to all 29% of failing SWBs for chemical status, most on technical feasibility and disproportionate cost.

Ground Water Bodies (106)	Trend (% good status/potential)	Main Pressures & Changes & Exemptions
QUANTITATIVE STATUS		Since 2015, the monitoring network has been improved in extent and quality. Of the formerly 27% of GWBs in unknown status, none are unknown now. Thus, it is difficult to say what the actual trend in status is, although data shows an apparent strong improvement. Water abstraction is not identified as a significant pressure, yet in 8 GWBs a long-term significant drop in the water table is reported. Additionally, 2 GWBs fail because of diminution of groundwater-associated aquatic ecosystems, and 1 GWB because of deterioration of dependent terrestrial ecosystems. Major GW users are public water supply (77 %) and industry (10 %). SK reports that water scarcity can be considered an emerging issue for the country due to climate change. Article 4(4) has been applied to three GWBs in poor quantitative status on technical feasibility. Article 4(5) was applied to 7 GWBs on technical feasibility.

CHEMICAL STATUS		Like the quantitative status, the trend in chemical status of GWBs is impacted by the significant improvement of knowledge. Both GWBs in poor and good status have increased, since monitoring extent and resolution have grown, and fewer GWBs are in unknown status. Although there is apparent improvement in status, a significant sustained upwards trend in concentrations of pollutants (nutrients and TOC) are reported, which is in contrast with reported reduction of nutrient pollution mentioned before. Article 4(4) has been applied to 13 GWBs on natural conditions, claiming that these would not allow for timely improvement of the status of the water body. Article 4(5) was applied to 3 GWBs on technical feasibility and to 1 GWB due to disproportionate costs.

2. Horizontal aspects

2.1 Governance

Slovakia is fairly unique as it has a very centralized approach to water management, with only one competent authority, the Ministry of Environment, responsible of all aspects of Water Framework Directive (WFD). Though in addition, the Office for Regulation of Network Industries (ÚRSO) regulates both drinking water and sanitation tariffs as well as water abstraction and pollution charges.

Slovakia adopted two RBMP: one for the Danube and another for the Vistula. For both the timetable, the work program, the consultation plan, the overview of significant water management issues and the draft RBMPs were submitted for consultation for six months in accordance with the WFD.

Since both RBDs are international, Slovakia is part of the international agreement and permanent cooperation body on the Danube international RBD, which has developed in addition an international RBMP for the Danube. For the Vistula, Slovakia rather relies on bilateral agreements with the neighbouring countries.

Due to the delay in the elaboration of the 2nd Flood Hazard Risk Maps (FHRM) and 2nd Flood Risk Management Plan (FRMP), the RBMPs could not be coordinated and integrated with the FRMPs. As a landlocked country, Slovakia does not publish any programme of measures pursuant to the Marine Strategy Framework Directive is, thus there is need for coordination.

2.2 Characterization of River Basin District

In the 3rd RBMPs, there are 1 351 SWBs comprised of 1 328 rivers (flowing) and 23 reservoirs. Table 1 depicts the types or water bodies.

Table 1: Overview of Slovakia 's River Basin Districts (RBDs)

RBD	Name	Rivers	Lakes	Groundwater bodies
SK30000	Vistula	69	0	4
SK40000	Danube	1259	23*	102

*Note: * reservoirs created by damming rivers*

Source: WISE e-reporting

It is worth noting that there is a reduction of 11% in the number of river water bodies compared to the previous cycle. This is the result of changes in the boundaries of rivers or merging and grouping. This may cause some problems of comparability between the two cycles. On the other hand, the numbers of reservoirs remained stable.

It is noted positively that reference conditions are established for all relevant biological, physico-chemical and hydromorphological quality elements for all river types. Rivers are the only natural surface water type in Slovakia. Reference conditions for reservoirs were calculated for selected

relevant biological quality elements on the basis of the results derived from long-term monitoring of reservoirs.

The 3rd RBMPs state that the reference conditions were checked and harmonised within the intercalibration process at EU level. It also indicates that all biological quality elements for most relevant types were intercalibrated, except for fish in very large and large river types, where the intercalibration was not completed.

Pressures

Surface waters

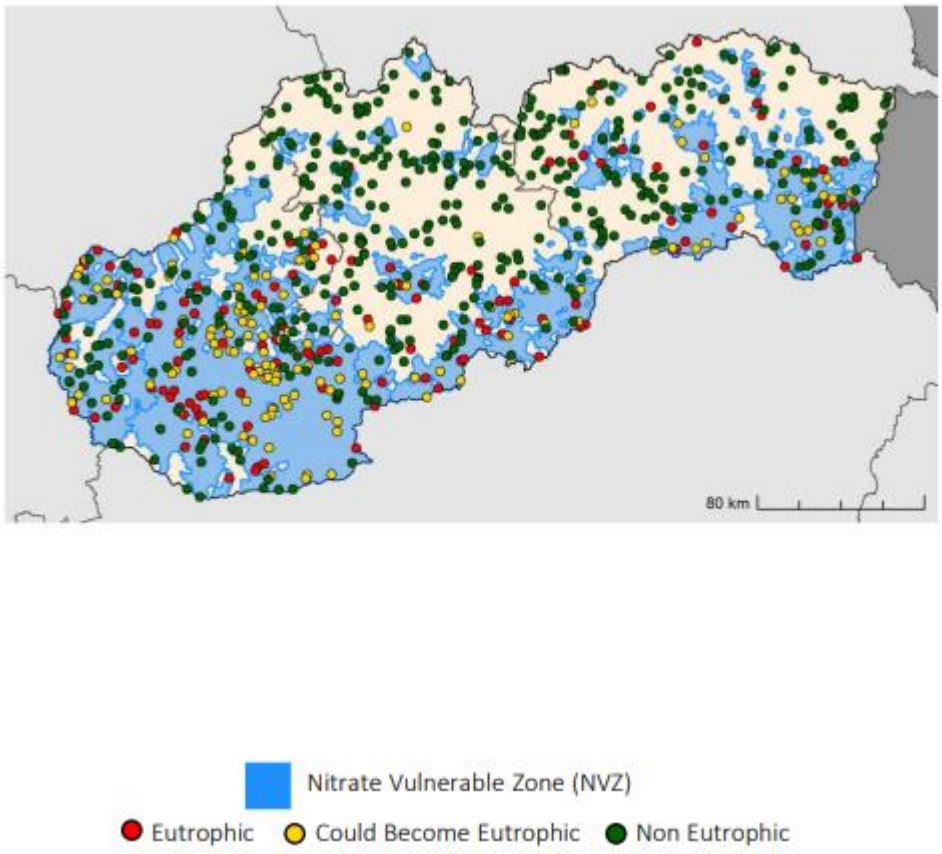
Agricultural areas cover around 47% of the Slovak territory. Together with forestry, agriculture represents around 2.8% of the gross value added of the country's economy. Rural areas still comprise a significant share of the population. The share of organic farming (roughly 10% of the farmland) is slightly higher than the EU average, but the country has the ambition to cultivate 20% of its farmland under organic farming by 2030.

In this context, for surface water, diffuse pollution from agriculture is described as a significant source of nutrient pollution. Indeed, the agricultural sector contributes 62 % of total nitrogen emissions and 51 % of total phosphorous emissions to surface water. Diffuse pollution by atmospheric deposition is highlighted as a significant source of pollution by some types of substances, such as polycyclic aromatic hydrocarbons (PAHs) and some metals.

For point sources of pollution, the RBMPs identify 'municipal sources of pollution' and in particular 'industrial and other sources of pollution' as significant pressures. Such point sources discharge priority and other relevant substances in the water causing a significant impact. Organic pollution from residential agglomerations, industry and agriculture is also a significant impact.

Hydromorphological changes are also highlighted as causing a significant pressure. This is due to the disruption of longitudinal continuity, morphological changes and disruption of lateral continuity. The infrastructure projects are also identified as a significant water management problem in the context of hydromorphological pressures.

Figure 1: Map of the monitoring points showing eutrophication assessment in Slovakia, according to the reporting of the Nitrates Directive



Source: Joint Research Center of European Commission (n.d.). JRC NITRATES DIRECTIVE - Reporting Period 7 (2016-2019) Trophic Status. [online] water.jrc.ec.europa.eu. Available at: https://water.jrc.ec.europa.eu/portal/apps/dashboards/cb6034c2a75e4df282f8a62f90c16caa.

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

Other significant pressures identified in the RBMPs are invasive alien species (In total, there are 16 aquatic freshwater species of EU concern in Slovakia [1]), sediment management, fish management, the pressure on sturgeons, and pollution by microplastics.

Groundwaters

Diffuse pollution, from agriculture (nutrients and pesticides) as well as point pollution are highlighted as significant pressures. Abstraction is not identified as a significant pressure in Slovakia.

The description and quantification of the pressures in the RBMPs is not sufficiently detailed. There are no significance thresholds which exist in other member States and the pressures are not linked with status objectives.

3. Policy elements contributing to biodiversity and climate change adaptation

3.1 Surface Water: what is their ecological status or potential

Monitoring

It is welcomed that there is a very significant increase, more than a three-fold increase, in the number of monitoring sites compared to the 2nd RBMPs. The number of sampling sites for surveillance monitoring increased from 794 to 2 682 sites, and for operational monitoring the number of sites increased from 1 112 to 4 165 sites[1]. The monitoring is covering all quality elements, including 26 river basin specific pollutants.

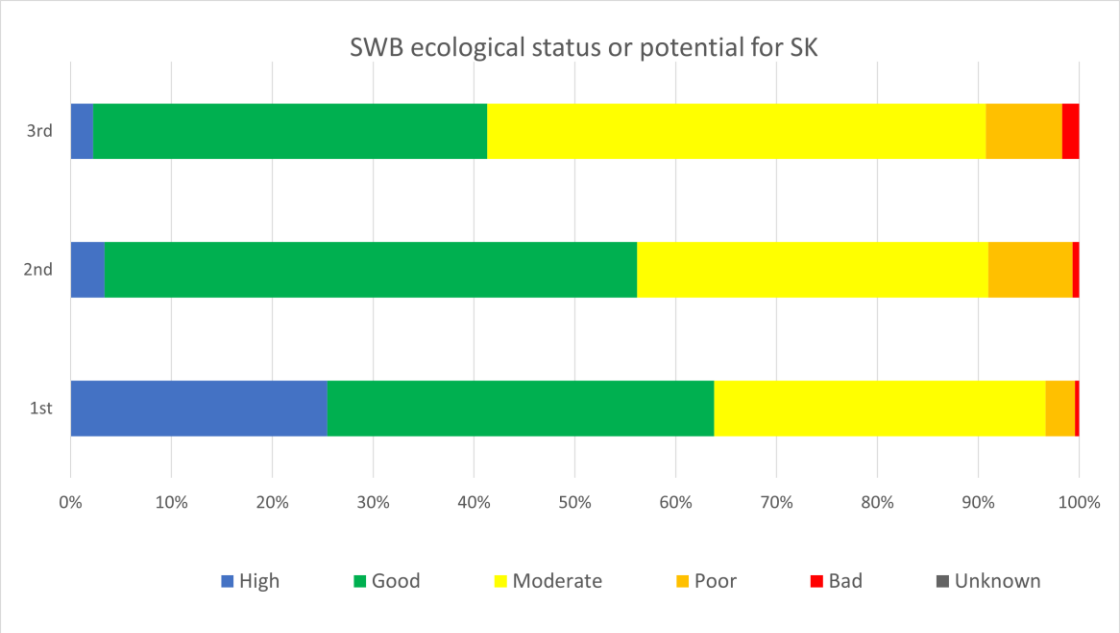
It is not clear why there is no considerable improvement on the use of monitoring data for status assessment, despite the significant increase in the number of monitoring sites. According to the electronic reporting, the status assessment of biological and physico-chemical quality elements is based on almost the same number of water bodies. However, some improvements can be noted in the RBMPs, for example as regards the inclusion of additional quality elements.

Status assessment

According to the available information, only 39,9 % of the water bodies show good ecological status/potential and there are just 2,2% of water bodies in high ecological status or maximum ecological status. None of the surface water bodies in Slovakia were reported to have unknown status similarly as in the 2nd RBMPs. There is a clear deterioration in the ecological status compared to the 2nd RBMPs. The most notable deterioration is seen in the status of rivers, while the status of lakes has improved. Figure 3 depicts the evolution of the ecological status through the different cycles as well as the predictions for 2027.

[1] There are two types of monitoring: i) operational monitoring to determine the status and which covers all water bodies at risk and ii) surveillance monitoring aimed rather at identifying impacts and long-term changes and design monitoring programmes.

Figure 2 - Ecological status / potential of surface water bodies in the 1st RBMP, 2nd RBMP and 3rd RBMP



Source: WISE e-reporting

3.2 Hydromorphological changes and artificialization (HMWBs and AWBs)

The level of human intervention in the water system has considerably increased compared to the 2nd RBMPs. Table 2 depicts the number of heavily modified and artificial water bodies. Indeed, the number of heavily modified water bodies (HMWBs) has increased from 258 (2nd RBMPs) to 264 (3rd RBMPs), or 19% and 20% of all water bodies, respectively. All lakes are heavily modified.

The reason for designating water bodies as heavily modified is due to the presence of weirs and dams, channelisation and straightening of rivers, and bed stabilisation and bank reinforcement. The main uses which cause hydromorphological alterations are mainly flood protection and hydropower, but also agriculture (drainage and irrigation) and other sectors (recreation, water supply, aquaculture and industry).

Table 2 Number of Heavy Modified and artificial surface water Bodies

Modifications	Rivers	Lakes
HEAVILY MODIFIED	241	23
ARTIFICIAL	53	0

Source: data mining and WISE e-reporting

As regards artificial water bodies, they represent a much smaller share of water bodies and the number of water bodies has decreased from 76 (2nd RBMPs) to 53 (3rd RBMPs) i.e., from 5.2% to 3.9 % of all river water bodies, respectively.

No information could be found in the Plan on the reasons or uses that triggered the designation of artificial water bodies. Yet, some information could be found in the 2nd RBMPs demonstrating that the main water uses behind the human intervention were flood protection, followed by hydropower, irrigation, tourism/recreation, industry and drinking water supply.

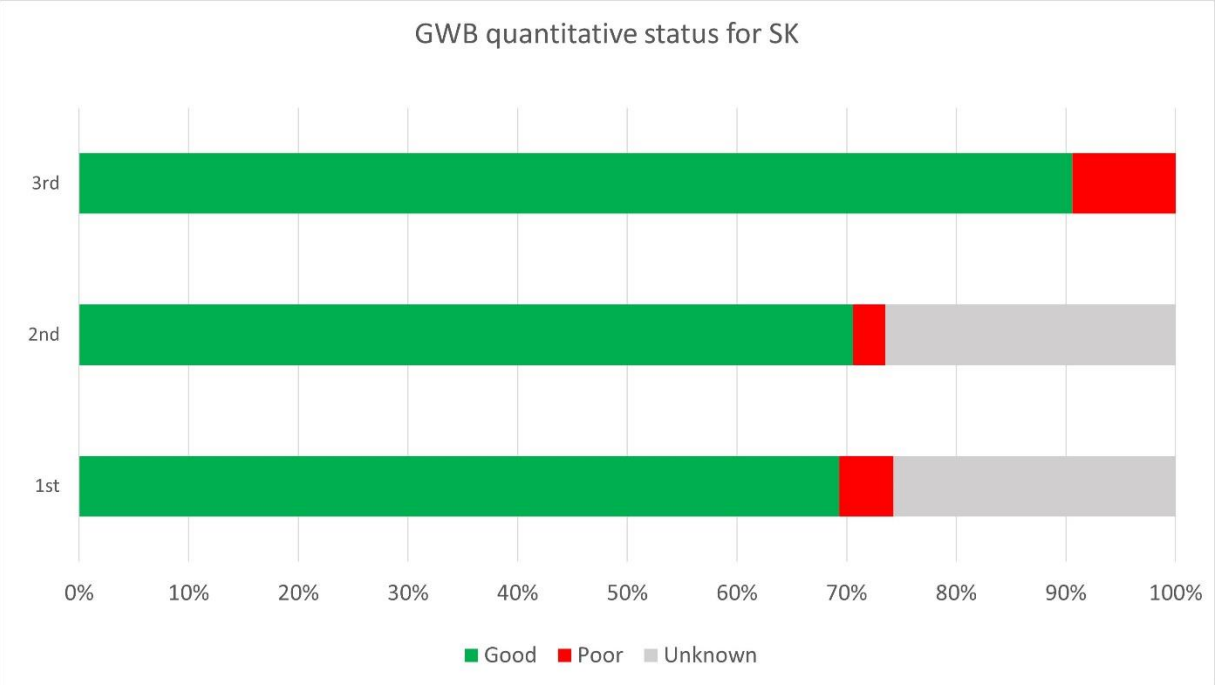
The production of hydropower is particularly important in river Hron and other small rivers its area. In previous years, small hydropower plants (SHPs) were placed in nine potentially affected water bodies, including in river Hron, without a prior assessment as foreseen by Article 4(7) of the Water Framework Directive on grounds that there would not be a deterioration. The European Commission opened an infringement procedure which is still ongoing. Based on the latest information, Slovakia acknowledges that the SHPs hamper the achievement of good ecological status/potential of the river Hron, that mitigation measures are needed, and permit conditions need to be revised to create the necessary conditions for aquatic species, including restoring continuity for migratory fish, to achieve the environmental objectives by end of 2027.

For each water body defined as HMWB / AWB, the ecological potential has been determined. This is usually based on reference conditions and classification methodology specific to the water body type. Where this method cannot be used, the MEP / GEP is derived from the observed status of the water body and the predicted response of the implementation of mitigation measures to the status of the water body.

3.3 Groundwater bodies - have they sufficient water – quantitative status

Compared to the previous cycle, the total number of delineated GWBs slightly increased from 102 to 106, yet the area remains the same. Thus, the higher number seems the results of a change in methodology. It is very welcome that the number of GWBs subject to monitoring to establish the quantitative status has increased and it is fairly high now: 79.2 % of the total GWBs. Also, it is noted that thanks to these considerable efforts, the unknowns have disappeared. This implies that Slovakia has now a much better knowledge of the quantitative status of its GWB.

Figure 3 - Quantitative status of groundwater bodies in the 1st RBMP, 2nd RBMP and 3rd RBMP



Source: WISE e-reporting

Over abstraction does not seem to be a problem for the large majority of the GWBs since 91% are in good quantitative status. Yet there are 10 GWBs in poor quantitative status. Unfortunately, no detailed information could be found as regards the pressures significantly affecting GWBs.

As mentioned earlier, it is worth noting that there are more than 1300 mineral springs and hot springs in the country. The monitoring of geothermal GWBs is not sufficient. The technical condition of monitoring devices that provide key data for the assessment of quantitative status is deteriorating. According to the 3rd RBMPs, there is weak legal protection for the maintenance of a long-term, stable and representative hydrological monitoring network of groundwater in Slovakia.

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 (ie. aquaculture). As mentioned earlier there is a quiet large share of the country designated as nature protected area. Moreover, Slovakia reported having 60,8 % of utilised agricultural areas in Nitrate vulnerable zone in the Nitrates report 2024.

For surface water bodies, protected areas have been identified for bathing waters, Birds and Habitats Directive (Natura 2000) sites, vulnerable zones under the Nitrates Directive and areas for the protection of freshwater fish. For groundwaters, nutrient sensitive protected areas and drinking water protected areas have been designated.

Table 3 - Number of protected areas in Slovakia by 2021, per type of protected area and type of associated water body

Protected area type	Number of water bodies associated with protected areas
Bathing waters	32
Natura 2000	Areas designated under Birds Directive: total 44 of which 24 are dependent on water
	Areas of European importance: total 642 of which 492 are dependent on water
Nitrate vulnerable zones	1,223 municipalities representing 65.8% of the total used agricultural land in the Slovakia
Freshwater Fish protected areas	58 water bodies associated with freshwater fish protected areas

Source: Data mining

Slovakia applies the 'whole country' approach to the designation of sensitive areas under the Urban Wastewater Treatment Directive. As a landlocked country, it has not designated shellfish protected areas. No information could be found on whether there were changes introduced compared to the previous cycle.

In terms of reinforced measures, additional objectives have been set in all RBMPs for groundwater drinking water protected areas. Additional objectives are also described in the 3rd RBMPs for Natura 2000 areas, where the overall goal is to ensure a favourable state of protection of habitats of European importance and a favourable state of protection of species of European importance in their natural range. Slovakia indicated that work has begun to establish more stringent objectives for Birds and Habitats protected areas associated with GWBs – in relation to their chemical status and to meet the ambition of the 2030 Biodiversity strategy. The RBMPs describe also further objectives for wetlands. Additional objectives are defined for sensitive areas where a removal of 75% of phosphorus and nitrogen must be achieved by wastewater treatment plants. In addition, in Nitrate Vulnerable Zones, specific farming practices must be respected and specific concentration of nitrates in groundwater must be met. For other protected areas than those described above no additional objectives were deemed necessary as reaching good ecological status is considered sufficient. No information was found on additional measures related to specific types of protected areas. However, the 3rd RBMPs indicates that, if necessary, additional measures can be taken in protected areas.

It is worth noting that while information is provided on the overall ecological status for surface and groundwater, no information could be found on status linked to the protected areas. Thus, it cannot be concluded whether their designation as protected as well as the reinforced measures applied therein have led to an enhanced state. Yet, it is positively noted that no exemptions have been applied to protected areas.

3.5 What is being done to prevent/reduce hydromorphological pressures

Significant hydromorphological pressures on rivers are reported for both RBDs in the 3rd RBMPs.

Although prioritisation of measures related to restoration of river continuity was carried out in the 1st and 2nd RBMPs, overall management objectives in terms of restoring river continuity have not been set in the 3rd RBMPs.

The types of specific mitigation measures described in the 3rd RBMPs include fish ladders, bypass channels, habitat restoration, removal of structures, reconnection of meander bends, setting of ecological flows, measures to address hydropeaking (which correspond to KTM5, KTM6 and KTM7), as well as research activities (KTM14).

In terms of basic measures planned to tackle hydromorphological pressures, there is an authorisation and / or permitting regime in place to control physical modifications in both RBDs. There is an indication in both RBMPs that a systematic revision of permits will be undertaken once the definition of e-flows is complete. This is described in the RBMPs as a planned measure, but no further details on the frequency of the review is included. This review is planned because ecological flows have not yet been introduced and the current permits are based on a different concept (i.e. minimum flows).

There is also a register of physical modifications of water bodies described in the 3rd RBMPs.

The design of new and existing structural measures, such as flood defences, storage dams and tidal barriers, was reported to have been adapted to take into account WFD objectives in both RBDs.

The 3rd RBMPs indicate that given the many barriers and limited financial resources for implementation, a comprehensive ecological prioritisation of rivers will be undertaken in the next period to select the water bodies where efforts should be focused to restore longitudinal continuity. Actions that are ecologically effective and will have the greatest impact will be prioritised (KTM14). This will take into account fish migration passage and requirements, as well as sediment continuity, number of barriers above and below the reach, distance from the confluence, length of the restored reach, ecological status of water bodies, habitat connectivity and protected areas.

Slovakia published a list of national measure types for river revitalisation to tackle various hydromorphological pressures and assessed their efficiency on a low, medium, high scale. Out of 46 measures, 2 were rated as low efficiency, 24 as medium and 20 as high efficiency.

With respect to the ambition of hydromorphological measures in closing the gap to good status/potential for hydromorphological pressures, no clear information was found in the RBMPs.

3.6 What Slovakia is doing for abstractions and water scarcity

As it was already the case in the previous cycle, water abstraction is not identified as a significant pressure at the RBD level or in significant portions of any RBD and Slovakia addresses water abstraction/scarcity issues only relevant for specific regions across the country. No significant changes have been introduced since the last cycle.

The major users of surface water are industry (54 %) and public water supply (34 %). The major users of groundwater are public water supply (77 %) and industry (10 %). The RBMPs do not data on trends on water consumption. The current estimation of the annual Water Exploitation Index+ for the

country is 0.2-1.4 % for the period (2016-2019) which is very low. However, in the 3rd RBMPs, 10 GWBs (i.e., 9.4 % of total GWBs) are assessed in poor quantitative status. The reason for invoked is the deterioration of the water balance or the long-term significant downward trends of groundwater tables in 8 GWBs. Due to climate change, water scarcity is a topic that can become an emerging issue in Slovakia although it has not been so far.

As a reaction Slovakia is implementing some measures grouped in key type of measures (KTM).

KTM7 – Improvements in flow regime and / or establishment of ecological flows" are not planned for the 2021-2027 period in all RBDs. However, measures with the same focus are reported under WISE e-reporting category "Other KTMs" in the Danube RBD (e.g. setting up an effective control mechanism and strengthening control activities; improvement of quantitative status of GWBs).

Other related supplementary measures planned for the 2021-2027 period in all RBDs are "KTM14 - Research, improvement of knowledge base reducing uncertainty" (e.g. improving knowledge on hydrological conditions; verification and refinement of usable amounts of groundwater; hydrogeothermal evaluation of GWBs)

As regards permits, conditions to grant or refuse permits for abstraction of ground water are stipulated in the national legislation so not a lot of information is included in the 3rd RBMPs. The specific conditions are set up to maintain good quantitative status of groundwater (art. 21(7) Act 364/2004 (Water Act). Thus, there is a concession, authorisation, and / or permitting regime to control surface and groundwater abstractions and impoundments. Furthermore, there is an updated register of abstractions from surface water and groundwater and impoundments. Small abstractions are exempted from permitting and controls. Abstraction permits may be issued for a period of ten years, after which they expire. The validity of the permit may be extended by the state water authority.

However, it must be noted with concern that ecological flows were not defined and implemented in the country during the period 2015-2021. Therefore, there is not an explicit link between the implementation of e-flows and the authorisation process and / or review of permits to control water abstractions and impoundments. As a result, permits do not consider the need to maintain good ecological status of surface water bodies.

The national RBMPs and the international RBMPs of the Danube and the Vistula, where Slovakia is located, do not report any coordination specifically on water abstraction / scarcity issues at the international level. The 3rd RBMPs included measures to address water abstraction. These measures focus on e-flows definition and enforcement, control of abstraction, water efficiency through awareness raising, protection of drinking water protected areas from abstraction, climate change adaptation, research and knowledge building.



3.7 Adaptation to climate change

Both the Danube RBMP and the Vistula RBMP contain a chapter dedicated to the assessment of climate change impacts on water management. These include the impacts of droughts, with historical assessments of the hydrological regime. The RBMPs note that extensive modelling is underway coupled with the establishment of drought operational monitoring and early warning systems. The Slovakian RBMPs include cross-reference to measures from the Slovakian Climate Change Adaptation Strategy (2018) and Action Plan (2021). In addition to the above, the 2018 Action Plan "H2Odnota je voda" for dealing with the consequences of drought and water shortage, contains preventive and

operational measures on how to fight the consequences of drought in Slovakia.[2] No explicit mention could be found to the existence of dedicated drought management plans, yet the aforementioned Action Plan could perhaps be considered an equivalent instrument since it focuses on drought and water scarcity issues.

Yet the measures referred to remain generic, are largely small-scale in nature- with the view to pilot measures to combat drought and analyse their effectiveness to inform longer-term management decisions. These measures are not explicitly referred to in the RBMPs. However, in the RBMPs there is a generic Key Type of Measure 24 - "Adaptation to climate change" has been made operational with a measure 'verify the water potential and groundwater available sources in relation to changing climatic conditions in order to prevent further lowering of groundwater levels and to avoid the negative impacts of climate change'.

4. Policy elements contributing to zero pollution



4.1 Surface Water: what is their chemical status

Monitoring

There are two types of monitoring: i) operational monitoring to determine the status and which covers all water bodies at risk and ii) surveillance monitoring aimed rather at identifying impacts and long-term changes.

It is very welcome that, compared to the previous cycle, the share water bodies that have been monitored for chemical status has increased from 26% (390 water bodies) to 40% (541 water bodies). This is due to two reasons: increased efforts made by the authorities but also to the fact that a change in classification has reduced the number of water bodies in the country from 1510 to 1351.

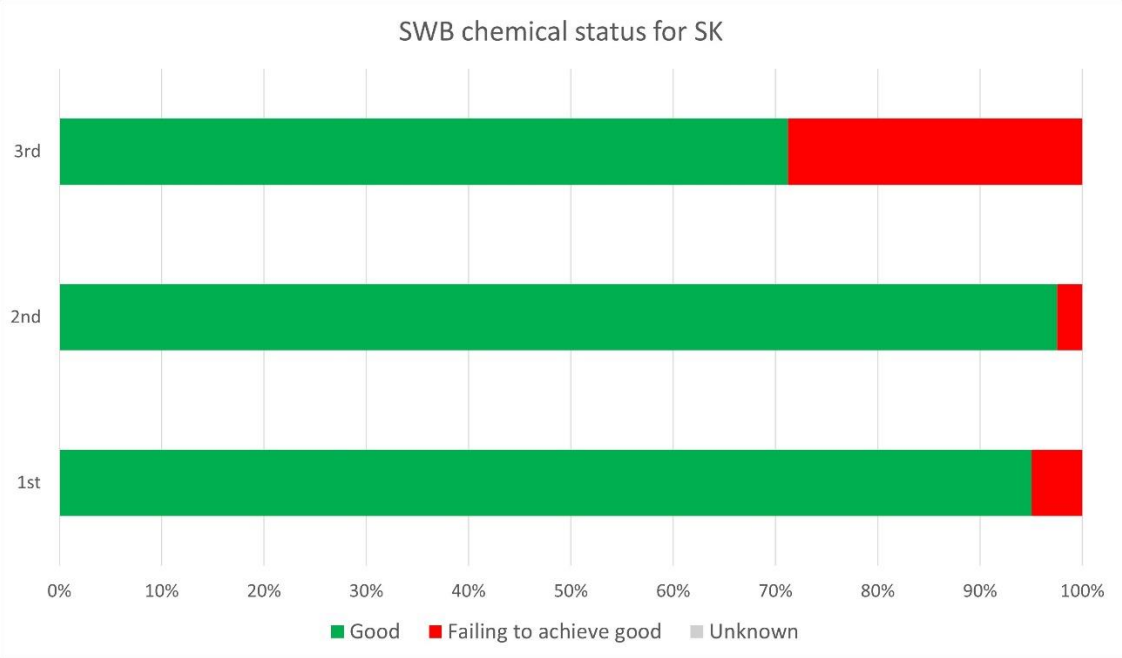
Member States are required to undertake monitoring for all priority substances which are discharged into the river basin or sub-basin. The details on monitoring and frequency are described in the Annual monitoring programmes for water of Slovakia. The 3rd RBMPs for both the Danube and Vistula RBDs mention that both operational and surveillance monitoring are undertaken. It is noted positively that, for the first time, this includes biota and sediment monitoring. It is also stated that all 45 priority substances, those that substances that are of EU concern, are included in the monitoring campaign but with some caveats. It is noted that the monitoring period used for the chemical status assessment is 2013 to 2018. Grouping approaches have been used, that means that results from monitored SWBs have been combined with extrapolations for adjacent water bodies. The RBMPs report that inventories of emissions have been developed based on a combination of the pollutant release and transfer register and monitoring to help identify discharges and potential pressures. The RBMPs state that for surveillance monitoring (covering water, biota, and sediment), 10 sites across Slovakia were selected and monitoring was carried out for all relevant priority substances (12 substances in the Vistula, and 34 substances in the Danube RBD). No further details on this issue are provided.

[2] Schmidt et al., (2023) Stock-taking analysis and outlook of drought policies, planning and management in EU Member States. Final report under contract "Technical and scientific support to the European Drought Observatory (EDO) for Resilience and Adaptation - Lot 2: In-depth assessment of drought management plans and a report on climate adaptation actions against drought in different sectors"

Status assessment

Figure 3 is based on the e-reporting to WISE and reflects the chemical status of SWBs in Slovakia reported in the 1st, 2nd and 3rd RBMPs[1]. At the time of the 2nd RBMPs it was assessed that 98 % of water bodies (1,473 water bodies) were in good chemical status and 2% (37 water bodies) had failed to achieve good chemical status. Note that no water bodies were in unknown status in the 1st, 2nd or 3rd RBMPs. The 3rd RBMPs (**including** uPBTs) shows a decline in this situation with 72 % now achieving good chemical status, and 29 % failing to achieve good chemical status. When excluding uPBTs, 96% of surface water bodies in Slovakia are in good status.

Figure 4 Chemical status of SWBs in the 1st RBMP, 2nd RBMP and 3rd RBMP



Source: WISE e-reporting

According to the EQS Directive[3], eight priority substances and groups of priority substances behave like ubiquitous, persistent, bioaccumulable and toxic substances (uPBT)[4]. These substances are generally expected to cause widespread exceedances, and their emissions can be challenging to tackle (e.g., due to long-range atmospheric transport and deposition). The main EQS failures in Slovakia occur due to uPBT substances, namely, mercury, PBDEs, PAHs, PFOS, dioxins and furans, tributyltin, and heptachlor and heptachlor epoxide. As in many other Member States, the three substances that primarily cause issues are Mercury and polybrominated diphenyl ethers (PBDEs) (in biota), and PAHs in surface water. Since the WFD operates a 'one out, all out' approach a water body can fail in relation to one or more than one substance (e.g. due to Mercury and PBDEs).

[1] Note that the data presented within the electronic reporting to WISE covers the status excluding uPBT substances. The Danube RBMP in particular reflects that the overall status has 71% of WBs are in good status and 29% are in poor status. The electronic reporting (excluding uPBTs) has 94% good chemical status and 6% poor chemical status across Slovakia.

[3] Amended by Directive 2013/39/EU

[4] Brominated diphenylether, Mercury and its compounds, Polyaromatic hydrocarbons (PAH), Tributyltin, PFOS, dioxins, hexabromocyclodecane and heptachlor

However, based on the 389 water bodies that fail to achieve good chemical status, the 241 water bodies fail due to exceedances of Mercury. Whereas PBDEs cause failures in 217 water bodies and benzo(a)pyrene in 153 water bodies. If PAHs and fluoranthene are counted together they are a cause of failure in 182 water bodies.

The other important substances which cause failure to achieve good chemical status relate to PFOS (22 water bodies), Lead (16 water bodies), Octylphenol (6 water bodies), dioxins and furans (4 water bodies), Cadmium (7 water bodies), Heptachlor and Heptachlor epoxide (3 water bodies based on biota and 2 water bodies based on surface water), Nickel (2 water bodies), and Tributyltin (2 water bodies).

For some of these substances the exceedances are localised (e.g., contaminated sites), for example "heptachlor and heptachlor epoxide" is a pesticide that has been banned in the European Union since 1984.

In order to show the progress made in tackling other priority substances, Member States have the possibility to present the information related to chemical status separately for these substances. Both RBMPs make use of the clause to present the data including all substances and also excluding uPBTs. For the Danube if the uPBT substances are excluded, the number of water bodies in good chemical status is 94 %. For the Vistula RBD if uPBT substances are excluded 100% water bodies (that is all 69) achieve good chemical status.

Regrettably, Slovakia does not provide any estimation of the share of water bodies achieving good chemical status by 2027.

4.2 Groundwater Bodies: what is their chemical status

Monitoring

The total number of GWBs in Slovakia is 106, increasing from 102 in the 2nd RBMPs (4 % increase), but the total GWB area remained almost the same. The change in the number of GWBs is due to the new knowledge acquired about geothermal sources. As a result, 4 new geothermal GWBs are delineated. Slovakia performs a sound monitoring of groundwaters. It is worth noting that in the 3rd RBMPs, 79% of GWBs (84) are monitored to ascertain their chemical status.

All substances causing risk of deterioration in chemical status, i.e. GWD Annex I and Annex II (Part B) substances and WFD Annex V (Point 2.4.2) core parameters are subject to monitoring.

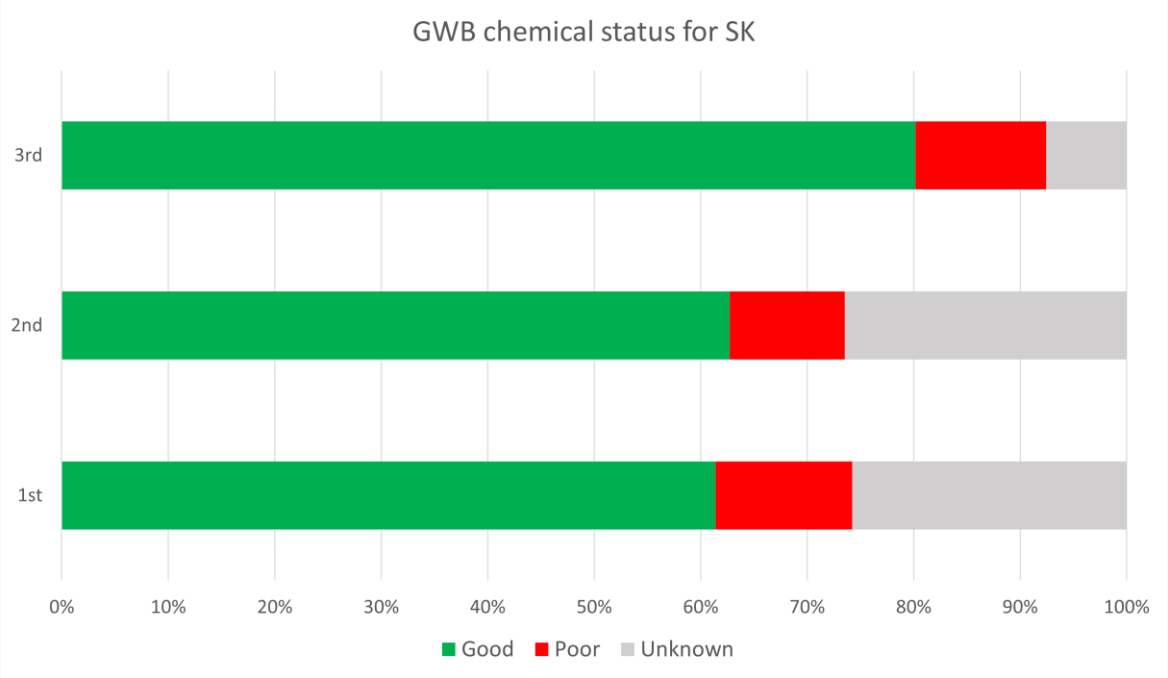
Status assessment

A gap analysis could not be identified for the pressures significantly affecting GWBs. It is noted with concern that the assessment of impacts on groundwater dependent ecosystems and saline or other intrusions are not considered in the assessment of chemical status of GWBs, although the issue existed already in the 2nd RBMPs.

There is no indication in the 3rd RBMPs that threshold values have been coordinated with neighbouring countries. The time series being used for the trends and trend reversal assessments extend only up to 2017 and the applied methodology is not elaborated (e.g., selection of monitoring frequencies and locations, baseline levels for substances that occur both naturally and from

anthropogenic sources, distinction between upward trends and variation of natural background levels).

Figure 5 Chemical status of GWBs 1st RBMP, 2nd RBMP and 3rd RBMP



Source: WISE e-reporting

In Slovakia, 80 out of 106 GWBs are assessed in good chemical status (i.e., 80.2 % of total GWBs and 68,8 % of total area) and 13 GWBs (i.e., 12.3 % of total GWBs and 23,0 % of total area) are assessed in poor chemical status in the 3rd RBMPs (Figure 5).

A clear improvement can be seen compared to the previous cycle, when 64 GWBs were in good chemical status and 11 GWBs were in poor chemical status (i.e., 62.7 % and 10.8 % of total GWBs, or 60.6 % and 17.2 % of total area respectively). This is largely due to the significant improvement in knowledge between the cycles, since unknowns have gone from 27 to 8 GWBs.

However, there are 15 GWBs at risk of failing to achieve good chemical status by 2027 due to nitrates, ammonium, phosphates, sulphates, arsenic, total organic carbon and pesticides.

The top five pollutants causing failure to achieve good chemical status of GWBs are phosphates (5.7 % of total GWBs), nitrates (5.7 %), ammonium (5.7 %), sulphate (5.7 %) and total organic carbon (TOC) (3.8 %).

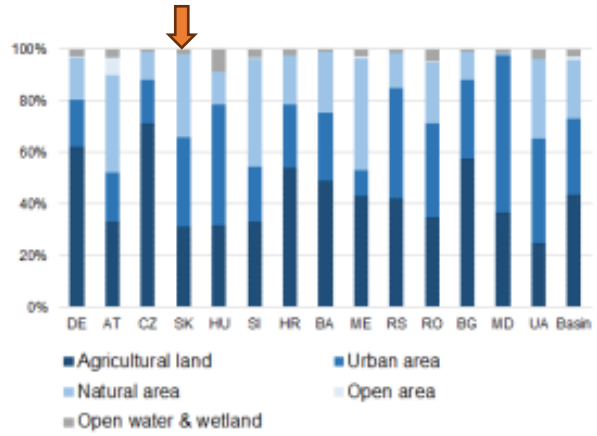
In addition to the ground water pollution, it is important to mention the old waste dump sites, which remain untreated, like in Bratislava's Vrakuňa chemical dump (in close vicinity of the drinking water reservoir Žitný Ostrov). Slovakia should speed up addressing these problems and explore the possibilities of a better use of EU funds.

4.3 What Slovakia is doing to combat pollution from agriculture

Agricultural pressures have been identified as significant in the 3rd RBMP. Yet the intensity of these and the measures taken remain the same as in the previous cycle. Some data suggests that the nitrogen and phosphorus pollution is decreasing. Regrettably, the RBMPs include limited information on the applied measures and the expected effects. Moreover, it is noted with concerns that despite some mentions to modelling, there are no data quantifying the agricultural nutrient load reduction needed to achieve the environmental objectives. This would be very much needed to tailor the measures that must be applied. For pesticide pollution, there is no gap assessment either. the RBMPs mention that there is one GWB at risk of failing good status by 2027 due to pesticide pollution. However, there is no further information about the specific measures planned to reduce the risk.

The international RBMP for Danube includes assessments of nutrient loads including considerations of the agriculture shares as can be seen in the figure below.

Figure 6 Share of sources in the overall Total Nitrogen emissions in the Danube countries for the reference period (2015-2018)



Source: Danube River Basin Management Plan Update 2021

The PoM provides information on measures addressing nutrients and pesticide pollution from agriculture and sorts them according to basic and supplementary measures and whether they are mandatory or voluntary. For nutrients from agriculture, only Key Type Measure 2 – Reduce nutrient pollution from agriculture- has been reported as a basic measure. Under KTM2, there is reference to basic measures such as those included under the Nitrates Directive and cross-compliance requirements under the Common Agricultural Policy (CAP)[5]. For basic measures, the farmers cover the costs of the measures. Examples of such measures include the changes to nutrient application standards and the adjustment of environmental nutrient loading limits through the adaptation of national legislation with appropriate penalties, which fall under the category of basic measures under the WFD. There is limited information on whether these measures will continue to be implemented and the extent to which they can deliver significant improvements.

[5]There is also information about relevant measures in "Mapping and analysis of CAP strategic plans" (2023-2027) the link Mapping and Analysis of CAP Strategic Plans - European Commission (europa.eu)

Pollution from pesticides is addressed the same way as nutrients and the RBMPs include only general references to the basic measures under cross-compliance requirements. As supplementary measures, the RBMPs make reference to the Rural Development Programme. Here again, the group of the measures for pesticides seem to be voluntary.

In relation to the application of the polluter's pay principle, this is partly applied for agriculture. In Slovakia, these basic measures are implemented by the Fertiliser Act, which also includes measures for nitrate vulnerable zones as defined under the EU Nitrates Directive. So beyond the Nitrates Action Plan, there seems to be very few mandatory measures for farmers. The supplementary measures are funded by the CAP[6] or by national support. Under the CAP for 2023-2027, Slovakia aims for an increase from 13.7% in 2022 to 20% coverage of the agricultural lands by organic farming in 2030[7].



4.4 What Slovakia is doing to combat pollution from other sectors

Slovakia's RBMPs report that there are measures to eliminate pollution of surface waters by priority substances and to progressively reduce pollution by other substances, which would otherwise prevent achievement of the objectives set out in WFD. The basic measures include compliance with the Urban Waste Water Treatment Directive and the Industrial Emissions Directive as the main instruments to address chemical pollution.

Overall, 93% of the urban waste water in Slovakia is treated according to the requirements of the UWWTD. This is above the EU average of 76%. According to the 2nd RBMPs discharges of urban waste water contributed significantly to less than good water quality in 8.7% of river water bodies and 13.7% of groundwater bodies area. Discharges of waste water from unconnected dwellings contributed significantly to less than good water quality in 14.4% of groundwater bodies area. Discharges from storm water overflows were not reported as significant pressures.

Supplementary measures include for example KTM14 on further knowledge gathering on measures to address chemical pollution. It also includes KTM10, where it is mentioned that the environmental tax on wastewater discharges should consider the emissions of hazardous substances.

There is no information in the RBMPs that allows to determine whether measures planned to address all drivers causing chemical pollution. Even though RBMPs list the KTM that are to be applied, they do not provide sufficient details of their actual implementation or how they are expected to address specific drivers causing chemical pollution. Worth noting is the key measures pertaining to revision of permits / authorisations and construction of wastewater treatment plants which were already in the 1st and 2nd cycles. In the 3rd RBMPs, the same measures are listed but no further details are provided.



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

The Key Types of Measures (KTM) are groups of measures identified by Member States in the PoM, which target the same pressure or purpose. The RBMPs do distinguish between basic and supplementary measures. The prioritisation of measures is mentioned for the purpose of removing

[6] Mapping and analysis of CAP strategic Plans (2023 – 2027) Mapping and Analysis of CAP Strategic Plans - European Commission (europa.eu)
[7] At a glance: Slovakia's CAP Strategic Plan (europa.eu)

hydromorphological pressures. The prioritisation includes synergistic effects of different measures on the water bodies affected by hydromorphological pressures, these pressures are usually the clearance of barriers for fish. Also, all other types of measures to improve the hydromorphological quality of SWBs were considered, including the protection of Natura 2000 sites.

Other significant water management issues mentioned in the RBMPs are Sediment quality management and Revitalisation of regulated rivers, with the aim of supporting natural processes that lead to the restoration and preservation of the biodiversity of the river ecosystem.

For Slovakia no information has been found on a full gap analysis for all pressures in the RBMP documents. Progress has been made in the delineation of water bodies and in identifying pressures. There are a wide variety of measures presented, but it is not possible to ascertain with 100 % certainty if these cover all pressures, without analysis of the electronic reporting[8].

5. Exemptions and economics



5.1 To what extent are exemptions applied in Slovakia

Article 4(4)

Article 4(4) exemptions have been applied to 787 SWBs (58 % of SWBs) for ecological status and to 389 SWBs (29 % of SWBs) for chemical status. This represents a considerable increase compared to the previous cycle even if it is not possible to make a direct comparison of the application of exemptions with the 2nd RBMPs. Indeed, this is due to the reduction in the number of surface water bodies (decreasing from 1510 to 1351 SWBs). All Article 4(4) exemptions have been justified based on technical feasibility, disproportionate costs and natural conditions. The application of Article 4(4) to GWBs remained the same for quantitative status (3 GWBs) and increased for chemical status (from 11 to 13).

It is worth noting that Slovakia has developed a "Methodology for Economic Explanation of Exemptions" under Article 4(4) and 4(5) of the WFD to establish whether a water body may be exempted from achieving the environmental objectives. The methodology contains essential criteria and further guidance on the logic to be applied when applying one of the two provisions.

Article 4(5)

Equally, it is noted with concern the considerable increase in the use of Article 4(5) derogations for groundwaters. In the 2nd RBMPs, Article 4(5) was applied in one surface water body of the Danube RBD due to technical feasibility and disproportionate costs. In the 3rd RBMPs, one SWB was exempted based on grounds of technical feasibility and disproportionate costs (ecological status), seven GWBs based on grounds of technical feasibility (for quantitative status), five GWBs due to disproportionate costs (for quantitative status) and three GWBs based on grounds of technical feasibility (for chemical status) and one GWB due to disproportionate costs (for chemical status).

For surface water body SKH0023, a justification for applying Article 4(5) exemption is provided, including details on the source of pollution, measures applied, technological and economic impact of

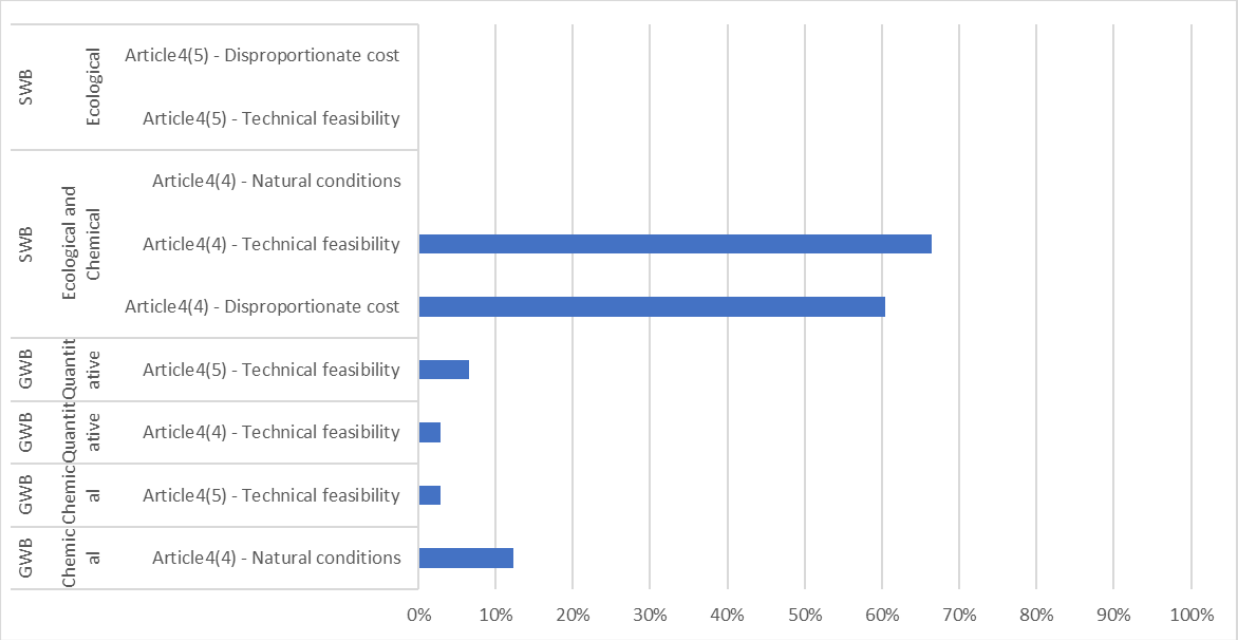
[8] The partial electronic reporting (which was only available for the Vistula RBD at the time of writing) has reported "all measures completed". Delays, lack of finance and extreme events were reported as the only obstacles.

ensuring compliance at the manufacturing plant level. For groundwater bodies, the RBMPs contain water body specific descriptions and detailed justifications for applying Article 4(5) exemptions on the grounds of technical feasibility including details on the status, sources of pressures, measures planned and implemented, climatic and hydrogeological conditions etc. The application of Article 4(5) to GWBs was made on the grounds of technical feasibility and affected seven GWBs (quantitative status) and three GWBs (chemical status).

It is noted positively that exemptions pursuant to Article 4(6) (temporary deterioration for reason of 'force majeure') have not been applied.

It is noted that Article 4(7) (deterioration or prevention of achievement of good status or potential as a result of new modifications or new sustainable human development activities) has been applied to 5 surface water bodies of the Danube and Vistula RBD, whereas it was not invoked in any case for the previous cycle.

Figure 7 Type of exemptions reported to be applied to SWBs and GWBs for the 3rd RBMPs in Slovakia



Note: updated numbers available at WISE e-reporting

Source: Data mining

There has been a steady progress on transparent application of Article 4 exemptions. While the overall number of exemptions remains considerable and, in some cases, increasing, progress has been made in relation to providing clear and transparent justifications, albeit not in all cases as required by the law. In particular, significant progress has been achieved in relation to justifying Article 4(7) exemptions: the assessment of each exemption is very detailed; however, it is not entirely clear whether cumulative effects have been explicitly considered.

5.2 Use of economic analysis and water pricing – cost recovery

The RBMPs present an enhanced economic analysis in response to the Commission's recommendations on the 2nd RBMPs. The table below reports on the presence in the RBMPs of the various assessment elements as listed in WFD Annex III.

The economic analysis takes into account long-term forecasts of water supply, but the corresponding water demand forecasts only run until 2027, i.e. the end of the programming period. While of course the Programme of Measures contains the investments until 2027, the strategic orientation of the investment efforts thus appears underdeveloped, i.e. whether the built-up capacity will be sufficient for the medium and long term, and how to combine investments with demand management, i.e. the extent of investments in water use efficiency. While the economic analysis also includes volume estimates associated with the different water services, differentiated overuse types / sectors, the presence and use of cost and price estimates for the water services could not be verified.

Figure 8 Requirements under Annex III of the Water Framework Directive

1	long term forecasts of water supply	
	differentiated over type of supply source	
2	long term forecasts of water demand	
	differentiated over user type/sectors	
3	volume estimates for the distinct water services	
	differentiated over user type/sectors	
4	cost and price estimates for the distinct water services	
	differentiated over user type/sectors	
5	investment forecasts - total	
	differentiated over type of supply source	
6	costing of measures	
7	judgements about the most cost-effective combination of measures	

The RBMPs provide the estimates of the potential costs of measures and the extent this is meant to be financed by national, private or EU funding, but they do not say much about the use of cost-effectiveness analysis (CEA) and more generally the criteria for prioritising measures. For instance, while CEA is mentioned in the context of addressing hydromorphological pressures, river restoration measures appear to have been selected at the hand of a set of “revitalisation priorities” with an unclear role of the cost factor.

The RBMPs do not provide a clear overall conclusion as to whether pricing policy provides adequate incentives to use water efficiently, although the provided information seems to suggest that on balance limited to modest incentives have been put in place. The regulatory authority (the Office for Regulation of Network Industries) sets a single combined tariff for the two broad water services 'drinking water provision' and 'sanitary services', based on “economically justified costs” and this cost-based price setting is reportedly applied uniformly across Slovakia and over the household, industrial and agricultural sectors. This tariff is based on a unit rate applied on consumption volumes, with a threshold below which no price is charged (a variant of a social tariff). Moreover, there is a fee applied to water used for hydropower generation, while the unit rate of water abstraction is the same for public water supply systems and for industry.

However, the RBMP offers evidence that groundwater abstraction charges should be higher for all sectors, with the exception of drinking water, and that from an efficiency perspective, prices for irrigation water abstraction should gradually increase up to the level of drinking water prices. Nevertheless, it appears that the RBMPs have not opted for this course of action as this would bring undesirable social and economic impacts on the agriculture sector. Similar to the pricing threshold applied to drinking water consumption, this appears to concern an implicit call on the mitigation factors on water services' cost recovery as foreseen in article 9 of the WFD.

The RBMP reports for the period 2016-2018, (nearly) full cost recovery rates for the collective water supply and sanitation services and high recovery rates for the other us water services (with only a few incidental exceptions). Because a lack of a sectorial breakdown, there does not seem too much specific and quantitative corroboration of the RBMPs' general assurance that the three broad water user sectors (agriculture, industry and households) provide an adequate contribution to cost recovery.

There does not appear to be a comprehensive appraisal of the environmental and resource costs, as the national methodology is reported to be still under development. For now, these costs are assumed to be largely captured by the revenues of water abstraction and pollution fees in place. However, as regards the former, it is unclear whether abstraction fees can vary with scarcity conditions; and as regards the latter, there is no account that the fee rates reflect the actual environmental damage costs and that the fee captures all pollution. This qualifies the RBMPs' statement that the polluter pays principle has been applied in the cost recovery efforts.



6. WFD recommendations

Recommendations - Slovakia should:

1. Increase the level of ambition and accelerate action to reduce the compliance gap as much as possible by 2027. This implies:
   a) the development of more robust Programmes of Measures based on a clearer assessment of the gap to be bridged to reach good status and a clearer prioritization of measures.
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. This implies for example:
   a) Slovakia should develop more robust Programmes of Measures based on a clearer assessment of the gap to be bridged to reach good status and a clearer prioritization of measures. Also, the programme of measures should identify for each measure how success (or failure) of a measure will eventually be measured, allowing for feedback loops and improvements;
   b) Slovakia should enhance measures to reduce pressures from agriculture by adopting measures also beyond voluntary measures subsidies under the CAP Strategic Plan and reduce impacts on surface water bodies;
   c) Slovakia should provide information on how mitigation measures improve the status of various BQEs.
   d) Slovakia should take all necessary mitigation measures to reduce the harmful impacts of (small) hydropower plants installed along river Hron and other rivers. These measures are necessary to allow

these water bodies to make progress towards reaching good status by end of 2027 as foreseen by the Water Framework Directive.

3. Slovakia should increase investments and ensure adequate financing including implementation of cohesion funding to effectively implement the Programme of Measures to reach the objectives of the WFD. This involves in particular:
   a) Slovakia should more explore possibilities of make polluters pay (Article 9 WFD), to clean up contaminated industrial sites (especially for pollution from agriculture brown fields) and reducing nutrient and pesticide pollution;
   b) Slovakia should do a proper assessment on funding needs and reflect them in the RBMPs.
4. As regards monitoring, assessment, data management and reporting, Slovakia should:
   a) define a methodology for ecological flows based on CIS Guidance No. 31 and apply it in practice when granting water permits;
   b) establish the nutrient and pesticide load reduction needed to achieve the environmental objectives;
   c) In cooperation with the Commission and the EEA, ensure timely reporting in line with WFD requirements and more complete electronic reporting for future cycles, and make better use of the opportunities from digitalisation and earth observation to enable a better assessment of the state of implementation of the WFD and reduce reporting burden;
   d) Further improve data quality and data comparability by harmonising methods and electronically collected data across RBDs, on monitoring, assessments, projections, economic assessment, etc. and make all data openly available through timely publication in line with the requirements of the INSPIRE, Open Data and Public Sector Information Directive (PSI) Directives and the public sector High Value Datasets (Commission Implementing Regulation (EU) 2023/138) to help eliminate the need for reporting.
5. On the use of economic tools, Slovakia should:
   a) improve price incentives and application of the polluter-pays principle (PPP);
   b) transparently and more clearly report on the economic analysis.

SECTION B:

FLOODS DIRECTIVE

7. Flood risk management under floods directive (FD)

Slovakia has failed to comply with its legal obligation and has not reported the 2nd FHRMs and the 2nd FRMPs in time. The Commission has thus been bound to launch legal proceedings.