Ministry of Environment of the Slovak Republic

WATER PLAN OF THE SLOVAK REPUBLIC

Update 2021

Summary Information

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Ministry of Environment of the Slovak Republic

Water Plan of the Slovak Republic

Danube River Basin Management Plan

Vistula River Basin Management Plan

Update 2021

Summary Information

Declaration

The purpose of this publication is to provide an overview of the most important information presented in the document *Water Plan of the Slovak Republic (Danube River Basin Management Plan, Vistula River Basin District Management Plan) – Update 2021*, approved by the Resolution of the Government of the Slovak Republic No. 319 of May 11, 2022.

In the publication, the data from the Danube River Basin Management Plan and from the Vistula River Basin Management Plan are summarized in a brief form from the perspective of the entire Slovak Republic. The source of the data in the texts, tables, graphs and maps used in this publication is the *Water Plan of the Slovak Republic – Update 2021*. If the tables present summary data that is not explicitly stated in the water plan, this fact is indicated in the references below the tables.

The content of the publication does not replace or supplement the *Water Plan of the Slovak Republic – Update 2021*. References to this publication cannot therefore replace references to the *Water Plan of the Slovak Republic – Update 2021*.

The full text of the *Water Plan of the Slovak Republic – Update 2021* is available on the website of the Ministry of the Environment of the Slovak Republic (https://www.minzp.sk/voda/vodny-plan-slovenska/). Its development was ensured by the Ministry of Environment of the Slovak Republic through the organizations managed by the ministry, namely: Water Research Institute, Slovak Hydrometeorological Institute, Slovak Water Management Enterprise, State Geological Institute of Dionyz Stur, Slovak Environment Agency, State Nature Conservation of the Slovak Republic, Water Management Construction. The state water authorities, other concerned state authorities and interested entities, especially representatives of municipalities, industry, agriculture, water companies, and other stakeholders, collaborated on its preparation. Public consultations were held from October 2020 to December 2021, in which key stakeholders and the public participated.

This publication was compiled and published by the Slovak Environment Agency as a part of the national project Information and Providing Advice on Improving the Quality of Environment in Slovakia. Thanks for the cooperation in its development goes to Ivana Bajkovićová from the Water Research Institute and Danka Thalmeinerová and Ľudmila Strelková from the Ministry of the Environment of the Slovak Republic.

Contents

Foreword

In May 2022, the Government of the Slovak Republic by its Resolution No. 319/2022 adopted the Water Plan of the Slovak Republic (Danube River Basin Management Plan, Vistula River Basin t Management Plan) – Update 2021. This, already the third Water Plan of the Slovak Republic ('hereafter as 3WMP') is valid for the period 2022 – 2027 and creates conditions for achieving good water status.

The Water Plan of the Slovak Republic – Update 2021, and the river basin managements plans contained in it, are extensive documents, the processing of which involved a wide team of experts from several professional organizations, under the coordination of the Water Policy Directorate of the Ministry of Environment of the Slovak Republic and the Water Research Institute.

The aim of this publication is to provide, in abbreviated form, basic information on the findings and measures presented in the Water Plan of the Slovak Republic – Update 2021, the impacts of human activity on water bodies, their status, measures to achieve a good status and the progress in achieving goals. With the structure of Chapters 1 to 12, the publication copies the structure of the Water Plan of the Slovak republic – Update 2021, while the chapters are shortened and supplemented with a summary of data from two river basin management plans at the level of Slovakia as entire territory. At the same time, the reader of the electronic version has the opportunity to look into the annexes and maps of river basin management plans by using direct Internet links.

1 Introduction

Water planning is based on Directive 2000/60/ES of the European Parliament and of the Council establishing a framework for Community action in the field of water policy[1] (hereafter as 'Water Framework Directive' or 'WFD'), which has been transposed into Act No. 364/2004 Coll. on water and on amendments to the Act of the National Council of the Slovak Republic No. 372/1990 Coll. on offences, as amended (the Water Act), as later amended, and other related legislation. A vision of the water policy is the achievement of environmental objectives, which means achieving good water status.

River basin management plans (hereinafter as 'RBMP'), including programs of measures, are the instrument for achieving the objectives of the WFD. In the Slovak Republic, the Danube River Basin Management Plan and Vistula River Basin Management Plan are being developed, which are part of the Water Plan of the Slovak Republic. The lower unit involves the sub-basin management plans; these are prepared for 10 sub-basins in the Slovak Republic.

The planning process takes place in six-year planning cycles. In the 2022 – 2027 period, this is the 3rd planning cycle in which the 2nd update of the river basin management plans is being implemented.

River basin management plans and of sub-basin management plans are elaborated by the Ministry of Environment of the Slovak Republic through the its supervised organizations, in cooperation with the state water administration authorities, other concerned state administration authorities and other stakeholders, in particular the representatives of municipalities, industry, agriculture, water supply companies and other institutions, non-governmental organizations and the public concerned.

The tasks for the 3rd planning cycle are modified taking into account lessons learned from the first two planning cycles and current development, with emphasis on activities to implement the WFD and other EU water-related Directives. The baseline data for the 3rd planning cycle covers the 2009 – 2018 period. The strategic documents adopted at European and national levels have been taken into account in the elaboration of the RBMP.

In parallel with the 3WPS, the Ministry of Environment of the Slovak Republic (hereafter as 'MoE SR') developed the Water Policy Concept until 2030 with a prospective to 2050 (hereinafter as the 'Concept') as a strategic document that integrates national planning instruments and supports the integration of water policy objectives into all sectoral policies. The Concept sets objectives and actions in ten areas: Water in the landscape, Water in the urban settlements, Sustainable water use, Water for all citizens, Clean water, Living rivers,

[1] https://eur-lex.europa.eu/legal-content/SK/TXT/?uri=CELEX%3A32000L0060&qid=1684341495543

The Danube River, Understanding water, Responsible and informed decision-making about water, and Water as a strategic investment. The objectives, measures of the Concept and the related indicators are in synergy with the measures resulting from the 3WPS and with other measures in documents related to water protection, water management and water use, in particular in the plans for the development of public water supply and sewerage systems and in the flood risk management plans.

1.1 Approach to the river basin management and relations between the management levels

Slovakia works together with other EU countries on a join approach to water protection and river basin management as a whole. The implementation of the WFD is therefore performed at different levels, particularly international river basins, river basin (hereafter as 'RBMP'), and sub-basins designated in the territory of each EU member state.

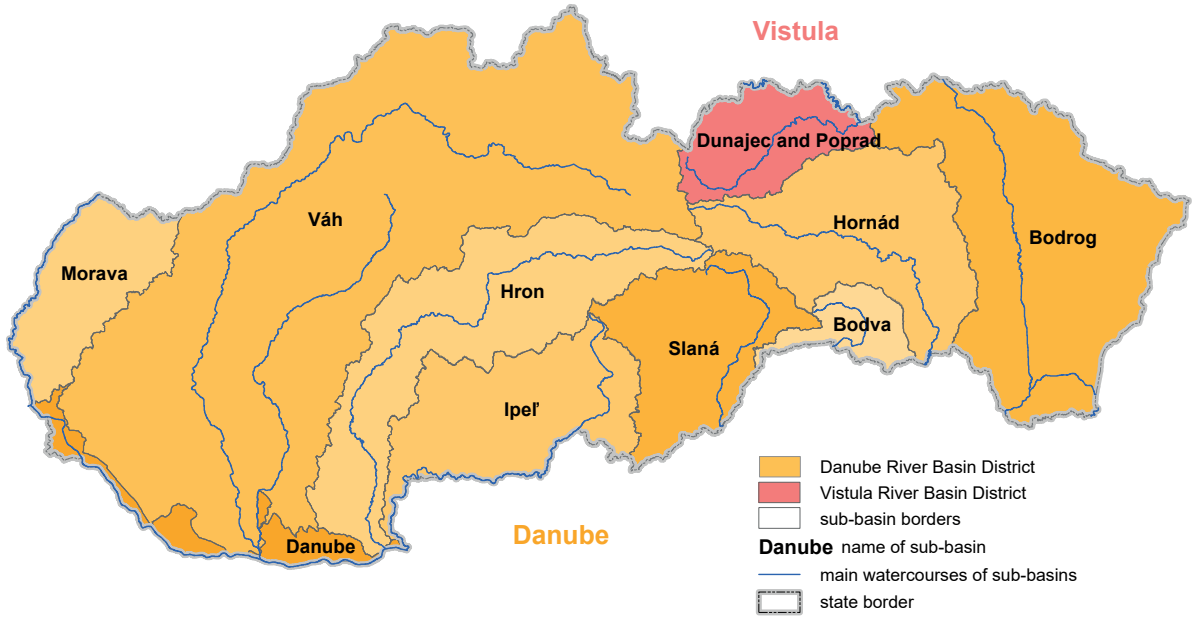
The management plans are developed for the following:

Level 3 – the Danube and Vistula River basins at international level. The ICPDR elaborates and implements the international Management Plan for the Danube River Basin.

Level 2 – national parts of the Danube River and Vistula River basins. In the Slovak Republic, these correspond to the Danube River Basin Management Plan and Vistula River Basin Management Plan.

Level 1 – sub-basins. At this level, the sub-basin management plans for the Morava, Danube, Váh, Hron, Ipeľ Slaná, Bodva, Hornád and Bodrog rivers correspond to the Danube RBD and the Dunajec and Poprad sub-basins correspond to the Vistula RBD. They form the basis for the processing of the RBMP of levels 2 and 3.

Figure 1.1 River basin districts of the Slovak Republic and their sub-basins



Slovakia, whose territory is part of two international river basins, has to align its procedures and programs of measures with the higher-order international plans (Level 3: the international Danube River and Vistula River basins). Therefore, the national RBD plans must also address environmental problems that would not necessarily be addressed for national needs (e.g., nutrient pollution of the Black Sea). The positives of this approach are experience sharing, information and transformation of relevant issues to the level of the whole river basin district, sharing of national approaches and improving their compatibility, improving information flows (especially important for early warning in case of floods, droughts and accidents), etc.

2 Characterization of the river basins

The basin characterization under the WFD referring to surface water includes characterization of surface water body types, establishment of type-specific conditions for these types, identification of pressures and assessment of impacts. The characterization of groundwater includes an initial characterization and supplemental characterization, a review of the impact of anthropogenic activities on the groundwater, a review of the impacts of changes in groundwater levels, and the impact of pollution on the quality of the groundwater.

The above-mentioned steps further aim to identify water bodies that are at risk of failing to meet the environmental objectives by 2027. The results of this stage are utilized to set up the monitoring program, define significant water management problems, and finally draw up programs of measures.

2.1 General description

The basic characteristics of the river basins districts are shown in Tab. 2.1.

Table 2.1 Basic characteristics of the Danube and Vistula river basin districts

	Danube RBD	Vistula RBD
International river basin area	801,463 km²	226,201 km²
Area of RBD in the Slovak Republic	47,084 km²	1,950 km²
Length of the river in the territory of the Slovak Republic	Danube: 172 km	Vistula: 0.0 km Dunajec: 17.0 km Poprad: 142.5 km
Sub-basins of the district and their area:	1. Morava: 2,282 km² 2. Danube: 1,138 km² 3. Váh: 18,769 km² 4. Hron: 5,465 km² 5. Ipeľ: 3,649 km² 6. Slaná: 3,217 km² 7. Bodva: 858 km² 8. Hornád: 4,414 km² 9. Bodrog: 7,272 km²	1. Dunajec and Poprad: 1,950 km²
Average precipitation	Ranging from 2,000 mm.y⁻¹ (Váh basin) up to 500 mm.y⁻¹ (Bodrog basin and Danube Lowland)	
Number of inhabitants (31.12.2019)	5,223,771	234,102

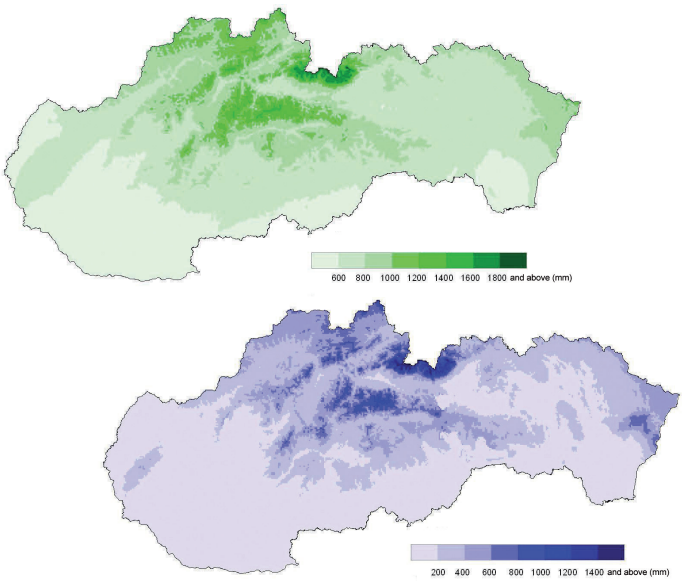
Basic information on the water potential of the basin includes data on average runoff and precipitation. The precipitation/runoff values vary considerably from sub-basin to sub-basin, in relation to the orographic and hydrogeological conditions.

Tab. 2.2 Hydrological balance for the 1961 – 2000 period

Sub-basin	Area [km²]	Precipitation (P) [mm]	Run-off (R) [mm]	P - R [mm]
Morava	2,282	614	101	513
Danube	1,138	611	38	573
Váh	18,769	788	268	520
Hron	5,465	790	289	501
Ipeľ	3,649	636	135	501
Slaná	3,217	713	190	523
Bodva	858	690	125	565
Hornád	4,414	701	203	498
Bodrog	7,272	718	223	495
Dunajec and Poprad	1,950	868	430	438
SR	**49,014**	**743**	**234**	**509**

Source: SHMI

Map of precipitation and run-off



2.2 Surface water

2.2.1 Categories of water bodies

One of the basic steps in the characterization of a river basin is to divide surface water into categories (rivers, lakes, transitional or coastal water) and then to divide the water bodies in each category into types. In the Slovak Republic, only rivers are defined as categories – including rivers with a changed category, which includes reservoirs. Water bodies in the category of lakes, which, according to the relevant EU methodologies, includes natural lakes with an area of more than 0.5 km^2, are not found in the Slovak Republic. Due to the inland geographic location of the country, there are no coastal or transitional water in the Slovak Republic.

2.2.2 Typology and reference conditions

The typology of rivers (running water) and rivers with a changed category (reservoirs - stagnant water) is needed to monitor and assess the status of surface water bodies. In total, 24 types of surface water bodies are identified in the Danube RBD and 6 types in the Vistula RBD.

The identification of reference conditions for each type of water body (for biological, physical-chemical and hydromorphological quality elements) and threshold values is essential for the classification of the ecological status of water bodies.

2.2.3 Designation of water bodies

A surface water body represents the basic unit for water planning. All assessments and activities (e.g., assessment of water status, definition of heavily modified water bodies, water status improvement measures, etc.) are related to specific water bodies (hereafter as 'WB').

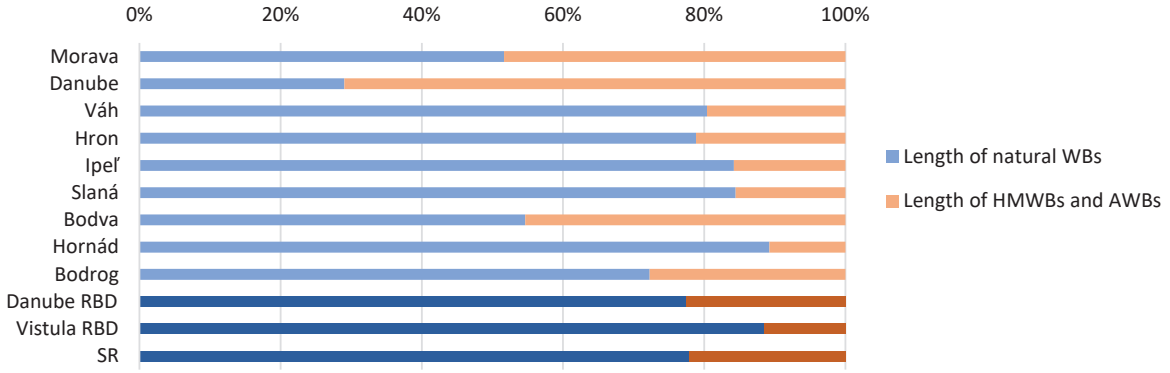
In each planning cycle, the initial delineation of WB was subject to revised to allow for more efficient management of WBs or more accurate characterization based on new knowledge. In the development of the 3rd cycle of the RBMPs, the review of surface water bodies was made in line with the updated Annex of the WFD Common Implementation Strategy Guidance No. 4 Identification and Definition of Heavily Modified and Artificial Water Bodies.

Tab. 2.3 Overview of the number of surface water bodies by sub-basins in individual planning cycles

Sub-basin	Surface water bodies in the river category					
	1st planning cycle		2nd planning cycle		3rd planning cycle	
	running	stagnant	running	stagnant	running	stagnant
Morava	102	1	77	1	68	1
Dunube	18	0	18	0	15	0
Váh	633	8	542	8	485	8
Hron	215	2	186	2	159	2
Ipeľ	129	3	119	3	114	3
Slaná	104	3	86	3	80	3
Bodva	35	1	32	1	28	1
Hornád	164	2	134	2	117	2
Bodrog	254	3	219	3	193	3
Dunajec and Poprad	83	0	74	0	69	0
Danube RBD	**1,654**	**23**	**1,413**	**23**	**1,259**	**23**
Vistula RBD	**83**	**0**	**74**	**0**	**69**	**0**
SR	**1,737**	**23**	**1,487**	**23**	**1,328**	**23**

Natural (NAT), heavily modified (HMWB) and artificial (AWB) water bodies are distinguished by their nature. The identification and definition of heavily modified and artificial water bodies is a methodologically defined process that takes into account changes in environmental, social and economic circumstances over time. The share of the defined HMWBs and AWBs in the total length of water bodies in the Slovak Republic is more than 20%. This share is highest in the Danube sub-basin (see Figure 2.1). The HMWBs and AWBs have the longest length of 1,293 km in the Váh sub-basin.

Figure. 2.1 Proportional representation of lengths of natural water bodies and HMWBs and AWBs in 3rd planning cycle



Tab. 2.4 Nature of surface water bodies in the RBDs and in the Slovak Republic in the 3rd planning period

WBs nature	Danube RBD	Vistula RBD	SR
Natural water body (NAT)	976	58	1,034
Highly modified water body (HMWB)	253	11	264
Artificial water body (AWB)	53	0	53
Total	**1,282**	**69**	**1,351**

2.3 Groundwater

2.3.1 Designation of groundwater bodies

A total of 106 groundwater bodies have been designated for the 3rd planning cycle. These are divided into groundwater bodies in quaternary sediments, in pre-quaternary rocks and in geothermal structures. In the framework of the update of the geothermal groundwater bodies, 31 prospective geothermal areas (geothermal groundwater bodies) have been identified in the Danube RBD, of which 4 are new geothermal groundwater bodies, taking into account also the geothermal water resources belonging to the medicinal water.

Tab. 2.5 Overview of the number of groundwater bodies and their area in the 3rd planning period

Basin	Groundwater bodies					
	in quaternary sediments		in pre-quaternary rocks		geothermal structures	
	number	Area [km²]	number	Area [km²]	number	Area [km²]
Danube RBD	15	10,226.042	56	47,105.278	31	17,638.067
Vistula RBD	1	420.759	3	1,970.861	0	0
SR	**16**	**10,646.801**	**59**	**49,076.139**	**31**	**17,638.067**

2.4 Overview of significant water management issues

Significant water management issues correspond to pressures/impacts on the water environment that threaten the achievement of environmental objectives. In water planning, therefore, attention needs to be paid to them. The process of identifying and proposing significant water management issues for the 3rd planning cycle took place in 2019 and 2020 and involved a consultation with the public.

The following significant water management issues for the 3rd planning cycle were identified:

1. organic pollution of surface water
2. nutrient pollution of surface water
3. pollution of surface water by priority substances and chemicals relevant for the Slovak Republic
4. hydromorphological changes
   - disruption of longitudinal continuity

- morphological changes and disruption of lateral connectivity
- hydrological changes
- perspective infrastructure projects

5. groundwater pollution
   - nitrogen pollution of groundwater
   - pesticide pollution of groundwater
   - groundwater pollution by other hazardous substances
6. deterioration of groundwater quantity status
7. negative impacts of climate change – drought, water scarcity and other impacts of climate change.

The identified significant water management issues are the main pillar of the RBMP development. A program of measures is proposed to eliminate the significant water management issues and achieve the objectives.

2.4.1 Other significant activities and emerging issues

Other topics in water management are also being studied to determine their importance and relevance, or potential to become a significant issue or the need to increase knowledge on the subject.

The RBMPs also address these important activities and emerging issues:

- invasive species,
- sediment management,
- fisheries management,
- sturgeon issue,
- microplastics and emerging substances.

2.4.2 Integration with other sectoral policies

The coordination and integration with other sectoral policies is an important area for meeting the objectives of the WFD. They are the following:

- flood risk management,
- inland waterway transport,
- hydropower,
- agriculture,
- spatial planning and urban development,
- protection of marine environment in line with EU Marine Framework Strategy Directive

3 Register of protected areas

The register of protected areas contains a list of protected areas as defined in §5 of the Water Act, including areas designated for the protection of habitats or species of plants and animals for which the maintenance or improvement of water status is an important factor for their protection (see also Map Annex 3.1. to the RBMP).

3.1 Protected areas intended for drinking water abstraction

The subject of protection are water supply resources that have three types of protection:

- protection zones of water supply resources (PZ WSR) – to ensure the protection of the water yield, quality and health safety of the water in the water supply resource,
- basins of water supply courses – there are 102 water supply streams in the Slovak Republic that are used as a water supply source or can be used as a water supply source for drinking water abstraction,
- protected water management areas (PWMA) – 10 PWMAs are declared in the Slovak Republic, defined in accordance with Act No. 305/2018 Coll. on protected areas of natural water accumulation.

Table 3.1 Overview of water supply resources and their protection zones

Sub-basin	Number of WSR		Number of PZ WSR		Area of PZ WSR [ha]	
	groundwater	surface water	groundwater	surface water	groundwater	surface water
Morava	104	0	28	2	13,149	549
Danube	131	0	25	0	2,499	0
Váh	1,146	12	495	25	209,178	37,379
Hron	334	7	175	14	53,680	9,346
Ipeľ	108	2	72	5	11,257	8,393
Slaná	112	3	78	9	18,844	16,317
Bodva	48	1	34	15	13,968	10,143
Hornád	282	13	180	33	18,219	59,708
Bodrog	350	13	253	35	6,700	192,260
Dunajec and Poprad	115	10	66	15	15,218	15,802
Danube RBD	**2,615**	**51**	**1,340**	**138**	**347,494**	**334,095**
Vistula RBD	**115**	**10**	**66**	**15**	**15,218**	**15,802**
SR	**2,730**	**61**	**1,406**	**153**	**362,712**	**349,897**

Source: WRI

Table 3.2 Protected water management areas in the Slovak Republic and their basic characteristics

No.	Name of PWMA	Area of the PWMA	Share in the area of the SR	Usable quantities of PZ			Land area	
		[km²]	[%]	surface water [m³.s⁻¹]	groundwater [m³.s⁻¹]	total [m³.s⁻¹]	agricultural [km²]	forest [km²]
1.	Žitný ostrov	1,400	2.86	-	18.00	18.00	1,150.0	50.00
2.	Strážovské vrchy	757	1.54	-	2.33	2.33	307.00	370.00
3.	Beskydy-Javorníky	1,856	3.78	1.84	0.69	2.53	670.00	1,029.80
4.	Veľká Fatra	644	1.31	0.97	2.98	3.95	266.00	369.00
5.	Nízke Tatry							
	a) western part	358	0.73	-	2.50	2.50	-	-
	b) eastern part	805	1.64	2.33	2.43	4.76	-	-
6.	Upper basin of the Ipeľ, Rimavica and Slatina rivers	375	0.76	1.09	0.11	1.20	199.00	150.00
7.	Muránska planina	205	0.42	-	1.40	1.40	23.00	178.00
8.	Upper basin of Hnilec river	108	0.20	0.16	0.10	0.26	-	-
9.	Slovensky kras							
	a) Plešivecká planina	57	0.12	-	0.55	0.55	11.00	46.00
	b) Horný vrch	152	0.31	-	1.97	1.97	23.50	126.00
10.	Vihorlat	225	0.46	0.08	0.43	0.51	42.00	180.00
Total		**6,942**	**14.16**	**6.47**	**33.49**	**39.96**	**3,085.40**	**3,289.80**

3.2 Protected areas for recreation and bathing water

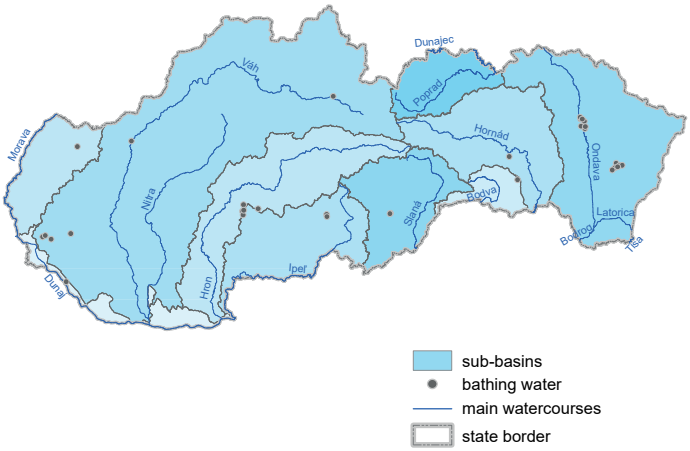
In 2019, 32 sites were designated as bathing water. A list of sites is provided in Annex 3.1 of the RBMP. Regular monitoring and assessment of water quality in four quality classes is performed at these sites, according to the criteria required by the Directive 2006/7/EC concerning the management of bathing water quality. Reports on bathing water quality are published annually by both the PHA SR[2] aj European Commission[3].

[2] https://www.uvzsr.sk/web/uvz/narodna-sprava-o-kvalite-vody-na-kupanie-a-kupaliskach

[3] https://www.eea.europa.eu/themes/water/europes-seas-and-coasts/assessments/state-of-bathing-water/state-of-bathing-water-4

Table 3.3 Overview of protected areas with bathing water in 2019

Sub-basin	Number of bathing sites	Area [km²]
Morava	1	0.63
Danube	1	0.78
Váh	6	24.73
Hron	3	1.00
Ipeľ	4	1.85
Slaná	2	0.70
Bodva	1	0.29
Hornád	1	4.60
Bodrog	13	48.78
Dunajec and Poprad	0	0
Danube RBD	**32**	**83.36**
Vistula RBD	**0**	**0**
SR	**32**	**83.36**



3.3 Nutrient-sensitive protected areas

In the Slovak Republic, two types of areas are identified where nutrient pollution should be prevented:

- sensitive areas are surface water bodies in which an undesirable water quality status is or may be caused by increased nutrient concentrations in water bodies used or capable of being used as water supply resources and which require a higher level of treatment of discharged wastewater to enhance water protection. In the Slovak Republic, one sensitive area is designated, which is the entire territory of the Slovak Republic with all surface water bodies.
- vulnerable zones are agricultural areas from which rainfall runoff reaches surface water or percolate into groundwater and where nitrate concentration in groundwater is higher than 50 mg.l^{-1} or are likely to exceed 50 mg.l^{-1} in the foreseeable future. The list of vulnerable zones is provided in Annex 1 to Government Regulation No. 174/2017 Coll., establishing sensitive areas and vulnerable zones, as later amended.

3.4 Protected areas, including the European network of protected areas

Sites containing habitats of European significance and habitats of national significance, habitats of species of European significance, habitats of species of national significance and habitats of birds, including migratory species, for the protection of which protected areas, significant landscape features or natural creations are declared, may be declared protected areas under Act No. 543/2002 Coll. on nature and landscape protection. The list of protected areas is available on the SNC SR[4] website.

3.4.1 European network of protected areas (Natura 2000)

The European network of protected areas (Natura 2000) is a network of protected areas designated by EU countries to conserve Europe's most valuable and threatened species and habitats. It consists of:

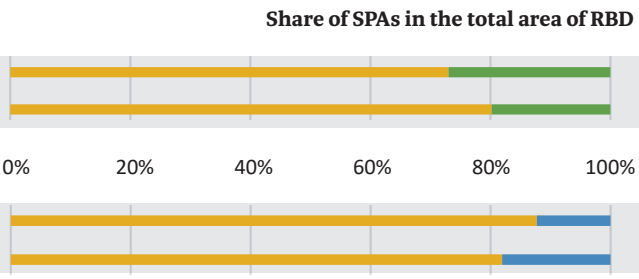
- special protection areas (SPA) designated for bird conservation and
- sites of Community importance (SCI) designated for the conservation of species of European importance (except for bird species) and biotopes of European importance.

Water-dependent SPA and SCI are prioritized in the water planning process.

[4] https://www.sopsr.sk/web/?cl=114

Table 3.4 Overview of special protection areas in 2019

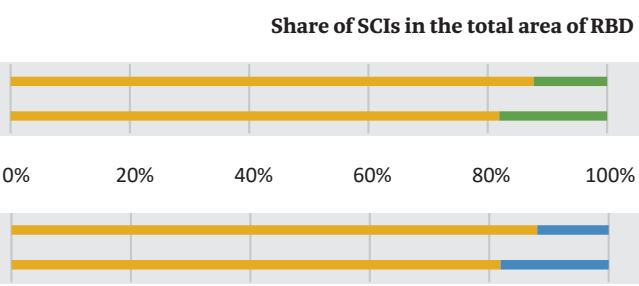
Basin	Number	Area [ha]	% of the total area of RBD
Danube RBD	41	1,269,834.03	27
Vistula RBD	3	38,858.86	19.8
SR	**41**	**1,308,692.89**	**26.69**
Dependent on water			
Danube RBD	23	462,874.83	9.8
Vistula RBD	1	19,733.59	10.1
SR	**23**	**482,608.42**	**9.84**



Source: SNC SR, WRI

Table 3.5 Overview of sites of Community importance in 2019

Basin	Number	Area [ha]	% of the total area of RBD
Danube RBD	625	579,680.28	12.3
Vistula RBD	23	35,459.84	18.09
SR	**642**	**615,140.12**	**12.55**
Dependent on water			
Danube RBD	475	563,011.4	11.96
Vistula RBD	23	35,459.84	18.09
SR	**492**	**598,471.24**	**12.21**



Source: SNC SR, WRI

3.5 Protected areas for the conservation of economically important aquatic species

The EU member states can also designate protected areas to protect economically important aquatic species. This type of protected area has not been designated in the Slovak Republic.

3.6 Protection of fresh surface water suitable for the life and reproduction of autochthonous fish species

Protected areas according to the Water Act include areas with surface water suitable for the life and reproduction of autochthonous fish species. Their purpose is to protect or improve the quality of those running or stagnant fresh water in which fish belonging to autochthonous species providing natural diversity and to species whose presence is suitable for aquatic management purposes live or will be able to live after pollution has been reduced or eliminated.

Watercourses of water management significance (basic watercourses No. I) and watercourses flowing into watercourses of water management significance including their tributaries (basic watercourses No. II) are declared as such areas.

Table 3.6 Basic water courses No. I suitable for the life and reproduction of autochthonous fish species

Basin		Salmonids	Cyprinids	Total
Danube RBD	[number]	41	17	58
	[km]	1,507.1	919.7	2,426.75
Vistula RBD	[number]	8	0	8
	[km]	159.6	0	159.6
SR	**[number]**	**49**	**17**	**66**
	[km]	**1,666.7**	**919.7**	**2,586.35**

4 Identification of significant impacts

The aquatic environment is influenced by human activities and needs, such as industry, agriculture, transport and urban development. These impacts need to be evaluated in the river basin management process and, in the case of negative impacts on the status of water bodies and the risk of failing to achieve good status, appropriate measures to address and mitigate them need to be set up.

All available data from the databases of the organizations in charge of keeping records of relevant data, as well as information from publicly available sources were utilized to identify and describe the significant impacts on the state of SWBs and GWBs.

4.1 Surface water

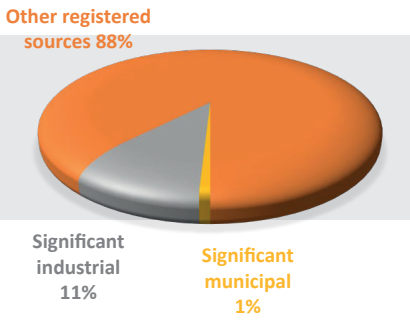
Based upon the identification of significant water management issues, the planning process continues to identify significant impacts. Significant water management issues have been divided into the following areas for surface water: organic pollution, nutrient pollution, pollution by priority substances and substances relevant for the Slovak Republic, hydromorphological changes.

From the registered point sources of pollution, the so-called significant sources of pollution are selected annually and published in the water quality balance of the surface water.

Table 4.1 Number of sources of surface water pollution in 2011 – 2017

	2011	2012	2013	2014	2015	2016	2017
Total pollution sources	1,001	1,026	1,009	1,073	1,236	1,318	1,417
Significant municipal sources of pollution	13	12	10	10	10	13	12
Significant industrial and other sources of pollution	153	153	155	156	156	154	155
Significant sources of pollution, which:	**166**	**165**	**165**	**166**	**166**	**167**	**167**
in Danube RBD	162	161	161	162	162	162	162
in Vistula RBD	4	4	4	4	4	5	5

Percentage of pollution sources



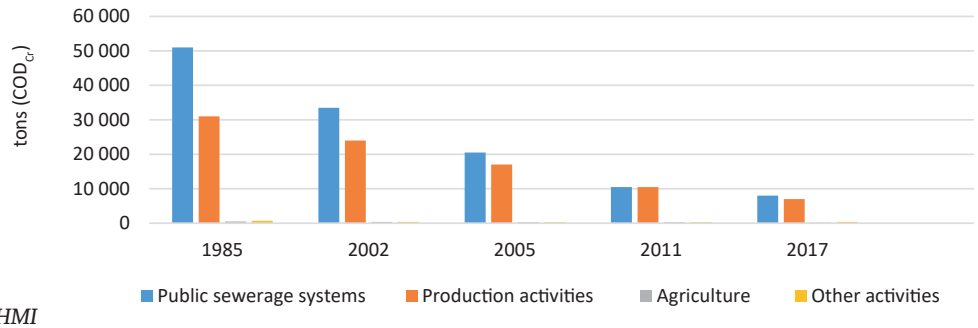
Source: SHMI

4.1.1 Pollution of surface water by organic pollution

The organic matter contained in water comes from natural and anthropogenic sources. Soil erosion, decomposition processes of dead fauna and flora are natural sources. Substances introduced in this way are relatively insoluble and slowly decomposable. The main anthropogenic sources are agglomerations, industry and agriculture. Organic compounds from various human activities are among the most common pollutants discharged into surface water.

Organic pollution in surface water is characterized by oxygen regime parameters (dissolved oxygen, biochemical oxygen demand, chemical oxygen demand, etc.). Information on the impact of organic pollution on aquatic ecosystems is provided by the analysis of biological quality elements. Chapter 4.4.1 of the RBMP presents a comprehensive analysis of organic pollution, which is briefly illustrated in Figure 4.1.

Figure 4.1 Development of the amount of discharged organic pollution in the Slovak Republic by main sectors



Source: SHMI

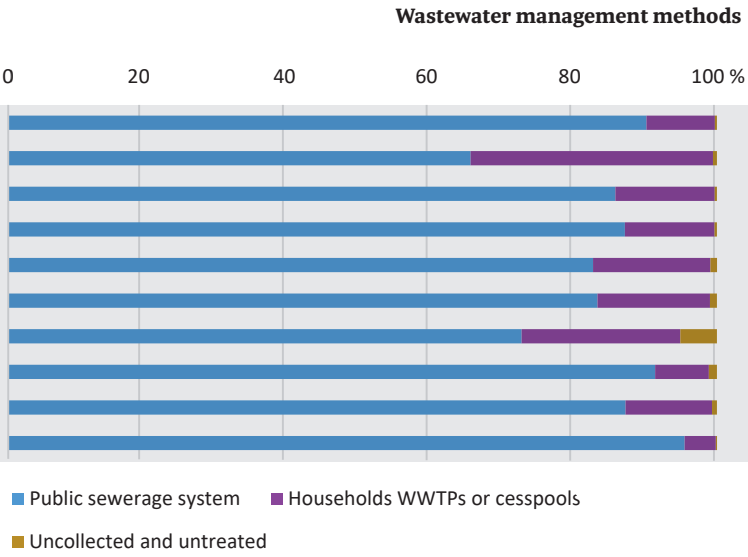
Organic pollution from municipal wastewater

The requirements for the collection and treatment of municipal wastewater are enshrined in the Water Act and Act on Public Drinking Water Systems and Public Sewerage Systems. The EU Directive 91/271/EEC on urban wastewater treatment was transposed into these acts. The basic unit of wastewater management is the agglomeration, the size of which is expressed in terms of population equivalent (p. e.). It represents the amount of organic pollution produced per inhabitant per day. In Slovakia, a total of 2,759 agglomerations are defined, of which 356 are above 2,000 p. e.; 662 towns and villages are located in them (see also Annex 4.1 of the RBMP). Pollution from agglomerations of over 2,000 p. e. produced in 2018 amounted to 4,168,420 p. e., which represents a decrease of 894,948 p. e. compared to 2011.

In 2017, 3,682,230 inhabitants were connected to the public sewerage system, which represents 67.72 % of the population of the Slovak Republic. This is an increase of 334,930 inhabitants compared to 2011.

Table 4.2 Management of municipal wastewater from agglomerations of above 2,000 p. e. in 2018

Sub-basin	Quantity of pollution [EO]
Morava	149,430
Danube	59,660
Váh	2,468,490
Hron	327,940
Ipeľ	80,490
Slaná	92,550
Bodva	30,350
Hornád	521,640
Bodrog	261,180
Dunajec and Poprad	176,690
Danube RBD	**3,991,730**
Vistula RBMP	**176,690**
SR	**4,168,420**



Source: WRI

Significant progress has been made in the field of wastewater collection and treatment since the 1st planning cycle. At present, the priority is mainly the construction of new WWTPs and sewerage networks, or their reconstruction. Attention is also paid to the elimination of pollution in agglomerations of below 2,000 p. e. located in protected areas and areas with poor water status.

4.1.2 Nutrient pollution of surface water

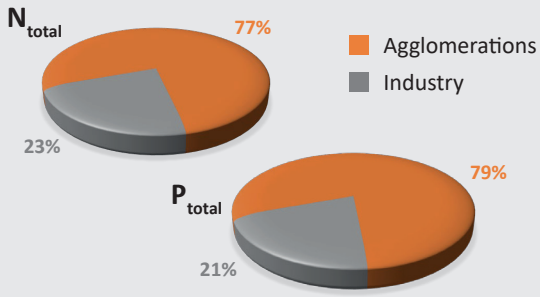
Nutrient emissions enter surface water from point sources (agglomerations, industry, agriculture) and diffuse sources (soil erosion and surface runoff, subsurface runoff and basic runoff from groundwater). Diffuse sources are partly natural and partly anthropogenic in origin.

Nutrients in surface water undergo a wide range of transformation processes. Some of them result in losses or accumulations. The remaining nutrients are transported by the flow to higher-order streams or even to the sea. The most significant impact of high nutrient loads is the eutrophication of water.

Agriculture accounts for around 62% of diffuse source emissions for nitrogen and 51% for phosphorus. In the case of nitrogen, groundwater, including subsurface runoff, is a critical input pathway for this nutrient to surface water. For phosphorus, soil erosion, usually associated with surface runoff, is the main pathway to surface water. The estimation of the risk of nutrient pollution of surface water is based on the balance of this nutrient in the case of nitrogen and on the total potentially available content of phosphorus in the soil, which is the result of the long-term phosphorus balance.

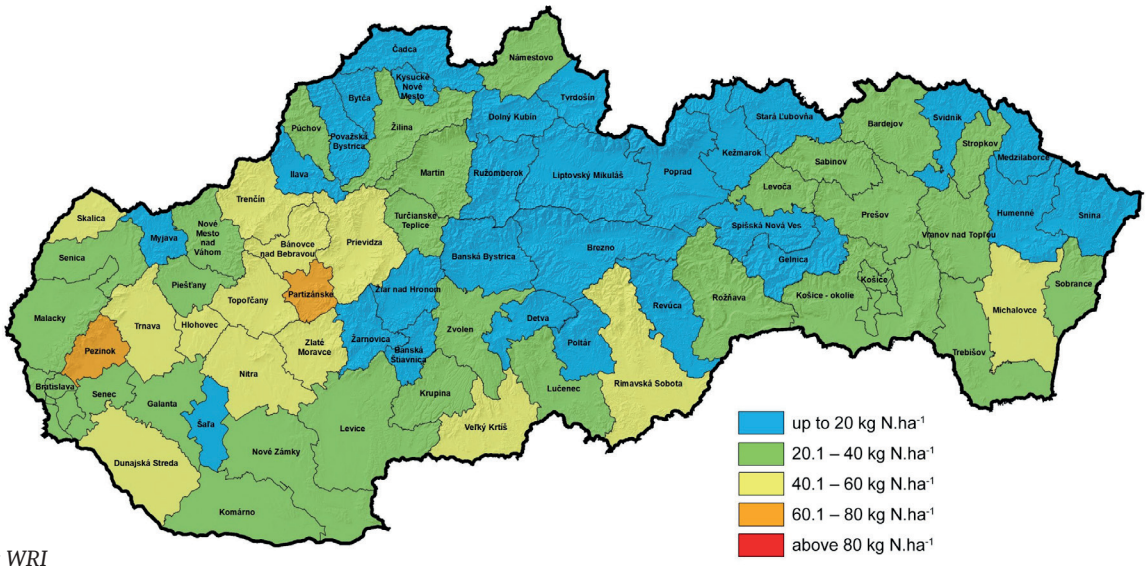
Table 4.3 Pollution discharges from point sources of pollution in 2017

Basin	Agglomerations of above 2,000 p. e			Industry and other sources		
	Wastewater	N_{total}	P_{total}	Wastewater	N_{total}	P_{total}
	[.10³ m³ .y⁻¹]	[t.y⁻¹]	[t.y⁻¹]	[.10³ m³ .y⁻¹]	[t.y⁻¹]	[t.y⁻¹]
Danube RBD	311,447	2,397	180	206,935	768	53
%	*60*	*76*	*77*	*40*	*24*	*23*
Vistula RBD	24,665	122	17	486	0	0
%	*98*	*100*	*100*	*2*	*0*	*0*
SR	**336,111**	**2,519**	**197**	**207,421**	**768**	**53**
%	***62***	***77***	***79***	***38***	***23***	***21***



Source: SHMI, WRI

Figure 4.2 Nitrogen balance in the 2015 – 2018 period per ha of used agricultural land at district level



Source: WRI

Phosphorus significantly affects the eutrophication of surface water. The estimate of its input was assessed in a 5-level classification, with medium to very high input considered to have a significant impact (see Table 4.4).

Table 4.4 Number of water bodies with significant input of total phosphorus by soil erosion and surface runoff processes

Sub-basin	Number of WBs
Morava	16
Danube	0
Váh	61
Hron	18
Ipeľ	18

Sub-basin	Number of WBs
Slaná	16
Bodva	8
Hornád	36
Bodrog	21
Poprad and Dunajec	8

Sub-basin	Number of WBs
Danube RBD	**195**
Vistula RBD	**8**
SR	**203**

4.1.3 Pollution of surface water by priority substances and substances of relevance to the Slovak Republic

The list of priority pollutants and some other pollutants is listed in Slovak Government Regulation No. 167/2015 Coll. on environmental quality standards in the field of water policy. The list of relevant synthetic and non-synthetic specific substances for Slovakia (hereinafter as 'relevant substances') is listed in Slovak Government Regulation No. 269/2010 Coll. setting up requirements on good water status, as amended.

Water pollution by priority substances and substances relevant for Slovakia poses a serious threat to the aquatic ecosystem. These substances can be toxic, difficult to degrade, and many are bioaccumulative in biota and/or sediment. They are emitted to water from point and diffuse sources of pollution, mainly from discharges

of wastewater from industry as well as households, from public sewage outfalls, from chemicals applied in agriculture, from effluents from mining activities, from landfills and from accidental pollution. Atmospheric deposition is also an important source of pollution of surface water by some types of pollutants (especially polycyclic aromatic hydrocarbons and some metals).

Priority substances are the basis for assessing the chemical status of surface water bodies. Relevant substances are included in the assessment of the ecological status of surface water bodies.

Discharge of wastewater containing specific pollution from potentially significant industrial and other point sources of pollution

To identify the impact of priority and relevant substances, data reported by polluters to the National Pollution Register[5] and to the Register of Installations[6] requiring integrated pollution prevention and control maintained within the Integrated Pollution Prevention and Control (IPPC) information system and published in the water balance of surface water quality[7] are used. Indirect discharges of pollutants are also considered as pollution. These are sources of pollution that are connected to sewers and/or WWTPs of other operators (see also Annex 4.3 of RBMPs).

Table 4.5 Priority and relevant substances in wastewater (data for 2017)

Basin	Priority substances	Relevant substances for SR
Danube RBD	anthracene, benzene, benzo(a)pyrene, benzo(b) fluoranthene, benzo(k)fluoranthene, benzo(g,h,i) perylene, bis(2-ethylhexyl)-phthalate, 1,2-dichloroethane, fluoranthene, ideno(1,2,3-c, d)pyrene, cadmium, naphthalene, nickel, nonylphenols, 4-tert-octylphenol, lead, mercury, pentachlorophenol, tetrachloroethylene, 1,2,4-trichlorobenzene, trichloroethylene, trichloromethane (chloroform), PAH	aniline, arsenic, benzothiazole, biphenyl, bisphenol A, dibutyl phthalate, diphenylamine, phenanthrene, formaldehyde, total formaldehyde, total chromium, total cyanides, copper, MCPA, 4-methyl-2,6-di-tert-butylphenol, PCB congeners, toluene, vinylbenzene (styrene), m-xylene, o-xylene, p-xylene, xylenes, zinc
Vistula RBD	benzene, cadmium, mercury, tetrachloroethylene, PAH	benzothiazole, bisphenol A

Other potential sources of specific pollutants are:

- discharges of municipal wastewater – directly from households, overflows from urbanized developments to WWTPs, from industrial wastewater discharged to public sewers or from wastewater directly delivered to WWTPs;
- generation and management of sewage sludge – only treated sewage sludge is applied to agricultural or forest lands; the level of sludge contamination is monitored on a continuous basis; sludge management includes: recovery (85%), temporary storage (10%) and final disposal (5%);
- plant protection products – source of priority and relevant substances from agriculture; applied quantities are monitored by the Central Control and Testing Institute in Agriculture (CCTIA) on the basis of data from business operators.

Inventory of emissions, discharges and releases of priority substances and substances relevant for the Slovak Republic

The emission inventory provides information on the significance of the priority substance for a given river basin and on the quantity of the substance discharged into the aquatic environment. For each sub-basin, the inventory contains significant priority substances and significant relevant substances that require further monitoring, control and implementation of appropriate measures.

4.1.4 Significant hydromorphological changes

Changes to the natural hydromorphological structure and substrate of the riverbed can negatively affect conditions for aquatic ecosystems and deteriorate the condition of surface water bodies.

The main drivers of hydromorphological changes are hydropower generation, flood protection, abstraction for water supply and river navigation.

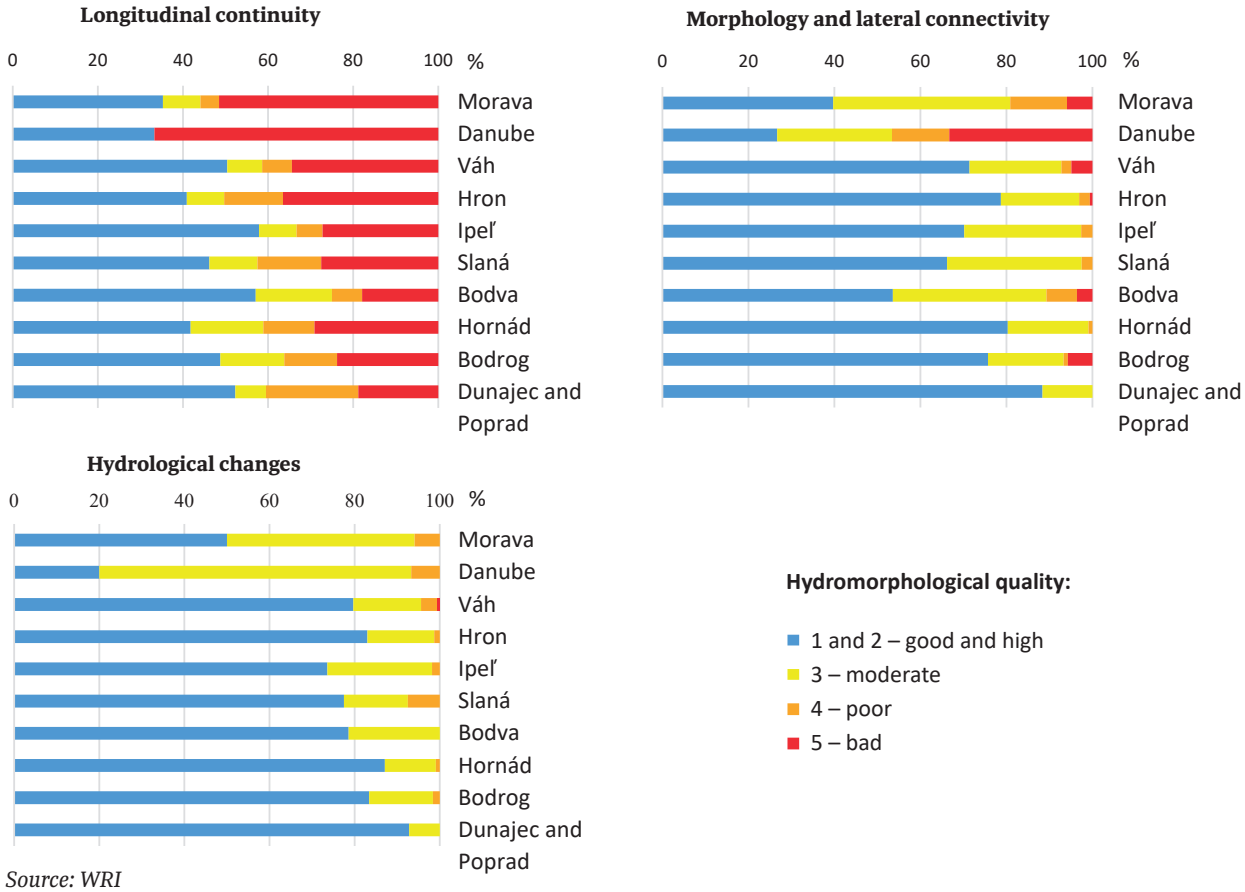
[5] https://www.minzp.sk/znecistovanie/narodny-register-znecistovania/
[6] https://www.enviroportal.sk/ipkz
[7] https://www.shmu.sk/sk/?page=1834

In terms of impact on water status, three groups of significant hydromorphological changes can be distinguished:

- disruption of longitudinal continuity – causes disruption of aquatic organism migration and access to habitats, as well as changes in sediment balance;
- morphological changes – these relate to the topography and size of the river bed, cross-sectional and longitudinal profile; they are the result of processes of erosion, sediment transport and deposition in conditions influenced by the geology and surface of the catchment; the most significant morphological changes in natural streams have occurred through the separation of the river bed and the inundation;
- hydrological changes – water level rise, influence on the hydrological regime (abstractions and discharges, accumulations, transfers, etc.); level fluctuations.

The results of the assessment of the hydromorphological quality of the water bodies are the basis for the overall assessment of the ecological status/potential of the water bodies, and also for the design of restoration/remediation and/or mitigation measures to improve the status of the water bodies. Hydromorphological quality indicators for individual water bodies are given in Annex 5.1 of the RBMP.

Figure 4.3 Overview of the hydromorphological quality of running water bodies – percentage of the number of water bodies in a sub-basin



Source: WRI

Perspective infrastructure projects

Integral to the planning of new perspective infrastructure projects or new sustainable human development activities (often linked to the objectives of other sectoral policies) are the environmental requirements that need to be met. The Water Act defines specific conditions for the exemption from the protection against deterioration of water status due to activities that may lead to changes in the physical (hydromorphological) characteristics of the affected surface water bodies or to changes in the level of groundwater bodies. New infrastructure projects that can be expected to cause the above-mentioned changes can only be implemented if they have undergone an assessment process in accordance with Article 4(7) of the WFD (transposed into §16a (1) of

Act No. 364/2004 Coll.). The assessment of individual infrastructure projects is a prerequisite for urban zone permit. The process consists of the following:

- assessment of the applicability of Article 4(7) of the WFD (overview of the projects for which the assessment has been performed is available in Annex 4.5a of the RBMP and Annex 4.5b of the RBMP),
- the assessment itself under Article 4(7) of the WFD (an overview of the projects for which an assessment was required is available in Annex 4.6 of the RBMP).

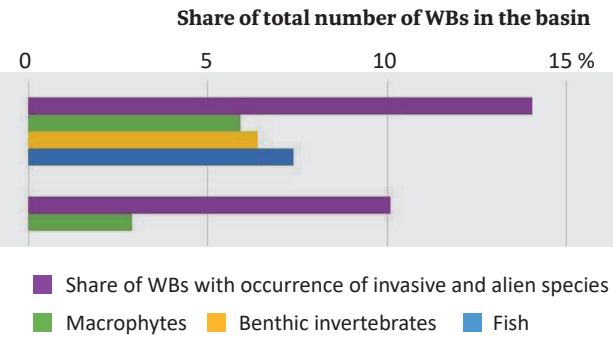
4.1.5 Other significant anthropogenic impacts

Invasive and alien species

Based on European and national legislation and procedures related to the prevention and management of the introduction and spread of invasive alien species, invasive and alien species occurring in the territory of Slovakia have been identified. Monitoring in the 2013 – 2018 period revealed a total of 33 invasive and alien species of animals, plants and algae, including 7 alien invasive macrophyte species, 17 benthic invertebrate species and 9 fish species. The assessment of the results identified the most at-risk water bodies.

Table 4.6 Number of water bodies with invasive and alien species for each biological quality element

Basin	Assessed period	Number of WBs	Macro-phytes	Benthic inver-tebrates	Fish
Danube RBD	2009 – 2012	180	65	134	66
	2013 – 2018	180	75	81	93
Vistula RBD	2009 – 2012	3	2	0	1
	2013 – 2018	7	7	0	0
SR	**2009 – 2012**	**183**	**67**	**134**	**67**
	2013 – 2018	**187**	**82**	**81**	**93**



Source: WRI

Accidental water quality deterioration

Causes of accidental water quality deterioration (AWD) are investigated by the Slovak Environmental Inspectorate they are also recorded. The most common causes of AWD include the transport and conveyance of polluting substances, the unauthorized handling of pollutants, non-compliance with technical procedures and emergencies (explosion, fire, etc.). The most common pollutants are oil and pollutants contained in wastewater. The number of AWD cases is fluctuating. For surface water, it ranges from 42 AWD in 2010 to 97 in 2007, and for groundwater from 27 AWD in 2000 to 93 in 2014.

4.2 Groundwater

4.2.1 Groundwater pollution

The main significant impacts of human activities on the chemical status of the GWBs formations in quaternary alluvium and groundwater formations in pre-quaternary rocks are mainly: agriculture, industrial production, contaminated sites, households – non-sewered agglomerations, mining activities, tourism, and transport. As a result, pollution occurs through indirect discharge (infiltration of precipitation and infiltration of the pollutant into groundwater through the soil horizon) or through leaching of the pollutant from the pollution source into groundwater. In terms of areal extent, significant pollution sources are divided into point (local) and diffuse (area) sources. Groundwater pollution is distinguished by the type of the most significant pollutants:

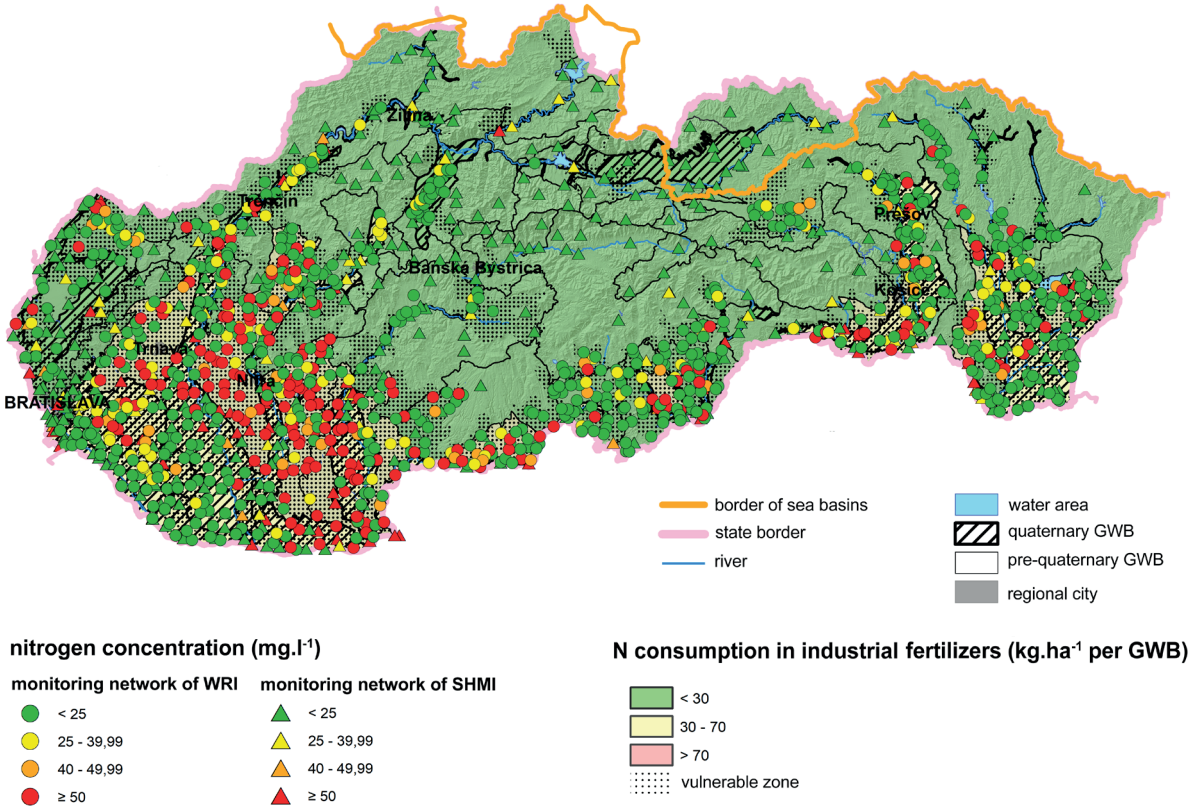
- nitrogenous substances,
- pesticides,
- other hazardous substances.

Nitrogen pollution of groundwater

Nitrogen pollution (nitrates, ammonium ions) is one of the most common reasons for groundwater bodies not achieving good chemical status. Nitrate or ammonium ions caused the poor chemical status of 11 groundwater bodies (6 quaternary and 5 pre-quaternary GWBs), all in the Danube RBD.

The application of industrial and organic fertilizers in agriculture, especially nitrogen fertilizers (about 74% of industrial fertilizers), is a significant source of surface pollution of groundwater and, secondarily, of surface water, which are hydraulically connected to them.

Figure 4.4 Average nitrogen consumption in fertilizers per total area of quaternary and pre-quaternary groundwater bodies formations and average nitrate concentrations at monitoring network sites in 2013 – 2017



Source: CCTIA, WRI, SHMI

Increased attention should be paid to localities where the long-term annual consumption of nitrogen fertilizers is higher than 70.0 kg.ha^{-1} and where the nitrate concentration in GWBs exceeds 50 mg.l^{-1}.

Pesticide pollution of groundwater

The source of pesticide contamination of groundwater involves a use of plant protection products (PPPs) containing the active substance (pesticide). Groundwater pollution is caused by penetration or sorption of the pesticide substance in the soil and its subsequent leaching through infiltration of precipitation or as a result of interaction of groundwater with surface water (about 90.0%). To a lesser extent pesticide pollution is associated with point source pollution (old pesticide dumps, warehouses, handling areas, etc.). In the 3rd RBMP cycle, 1 groundwater body was classified in poor chemical status due to pesticide contamination.

Table 4.7 Number of pesticide substances approved in the EU vs. authorized in the Slovak Republic in 2017

	Approved in the EU	Authorized in the Slovak Republic	
		[number]	[%]
Herbicides	123	82	66.7
Insecticides	109	35	32.1
Fungicides	157	81	51.6
Bactericides	9	1	11.1
Acaricides	39	11	28.2
Attractants	40	0	0
Total	**477**	**210**	**44.0**

Pesticides that most frequently exceeded the quality standard (percent exceedance greater than 1%) in the 2013 – 2017 period included alachlor ethane sulfonic acid (ESA), terbutryn, desethylatrazine, atrazine, nicosulfuron, prochloraz, clopyralid, and prometryn.

Pollution of groundwater by other hazardous substances

Groundwater contamination by other hazardous chemicals is caused by point sources of pollution linked to residential and industrial agglomerations (contaminated sites, large industrial enterprises and operations, landfills and mining operations). Contamination of groundwater by pollutants from wastewater or infiltration from polluted watercourses is a significant problem.

Other pollutants that have contributed to the poor chemical status of groundwater bodies or have been identified as having significant sustained upward trends (SSUT) in the levels of these pollutants at the groundwater body level include phosphates (in 6 GWBs, 4 SSUT), sulfates (in 6 GWBs), chlorides (in 1 GWB), arsenic (in 1 GWB) and the pollution indicator – total organic carbon (in 4 GWBs, 1 SSUT).

Change in the stability of the chemical composition of geothermal groundwater bodies

An important factor in assessing the chemical status of geothermal water, especially in terms of their use, is the stability of their chemical composition.

The geothermal water of the Western Carpathians are rich in gases present in the dissolved or partially gaseous phase. The natural gas content regime causes instability in the overall mineralization, most often due to the CO_2 component of the carbonate equilibrium. The processes occurring in the rock environment (dissolution of salts - evaporites-carbonates, hydrolytic decomposition of silicates, ion exchange processes, gas dissolution) also affect the quality of geothermal water. Other factors are the method and location of water retention and the determination of the abstraction quantity.

In terms of assessing the stability of the water chemistry of a geothermal formation, it is also important whether water abstraction takes place in the formation. WBs without abstraction are classified in good status because they are not affected.

4.2.2 Change in groundwater quantity

In general, the most significant potential anthropogenic impacts in terms of their impact on the quantitative status of groundwater bodies can be considered to be abstractions, water transfers, artificial infiltration and discharges to groundwater. In the territory of Slovakia, these are principally groundwater abstractions, other potential impacts are not of such magnitude as to significantly affect the quantitative status of groundwater bodies.

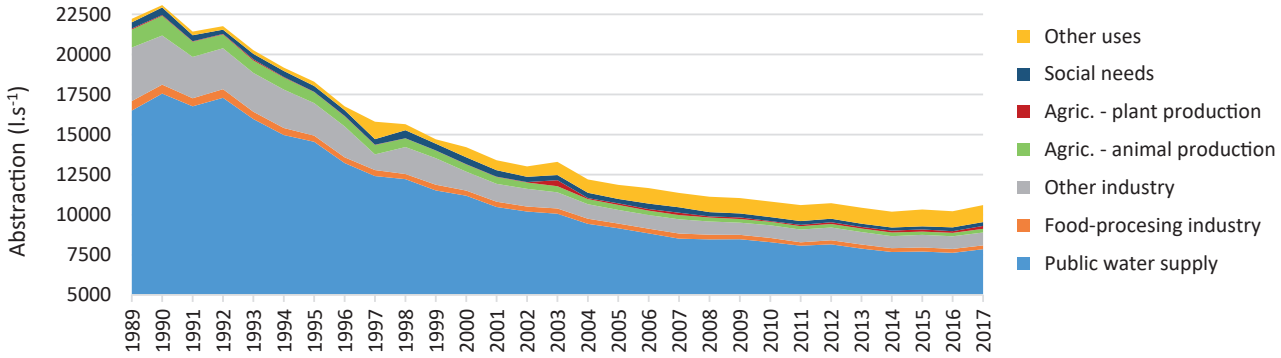
Groundwater abstractions

The use of groundwater (with the exception of general use of water within the meaning of §18 of the Water Act) requires a permit from the state water authority.

Groundwater abstraction is also a subject to a notification obligation for any abstracted volume, except for personal domestic use below a specified limit. Data on groundwater abstractions are the basis for the national groundwater use register and for the preparation of the water balance. Recorded abstractions were assigned to GWBs in quaternary sediment, GWBs in pre-quaternary rock, and geothermal GWBs.

In the long term, groundwater abstractions have a downward trend. The decline in abstractions due to changes in the economy and economic measures related to water price regulation in the 1991 – 2014 period. This declining trend stopped in 2015 and in recent years we have recorded a steadiness of abstraction quantities of groundwater.

Figure 4.5 Development of groundwater use in the Slovak Republic (taking into account geothermal water abstractions)



Source: SHMI

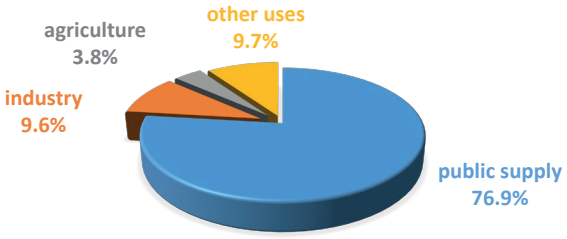
Groundwater abstractions above 10.0 l.s^{-1} are considered as significant. In 2017, a total of 10,607.31 l.s^{-1} of groundwater (including geothermal water) were abstracted by consumers subject to the reporting obligation, representing a decrease of 1.04% compared to 2012.

An overview of the most important customers in the Danube RBD in 2017 is provided in Annex 4.7 of RBMP. The location of significant abstractions is shown in Map Annex 4.4 of RBMP.

Table 4.8 Total groundwater abstraction in the Slovak Republic (excluding geothermal) with categorization according to the purpose of use

User groups	2012	2017
	[l.s^{-1}]	[l.s^{-1}]
Population supply	8,149.85	7,854.57
Industry	981.51	978.72
Agriculture	311.2	384.51
Other uses	956.63	996.13
Total	**10,399.19**	**10,213.93**

Representation of user groups in 2017



Groundwater abstractions approaching or exceeding natural groundwater recharge generate a risk of not achieving the objectives set for good quantitative status. Long-term over-abstraction results in an unfavorable balance condition of the groundwater body as a whole, the occurrence of sites with a critical or degraded balance condition, and the indication of a long-term significant downward trend in groundwater levels or spring yields.

From the assessments and data for the individual quaternary and pre-quaternary GWB, it is clear that the use of the two pre-quaternary groundwater bodies (both in the Danube RBD) negatively affectsg the usable groundwater resources and the quantitative status of these bodies (i.e. the percentage of groundwater abstraction exceeded 40% of the established usable resources). For the geothermal GWBs, an exceedance of the balance value of the formation >70% was considered a potentially significant impact. This has been the case in three geothermal GWBs and their abstraction causes the poor quantitative status.

Discharge of wastewater and special water to groundwater

In 2017, there were 30 entities with reporting obligations that discharged wastewater and special wastewater into groundwater with a total discharge of 16.20 l.s^{-1} (the maximum discharge per entity was 10.61 l.s^{-1}). There have been no recorded discharges into groundwater that could affect the quantitative status of the groundwater bodies.

5 Monitoring network, ecological status/potential, chemical and quantitative status

The assessment in the 3rd planning cycle is based on the results of water monitoring carried out in the period 2013 – 2018 in line with the relevant Slovak water monitoring framework programmes and their annual supplements, which took into account the requirements of European and national legislation in the field of water monitoring and assessment. Experts from the organizations supervised by the Ministry of the Environment have participated in the preparation of these programs (WRI, SHMI, SWME, SGIDS, SEA, SNC SR, WW).

5.1 Surface water

5.1.1 Monitoring network

Surveillance, operational and investigative monitoring of surface water quality

Surveillance monitoring provides information mainly for assessing the regime, quantity, quality of surface water and the status of surface water bodies. This monitoring is utilized also for complementing and confirming the assessment of the impacts of human activities on surface water, for designing future monitoring programs, for monitoring the transport of pollution from and to neighboring countries, for assessing long-term changes in natural conditions and changes caused by human activities.

Operational monitoring monitors changes in the status of water bodies resulting from the implementation of programs of measures, the quantity and quality of surface water, to obtain the basis for the water assessment, to ensure the management of watercourses.

Investigative monitoring gather information on the following the unknown cause of deterioration of quality indicators monitored in the aquatic environment, the cause of non-achievement of the environmental objectives of a water body, or the extent and consequences of an accidental deterioration/endangerment of surface water quality.

Table 5.1 Number of sampling points for monitoring the quality and status of surface water in the Slovak Republic

Type	Monitoring purpose	2013	2014	2015	2016	2017	2018
Surveillance	Ecological status assessment	43	35	35	127	132	148
	Ecological potential assessment	7	68	27	51	55	18
	Chemical status assessment	49	79	48	133	160	121
	Transboundary watercourses	45	42	50	48	50	51
	Long-term trends	83	10	10	10	10	10
	International monitoring in the Danube River basin	11	11	11	11	11	11
	Reporting to EEA	125	149	68	16	16	16
	Directive 91/676/EEC (Nitrate Directive)	145	157	138	35	70	17
	Directive 2016/2284 (Art. 9 - monitoring air pollution impacts on ecosystems)	0	0	1	0	4	5
Operational	Transboundary pollution transfer	14	14	14	15	15	15
	Operational monitoring in general	176	175	315	186	88	176
	Significant point sources of pollution	96	116	58	51	46	45
	Significant diffuse sources of pollution	74	147	27	68	48	127
	Water management assessment	79	79	79	79	79	79
	WBs with discharge of PS and/or RS	9	61	31	37	48	37
	Derivation of ES and EP classification schemes	175	144	120	39	35	29
	Exceedance of the EQS according to PS and RS analysis	20	45	114	68	110	169
	PWMA, water supply watercourses and reservoirs	0	0	0	139	139	139
	Reference sites	0	10	2	4	10	16

Type	Monitoring purpose	2013	2014	2015	2016	2017	2018
Investigative	Watch list under Directive 2008/105/EC	0	0	0	10	10	10
	Municipal wastewater survey	0	0	5	12	1	12
	Industrial wastewater survey	18	0	37	23	22	21

Explanatory notes: PS – priority substances, RS – relevant substances, ES – ecological status, EP – ecological potential, EQS – environmental quality standard, PWMA – protected water management area.

Surveillance and operational monitoring of surface water quantity

The surface water quantity monitoring network consists of water metering stations (WMS). The following indicators are observed: water level, water temperature, ice phenomena in winter, flows (quantified by means of a flow measurement curve), water samples are taken to assess the turbidity of the water (the amount of floats in the water), and direct measurements are made to create and updated of the measurement curve.

Table 5.2 Number of water metering stations by monitoring activities in the Slovak Republic in 2013 – 2018

Monitoring activity	Number of WMSs					
	2013	2014	2015	2016	2017	2018
Water levels	416	417	416	416	416	416
Flows	400	401	400	400	401	401
Water temperature	410	411	410	410	410	410
Float concentration	16	15	15	15	15	15

The list of water metering stations and the scope of monitoring for individual indicators are given in the Slovak water monitoring programs. The location of the water metering stations is shown on Map 5.1 of the RBMP.

5.1.2 Reliability of the assessment

Reliability of the assessment of ecological status, ecological potential and chemical status

The assessment of the status of surface water bodies was determined by the reliability of the assessment, which reflects the degree of uncertainty in the assessment. The assessment scheme is 3-grade, according to the following criteria:

- high reliability of the assessment – most requirements for relevant quality elements or indicators (e.g. requirements for methods, matrices, frequencies) were met,
- moderate reliability of the assessment – requirements for methods, frequencies and quality elements or indicators were not met,
- low reliability of the assessment – the status of water bodies was assessed based on the transfer of results within groups of water bodies with the same characteristics, or the status was assessed based on risk analysis.

Reliability of the surface water quantity assessment

The basic data are obtained from water metering stations of the national hydrological network. The representative period for the assessment of the quantity and regime of surface water was the 1961 – 2000 reference period. The assessment of surface water quantity can also be performed for profiles outside the WMS, using hydrological analogy (similarity of physical-geographical characteristics of catchments – regionalization). In this case, the reliability of assessment depends on a distance, length of river stream, location and duration of the assessed profile. Reliability classes (according to STN 751400) are:

I. class – hydrological data are determined from values of sufficient duration and quality directly measured in the water metering profile or a nearby profile on the same stream,

II. class – hydrological data are processed on the basis of long-term observations that do not correspond to class I in terms of length or quality,

III. class – hydrological data are derived from short-term observations directly in the water metering profile, or a nearby profile on the same stream,

IV. class – hydrological data are derived from water metering profiles to profiles outside the observed watercourse using regionalization and hydrological analogy methods.

5.1.3 Ecological status/potential

Assessment methodology

The basis of the ecological status assessment is the biological quality elements for the communities (benthic invertebrates, phytobenthos, macrophytes, phytoplankton and fish), which reflect the synergistic effect of changes in the aquatic environment. Supporting elements for the assessment of ecological status are the physical and chemical quality elements and the hydromorphological quality elements. Specific synthetic and non-synthetic substances relevant for Slovakia are also included in the assessment of the ecological status. Classification schemes for biological quality features are type-specific and include possible pressures (e.g., organic pollution, nutrient pollution, hydromorphological changes).

In the case of heavily modified and artificial water bodies, the environmental objective is to achieve good ecological potential, which allows the application of less stringent objectives for pressures such as hydromorphological changes.

Assessment results

In the 2013 – 2018 period, 1,282 surface water bodies with a total length of 16,687.55 km were assessed in the Danube RBD, and 69 water bodies with a total length of 834.05 km were assessed in the Vistula RBD. The results of the summary assessment are presented in Table 5.3 and in Map 5.3 of RBMP.

Table 5.3 Results of ecological status/potential assessment in the 3rd RBMP (on the right, comparison with the 1st and 2nd RBMP)

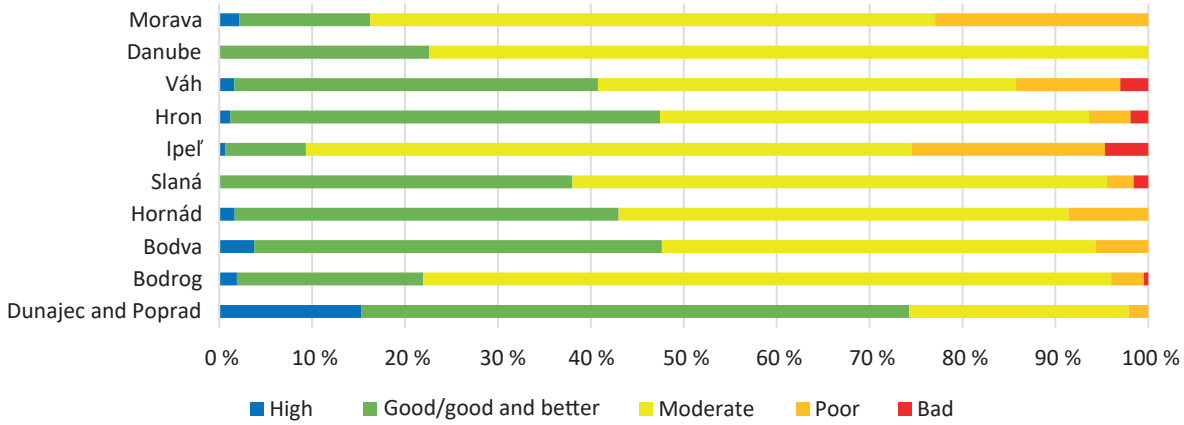
Basin	Ecological status/ potential	Number of water bodies	Length	Share of length	Reliability of the assessment			1st RBMP	2nd RBMP
					High	Moderate	Low	Share of length	Share of length
			[km]	[%]	[number of WBs]			[%]	[%]
Danube RBD	High	20	245.50	1.47	8	12	0	49.98	2.89
	Good	486	5,486.26	32.88	134	49	303	35.35	41.45
	Moderate	653	8,998.32	53.92	178	68	407	40.77	42.94
	Poor	100	1,621.68	9.72	47	34	19	5.49	11.78
	Bad	23	335.79	2.01	11	9	3	0.72	0.95
Vistula RBD	High	10	127.45	15.28	5	2	3	63.93	14.07
	Good	42	491.80	58.97	6	4	32	7.62	51.97
	Moderate	15	197.00	23.62	5	1	9	22.46	33.96
	Poor	2	17.80	2.13	2	0	0	6.00	0.00
	Bad	0	0	0	0	0	0	0.00	0.00
SR*	**High**	**30**	**372.95**	**2.13**	**13**	**14**	**3**		
	Good	**528**	**5,978.06**	**34.12**	**140**	**53**	**335**		
	Moderate	**668**	**9,195.32**	**52.48**	**183**	**69**	**416**		
	Poor	**102**	**1,639.48**	**9.36**	**49**	**34**	**19**		
	Bad	**23**	**335.79**	**1.92**	**11**	**9**	**3**		

*Explanatory notes: *Data for the whole Slovakia are derived for the purposes of this publication; they are not included in the river basin management plans*

Table 5.3 also shows a comparison with the previous planning periods of 2009 – 2012 (1st RBMP) and 2013 – 2018 (2nd RBMP), expressed as a percentage of the length of water bodies (the numbers of WBs have varied over time). Based on the comparison, there is a shift of water bodies from good to average status/potential. On the other hand, the reliability of the assessment has increased significantly. The causes of these changes are the following:

- increasing number of water bodies monitored,
- increasing number of quality elements monitored (especially fish community),
- gradual refinement of the assessment schemes for assessing ecological potential.

Figure 5.1 Ecological status/potential in sub-basins, expressed as a share of the length of water bodies



The result of the assessment of the ecological status/potential for each SWB is presented, among other related indicators, in the table in Annex 5.1 of the RBMP.

5.1.4 Chemical status

Methodology for assessing chemical status

Priority substances are the basis for the assessment of the chemical status of surface water bodies. The assessment used statistically processed data from measurements in the 2013 – 2018 period. Since chemical pollution is distributed in the stream, in the absence of monitoring results, the assessment was based on the results measured in the adjacent WBs. Unmonitored water bodies were assessed by transferring the results from monitored WBs in the same group without taking into account the results from biota. Groups were formed from the same characteristics (sub-basins, type, nature, possibly with respect to impacts).

The results of the chemical status assessment for each WB are presented in the water matrix, in the biota matrix, summarized (excluding ubiquitous substances) in Annex 5.1 of the RBMP and in Map 5.4 of the RBMP.

Results of the chemical status assessment

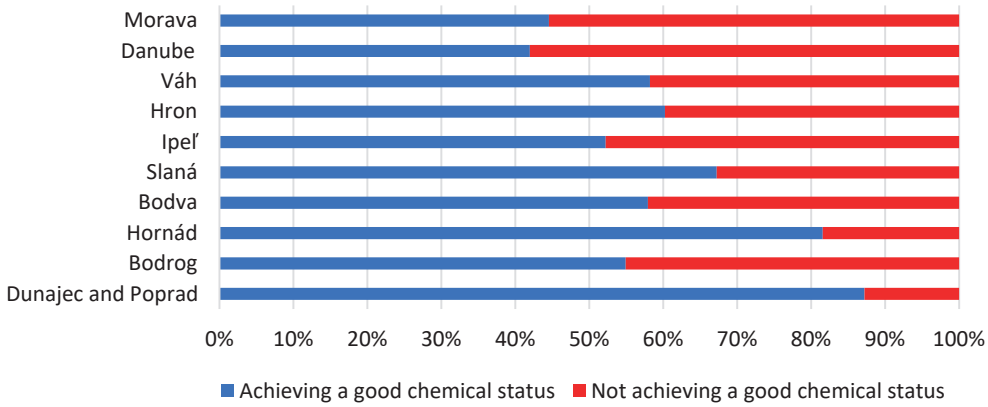
In the 2013 – 2018 period, the chemical status was assessed in 1,282 water bodies in the Danube RBD and in 69 water bodies in the Vistula RBD. Chemical status assessments based on monitoring were performed in 541 water bodies. The remaining 810 water bodies were assessed with low confidence based on the transfer of results.

Of the total number of WBs, 962 water bodies (71.21%) were assessed as being in good chemical status, representing a length of 10,596.3 km (60.45%).

Compared to the previous period, there was an increase in both the number and length of WBs with good chemical status not achieved. The causes are the following:

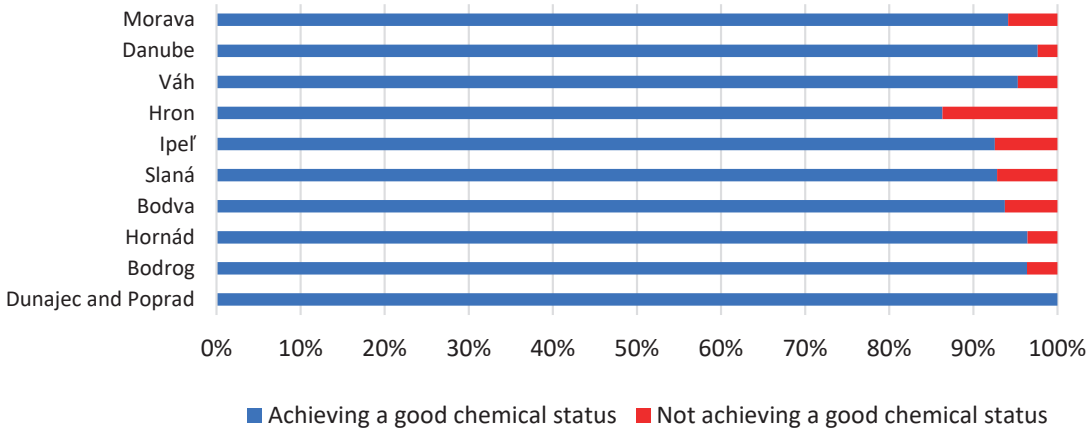
- increased number of water bodies monitored (541 water bodies monitored compared to the previous period when 402 water bodies were monitored),
- inclusion of the biota matrix in the summary assessment of chemical status,
- inclusion of newly identified priority substances in the monitoring and assessment of chemical status (dicofol, PFOS, quinoxyfen, dioxins and related compounds, aclonifen, biphenox, biphenox, cybuthrin, cypermethrin, dichlorvos, HBCDDs, heptachlor and heptachlor epoxide, terbutryn),
- tightening (revision) of environmental quality standards for certain priority substances (anthracene, brominated diphenyl ethers, fluoranthene, lead and its compounds, nickel and its compounds, polyaromatic hydrocarbons),
- increasing the sensitivity of monitoring methods for priority substances, due to improved analytical techniques.

Figure 5.2 Chemical status in the sub-basins, expressed as a share of the length of water bodies



Among the priority substances entering the chemical status assessment are persistent, bioaccumulative and toxic substances (PBT substances) and other substances that behave as PBT substances. They can be found in the aquatic environment for decades in quantities that pose a significant risk, even though measures have already been taken to reduce or eliminate emissions of such substances. Some of them could be transported over long distances and are largely ubiquitous in the environment. Such ubiquitous PBT substances include: brominated diphenyl ethers, mercury, polyaromatic hydrocarbons (benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i) perylene, indeno(1,2,3-cd)pyrene), tributyltin cations, PFOS, dioxins and related compounds, HBCDD, heptachlorine and heptachloroperoxide. In order to show the achievement/non-achievement of water quality improvement in terms of non-pervasive substances, the relevant EU Directives allow the assessment of the chemical status of SWBs in the absence of ubiquitous substances.

Figure 5.3 Chemical status without ubiquitous PBTs in sub-basins, expressed as a share of the length of water bodies



Assessed without ubiquitous PBTs, 100% of the water bodies in the Vistula RBD would achieve good chemical status, and 4.45% of the SWBs in the Danube RBD would not achieve good status. The following substances (excluding the ubiquitous PBTs) contribute to the failure to achieve good chemical status: 4-nonylphenol, 4-tert-octylphenol, cybuthrin, alachlor, bis(2-ethylhexyl) phthalate, pentachlorophenol and heavy metals (lead, cadmium and nickel).

Table 5.4 Results of the chemical status assessment in the 3rd RBMP (in the middle, comparison with the 1st and 2nd RBMP)

Basin	Good chemical status	Number of water bodies	Length	Share of length	1st RBMP Share of length	2nd RBMP Share of length	Good chemical status without ubiqui-tous PBT substances	Number of water bodies	Share of length
			[km]	[%]	[%]	[%]			[%]
Danube RBD	Achieved	897	9,863.05	59.10	89.48	96.70	Achieved	1,225	94.07
	Not achieved	385	6,824.50	40.90	10.52	3.30	Not achieved	57	5.93
Vistula RBD	Achieved	65	733.25	87.20	86.31	98.66	Achieved	69	100.00
	Not achieved	4	107.60	12.80	13.69	1.34	Not achieved	0	0.00
SR*	**Achieved**	**962**	**10,596.30**	**60.45**			**Achieved**	**1,294**	**94.36**
	Not achieved	**389**	**6,932.10**	**39.55**			**Not achieved**	**57**	**5.64**

*Explanatory notes: *Data for the whole Slovakia are derived for the purposes of this publication; they are not included in the river basin management plans.*

River basin management plans also address the monitoring and assessment of long-term trends in chemical status. (See the conclusion of Chapter 5.1.4.2 of the RBMP for more detail.)

5.1.5 Assessment of surface water quantity and regime

The data from the water metering stations provide an overview of the annual rainfall and annual runoff in all sub-basins for each year of the 2013 – 2018 reporting period. Their comparison with the long-term normal is provided in Figure. 5.4 and Figure 5.5.

Figure 5.4 Annual precipitation in % of long-term normal in 2013 – 2018

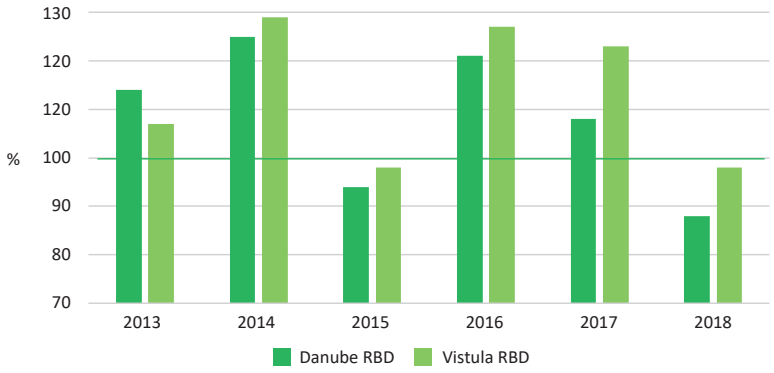
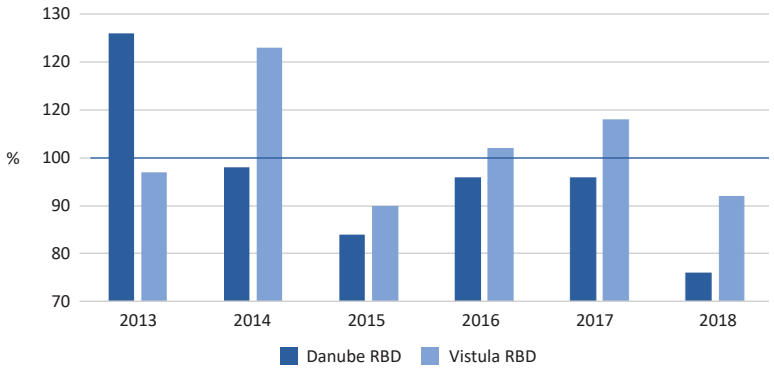
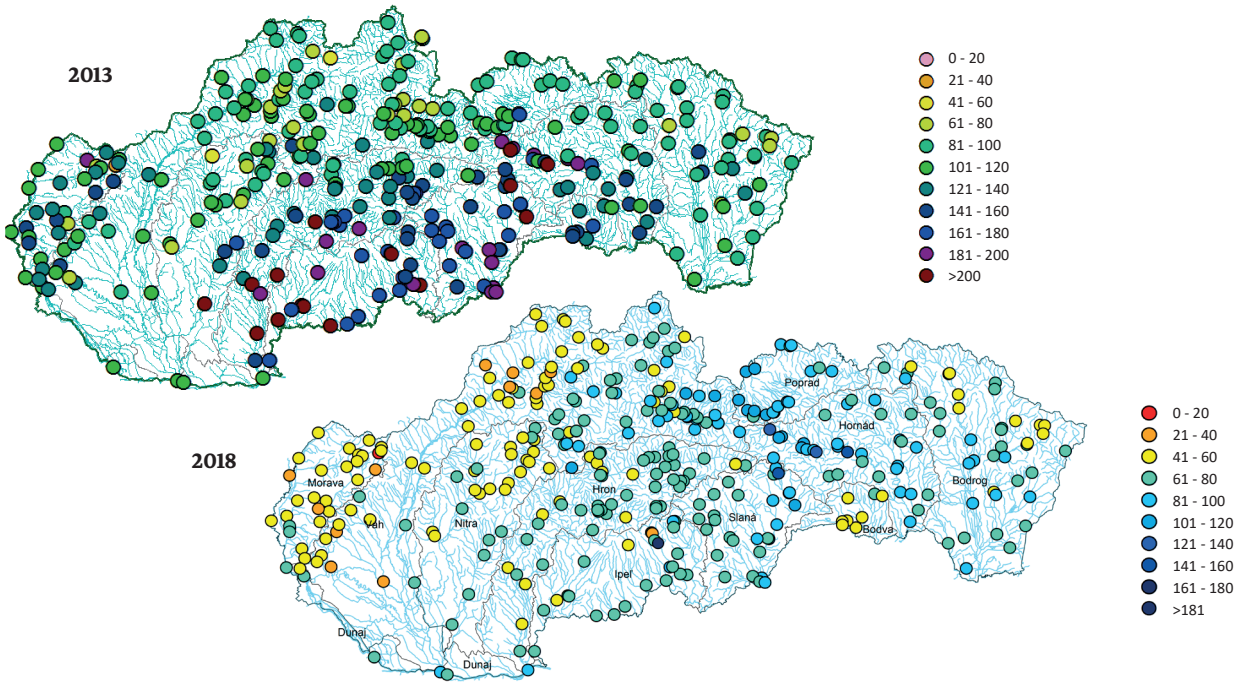


Figure 5.5 Annual runoff in % of long-term normal in 2013 – 2018



In terms of water levels, it can be stated that in the assessed period of 2013 – 2018, the year with the highest water levels in the Danube RBD was 2013, and the driest year - both in terms of water levels achieved and the occurrence of minimum average daily flows – was 2018.

Figure 5.6 Water levels in 2013 and 2018 expressed by the ratio Qy / Qa, 1961 – 2000 (%)



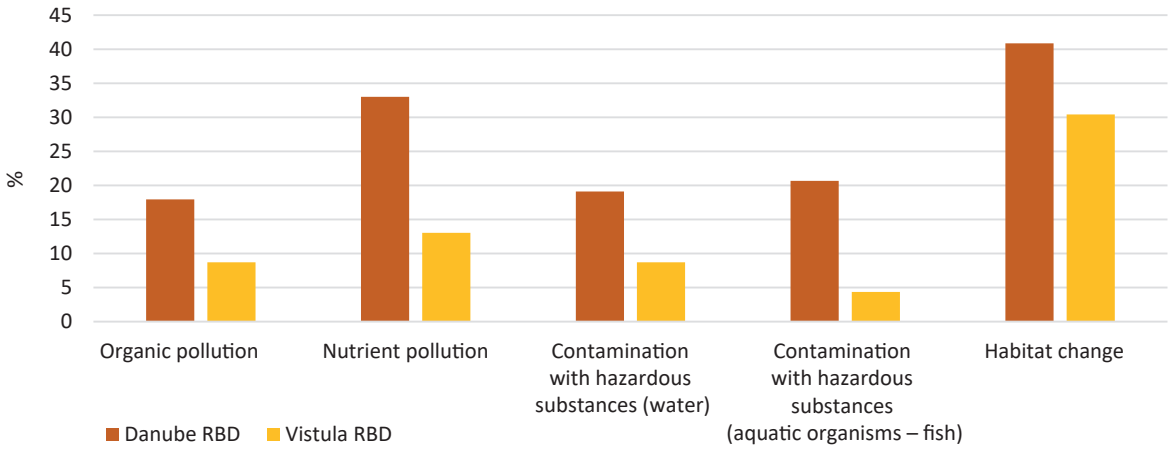
Source: SHMI

5.1.6 Impacts and risk analysis of non-achievement of objectives

In order to assess whether the set environmental objectives will be achieved by 2027, it is necessary to take into account the long-term trends (e.g., climate change) and anticipated new developments (e.g. new infrastructure, prospective economic development) in addition to assessing the impacts of human activities on water status.

An overview of the assessed impacts caused by significant impacts from anthropogenic activities in terms of the number of water bodies is provided in Figure 5.7. The most widespread impact in both RBD is habitat modification due to implemented hydromorphological changes in streams, with nutrient pollution being the second most common.

Figure 5.7 Identified impacts of significant human activities on surface water bodies (% of number)



The risk of not achieving the environmental objectives was estimated by combining the impacts and effects (existing, prospective), the ongoing implementation of the measures planned for the 2nd planning cycle and the measures needed to achieve the environmental objectives in the 3rd planning cycle. The summary results are shown in Table 5.5. The assessment for each water body is provided in Annex 5.1 of the RBMP.

Table 5.5 Percentage of the length of WBs at risk of not meeting environmental objectives by 2027

Basin	Organic pollution	Nutrient pollution	Contamination with hazardous substances	Habitat change	ES/EP total	CHS (free of ubiquitous substances)
Morava	17.8	42.5	47.2	21.3	38.6	1.8
Danube	0.0	9.2	60.0	1.9	54.4	2.4
Váh	6.2	27.4	34.7	31.1	33.1	2.2
Hron	4.6	12.7	32.5	24.3	23.7	2.7
Ipeľ	9.9	25.0	47.7	26.7	49.0	2.6
Slaná	9.1	25.5	30.1	16.5	22.1	1.2
Hornád	6.9	22.5	34.0	31.0	25.3	3.1
Bodva	0.0	25.6	42.7	11.8	33.7	0.0
Bodrog	2.5	13.1	41.8	19.9	30.5	3.6
Dunajec and Poprad	4.3	15.2	19.2	8.0	22.5	0.0
Danube RBD	**6.4**	**23.1**	**37.7**	**25.8**	**32.4**	**2.5**
Vistula RBD	**4.3**	**15.2**	**19.2**	**8.0**	**22.5**	**0.0**
SR*	**6.3**	**22.7**	**36.8**	**25.0**	**31.9**	**2.3**

*Explanatory notes: *Data for the whole Slovakia are derived for the purposes of this publication; they are not included in the river basin management plans.*

5.2 Groundwater

5.2.1 Monitoring network

Groundwater quality monitoring

Groundwater bodies in quaternary sediments and pre-quaternary rocks

Representative monitoring sites are included in the surveillance groundwater monitoring network:

- the groundwater wells or springs that are not affected by point sources of pollution and are located in areas of low groundwater vulnerability with land use predominant in the groundwater body,
- other significant springs or sources of drinking water, in case that no suitable monitoring facility of the groundwater monitoring network was available in the water body.

Operational monitoring is performed in all groundwater bodies that have been assessed as being at risk of failing to achieve good chemical status at the sites:

- which, due to the direction of flow of the groundwater, are assumed to be able to intercept possible pollution infiltration from point sources into the groundwater,
- located in agriculturally exploited areas to monitor areal pollution.

Table 5.6 Number of surveillance and operational quality monitoring wells in the groundwater in 2018

Type of monitoring	GWB layer	Danube RBD	Vistula RBD	SR*
Surveillance	Quaternary sediments	37	5	42
	Pre-quaternary rocks	127	7	134
Operational	Quaternary sediments	352	4	356
	Pre-quaternary rocks	56	3	59
Total		**572**	**19**	**591**

*Explanatory notes: *Data for the whole Slovakia are derived for the purposes of this publication; they are not included in the river basin management plans.*

A core set of indicators shall be monitored at all sampling points. The extent of the complementary set is monitored only at selected monitoring sites, depending on the type of pollution affecting the site (e.g., pesticides in agricultural areas, synthetic organics in industrial areas).

Geothermal groundwater bodies

Water quality monitoring in the sources of geothermal groundwater bodies takes place only at the sources, which are under the jurisdiction of the Inspectorate of Spas and Springs of the Ministry of Health of the Slovak Republic. Resources in 10 geothermal groundwater bodies are monitored. The scope and frequency of monitoring of individual indicators are site-specific (see more in Chapter 5.2.1 of the RBMP).

Groundwater quantity monitoring

Groundwater bodies in quaternary sediments and pre-quaternary rocks

The location of groundwater monitoring sites, which is also shown in Map 5.2a of the RBMP, provides data for the purposes of:

- assessment of the quantitative status of a groundwater body or groups of groundwater bodies,
- assessment of the effects of measures taken in groundwater bodies in poor quantitative status,
- international data exchange,
- assessment of the groundwater quantity and regime, including an assessment of the degree of permissible anthropogenic influence on the quantities,
- processing of hydrological and water management balances,
- provision of long-term, comprehensive observations and observations not influenced by humans in selected wells of the state hydrological network of the groundwater to indicate changes in natural conditions and to assess short- and long-term changes in the hydrological regime and trends in the groundwater,
- assessment of the potential impacts of climate change on the groundwater regime, to indicate drought and its impacts on the groundwater resources and stocks, and assessment of extreme phases of the hydrological regime,
- water management procedures aimed at environmentally sound management of the groundwater.

Table 5.7 Number of objects for monitoring the quantity of the groundwater in 2018

Type of monitoring	GWB layer	Danube RBD		Vistula RBD		SR*	
		wells	springs	wells	springs	wells	springs
Surveillance	Quaternary sediments	900	0	19	0	919	0
	Pre-quaternary rocks	217	347	8	12	225	359
Total		**1,117**	**347**	**27**	**12**	**1,144**	**359**

**Data for the whole Slovakia are derived for the purposes of this publication; they are not included in the river basin management plans.*

The monitoring wells primarily monitor the groundwater level and, for selected wells, the temperature of the groundwater. The springs are monitored for water abundance and temperature. The gradual integration of automated instruments with online data transmission makes it possible to obtain operational drought data.

Geothermal groundwater bodies

Water quantity monitoring in the sources of geothermal groundwater bodies takes place only at the sources, which are under the jurisdiction of the Inspectorate of Spas and Springs of the Ministry of Health of the Slovak Republic. Resources in 10 geothermal groundwater bodies are monitored. The scope of monitoring of the indicators is shown in Annex 5.3 of the RBMP and their location in Map 5.2b of the RBMP.

5.2.2 Reliability of the status assessment

Four assessment reliability measures were used to assess the chemical and quantitative status of quaternary and pre-quaternary groundwater bodies in relation to the availability of information and data:

0 – no information: status assessed by analogy,
1 – low reliability: no monitoring data or no conceptual model, expert judgement plays a major role in the status assessment,
2 – moderate reliability: limited or insufficient monitoring data, expert judgement plays a major role in the status assessment,
3 – high reliability: reliable monitoring data and a good conceptual model of the system based on information on natural characteristics and influences.

Similarly, for the geothermal groundwater bodies, four assessment reliability measures were used:

0 – no information/no sampling,

1 – low reliability: less than 3 information points, large time gap (>5 years),

2 – moderate reliability: limited or insufficient data, expert judgement,

3 – high reliability: reliable data and model of sustainable groundwater use.

5.2.3 Chemical status of groundwater bodies

The evaluation of the chemical status of the groundwater bodies in quaternary sediments and in pre-quaternary rocks was a synthesis of the results of the sub-tests:

I general test for assessing the quality of groundwater bodies,

II test of water resource protection zones/protected water management areas, and test of water quality for human consumption, respectively,

III test for deterioration in the chemical and ecological status of associated surface water bodies due to the intrusion of pollutants from groundwater bodies,

IV test for the deterioration of status of terrestrial ecosystems dependent on groundwater due to contaminant intrusion from groundwater bodies.

The assessment of the individual tests, the results, and the reliability level, are given Chapter 5.2.3. of the RBMP.

At the same time, groundwater pollution was assessed at the local level and an assessment of trends in pollutant concentrations in groundwater was also performed.

The assessment of the chemical status of geothermal groundwater bodies was performed for the first time for the 3rd RBMP cycle. Its important factor was the assessment of the stability of the chemical composition.

The resulting assessment of the chemical status of the groundwater bodies based on the tests I - III is summarized in Table 5.7 and shown on the RBMP maps 5.5a (quaternary), 5.5b (pre-quaternary) and 5.5c (geothermal). The clustering method was not used in the assessment of the chemical status of the groundwater bodies.

Table 5.8 Summary of the assessment of the chemical status of groundwater bodies

Basin	Chemical status	GWB layer type	Quaternary sediments			Pre-quaternary rocks			Geothermal structures*
		Planning period	1st RBMP	2nd RBMP	3rd RBMP	1st RBMP	2nd RBMP	3rd RBMP	3rd RBMP
Danube RBD	Good	number	8	8	**7**	50	52	**51**	**23**
		area [km²]	5,661	5,661	**3,500**	37,555	38,455	**36,013**	**11,302**
		% of area	55.4	55.4	**34.2**	79.7	81.6	**76.5**	**64.1**
	Poor	number	7	7	**8**	6	4	**5**	**0**
		area [km²]	4,565	4,565	**6,726**	9,536	8,650	**11,093**	**0**
		% of area	44.6	44.6	**65.8**	20.3	18.4	**23.5**	**0.0**
Vistula RBD	Good	number	1	1	**1**	3	3	**3**	-
		area [km²]	421	421	**421**	1,971	1,971	**1,971**	-
		% of area	100.0	100.0	**100.0**	100.0	100.0	**100.0**	-
	Poor	number	0	0	**0**	0	0	**0**	-
		area [km²]	0	0	**0**	0	0	**0**	-
		% of area	0.0	0.0	**0.0**	0.0	0.0	**0.0**	-
SR**	**Good**	**number**	9	9	**8**	53	55	**54**	**23**
		area [km²]	6,082	6,082	**3,921**	39,526	40,426	**37,984**	**11,302**
		% of area	57.12	57.12	**36.8**	80.56	82.37	**77.4**	**64.1**
	Poor	**number**	7	7	**8**	6	4	**5**	**0**
		area [km²]	4,565	4,565	**6,726**	9,536	8,650	**11,093**	**0**
		% of area	42.88	42.88	**63.2**	19.44	17.63	**22.6**	**0.0**

Explanatory notes: ** 8 geothermal groundwater bodies are unassessed.*

*** Data for the whole Slovakia are derived for the purposes of this publication; they are not included in the river basin management plans.*

5.2.4 Quantitative status of groundwater bodies

The evaluation of the quantitative status of the groundwater bodies in quaternary sediments and in pre-quaternary rocks was a synthesis of the results of the sub-test criteria:

- Test criterion I – balance assessment of groundwater bodies (Ia – quantification of the balance status), (Ib – assessment of the occurrence of local overexploitation),
- Test criterion II – assessment of the existence of significant downward trends in groundwater levels and spring yields,
- Test criterion III – assessment of the impact of groundwater quantity on the status of groundwater-dependent terrestrial ecosystems,
- Test criterion IV – assessment of the impact of groundwater quantity on surface water status.

The criteria for the geothermal groundwater bodies were:

- Test criterion I – balance assessment of groundwater bodies,
- Test criterion II – assessment of the trend in the quantitative status over time.

The evaluation and the results of the individual tests are discussed in detail in Chapter 5.2.4. of the RBMP.

The resulting assessment of the quantitative status of the groundwater bodies based on the Tests I – IV is summarized in Table 5.9 and shown in the RBMP maps: 5.6a (quaternary), 5.6b (pre-quaternary), 5.6c (geothermal). The clustering method was not used to assess the quantitative status of groundwater bodies.

Table 5.9 Summary of the assessment of the quantitative status of groundwater bodies

Basin	Quantitative status	GWB layer type	Quaternary sediments			Pre-quaternary rocks			Geothermal structures*
		Planning period	1st RBMP	2nd RBMP	3rd RBMP	1st RBMP	2nd RBMP	3rd RBMP	3rd RBMP
Danube RBD	Good	number	14	14	**15**	52	54	**49**	**28**
		area [km²]	9,292	9,292	**10,226**	43,867	45,877	**40,441**	**17,249**
		% of area	*90.9*	*90.9*	***100.0***	*93.1*	*97.4*	***85.9***	***97.8***
	Poor	number	1	1	**0**	4	2	**7**	**3**
		area [km²]	934	934	**0**	3,238	1,229	**6,664**	**390**
		% of area	*9.1*	*9.1*	***0.0***	*6.9*	*2.6*	***14.1***	***2.2***
Vistula RBD	Good	number	1	1	**1**	3	3	**3**	**-**
		area [km²]	421	421	**421**	1,971	1,971	**1,971**	**-**
		% of area	*100.0*	*100.0*	***100.0***	*100.0*	*100.0*	***100.0***	-
	Poor	number	0	0	**0**	0	0	**0**	**-**
		area [km²]	0	0	**0**	0	0	**0**	**-**
		% of area	*0.0*	*0.0*	***0.0***	*0.0*	*0.0*	***0.0***	-
SR**	**Good**	**number**	15	15	**16**	55	57	**52**	**28**
		area [km²]	9,713	9,713	**10,647**	45,838	47,848	**42,412**	**17,249**
		% of area	*91.23*	*91.23*	***100.0***	*93.40*	*97.50*	***86.4***	***97.8***
	Poor	**number**	1	1	**0**	4	2	**7**	**3**
		area [km²]	934	934	**0**	3,238	1,229	**6,664**	**390**
		% of area	*8.77*	*8.77*	***0.0***	*6.60*	*2.50*	***13.6***	***2.2***

Explanatory notes: * *8 geothermal groundwater bodies are unassessed.*

** *Data for the whole Slovakia are derived for the purposes of this publication; they are not included in the river basin d management plans.*

5.2.5 Assessment of the risk of non-achievement of environmental objectives

Groundwater quality

The risk analysis included factors such as: risk assessment in the 2nd planning cycle and the assessment of the chemical status of the groundwater bodies in the 3rd cycle of the RBMP, significant sustained upward trends

in pollutant concentrations, vulnerability of the groundwater, significant point sources of pollution, pesticide and fertilizer use, sewerage of urban settlements, drinking water resource protection zones and protected areas, predicted changes in climate, population and land use, and groundwater-surface water interaction.

Table 5.10 Overview of the groundwater bodies at risk of not achieving environmental objectives by 2027 – chemical status

GWB layer type	Danube RBD						Vistula RBD					
	without risk			at risk			without risk			at risk		
	Number	Area [km²]	% of area	Number	Area [km²]	% of area	Number	Area [km²]	% of area	Number	Area [km²]	% of area
Quaternary	5	1,313	12.8	10	8,913	**87.2**	0	0	0.00	1	421	**100.00**
Pre-quaternary	49	32,073	68.1	7	15,032	**31.9**	3	1,971	100.00	0	0	**0.00**
Geothermal	Not assessed						-					

Groundwater quantity

The analysis of the risk of not achieving good quantitative status by 2027 was performed on the basis of similar test criteria I - IV as for the assessment of the quantitative status of the groundwater itself.

Table 5.11 Overview of groundwater bodies at risk of failing to meet environmental objectives by 2027 – quantitative status

GWB layer type	Danube RBD				Vistula RBD			
	without risk		at risk		without risk		at risk	
	Number	% of area	Number	% of area	Number	% of area	Number	% of area
Quaternary	14	99.6	1	**0.4**	1	100.00	0	**0.00**
Pre-quaternary	43	74.2	13	**25.8**	1	9.70	2	**90.30**
Geothermal	28	90.5	3	**9.5**	-			

5.3 Protected areas

Protected areas monitoring monitors areas stipulated in the Water Act and the Nature and Landscape Protection Act (areas of habitats and species directly dependent on water).

Areas with surface water intended for abstraction for drinking water

The quality of drinking water in large water supply zones (over 5,000 inhabitants) has long been high. A main reason is that about 84% of the drinking water supplied comes from groundwater resources, which are of high quality and less vulnerable to pollution.

Areas with bathing water

Bathing water is any surface water that is used by a large number of bathers and has not been issued with a permanent bathing prohibition or permanent advice not to bathe. The Slovak Republic has 32 sites designated as bathing water. In most of them, the water quality ranges from good to very good. The information is available on the websites of Regional PHA and PHA SR[8].

[8] https://www.uvzsr.sk/web/uvz/voda-na-kupanie

Table 5.12 Overview of bathing water quality in the Slovak Republic

Quality/year	2013	2014	2015	2016	2017	2018
Excellent	24	20	16	21	19	18
Good	7	8	10	8	9	11
Sufficient	1	2	1	0	1	0
Poor	0	0	1	1	0	1
Not classified	1	3	5	3	3	2
Total	**33**	**33**	**33**	**33**	**32**	**32**

Areas with surface water suitable for the life and reproduction of autochtonous fish species

Water quality has not been assessed for this purpose.

Reference sites

Reference sites are selected representative sections of watercourses that are not, or only minimally, affected by human activities. The status of the reference site forms the basis for quantifying the disturbance to the aquatic environment and for assessing the status of surface water. The inventory lists 93 reference sites in the Danube RBD and 8 in the Vistula RBD. In the period 2016 – 2018 there were monitored 17 reference sites, 11 best accessible localities, and 6 newly proposed reference sites in the Danube RBD. Based on the results of the water status assessment, 13 reference sites were assessed to be in high ecological status, 3 in good ecological status and 1 in only moderate ecological status. In the Vistula RBD there were monitored 3 reference sites and 1 best available site. Two of the reference sites achieved high ecological status and one achieved good ecological status.

Nutrient-sensitive areas

Sensitive areas

The designation of sensitive areas results from the Water Act, as well as from the implementation of Directive 91/271/EEC on urban wastewater treatment, and aims to reduce nutrient pollution of surface water and groundwater. WWTPs of agglomerations of more than 10,000 p. e. in sensitive areas must be equipped to stricter nitrogen and phosphorus removal. All surface water bodies in the territory of the Slovak Republic are designated as sensitive areas. There are no increased requirements for water monitoring in sensitive areas beyond surface water monitoring for water quality assessment purposes (see Chapter 5.1.1 of the RBMP).

Vulnerable areas

The purpose of nitrate substances and pesticide monitoring in vulnerable zones is to monitor the impacts of agricultural activities on the quality of groundwater and to assess the effect of water protection measures implemented. In 2018, the total number of samplings, field measurements and analyses of nitrates and pesticide in the Danube RBD and Vistula RBD was 19,713 and 47 respectively.

Protected areas, including the European network of protected areas (Natura 2000)

The subject of monitoring in protected areas are habitats and species of European importance whose monitoring is covered by the SNC SR[9]. This monitoring is considered sufficient and there was no need to implement specific water quality monitoring in these areas in the 2013 – 2018 period. The results of the monitoring of habitats and species of European importance are compiled in the status report on habitats and species of European importance (according to the Habitats Directive) and in the status report on birds (according to the Birds Directive), which are available on the website of the European Environment Agency[10].

[9] http://www.biomonitoring.sk
[10] https://cdr.eionet.europa.eu/sk/eu/art17

6 Environmental objectives and exemptions

6.1 Environmental objectives

The environmental objectives of the WFD are at the heart of EU legislation, enabling sustainable water management based on a high level of protection of the water environment. The WFD transposed into the Water Act requires the achievement of environmental targets by 2015, by 2021 respectively, or by 2027 at the latest.

The environmental objectives for surface water bodies are:

a) preventing deterioration,
b) protection and restoration of the SWBs bodies to achieve good ecological and chemical status,
c) protection and enhancement of artificial and heavily modified water bodies to achieve good ecological potential and good chemical status,
d) progressive reduction of pollution by priority pollutants and the cessation or phasing out of emissions, discharges and releases of priority hazardous substances.

The objective for artificial and heavily modified water bodies is to achieve at least good ecological potential and good chemical status.

The environmental objective for groundwater is:

a) to prevent or limit the entry of pollutants into the GWBs bodies and to prevent deterioration,
b) the protection, enhancement and restoration of all GWBs bodies and to ensure a balance between abstraction and recharge of groundwater to achieve good status,
c) reversing any significant and sustained upward trend in the concentration of a pollutant that is caused by human activity to reduce groundwater pollution over time.

Quaternary and pre-quaternary groundwater bodies are covered by all three of the environmental objectives listed above. All geothermal groundwater bodies are subject to the two environmental objectives for groundwater under Article 4(1)(i-ii) of the WFD.

6.1.1 Objectives for protected areas

In addition to the achievement of good water status as defined in the WFD, other specific objectives may be set for protected areas related to the relevant European and national standards. These include:

- for areas intended for water abstraction for human consumption – ensuring the necessary protection of water bodies intended for water abstraction for drinking water to prevent deterioration in their quality and to reduce the level of water treatment needed for the production of drinking water. In the Slovak Republic, such water bodies, drinking water resources, are protected by a Level I protection zone (for protection in the immediate vicinity of the point of water abstraction or a water retention facility), a Level II protection zone (to protect the water resource from threats from more distant locations), or a Level III protection zone (to increase protection). The objectives according to Article 7(3) of the WFD are therefore now already achieved.
- for bathing water areas – achieving good to excellent quality of bathing water,
- for sensitive areas – reducing nutrient pollution of surface water through increased requirements on wastewater treatment from agglomerations and agriculture and food industries,
- for vulnerable areas – reduction of nutrient pollution of groundwater and surface water from agricultural sources by farming in accordance with the measures of the management program laid down in the Fertilizer Act,
- for Natura 2000 protected areas – contribution to ensuring biodiversity by protecting habitats, wild fauna and flora in the territory of the member state, taking into account economic, social and cultural conditions and local characteristics (within the meaning of the Habitats Directive), and to maintain populations of all wild bird species in the EU at the level which is appropriate to the ecological, scientific and cultural conditions in particular, also taking into account economic and recreational requirements, or to adapt the populations of these species to that level (within the meaning of the Birds Directive),

- for wetlands of European importance – addressing the causes of wetland loss and degradation, effective conservation and management of the Ramsar sites , wise sustainable use of all wetlands

6.2 Exemptions

According to the WFD, exemptions can be applied in justified cases for water bodies, both surface water and groundwater, which are at risk of failing to meet the environmental objectives, or where the result has not yet been achieved despite the implementation of the necessary measures:

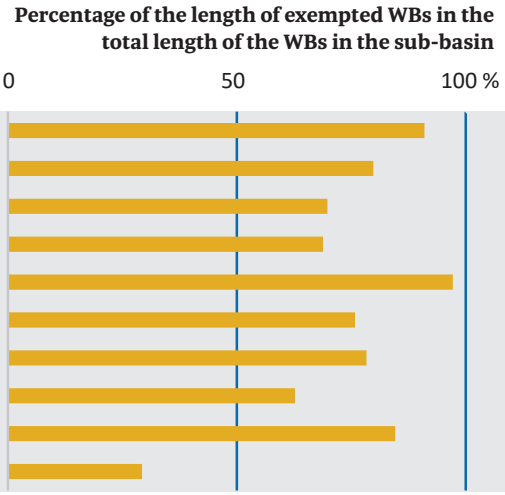
- extension of the deadline (Article 4(4) of the WFD),
- achieving less stringent objectives under certain conditions (Article 4(5) of the WFD),
- temporary deterioration of status/potential due to natural causes or 'force majeure' (Article 4(6) of the WFD),
- deterioration or failure to achieve good status/potential due to new sustainable human development activities (Article 4(7) of the WFD).

6.2.1 Surface water

Due to the large number of measures planned to address the individual water management issues, it is not possible to implement them all by the required deadline, for both technical and economic reasons. Therefore, most of the exemptions under Article 4(4) of the WFD (postponement of the date of achievement of good status) and in 1 case an exemption under Article 4(5) of the WFD (less stringent targets) are applied for the surface water in the 3rd planning cycle. The postponement of deadlines is also necessary because solving one of the problems for a given water body may not ensure that the overall objective is achieved – as water bodies are usually subject to multiple impacts. An exemption under Article 4(7) of the WFD (changes due to sustainable human development activities) is applied in 5 cases.

Table 6.1 Overview of the surface water bodies with an ecological and/or chemical status exemption

Sub-basin	WBs	VBs with the exemption		Lenght of WB	Length of WB with the exemption	
	[number]	[number]	[%]	[km]	[km]	[%]
Morava	69	61	88.4%	878.3	799.3	91.0
Danube	15	11	73.3%	348.7	278.2	79.8
Váh	493	293	59.4%	6,567.6	4,585.8	69.8
Hron	161	99	61.5%	1,949.0	1,340.4	68.8
Ipeľ	117	114	97.4%	1,549.9	1,505.9	97.2
Slaná	83	60	72.3%	988.6	749.0	75.8
Bodva	29	21	72.4%	326.0	255.2	78.3
Hornád	119	71	59.7%	1,601.6	1,003.5	62.7
Bodrog	196	155	79.1%	2,478.1	2,095.4	84.6
Dunajec and Poprad	69	19	27.5%	840.9	246.4	29.3
SR	**1,351**	**906**	**67.1%**	**17,528.7**	**12,884.1**	**73.5**



A spatial representation of water bodies with exemptions from achieving good ecological status by 2027 is shown in Map 6.1 of the RBMP, exemptions from achieving good chemical status is shown Map 6.2 of the RBMP.

The table in Annex 5.1 of the RBMP for each of the water bodies includes, in addition to the type of derogation and justification, the assumption of achieving good status by 2027 or 2033.

6.2.2 Groundwater

Natural conditions or technical feasibility are the reasons for 13 exemptions from achieving good chemical status by 2027 for groundwater bodies. Spatial representation is shown in the Map 6.3a of the RBMP for quaternary groundwater bodies and the Map 6.3b of the RBMP for pre-quaternary groundwater bodies.

Table 6.2 Exemptions from achieving good chemical status by 2027 for groundwater bodies in the Slovak Republic

Quaternary GWBs			Pre-quaternary GWBs		
WB code	**Area** [km²]	**Nature of exemption**	**WB code**	**Area** [km²]	**Nature of exemption**
SK1000100P	830.110	Article 4(4)	SK2000200P	1,484.726	Article 4(4)
SK1000400P	1,943.020	Article 4(4)	SK2001000P	6,248,370	Article 4(4)
		Article 4(5)	SK2001300P	548.077	Article 4(4)
SK1000600P	514.542	Article 4(4)	SK2002300P	2,000.440	Article 4(4)
		Article 4(5)	SK2003700P	810.986	Article 4(4)
SK1000700P	723.773	Article 4(4)			
		Article 4(5)			
SK1000800P	198.072	Article 4(4)			
SK1000900P	111.440	Article 4(4)			
SK1001200P	934.295	Article 4(4)			
SK1001500P	1,470.868	Article 4(4)			

The good quantitative status is not achieved by 7 pre-quaternary groundwater bodies in Danube RBD. The reason for the application of the exemption is the technical and temporal feasibility of securing replacement sources also in relation to changing hydrogeological and climatic conditions. Similarly, 3 geothermal formations are not in good quantitative status and the reason for the exemption is technical feasibility. There are no exceptions in the Vistula RBD.

Table 6.3 Exemptions from achieving good quantitative status by 2027 for groundwater bodies in the Slovak Republic

Pre-quaternary GWBs			Geothermal GWBs		
WB code	**Area** [km²]	**Nature of exemption**	**WB code**	**Area** [km²]	**Nature of exemption**
SK200030FK	222.033	Article 4(5)	SK300070FK	47.522	Article 4(4)
SK200160FK	278.948	Article 4(5)	SK300210FK	185.334	Article 4(4)
SK2001800F	4,451.705	Article 4(5)	SK3002600P	156.710	Article 4(4)
SK200250KF	168.292	Article 4(5)			
SK200270KF	1,006.513	Article 4(5)			
SK200410KF	80.493	Article 4(5)			
SK200590FP	455.998	Article 4(5)			

A spatial representation of the groundwater bodies for which exceptions to good quantitative status are required is shown in the Map 6.4a of the RBMP for the pre-quaternary formations and the Map 6.4b of the RBMP for the geothermal water bodies.

7 Economic analysis of water use and cost recovery for water services

The focus of the economic analysis of water use for the river basin district (within the meaning of Article 5 of the WFD and Annex III) is:

- economic analysis of water use (economic importance of water use),
- trends in key economic indicators and drivers to 2027,
- cost recovery of water management services (implementation of Article 9 of the WFD).

Article 9 of the WFD requires the application of the principle of cost recovery for water management services provided, including environmental and resource costs.

For the RBMP, a detailed review and update of the above-mentioned areas was performed, also based on the assessment of the 2nd planning cycle for the 2016 – 2021 period. The results of the review are in Chapter 7 of the RBMP.

An important role of economic analysis is to support the design of RBMP programs of measures:

- estimating the potential costs of implementing the program of measures (see Chapter 8.9 of the RBMP),
- assessing the most cost-effective combination of measures for water bodies within each sub-basin.

7.1 Economic importance of water services and water use

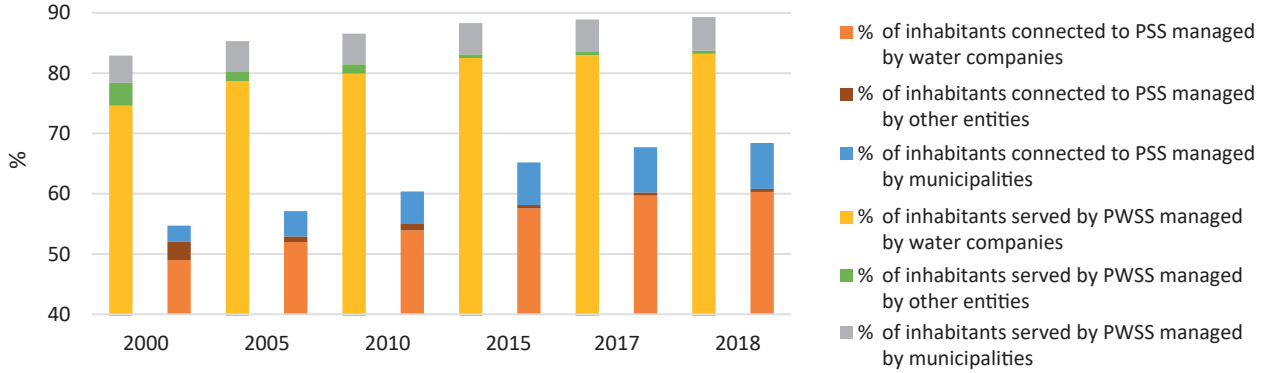
A water service is any service provided to households, public institutions or economic activities, such as the abstraction, raising, collection, treatment and supply of surface water and groundwater, and the disposal and treatment of wastewater, with subsequent discharge to surface water. We can divide them into areas:

- drinking water supply and wastewater collection and treatment (service provided by water companies and municipalities),
- water management services related to the use of water (provided by SWME, as the manager of water-economically important streams and other watercourse managers).

Drinking water supply from public water supply and wastewater disposal and treatment

The share of the population connected to public water supply, as well as the share of the population connected to public sewerage, is on an upward trend in the Slovak Republic. Water companies are the dominant supplier of these services. In 2018, 89.25% of the total number of inhabitants in the Slovak Republic were served by public water supply. 39.03% of the municipalities had a public sewerage system that comprise 68,40% of inhabitants connected to public sewerage system. Between 2011 and 2018, with the exception of 2012, the specific water consumption per household in Slovakia fell below the sanitary minimum (about 80 litres/inhabitant/day).

Figure 7.1 Development of the share of population supplied from public water supply system (PWSS) and the share of population living in houses connected to public sewerage system (PSS) in the 2000 – 2018 period in the Slovak Republic



Source: WRI

Water use

Each sector of the economy is linked to water use. When assessing the economic significance of individual sectors, the key indicator is the amount of GDP generated and the share in total GDP. Industry and manufacturing dominate in terms of GDP generation in Slovakia.

The basis for assessing the economic importance of individual water uses is data on abstractions from surface water and groundwater. Surface water has several areas of use: drinking and utility water supplies, hydropower potential, irrigation systems, navigation waterways, fisheries. The industry sector has the highest share of surface water abstractions. In 2018, the following companies were the most significant surface water users in 2018: Slovnaft, a. s., Bratislava (abstraction 34,108 thousand m^3), U. S. Steel Košice (29,480 thousand m^3), Mondi SCP, a. s., Ružomberok (24,273 thousand m^3) and SE, a. s., Bratislava – EBO Jaslovské Bohunice (21,579 thousand m^3).

Groundwater abstraction includes the use of water for public water supply, food and other industry, agriculture, sanitary needs and others. Agriculture accounts for the lowest proportion of abstraction, followed by industry and the highest proportion of abstraction for public water supply. (Chapter 7.1 of the RBMP and Annex 7.1 of the RBMP provide details).

7.2 Trends in key economic indicators and forecast until 2027

For the purpose of water use projections in 2027, the RBMP took into account trends in the development of the Slovak economy, projections of key macroeconomic indicators (including the coronavirus pandemic), population projections, and policies and projections for selected major sectors of the national economy (industry, energy, agriculture, transport, and water management). (See Chapter 7.2 of the RBMP for details.)

Table 7.1 Structure of water use in the Slovak Republic in 2027 – forecast according to the methodology of the UN Economic Commission for Europe

	No.	Abstraction purpose	Water abstraction [million m^3]		
			Total	Surface water	Ground-water
A. Population	1	Public water supply facilities	330.5	55	275.5
	2	Individual supply from wells	7	0	7
	3	Supply of industry and services from public water supply facilities	69.2	11.6	57.6
	4	Agricultural supply from public water supply facilities	2.5	0.4	2.1
	5	Losses and own consumption	86.4	14.8	71.6
		Total (1+2-3-4-5)	**179.4**	**28.2**	**151.2**
B. Industry	6	Water from own resources	275	200	75
	(3)	Supply of industry and services from public water supply facilities	69.2	11.6	57.6
		Total (6+3)	**344.2**	**211.6**	**132.6**
C. Agriculture	7	Water for irrigation	29	25	4
	8	Water for livestock production	14	0	14
	(4)	Supply of agriculture from public water supply facilities	2.5	0.4	2.1
		Total (7+8+4)	**45.5**	**25.4**	**20.1**
D. Other purposes	9	Water from own resources	-	-	-
	(5)	Water for other purposes from public water supply facilities	-	-	-
		Total (9+5)			
E. Total abstraction in SR			**655.5**	**280**	**375.5**

7.3 Cost recovery of water services

Cost recovery of water services was assessed for:

- water services related to the supply, delivery and distribution of drinking water and the collection and treatment of wastewater, and
- water services related to the use of a watercourse, which are: use of hydropower potential, use of energy water and abstraction of surface water.

All of the above-mentioned water services are paid services, which regulated by the Regulatory Office for Network Industries. Exemption is 'abstraction of surface water for irrigation of agricultural land', for which the fee is set by the Slovak Republic Regulation No. 755/2004 Coll. as later mended. The provider of this service is SWME.

Cost recovery calculation includes costs, revenues and subsidies. The estimated cost recovery for water services is analyzed annually, using the formula: revenues - subsidies / costs * 100.

Detailed description of requirements on payment for water management services are contained in Annex 7.3 of the RBMP.

Table 7.2 Cost recovery rates for individual water management services in 2018 [%]

	Danube RBD	Vistula RBD	SR
Water services sector:			
Drinking water supply (public water supply)	104.8	120.6	**105.2**
Wastewater disposal and treatment (public sewerages)	92.8	106.2	**93.2**
Total public water supply and public sewerage	**98.5**	**112.8**	**99.0**
River basin management:			
Hydropower potential	76.7	0.6	**75.0**
Energy water	80.5	0.0	**78.2**
Total surface water abstractions	91.2	16.0	**89.2**
- household abstraction	90.2	18.3	**83.3**
- abstractions for other customers	91.4	8.8	**90.8**
Total river basin management:	**84.1**	**9.1**	**82.3**

Notes: Flood control, navigation, irrigation water for agriculture, and self-service abstraction were not included in the cost recovery analysis.

8 Program of measures

The Program of Measures to achieve the environmental objectives for water is a key component of the RBMP. It is designed in relation to the 2027 objectives set at a national level and corresponds to each of the significant water management issues.

In addition to the objectives, the Program describes the approach to the design of the measures, the description and consideration of the progress made in implementing the program of measures from the 2nd planning cycle, and the design of the measures to ensure improvements in the achievement of the environmental objectives of the 3rd planning cycle.

A detailed description of the measures and explanations is in Chapter 8 of the RBMP. Tab. 8.1 provides a basic overview of the measures by national measure code, including references to WFD articles, key types of measure (KTMs), and the cumulative number of water bodies in which the measures are to be implemented.

The cumulative cost estimate for the implementation of the Programs of Measures in the Slovak Republic for the 2022 – 2027 period amounts to approx. EUR 1,794 million. Their financing is to be covered through the Program Slovakia 2021 – 2027, the Recovery and Resilience Plan of the Slovak Republic, the Rural Development Program of the Slovak Republic, the Environmental Fund and other sources (see Chapter 8.9 of the RBMP for details).

Table 8.1 List of measures to achieve the WFD environmental objectives for water bodies not achieving good ecological, chemical and quantitative status and good ecological potential

Article WFD	Name of the measure	Type	National code	KTM	Number of WBs*
	1 SURFACE WATER				
	1.1 Reducing surface water pollution				
11.3(a)	Fulfilling the requirements resulting from the implementation of the Urban Wastewater Treatment Directive – construction and upgrade of municipal wastewater treatment plants (Annex 8.1b of the RBMP) and public sewerage networks (Annex 8.1a of the RBMP), (Annex 8.5 of the RBMP).	B	1-1-01	1, 21	192
11.3(a); (d); (h)	Compliance with the requirements resulting from the implementation of the Nitrate Directive – the Management Program in declared vulnerable areas (action program) laid down in the Fertilizers Act compliance with the requirements of cross-compliance set out in the Government Regulation No laying down the rules for the provision of support in agriculture in connection with decoupled direct payment schemes.	B	1-1-02	2	429
11.3(a)	Fulfilling the requirements arising from the implementation of the EU directive on sustainable use of pesticides – transposed into legislation and the approved National Action Program (NAP) for the sustainable use of plant protection products.	B	1-1-03	3	429
11.3(a); (d); (h)	Enforcement of national legislation (Plant Health Act and related implementing regulations) – compliance with the cross-compliance requirements set out in the Government Regulation laying down the rules for the granting of agricultural support in connection with decoupled direct payment schemes.	B	1-1-04	3	429
11.3(d)	Implementation of measures in line with the State Remediation Program of Contaminated Sites for 2022 – 2027 period: identification and survey of presumed contaminated sites, implementation of a detailed survey of contaminated sites (CSs), remediation of CSs and building a dedicated monitoring system for contaminated sites.	B	1-1-05	4	18
11.3(g)	Alignment of pollutant management with the conditions of the Water Act by 2027 – including a review of issued permits in accordance with §38 (3) of the Act.	B	1-1-06	1, 15, 16, 21	247
11.3(g)	Reassessment and updating of permits in accordance with §33 1(d) of the Integrated Pollution Prevention and Control Act in relation to §40(2) of the Water Act.	B	1-1-07	15	89
11.4	Implementation of measures under the current Rural Development Program - on a voluntary basis.	S	1-1-08	1,2,3 12,17 21	555
11.4	Implementation of measures from the Plan of Public Water Supply and Public Sewerage Systems Development for the territory of the Slovak Republic for the 2021 – 2027 period.	S	1-1-09	1, 21	192
11.4	Revision of regulations on charges for the discharge of wastewater into surface water under §79 (4) of the Water Act also for other pollution indicators (priority hazardous substances and priority substances).	S	1-1-10	10	89
11.4	Implementation of priority and support measures to reduce emissions and atmospheric deposition of B(a)P.	S	1-1-11	14	234
11.4	Support of research projects on technologies and best practices (e.g., for dry periods, extreme events, etc.).	S	1-1-12	14	399
11.4	Research, improving the knowledge base to mitigate uncertainty – monitoring, control and quantification.	S	1-1-13	14	525
	1.2 Elimination of hydromorphological impacts				
11.3(c)	Measures to improve hydrological conditions; establishment of e-flow using a methodology that takes into account the needs of the ecosystem.	B	1-2-01	7	17
11.3(e)	Issuance of new surface water abstraction permits in accordance with §21(4) and §8(3) of the Water Act.	B	1-2-02	14	89
11.4	Removal or adaptation of barriers to improve longitudinal continuity of flows.	S	1-2-03	5	96
11.4	Measures to improve the morphological quality of water bodies – restoration of streams or mitigation of negative consequences caused by river chanelling; support of natural hydromorphological diversity and restoration of disturbed lateral connectivity.	S	1-2-04	6	23

Article WFD	Name of the measure	Type	National code	KTM	Number of WBs*
11.4	Supplementing the knowledge base with an assessment of the number and status of all migration barriers, information on their ownership relationships, the fulfilment of the purpose for which they were built, and a comprehensive ecological prioritization of barrier removal and/or adaptation.	S	1-2-05	14	438
11.4	Supplementing the knowledge base on the effectiveness of existing and newly built corrective and mitigating measures on migration barriers by introducing systematic monitoring - including the use of innovative monitoring procedures and tools.	S	1-2-06	14	438
11.4	Supplementing the knowledge needed to improve morphological quality – programs, inventories, methodologies and studies.	S	1-2-07	14	373
11.4	Enhance of the knowledge base needed to improve hydrological conditions.	S	1-2-08	14	253
	1.3 Inváze terestrické druhy				
11.4	Implementation of national legislation (Act on the prevention and management of the introduction and spread of invasive alien species) - removal of invasive alien species in the national or EU list and care of the lands to prevent their spread.	S	1-3-01	18	67
11.4	Care of the streams – mowing, weeding, digging.	S	1-3-02	18	67
	1.4 Perspective infrastructure projects				
11.4	Review an update the list of perspective infrastructure projects based on new conceptual and strategic documents.	S	1-4-01		
11.4	Amend §16a of the Water Act – to streamline the assessment process, to specify in detail the projects/activities to which §16a applies.	S	1-4-02		
11.4	Create a publicly available inventory of projects under consideration.	S	1-4-03		
11.4	Mitigation measures will be proposed in the framework of the assessment of the perspective infrastructure project in accordance with the requirements of Article 4(7) of the WFD, which shall be provided by the project investor.	S	1-4-04		
	2 GROUNDWATER				
	2.1 Reducing groundwater pollution				
11.3(a); (d); (h)	Compliance with the requirements resulting from the implementation of water Nitrate Directive – the Management Program in declared vulnerable areas (action program) laid down in Act No. 136/2000 Coll. on fertilizers and compliance with the requirements of cross-compliance set out in the Government Regulation No. 342/2014 Coll. laying down the rules for the provision of support in agriculture in connection with decoupled direct payment schemes.	B	2-1-01	2	11
11.3(a)	Fulfilling the requirements resulting from the implementation of the Urban Wastewater Treatment Directive – construction and upgrading of municipal wastewater treatment plants (Annex 8.1b of the RBMP) and public sewerage networks (Annex 8.1a of the RBMP).	B	2-1-02	1, 21	9
11.3(d)	Implementation of measures for agglomerations of below 2,000 p. e. situated in the PWMA.	B	2-1-03	21, 1	1
11.3(a)	Fulfilling the requirements arising from the implementation of the Pesticide Directive – transposed into implementing legislation and the approved National Action Program (NAP) for the sustainable use of plant protection products.	B	2-1-04	3	1
11.3(a); (d); (h)	Enforcement of national legislation (Plant Health Act and related implementing regulations) – compliance with the cross-compliance requirements set out in the Government Regulation laying down the rules for the granting of agricultural support in connection with decoupled direct payment schemes.	B	2-1-05	3	1
11.3(d)	Implementation of measures to protect groundwater from pesticides in accordance with the Act on Protected Areas of Natural Water Accumulation.	B	2-1-06	13	
11.3(d)	Continuation of the remediation of contaminated sites (CSs) listed in the Register of Contaminated Sites (RoCSs – Part B) in the IS CS in accordance with the State Remediation Program of Contaminated Sites for the 2022 – 2027 period (SRP CSs) and as a priority to remediate CSs in groundwater bodies classified in poor chemical status or at risk of non-achievement of the environmental objectives of the WFD.	B	2-1-07	4	3

Article WFD	Name of the measure	Type	National code	KTM	Number of WBs*
11.3(a)	Implementation of measures in relation to the Industrial Emissions Directive (Integrated Pollution Prevention and Control) - transposed into the Act on Integrated Pollution Prevention and Control and the Decree of the Ministry of Environment of the Slovak Republic implementing the IPPC Act.	B	2-1-08	15, 16	
11.3(g)	Issuance of permits for the management of pollutants under the Water Act, including the review of issued permits as well as the review of pollutant discharge charges.	B	2-1-09	15	
11.3(d); (g)	Compliance with the provisions of §36 of the Water Act on the discharge of wastewater and special water into surface water and the provisions for prohibited activities in the PWMA given by Act No. 305/2018 Coll. and reassessing (enlarging) the Level I protection zones.	B	2-1-10	13	1
11.3(d)	Consistent application of measures under the Environmental Damage Prevention and Remediation Act. Application of the 'the polluter pays' principle in line with the principles of sustainable development of water resources and their protection as well as review of pollution charges, development of methodological guidelines and a methodological procedure for the assessment and quantification of environmental damages.	B	2-1-11	15, 21	
11.4	Implementation of measures within the valid Rural Development Program of the Slovak Republic – on a voluntary basis.	S	2-1-12	2, 3, 12, 21, 13, 122, 99	12
11.4	Application of the Code of Good Agricultural Practice - Protection of water resources - on a voluntary basis.	S	2-1-13	2	11
11.4	Introducing new technologies regarding fertilizers and fertilization, the so-called precision farming.	S	2-1-14	2	11
11.4	Implementation of measures from the Plan of Public Water Supply and Public Sewerage Systems Development for the Slovak Republic.	S	2-1-15	1, 21	9
11.4	Economic or fiscal tools (promotion of environmental solutions, organic farming, fines).	S	2-1-16	99	11
11.4	Setting up an effective control mechanism for the management of sewage wastewater accumulated in cesspools and to control the quality of water discharged from household wastewater treatment plants.	S	2-1-17	99	12
11.4	Reinforcement of inspection activities (both personnel and financial), including an increase in the number of inspections, e.g. in the case of the Central Control and Testing Institute in Agriculture in Bratislava and the Slovak Inspectorate of the Environment.	S	2-1-18	99	11
11.4	Support of research projects on technologies and best practices (e.g., for dry periods, extreme events, etc.).	S	2-1-19	14	11
11.4	Support of the targeted monitoring of nitrate substances in groundwater to provide information on groundwater contamination and sources of pollution, including for the purpose of monitoring the effectiveness of proposed measures.	S	2-1-20	14	11
11.4	Introduction of new technologies in the application of pesticides in plant protection products, the so-called precision farming.	S	2-1-21	3	1
11.4	Implementation of NAP measures to achieve sustainable use of plant protection products.	S	2-1-22	3, 13, 12,1, 18,99	1
11.4	Annual update of the list of the most risky plant protection products applied in the PWMA and elaboration of a common methodology for the selection of the most risky plant protection products authorized in the Slovak Republic.	S	2-1-23	13	
11.4	Inclusion of active substances and plant protection products with a high risk to surface and ground water in the targeted monitoring, in which the holders of product authorizations and holders of parallel trade permits for plant protection products containing those active substances will participate financially.	S	2-1-24	14	1
11.4	Research and development of new, ecologically optimal practices for the agricultural and forestry sectors in different geographical and climatic conditions of the Slovak Republic.	S	2-1-25	14	1
11.4	Support of the research projects in the field of application equipment and the introduction of new processes.	S	2-1-26	14	1
11.4	Support for targeted monitoring of pesticides in the groundwater to obtain information on groundwater contamination and sources of pollution, including monitoring of drinking water and an update of the list of pesticides under the PHA SR 'Recommended procedure for the detection and assessment of pesticides and their metabolites in drinking water and its sources'.	S	2-1-27	14	1

Article WFD	Name of the measure	Type	National code	KTM	Number of WBs*
11.4	Continuation of the investigation and monitoring of priority presumed contaminated sites (RoCSs – Part A) and priority environmental sites (RoCSs – Part B) in accordance with the SRP CSs for the 2022 – 2027 period.	S	2-1-28	14	7
11.4	Continuation of the development of risk analyses of CSs for priority environmental sites in coordination with the state CSs monitoring program in accordance with the guideline of the Ministry of the Environment of the Slovak Republic to develop a risk analysis of the contaminated area.	S	2-1-29	14	7
11.4	Keeping records and regular update of information on CSs in the Information System of CSs and evaluation of the impact of contaminated sites on the groundwater quality.	S	2-1-30	14	7
11.4	Keeping records and regular update of the results of groundwater pollution monitoring conducted by operators who have been ordered to monitor (in the database of integrated monitoring of pollution sources) and regular assessment of the impact of pollution sources on groundwater quality.	S	2-1-31	14	5
11.4	Support of the introduction of new and innovative industrial and municipal wastewater treatment practices in WWTPs to eliminate hazardous substances, including emerging substances.	S	2-1-32	1, 21	4
11.4	Ensuring the revitalization, reclamation and subsequent appropriate use of exposed groundwater formed after excavation of sand and gravel after the end of mining activities in connection with the protection of water resources and the protection of the quality of associated groundwater (gravel pits, dredging sites) and the protection of biodiversity.	S	2-1-33	99	
11.4	Reassessment and modification of the use of exposed groundwater (water for bathing, recreational purposes, fish farming, economic purposes, etc.).	S	2-1-34	99	
11.4	Expanding monitoring of mining sites (number of sites, number of objects, range of parameters, increase in monitoring frequency, automation of measurements) to achieve more reliable annual characteristics and to improve the knowledge of the seasonal regime of water chemistry for the purpose of assessing the impact of mining sites on the quality of groundwater and surface water.	S	2-1-35	99	1
11.4	Amendment of the legislative provisions concerning the conditions for the demarcation of protection zones for water resources, their registration, review and control, as well as the presentation of protection zones in spatial planning documentation, including the conditions and restrictions resulting therefrom for users and owners of lands in the protection zones, and to regulate of the fees for restricted use.	S	2-1-36	13	1
11.4	Update the definitions of the protection zones of water resources (including quality resources currently temporarily not used for water supply purposes) and update of the permits and maps of the protection zones of water resources to the level of cadastral maps, incorporation of the updated zones in the documents used for decision-making, including their insertion into the Land Register.	S	2-1-37	13	1
11.4	Economic or fiscal tools (support for the introduction of new technologies and environmental solutions, fines in case of non-compliance with basic measures).	S	2-1-38	99	1
11.4	Prevention of illegal dumps and financial support cover the cost of the removal of illegal dumps.	S	2-1-39	99	
11.4	System of regular training for personnel handling hazardous substances.	S	2-1-40	99	1
11.4	Education and training in water protection for the professional and general public (including schools).	S	2-1-41	99	6
11.4	Support of the research projects and monitoring (including innovative approaches) to obtain information on contamination of groundwater by hazardous substances, including emerging substances, as well as sources of groundwater pollution, including for the purpose of monitoring the effectiveness of proposed measures.	S	2-1-42	14	6
	2.2 Groundwater quantity				
11.3(e)	Issue and/or review and update of water permits in accordance with §21 (4) of the Water Act.	B	2-2-01	99	7
11.3(c)	Support of the efficient and sustainable use of water in accordance with the Plan for Public Water Supply Systems Development for the Slovak Republic for the 2021 – 2027 period according to the principles of ecologically optimal use of water resources as part of the landscape.	B	2-2-02	99	1

Article WFD	Name of the measure	Type	National code	KTM	Number of WBs*
11.3(e)	Introduction of limits for environmentally acceptable use of water resources - definition of the term minimum groundwater level, minimum yield of the spring, minimum outflow from the spring, minimum flow, and preparation of the guidelines for their determination, including the obligation to use them in hydrogeological and water management practice.	B	2-2-03	99	5
	On-site inspection to ensure that there is no increase in abstractions due to wasteful water management in line with §17 (2) of the Water Act.	B	2-2-04	99	
11.4	Verification and refinement of the usable quantities of groundwater through hydrogeological surveys and research (e.g., with the aim of including other prospective and additional resources of groundwater in categories with high security).	S	2-2-05	14	4
11.4	Verification of the water potential and natural quantities of groundwater resources in relation to changing climatic conditions to prevent further lowering of groundwater levels and avoiding the negative impacts of climate change.	S	2-2-06	24	3
11.4	Construction of the interconnection of water supply systems and construction of feeder pipelines (trunk pipelines).	S	2-2-07	99	2
11.4	Provision of supplementary water resources for short-term groundwater use during dry periods.	S	2-2-08	99	
11.4	Preparation of a system for regulating abstractions depending on the prioritization of customers for water scarcity situations.	S	2-2-09	24	3
11.4	Legislative proposal to introduce prioritization of individual users' entitlements to water abstraction and use in the event of water scarcity and/or droughts.	S	2-2-10	24	
11.4	Construction of a water reservoir where hydro-geological conditions are very unfavorable and other technical solutions are economically ineffective.	S	2-2-11	99	2
11.4	Implementation of technical measures on used groundwater/geothermal water facilities.	S	2-2-12	99	1
11.4	Ensuring the sustainable use of geothermal water and the effective management of groundwater geothermal energy use so as to avoid deterioration of groundwater and surface water bodies.	S	2-2-13	99	
11.4	Introduction of a joint Slovak-Polish water management of used groundwater and thermal water resources in the Vitanová, Oravice, Habovka area, mutually agreed by the Slovak-Polish Commission for Border Water.	S	2-2-14	99	1
11.4	Implementation of a geothermal balance and hydro-geothermal evaluation of the groundwater body.	S	2-2-15	14	3
11.4	Inspection of the abstraction quantities of geothermal water for the 2018 – 2020 period.	S	2-2-16	99	
11.4	Implementation of measures defined by the strategic documents of the Slovak Republic (Climate Change Adaptation Strategy of the Slovak Republic, Action Plan for Dealing with the Consequences of Drought and Water Scarcity - VALUE IS WATER, Flood Risk Management Plans, etc.).	S	2-2-17	24	
3 CLIMATE CHANGE					
11.4	Implementation of measures defined by strategic documents of the Slovak Republic (Strategy of Adaptation of the Slovak Republic to the Adverse Consequences of Climate Change and its NAP, Action Plan for Dealing with the Consequences of Drought and Water Scarcity - VALUE IS WATER, Strategy of the Environmental Policy of the Slovak Republic until 2030, Flood Risk Management Plan, etc.).	S	0-3-01	24	58

Explanatory notes: *B – basic measure, S – supplementary measure.*

**The number of WBs does not include measures proposed for implementation in water bodies assessed at risk of not achieving the WFD environmental objectives by 2027, with identified significant sustained upward trends of pollutant concentrations in groundwater, with local issues or measures resulting from the legislation with application in all water bodies, etc.*

9 Protection from the harmful effects of water and climate change

The negative impacts of climate change (drought, water scarcity and other impacts of climate change) have been identified as a significant water management issue for the first time in the river basin management plans for the 2022 – 2027 period. As climate change affects all hydrological phenomena, this cross-cutting issue applies to all areas of water management. Therefore, mitigation measures are also taken from a number of strategic documents linking different sectors of the economy (see Chapter 8.8 of the RBMP).

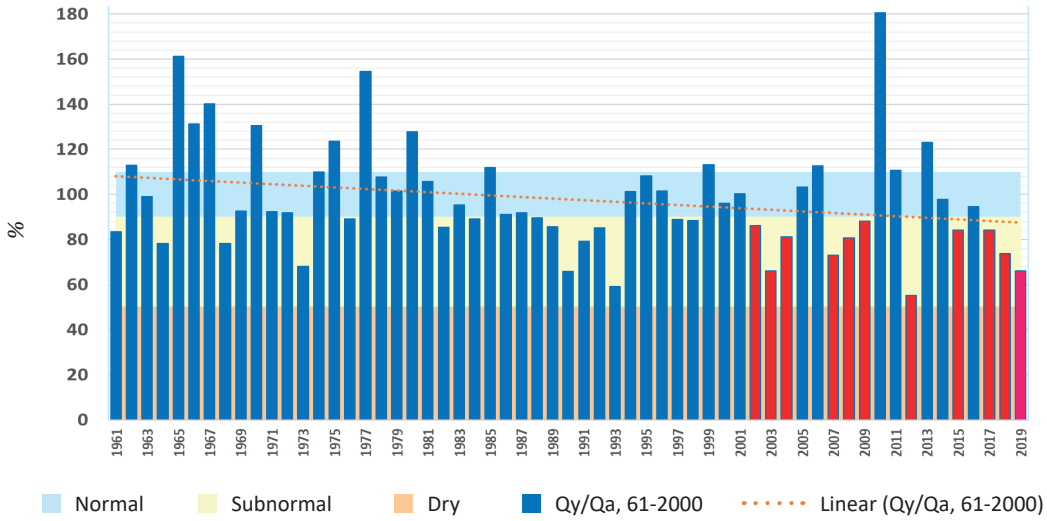
Climate change

An appropriate combination of greenhouse gas reduction and adaptation measures is the solution to avoid, or at least minimize, the risks and negative impacts of climate change. The following have been developed and updated in Slovakia in recent years[11]:

- Adaptation strategy of the Slovak Republic to the Adverse Impacts of Climate Change – Update 2018[12] and an action plan for its implementation[13],
- Integrated National Energy and Climate Plan for 2021 – 2030[14],
- national reports of the Slovak Republic on climate change.

The manifestations of climate change are visible in the changing hydrological regime. The trends of changes in the hydrological regime show a redistribution of runoff between the north and south (or higher and lower parts) of the territory of the Slovak Republic, between different years, and during the year.

Figure 9.1 Development of the average annual water level of surface streams in the Slovak Republic in the 1961 – 2019 period



Source: SHMI

In addition to the decrease in water availability from year to year, changes in the distribution of runoff during the year can also be observed. During most of the vegetation season (April to July) and in the months of November and December, less runoff was observed, and in contrast, runoff increased in the month of January.

A similar regime was observed for groundwater (spring yield).

Climate change can also negatively affect the quality of water resources. The impact of heavy rainfall and flood conditions can significantly deteriorate the status of the surface water bodies in the short term, as well

[11] https://www.minzp.sk/klima/adaptacia-zmenu-klimy/
[12] https://www.minzp.sk/files/odbor-politiky-zmeny-klimy/strategia-adaptacie-sr-zmenu-klimy-aktualizacia.pdf
[13] https://www.minzp.sk/files/odbor-politiky-zmeny-klimy/akcny-plan-implementaciu-nas.pdf
[14] https://www.economy.gov.sk/energetika/integrovany-narodny-energeticky-a-klimaticky-plan-na-roky-2021-2030/navrh-integrovaneho-narodneho-energetickeho-a-klimatickeho-planu?csrt=3851191655588536744

as the chemical status of groundwater bodies used as a source of drinking water. In dry periods, there is a risk of eutrophication and rising surface water temperatures, which can affect water quality and the condition of water-dependent ecosystems.

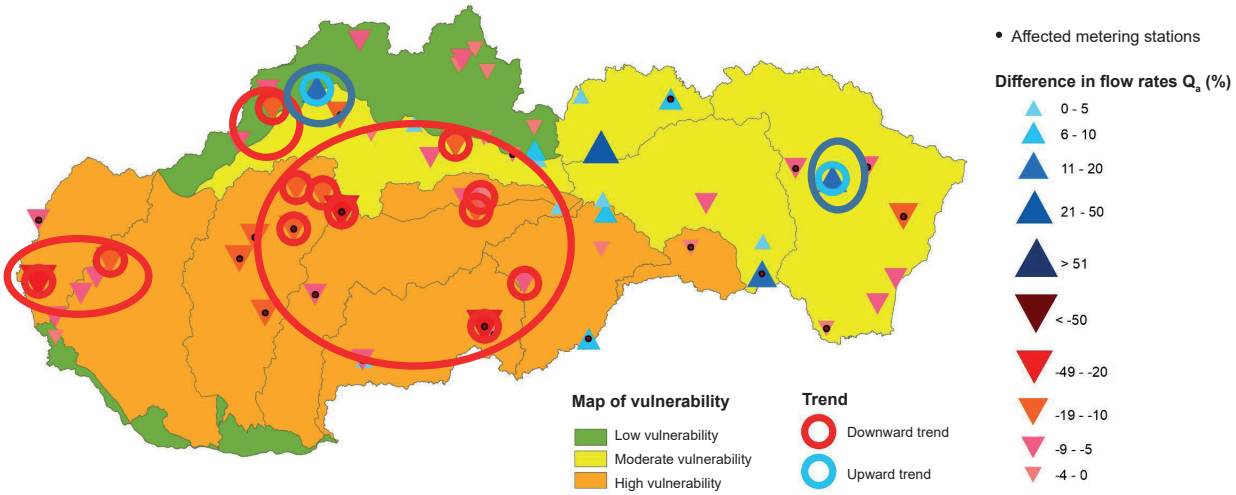
Protection against floods

Flood protection is dealt with in Flood Risk Management Plans[15], which are developed separately and in coordination with the river basin management plans. The aim of this coordination is to integrate the two areas.

Drought and water scarcity

Meteorological and hydrological (or soil) drought in Slovakia is monitored at surface and groundwater monitoring facilities and assessed according to the relevant methodologies (for details see Chapter 9.1 of the RBMP and the SHMI website[16]). In addition to the monitoring of 'drought' (as a state of natural water availability), 'water scarcity', which is a water management concept that relates to human needs, must also be taken into account. In the Slovak Republic, this issue is mainly addressed by the Action Plan for Dealing with the Consequences of Drought and Water Scarcity – VALUE IS WATER (2018)[17].

Figure 9.2 Comparison of the vulnerability map of the territory of the Slovak Republic with the changes of long-term flows of the 2001 – 2015 period in relation to the 1961 – 2000 reference period and their significant trends at long-term water metering stations



Source: SHMI

Ecological flows (e-flow)

Ecological flows are considered to be 'the hydrological regime in natural surface water bodies consistent with the achievement of environmental objectives': no deterioration of the existing status, achievement of the good ecological status in natural surface water bodies, compliance with standards and objectives for protected areas.

Determining the ecological flow represents a quantification of the needs of the aquatic ecosystem in a given stream profile at any point in time during the year. Such unambiguous numerical value(s), depending on seasonality, can then be used: in planning/design for all water uses (especially abstraction, reservoirs, flow regulation) with different characteristics (reversible and irreversible abstractions, intermittent and permanent, for both surface water and groundwater), in the issuing of permits, in the strategic planning of water use, in the review of existing water rights, and others.

[15] https://www.minzp.sk/voda/ochrana-pred-povodnami/manazment-povodnovych-rizik/
[16] https://www.shmu.sk/sk/?page=2166
[17] https://www.minzp.sk/voda/koncepcne-dokumenty/h2odnota-je-voda-akcny-plan-riesenie-dosledkov-sucha-nedostatku-vody.html

Slovakia currently uses hydrological limit characteristics other than e-flow. Determination of ecological flows using a methodology that takes into account the needs of the ecosystem is planned in the Program of Measures for the 3rd planning cycle. Once the methodology for determining the ecological flows has been developed, it will be necessary to incorporate it into the Slovak legislation and to set up processes for its consistent application in practice.

10 Other significant water management issues

Within the 3rd planning cycle, sediment management and restoration of river streams were not formally included as significant water management issues, however, these are considered as serious issues in Slovakia, with potential for active improvement.

10.1 Sediment management

Sediment quantity management

The most common pressures that influence the change of the sediment regime on streams are stream modifications, cross-barriers on streams and excessive dredging of bed sediments. The adverse impacts of these pressures are particularly evident in the following:

- siltation of reservoirs and areas of upwelling above waterworks, siltation of active floodplains; colmatation,
- erosion and bed subsidence in modified straight sections of streams and in the area below waterworks, bed degradation in the area of excessive dredging,
- drop in surface water and groundwater levels in areas of bed erosion (degradation),
- rising surface water and groundwater levels in areas of sedimentation associated with bed colmatation and disruption of surface and groundwater interaction.

The intensity and extent of siltation of reservoirs represents one of the main negative impacts, with a volume of sediment trapped in reservoir deposits of approx. 45 million m3. Another significant impact is the degradation of the riverbed. Bottom erosion sections are not systematically monitored in water bodies, nor is the floodplain regime of rivers. Considering the current state of knowledge about the sediment regime in Slovak watercourses, the following activities should be conducted:

- to update identification of areas of significant disturbance of the sediment balance, to describe impacts and effects on water bodies,
- to identify economic activities that affect sedimentation and to establish measures to minimize sedimentation as a result of human activities,
- based on monitoring, to propose and implement effective sediment management measures for areas in the catchment outside watercourses, for watercourses and specifically for reservoirs,
- to fill missing data and to propose the establishment of a national monitoring network,
- to install two monitoring stations for the monitoring of sediments above and below the Gabčíkovo Waterworks,
- to compile a catalogue of remedial measures to mitigate impacts on the sediment regime;
- to develop a manual for major reservoirs in the Slovak Republic, for smaller reservoirs and small hydropower plants;
- to implement comprehensive sediment management at the Gabčíkovo Waterworks.

Sediment quality management

Bottom sediments are an important component of the river ecosystem, which has the ability to accumulate pollutants such as heavy metals, radionuclides and organic matter from the water. Due to their different solubility in water, especially under anaerobic conditions, these substances may be released back into water.

Monitoring of river sediments of the main streams in Slovakia has been performed out since 1996. Currently, in accordance with the Slovak Water Monitoring Framework Program for 2016 – 2021, annual monitoring of sediment quality and monitoring of trends in sediments of watercourses and 23 reservoirs is performed.

Sampling, analysis and evaluation of sediment composition are also performed in the Gabčíkovo Waterworks once a year as part of the monitoring of the impact of the waterworks on the natural environment.

The aim of systematic monitoring of sediment quality is to identify temporal changes in the substances present in the sediments (trends) and to assess the potential risk of threatening the natural balance in the aquatic ecosystem. Two main issues need to be addressed in particular:

- to assess the qualitative composition of sediments accumulated in reservoirs,
- to propose options for their further use.

This requires the development of environmental quality standards for sediments in reservoirs and the definition of conditions for the application of sediments back into the soil (e. g., as fertilizers).

10.2 Revitalization of watercourses

River revitalization/restoration is the process of remediating regulated rivers to promote natural processes that lead to the restoration and maintenance of the biodiversity of the river ecosystem.

The main principles that should be followed in river restoration proposals are:

- minimum maintenance in the long term,
- use of the potential energy of the river as a natural force for its restoration,
- adaptation of the revitalization design to the hydrological regime and climate,
- adaptation to flood, average and minimum flow conditions,
- involvement of different stakeholders when proposing measures – to apply an integrated approach,
- long-term approach to evaluating the effectiveness of measures (monitoring),
- as few structural objects as possible, focusing mainly on nature-based solutions.

During the preparation of the third river basin management plans, 169 surface water bodies were selected for revitalization in the prioritization process (see Annex 10.1 of the RBMP). The selection took into account 9 indicators: achieved ecological status/potential, protected area, international significance, hydro-morphological quality, assessment of supporting physical and chemical quality elements, assessment of specific substances, priority of the SNC SR for the elimination of significant disturbance of longitudinal connectivity of rivers and habitats, priority according to the document Passportization of River Arms Suitable for Revitalization", and the stage of development of the project for revitalization.

The selected water bodies will be the subject of further detailed analysis with the aim of designing and implementing revitalization. The 26 highest priority water bodies have become part of the Program of Measures (see Annex 8.4a of the RBMP).

Chapter 10.2 of the RBMP also includes a list of revitalization measures, including their degree of effectiveness with respect to improving the quality of the treated streams for the hydrology, continuity/connectivity, and morphology components.

11 Public information and consultation

Stakeholders and the public were consulted in the preparation of the river basin management plans. Information on the process of implementation of the WFD in the Slovak Republic and on the preparation of river basin management plans has been gradually published on the website of the Ministry of Environment of the Slovak Republic:

- https://www.minzp.sk/voda/koncepcne-aplanovacie-dokumenty/,
- https://www.minzp.sk/voda/implementacia-smernic-eu/,
- https://www.minzp.sk/voda/vodny-plan-slovenska/.

The river basin management plans were subject to an environmental impact assessment[18] of the strategic document as part of the Slovak Water Plan – Update 2021.

[18] https://www.enviroportal.sk/sk/eia/detail/vodny-plan-slovenska-plan-manazmentu-spravneho-uzemia-povodia-dunaja-p

12 Evaluation of progress achieved compared to the 2nd planning cycle

Characterization of the river basin district

- River typology – new river types added, some recategorized.
- Designation of water bodies – revision of river basins and existing surface water bodies, incorporation of testing results, change in number of SWBs from 1,511 to 1,351. Increase in the number of groundwater bodies, by 4 geothermal GWBs. One transboundary GWB has been designated.
- Significant water management issues – a new identified significant water management issue has been added 'Negative impacts of climate change – drought, water scarcity and other impacts of climate change'.

Identification of significant impacts

- The trend of decreasing the amount of wastewater discharged and its load of organic pollutants has continued. The proportion of treated wastewater has also increased and the nutrient load from point sources has decreased.
- The inventory of emissions, discharges and releases of all priority substances has been updated.
- Hydro-morphological quality was expressed using three indicators: for disturbance of longitudinal continuity of streams, for morphological changes of the stream bed and disturbance of lateral connectivity, and for hydrological changes.
- In addition to the migration of aquatic organisms sediment migration is being to be considered in the context of the disruption of longitudinal continuity.
- Procedures for perspective infrastructure projects were revised.
- Groundwater pollution – better mapped pressures/impacts (from agriculture, households, industry, etc.) to groundwater bodies assessed to be in poor chemical status and/or at risk of not achieving the environmental objectives of the WFD by 2027.

Monitoring and evaluation of the status

- Surface water monitoring: number of monitoring sites tripled, new monitoring purposes, new sampling methods, new analytical procedures, use of required criteria for analytical methods, ichthyological surveys performed, biota matrix included to a greater extent, higher level of technology in laboratories.
- The assessment of ecological status/potential of surface water – the high confidence assessment increased by 11% and at this level of confidence the total number of water bodies where the environmental objectives of good ecological status were achieved and increased by approx. 5%.
- The assessment of the chemical status of surface water in accordance with the extended list of monitored substances and the tightening some environmental quality standards recorded a 26.4% decrease in the total number of water bodies in good chemical status. However, when assessed without ubiquitous substances, up to 95.8% of water bodies in Slovakia achieve good chemical status. The reliability of the assessment has increased by 15%.
- Groundwater monitoring – stable number of wells for basic and operational groundwater quality monitoring, increase in automation of quantity measurement and increase in frequency of measurements.
- Assessment of groundwater status – chemical status was assessed based on 2 additional tests (changes in the quality of groundwater resources for human consumption and deterioration of the related groundwater bodies due to contaminant intrusion from groundwater bodies).
- The assessment of the chemical status of the geothermal groundwater bodies was performed for the first time in Slovakia in the 3rd cycle of the RBMP. All 23 of the assessed groundwater bodies were classified in good chemical status and 8 geothermal groundwater bodies were not assessed due to the unavailability of current data.
- Evaluation of groundwater quality trends – updated methodology to identify significant sustained upward trends in pollutant concentrations and evaluated reversal of upward trends identified in the previous 2nd cycle of the RBMP.

- In the 3rd cycle of the RBMP, an assessment of trends in pollutant concentrations in point sources of pollution – contaminated sites located in the PWMA – was also performed for the first time.
- The risk analysis methodology has been updated. Higher number groundwater bodies were classified as being at risk of not achieving the environmental objectives in the 3rd cycle of the RBMP (17 GWBs) than in the 2nd cycle of the RBMP (8 GWBs). This is mainly due to the availability of new and detailed data.
- The increase in the number of pre-quaternary GWBs in poor quantitative status compared to the assessment in the previous two cycles of the RBMP is due to the more accurate and critical assessment of the tests used. Declining trends in spring yields and groundwater levels indicate the possible impacts of climate change..
- The number of groundwater bodies assessed at risk of not achieving good quantitative status increased in the 3rd cycle of the RBMP compared to the 2nd cycle, with geothermal groundwater bodies assessed at risk for the first time.

Economic analysis of water use and cost recovery for water management services

- Introduction of fees for the abstraction of surface water and groundwater for irrigation of agricultural land from 1 January 2017.
- Application of the 'the polluter pays' principle – charges for discharges of wastewater into surface water, change in the length of validity of permits and conditions for their granting.
- Tightening of legislation on cesspools – obligation of owners to ensure removal of the cesspool to the WWTPs, tightening of inspection.
- The Lex Žitný ostrov Act – more attention to the Žitný ostrov Protected Area, the aim is to ensure the allocation of financial resources for the remediation of the contaminated sites, support for the implementation of sewerage and wastewater treatment systems in agglomerations with less than 2,000 population equivalents in protected water management areas.
- The 'Water Pricing' analysis (IEP, 2020) recommends increasing prices for all types of groundwater abstractions, except for drinking water, and reducing the minimum quantity of water subject to charging.

Program of measures

- In the field of collection, disposal and treatment of municipal wastewater, compliance with Council Directive 91/271/EEC on urban wastewater treatment has been taken as a primary consideration. Extensive and intensive construction of sewerage networks and WWTPs has concentrated in agglomerations with of over 2,000 p. e. A total of 22 municipal WWTPs were constructed/reconstructed and 1 WWTP was terminated. 13 WWTP measures are in the process of being implemented, with 9 WWTPs to be constructed or upgraded and 4 WWTPs to be terminated. In the field of collection and disposal of municipal wastewater, 51 measures were implemented by 2021 and 23 measures are under implementation. There are 43 measures in the stage of preparation for implementation.
- For the first time, measures to improve the hydro-morphological quality of the surface water also included framework measures for the revitalization of streams.
- Of the measures planned in the previous cycle, 93 measures to improve longitudinal continuity of flows and 2 measures to improve lateral connectivity of flows and other morphological changes have been implemented. Outside the plan, measures were implemented to improve lateral connectivity: connecting the arms and restoration of riverine wetlands – arms with a total length of at least 18.3 km, which improved the lateral connectivity of areas in the extent of 1,716 ha, the water regime and flowing character of the Čiližský potok with a length of about 33 km, gradually reinforced arms in the original Danube River system, restoration of wetlands in the sub-basins of Váh River and Bodrog River. Removal of barriers has been performed on several short sections of the Danube River and is also under preparation on other rivers. At other locations, expert studies have been prepared and proposals for measures are in project preparation. The conceptual design of the connection of the arms in the Bor, Podunajská and East Slovak Lowlands has been developed. For the extensive former Danube River inundation, which is currently artificially fed from the inlet channel through the Dobrohošt' object, a study has been prepared to restore the lateral and longitudinal continuity and the water regime.
- Measures to reduce groundwater pollution by nitrate substances from agriculture are continuously implemented: the implementation of the tasks of the Program for Management in Vulnerable Areas

(Action Program) is performed in line with the national legislation – the amended Fertilizer Act, additional measures include the measures of the Rural Development Program of the Slovak Republic 2014 – 2020, the application of the Code of Good Agricultural Practice – Protection of Water Resources.

- The share of agricultural land in vulnerable areas in total agricultural land decreased by 4.8%.
- In order to reduce groundwater pollution by pesticides, the basic measures resulting from the implementing regulations and the approved National Action Plan (NAP) for the sustainable use of pesticides as well as the measures related to the marketing of plant protection products under the Act on Plant Health Care and on the amendment of the Act on Administrative Fees and related implementing regulations are continuously implemented.
- There is also an ongoing expert assessment of the risk of pesticides to groundwater and surface water, and specific measures for their use in protected areas (drinking water source protection zones and PWMAs). Of the total number of pesticide substances approved in the EU, 210 (44.0%) were authorized in the Slovak Republic.
- In order to reduce the pollution of the groundwater with other hazardous chemicals, measures are mainly implemented in accordance with the State Remediation Program of Contaminated Sites. 17 sites have been approved for remediation of selected CSs. Detailed geological surveys (with risk analysis) are being performed on 100 sites of presumed CSs. The OP QE program has not been completed, geological tasks (surveys, monitoring, remediation) are being performed, some of which will continue until 2023.
- Measures to achieve good quantitative status of groundwater are: hydrogeological exploration of new, prospective and additional groundwater resources, issuing of new permits for groundwater abstraction in accordance with the Water Act (a total of 529 permits were issued in 2016 – 2018, including small abstractions, of which 59 for significant abstractions), protection of natural infiltration areas is continuously implemented.

Protection from the harmful effects of water and climate change

- In 2018, the Slovak Adaptation Strategy for Climate Change was updated; the Action plan for the implementation of the Slovak Climate Change Adaptation Strategy was revised in 2021.
- Analyses of the development of the annual water availability of the surface watercourses and changes in the distribution of runoff in the year have been prepared.
- Since 2017, quantitative monitoring programs of the groundwater are specifically focused on the potential impacts of climate change and the indication of the onset and occurrence of drought. Conditions are created for planning the elimination of the adverse effects of climate change on groundwater use.
- Research studies assessing climate change to groundwater at monthly and annual time steps, estimating the magnitude of these impacts, their duration, their intensity, and their spatial homogeneity.
- To support flood protection, a study was undertaken using groundwater wells where the rise to ground level and correlation with flooding was assessed. In Slovakia, the following are performed annually: monitoring and assessment of different types of droughts (hydrological, meteorological and soil) and water balances of surface and groundwater quantity. A perspective balance of surface water quantity is also prepared on a regular basis.
- Operational monitoring of selected representative groundwater wells – a tool for assessing the onset, existence or duration of drought in groundwater.

Other significant water management issues

A new chapter has been included in the 3rd cycle of the RBMP which analyses in detail the selected issues with the potential to define them as a significant water management issue or identify research requirements:

- sediment management (in terms of quality, quantity and migration),
- revitalization of watercourses (both as a complex issue and as a desirable activity to improve the status of water bodies).

Summary

The purpose of this publication was to present in abbreviated and summarized form the most important information, data, and findings that are contained in the document Water Plan of the Slovak Republic (Danube River Basin Management Plan, Vistula River Basin Management Plan) – Update 2021, approved by the Resolution of the Slovak Government Republic No. 319 of May 11, 2022.

This, already the 2nd update of the Water Plan of the Slovak Republic, is the outcome of the implementation process of the common water policy of the European Union member states in the Slovak Republic, the goal of which is to achieve good water status. The purpose of the update was to updating the program of measures based on the review of the previous river basin management plans in order to ensure the achievement of these goals by 2027.

For the needs of the 3rd water planning cycle, a revision of water bodies was carried out, the result of which was the designation of 1,351 surface water bodies and 106 groundwater bodies. The results of monitoring the status of water bodies showed that in the case of surface water, at least a good ecological condition, or potential, reached 41.30% of bodies, and good chemical status of 71.21% of surface water bodies. In the case of groundwater, 80.19% of bodies achieved good chemical status and 90.57% of water bodies achieved good quantitative status. It is estimated that at risk of not achieving good ecological status, or potential, by 2027 25.98% of GWBs remain and 2.22% of surface water bodies are at risk of not achieving good chemical status. In the case of groundwater bodies, 16.98% of groundwater bodies are at risk of not achieving good chemical status by 2027, and 17.92% of groundwater bodies are at risk of not achieving good quantitative status.

Compared to the previous planning cycle, the 3rd planning cycle showed progress in the achievement of the environmental objectives of water planning. The water monitoring network was expanded, new analytical methods were introduced, and the reliability of the assessment of the status of water bodies increased. Higher number of monitored substances were included in the assessment of the chemical status of surface water and some environmental quality standards were tightened. The chemical status of groundwater bodies was evaluated on the basis of another 2 tests, and the chemical status of geothermal bodies was also evaluated for the first time. Planned measures were implemented, such as introduction of fees for surface and groundwater abstractions for agricultural land irrigation, strengthening legislation to inspect cesspools. There were 22 municipal wastewater treatment plants constructed or upgraded. For the first time, framework measures for the watercourses revitalization were included in the measures to improve the hydro-morphological quality of surface water. Of the measures planned in the previous cycle, 93 measures to improve the longitudinal continuity of flows were implemented. Measures to reduce groundwater pollution with nitrogenous and pesticide substances were continuously implemented. In order to reduce the pollution of groundwater by other hazardous chemical substances, measures were mainly implemented in accordance with the State Program for the Remediation of Contaminated Sites. The second update of the water plan also addresses new topics such as the negative consequences of climate change, sediment management and watercourse revitalization.

In the second update of the water plan, ensuring the achievement of water management goals in the river basin by 2027 is supported by the Program of Measures for the years 2022 – 2027. The cost estimated to implement the Program of Measures amounts 1,793.656 mil. Euro. Funding of the programs of measures will be provided from the Program Slovakia 2021 – 2027, the OP QE, the Recovery and Resilience Plan of the Slovak Republic, the Rural Development Program of the Slovak Republic, the Environmental Fund, and other sources.

List of abbreviations

3WPS	Water Plan of the Slovak Republic (Danube River Basin Management Plan, Vistula River Basin District Management Plan) – Update 2021
AWB	Artificial water body
AWD	Accidentall water (quality) deterioration
CCTIA	Central Control and Testing Institute in Agriculture / *Ústredný kontrolný a skúšobný ústav poľnohospodársky*
CS	Contaminated site
EEA	European Environment Agency
EP	Ecological potential
EQS	Environmental quality standard
ES	Ecological status
EU	European Union
GWB	Groundwater body
HMWB	Heavily modified water body
ICPDR	International Commission for the Protection of the Danube River
IEP	Institute for Environmental Policy of the Ministry of Environment of the Slovak Republic / *Inštitút evnironmentálnej politiky pri Ministerstve životného prostredia Slovenskej republiky*
IPPC	Integrated pollution prevention and control
KTM	Key type of measure
MoE SR	Ministry of Environment of the Slovak Republic / *Ministerstvo životného prostredia Sloven skej republiky*
NAT	Natural water body
OP QE	Operational Program Quality of Environment / *Operačný program Kvalita životného prostredia*
p. e.	Population equivalent
PHA SR	Public Health Authority of the Slovak Republic / *Úrad verejného zdravotníctva Slovenskej republiky*
PS	Priority substances
PWMA	Protected water management area / *chránená vodohospodárska oblasť*
PZ WSR	Protection zone of water supply resources / *ochranné pásmo vodárenského zdroja*
RBD	River basin district
RBMP	River basin management plan
RS	Relevant substances
SCI	Sites of Community Importance / *územie európskeho významu*
SEA	Slovak Environment Agency / *Slovenská agentúra životného prostredia*
SGIDS	State Geological Institute of Dionýz Štúr / *Štátny geologický ústav Dionýza Štúra*
SHMI	Slovak Hydrometeorological Institute / *Slovenský hydrometeorologický ústav*
SNC SR	State Nature Conservancy of the Slovak Republic / *Štátna ochrana prírody a krajiny Slovenskej republiky*

SPA	Special protection area / *chránené vtáčie územie*
SR	The Slovak Republic
SRP CSs	State Remediation Program of Contaminated Sites / *Štátny program sanácie environmentálnych záťaží*
SSUT	Significant and sustained upward trend
SWB	Surface water body
SWME	Slovak Water Management Enterprise, state owned enterprise / *Slovenský vodohospodársky podnik, štátny podnik*
URSO	Regulatory Office for Network Industries / *Úrad pre reguláciu sieťových odvetví*
WB	Water body
WFD	Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (Water Framework Directive)
WMC	Water Management Construction, State owned enterprise / *Vodohospodárska výstavba, štátny podnik*
WMS	Water metering station
WRI	Water Research Institute / *Výskumný ústav vodného hospodárstva*
WWTP	Wastewater treatment plant

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