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Member State : Slovak Republic

Accompanying the document

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

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

River Basin Management Plans

{COM(2012) 670 final}

1. GENERAL INFORMATION

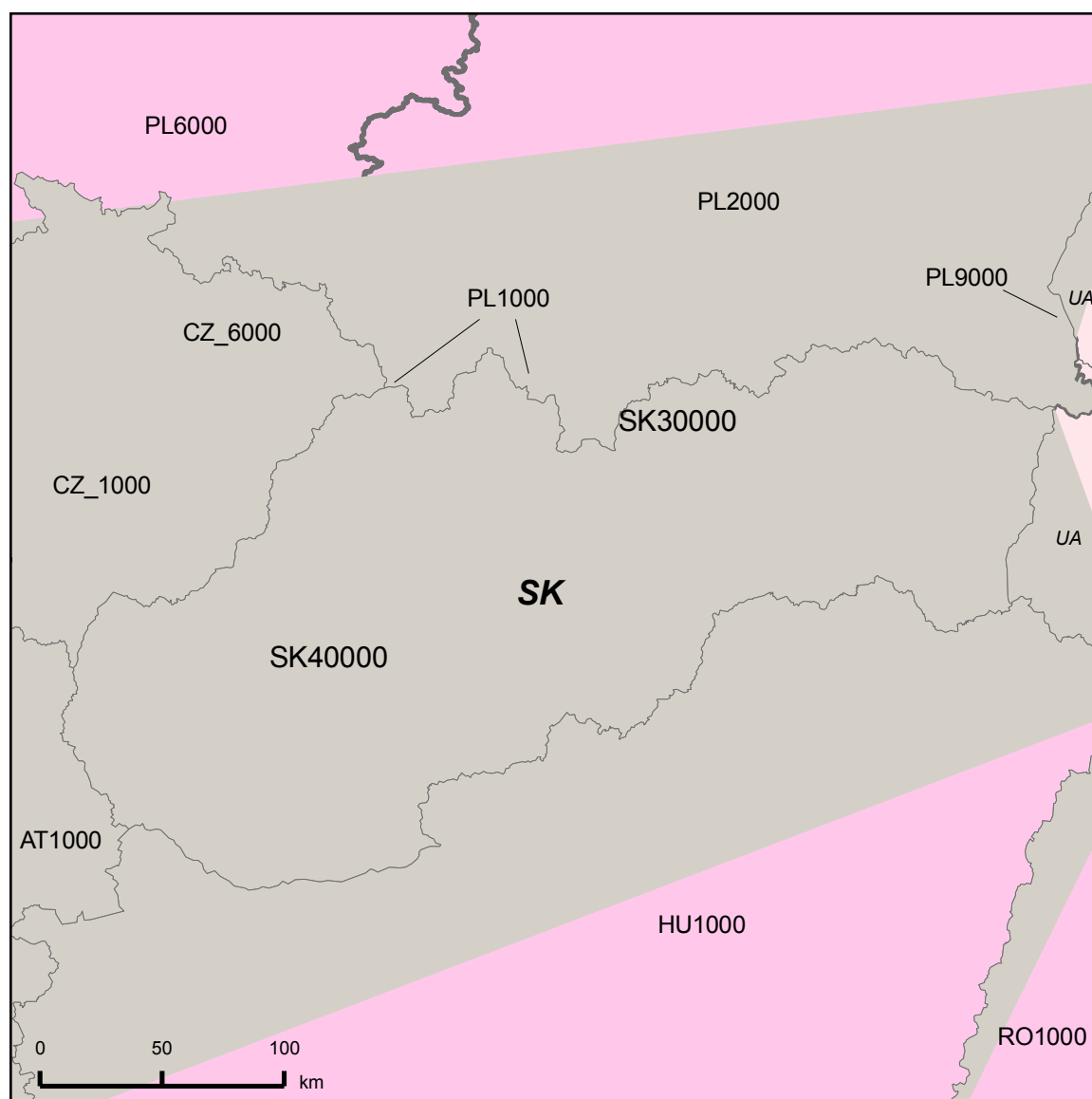
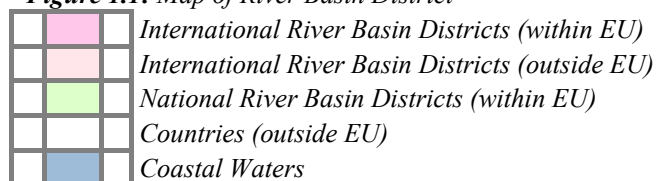


Figure 1.1: Map of River Basin District



Source: WISE, Eurostat (country borders)

Slovakia is a landlocked country surrounded by five neighbours: the Czech Republic and Austria in the west, Poland in the north, Ukraine in the east and Hungary in the south. About 60% of the Slovak territory has an altitude over 300 m above the sea level, prevailing in the West Carpathians. The total area of the Slovak Republic is 48 845 km² and the population is 5.4 million.

The territory of the Slovak Republic belongs to two international river basin districts (RBDs): Danube River basin and Vistula River basin. The Danube River Basin District is shared with 18 countries. The Vistula River Basin District is shared with Poland, Czech Republic, Belarus and Ukraine.

Information on areas of the national river basin districts including the sub-basins is provided in the following table:

RBD / Sub-basin	Name	Size (km ²)	% of SK territory	Countries sharing RBD
SK30000	Vistula (Dunajec & Poprad sub-basins)	1950	4	BY, RU, UA
SK40000	Danube	47084	96	DE, PL, UA, AT, BG, CZ, HR, HU, RO, IT, MD, ME, RS, SI, BA, AL, CH, MK
Sub-basin				
	Morava sub-basin	2282		
	Dunaj sub-basin	1158		
	Vah sub-basin	18769		
	Hron sub-basin	5465		
	Ipel sub-basin	3649		
	Slana sub-basin	3217		
	Bodva sub-basin	858		
	Hornad sub-basin	4414		
	Bodrog sub-basin	7272		

Table 1.1: Overview of Slovakia's River Basin Districts

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

The share of Slovakia in the Vistula and Danube RBDs is indicated below. Coordination in the Danube basin is more developed than for the Vistula.

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

Name international river basin	National RBD	Countries sharing RBD	Co-ordination category			
			1		3	
			km ²	%	km ²	%
Vistula	SK30000	BY, RU, UA			1957	1.0
Danube	SK40000	DE, PL, UA, AT, BG, CZ, HR, HU, RO, IT, MD, ME, RS, SI, BA, AL, CH, MK	47084	5.8		

Table 1.2: Transboundary river basins by category (see CSWD section 8.1) and % share in Slovakia²

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

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

Category 3: Co-operation agreement in place.

Category 4: No co-operation formalised.

Source: EC Comparative study of pressures and measures in the major river basin management plans in the EU.

The coordinating role in the international Danube River basin is carried out by the International Commission for the Protection of the Danube River (ICPDR, MKOD). Slovak cooperation in the international Vistula River basin is managed by the Ministry of Environment of the Slovak Republic (MoE) through the Agreement between the Governments of the Slovak Republic and Poland on water management on transboundary waters.

There is one small and one large RBD consisting of a number of sub-basins. Therefore the Slovak administration decided to report on both RBDs in one plan.

2. STATUS OF RIVER BASIN MANAGEMENT PLAN REPORTING AND COMPLIANCE

The Slovak Republic reported one river basin management plan (RBMP) covering both, the Danube and the Vistula River Basin Districts. The RBMP was reported to the Commission on 23 April 2010.

The main strengths of the plan are as follows:

- The RBMP is well-structured in line with the WFD Annex VII and provides most of the necessary information concerning all elements of the Annex VII in a clear manner.
- The RBMP provides a comprehensive description of key pressures, the status of both surface and groundwaters and the programmes of measures.

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

- The review of significant pressures in the Plan was based on the concept of significant water management issues which included organic pollution, nutrient pollution, pollution by hazardous substances and hydromorphological alterations, and also groundwater quality and quantity. This concept was applied for both RBDs in a unified manner and is based on the approach applied internationally by the ICPDR for the Danube RBD.
- To prepare the RBMP a large amount of data has been collected, processed and analysed (even though there are still certain information gaps), forming a solid basis with the potential of setting the measures towards achieving the WFD environmental objectives.
- The whole process of the development of the RBMP was managed by a single administration unit, the Ministry of Environment, which enabled a good and effective coordination of all actors.
- Multiple mechanisms were used in the public consultation process on the RBMP.

The main shortcomings of the plan are as follows:

- There is one plan for two RBDs. It does not always provide a clear guide if an issue/problem is relevant for both or only for one RBD. It was often difficult to identify RBD-specific information. WFD Art 13(1) stipulates that Member States shall ensure that a river basin management plan is produced for each river basin district lying entirely within their territory.
- The data available form a solid basis for the plan, but a detailed perspective on the links between pressures and status and respective measures for surface waters is missing. It is not clear if the proposed measures are based on the status assessment of surface water bodies.
- Financial and technical constraints do not enable sufficient implementation of the programme of measures to achieve environmental objectives for all water bodies by 2015. There is no clarity about the level of detail of the measures, when they will be implemented and what ecological improvements can be expected. It is also unclear when the measures will be implemented more specifically at the RBD level.
- No information was provided on how the measures have been discussed with the stakeholders, including which impact the consultation held on the RBMPs,
- There was little information on costs of programme of measures per sector. It is not clear which specific measures will be taken for those priority substances which are the cause for not reaching good chemical status. The same applies for the specific pollutants which are the cause for not achieving good ecological status. It is unclear if there are measures taken to reduce the pollution with priority substances and phase-out or cease the emissions discharges and losses of priority hazardous substances.

- The status of associated surface waters and groundwater dependent terrestrial ecosystems were not considered for assessing chemical status of groundwaters. Trend evaluation for groundwaters is foreseen in the 2nd RBM cycle.
- Intercalibration has not been accomplished for all biological quality elements (BQEs) and thus not applied for the classification. There is no information in the plan if the typology has been verified with biological data.
- The methodology for assessing good ecological potential (GEP) very closely follows the CIS Guidance. However, the assessment methods for the BQEs are not yet complete and there are data gaps that still need to be closed.
- The reference conditions have been established for all BQEs but for fish they are only preliminary. Fish were not included in the first RBMP, as they were not monitored in 2007 and 2008. The ecological status assessment methods for fish have not been developed for rivers or for lakes.
- The operational monitoring programme is based on the results of the risk assessment but there is no information given as to the relationship between the pressures and the BQEs that indicate the pressure.
- The activities at the level of international RBD are not always sufficiently explained/referred to in the RBMP (e.g. monitoring activities not mentioned in WISE) and there is a gap in understanding of international activities and obligations.

3. GOVERNANCE

3.1 Timeline of implementation

The RBMP was reported to the Commission on 23 April 2010 (Slovak Water Plan containing RBMPs for Danube RBD and Vistula RBD).

3.2 Administrative arrangements – river basin districts and competent authorities

The Ministry of Environment is the competent authority for WFD implementation. The other government authorities participating in the WFD implementation process are the Ministry of Agriculture, Ministry of Health, Ministry of Finance, Ministry of Transport, the Supreme Postal and Telecommunications Office and other unspecified organisations.

The national approach in WFD implementation has been followed on the whole territory of Slovakia, no specific differences can be distinguished between Danube and Vistula RBDs at the national level.

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

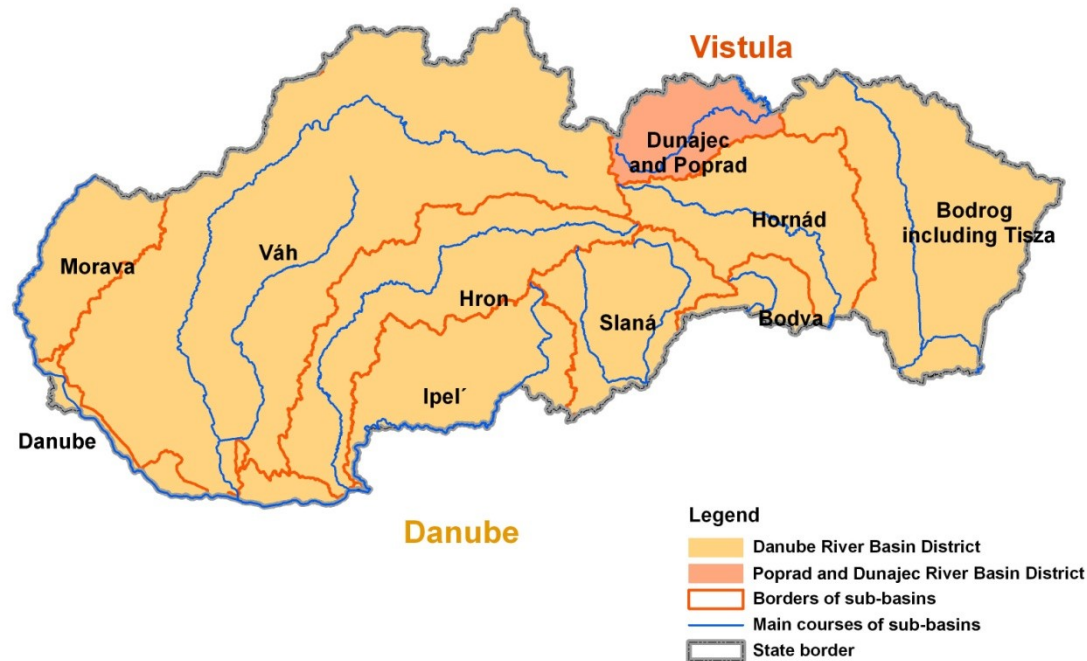


Figure 3.2.1: Danube RBD contains the following sub-basins: Morava, Dunaj, Váh, Hron, Ipel, Slaná, Bodva, Hornád and Bodrog

Source: RBMP

3.3 RBMPs – Structure, completeness, legal status

One RBMP was reported for the whole territory. The RBMP is well-structured and provides most of the necessary information in a clear manner. It is however not always easy to identify the RBD specific information.

In addition Sub-plans for sub-basins/subunits were reported, all with a similar structure to the main plan, mentioning all of the different sectors and water management issues raised.

The Government adopts the RBMPs by Regulation. The Ministry of Environment endorses the RBMP. The RBMP, once endorsed by the Government, shall be published in the National Collection of Laws as a Governmental Regulation. However, the Governmental Regulation applies only to the Programme of Measures and the environmental objectives, and therefore only these parts of the Water Plan are published and mandatory. The remaining parts of the RBMP of the Danube River and the Vistula River are not-legally binding documents as they are not published in the Collection of laws of Slovakia's official legal acts (i.e. they cannot be classified under any category of legal instruments according to the law).

There is a link between the RBMPs and individual decisions. The PoM has a binding effect. The environmental objectives are a generally binding legal regulation. The State authorities

are obliged to take into account the RBMP and the Slovak Water Plan while issuing permits for the special use of waters, granting consents, giving statements and other decisions. Competent authorities, legal entities and natural persons are bound by these RBMPs.

3.4 Consultation of the public, engagement of interested parties

The participation of stakeholders was ensured through consultations with the following publication dates for:

- the timetable for preparation of the RBMP: 01/01/2007
- the overview of preliminary significant water management issues: 31/12/2007
- the draft RBMP: 17/01/2009

In addition consultations took place during the approval process of the RBMP.

The consultation process was organized as follows:

- Consultation documents were uploaded onto the WFD implementation website;
- Communication was sent to stakeholders from all sectors via e-mail (the mailing list was prepared in cooperation with stakeholders);
- Number of information dissemination options were used, including seminars and public consultations with identified stakeholders being invited;
- Feedback was collected by e-mail and post;
- Comments were evaluated and published on the website of the Ministry of Environment.

It is not clear from the RBMP which stakeholders were involved, and what impact the consultation had on the content of the RBMP. The list of stakeholders, together with the applied or proposed measures, objections and observations and the method of their evaluation has been provided in a separate document “Evaluation of Feedback”, which is available on the website of the Ministry of Environment. All acceptable recommendations and observations by stakeholders were included into the final versions of RBMPs (Slovak Water Plan).

For consultation purposes, the Ministry of Environment set up the Cross-sectoral coordination group for the implementation of the WFD as an expert and consulting body of the Ministry. Members of the group include representatives of Ministries, the Slovak National Council for Agriculture, Environment and Countryside Protection, the Network Regulation Authority, the Slovak Chamber of Agriculture and Food, the Slovak Cities and Municipalities and numerous professional associations.

3.5 International cooperation and coordination

Slovakia is a signatory of the Danube River Protection Convention and a Contracting Party to the ICPDR. The ICPDR is a coordination platform for the river basin management for the whole of the international River Basin District (level A). A specific sub-basin-wide cooperation (B-level) is organized under the ICPDR for the international Tisza River Basin shared by Ukraine, Romania, Hungary, Serbia and Slovakia. In addition to the cooperation in river basin districts, the bilateral transboundary RBM issues in all Slovak RBDs are dealt with by the bilateral commissions established in cooperation with the Czech Republic, Hungary, Austria and Ukraine. These Commissions meet regularly to manage RBM issues between two neighbouring countries.

The international plan for the Danube RBD is available on the ICPDR website. Various elements of the RBMP for the Danube River Basin District have been applied in the Slovak plan, such as the concept of significant water management issues, nutrient emission assessment by the MONERIS model, the concept of confidence of the status assessment, measures for phosphate reduction and flood protection measures.

No international RBMP was adopted for the Vistula RBD. The coordination of implementation of the WFD between the Slovak Republic and Poland is ensured by the Slovak-Polish "WFD Working Group" set up under the Slovak-Polish Committee for Border Waters on the basis of the Agreement of the Slovak and Polish Governments on Water Management of Border Waters. The Ministry of Environment is responsible for the Slovak activities within this working group, while Poland is represented by the Krakow Regional Water Management Authority. During preparing and drafting the 1st national RBMPs the data for jointly shared water bodies were internationally harmonised in accordance with the WFD requirements (typology, water bodies, impacts and consequences, risks of not achieving good status, economic analysis, water management issues, water body status and measures).

4. CHARACTERISATION OF RIVER BASIN DISTRICTS

4.1 Water categories in the RBD

Slovakia is a land-locked country so the only water categories in the basin are rivers and lakes; there are no transitional and coastal waters.

4.2 Typology of surface waters

Surface water typology has been developed for rivers and lakes using abiotic criteria (System A). For rivers the following descriptors from the Annex II were applied: ecoregion, altitude, catchment area and geology. For lakes, ecoregion, altitude, depth, surface area and geology were used as descriptors. However, there is no information in the RBMP as to whether the typology has been verified with biological data. Validation of the typology will be carried out in the next RBM planning cycle using the results of the BQEs monitoring. The results of the validation will be described in the revision of the Article 5 analysis report.

The minimum size of lake water bodies for inclusion in the RBMP was set to 0.5 km² and the minimum catchment size of river water bodies was 10 km². None of the Slovak lakes exceeds this threshold and all reservoirs were assessed as HMWBs. Water bodies below the threshold size were not separately delineated and were considered to be a part of a water body in the catchment in which they are located.

This approach was based on the system A typology according to WFD Annex II, which specifies values for size descriptors for rivers and lakes. The smallest size range for a System A river type is 10 – 100 km² catchment area. The smallest size range for a System A lake type is 0.5 – 1 km² surface area.

RBD	Water category	Number of types
SK30000	Vistula rivers	5
	Vistula lakes	0
	Vistula reservoirs (HMWB)	0
SK40000	Danube rivers	34
	Danube lakes	0
	Danube reservoirs (HMWB)	14

Table 4.2.1: Surface water body types at RBD level

Source: WISE

Reference conditions were established using data collected in 2003 – 2006. Reference conditions were assessed using combination of several methods. Where possible, reference sites were identified and respective data were collected. However, this was the case only for 50% of river types. In order to define reference conditions for the remaining river types, modelling, expert judgement or a combination of the two were used. There were however only preliminary reference conditions available for fish because a new approach was adopted in Slovakia in 2009 in the context of the intercalibration exercise. The reference conditions for fish will be reported in forthcoming planning cycles.

4.3 Delineation of surface water bodies

RBD	Surface Water				Groundwater	
	Rivers		Lakes			
	Number	Average Length (km)	Number	Average Area (sq km)	Number	Average Area (sq km)
SK30000	83	11	0		4	598
SK40000	1677	11	0		97	773
Total	1760	11	0		101	766

Table 4.3.1: Surface water bodies, groundwater bodies and their dimensions

Source: WISE

4.4 Identification of significant pressures and impacts

The review of significant pressures was based on the concept of significant water management issues which in Slovakia include:

- Organic pollution
- Nutrient pollution
- Pollution by hazardous substances
- Hydromorphological alterations

Slovakia did not report data to WISE on specific pressures. An overview table and graph on this has therefore not been included.

This concept was applied for both RBDs in a unified manner and is similar to the concept applied by the ICPDR for the international Danube RBD. Significant water management issues were identified by the Article 5 report (Danube Basin Analysis) and they were derived according to the requirements of the WFD.

The following point sources of pollution are considered as significant in Slovakia, meaning that the pressure contributes to an impact that may result in the failing of the environmental objective:

- Communal pollution sources subject to Directive 91/271/EEC on urban waste water treatment: the agglomerations over 2000 PE and agglomerations under 2000 PE with waste water collection systems, but no waste water treatment;
- Industrial pollution sources from specific industrial branches defined by Annex III of the Directive 91/271/EEC;
- The sources of pollution falling under the category of industrial activities referred to in Article 2 of Annex I to Directive 96/61/EC;
- Pollution sources from permitted discharges or in which priority substances and or country specific chemical substances have been identified;
- All sources of wastewater for which the ratio of waste flow to the flow rate of the receiving river water body at the level Q_{355} , is 1:1 or higher.

The following diffuse sources of pollution are considered as significant:

- All agricultural activities – application of mineral and organic fertilisers and plant protection products. Water bodies with an area of agricultural land in their basins of over 40% are considered as being subject to significant pollution from agriculture;
- Agglomerations defined by Council Directive 91/271/EEC where level of waste water removal does not meet the requirements of that Directive;
- Municipalities under 2000 PE without a public sewer system.

In addition to the above, mining activities and transport were considered as a significant pressures for groundwaters.

The following criteria were used to define ‘significant’ pressures from water flow regulation and morphological alterations:

- 1) River coverage:
 - a. Covered reach > 100 m;
 - b. Length of all covered reaches is 150 m and is more than 50% of the total length of the water body.

- 2) River straightening: the length of straightened reaches $> 10\%$ of the total length of the water body.
- 3) Backwater:
 - a. Backwater length > 1500 m for $B/H > 15$;
 - b. 1000 m for $B/H < 15$;
 - c. 600 m for $B/H < 8$;
 - d. Total backwater length $> 10\%$ of the total length of the water body.
- 4) Bank reinforcement: the length of reinforced reaches $> 10\%$ of the total length of the water body.
- 5) Flood protection: the distance of dikes from the river $< 3B$ within the river length of $5B$ (B = river width).
- 6) Urbanization: constructions are located in a distance of less than 5 m from the river within the reach $> 15\%$ of the total length of the water body.
- 7) Combined assessment integrating criteria 4, 5 and 6 divided into 6 classes: class 3 and above = river with a significant change. Class 2: river with nearly natural changes. Class 1: natural stream.
- 8) Lateral profile change:
 - a. River bed widening $> 20\%$ within a reach > 1 km;
 - b. River bed narrowing $< 25\%$ within a reach > 1 km.
- 9) Locks and weirs.
- 10) Water abstractions:
 - a. Abstractions, downstream of which a discharge of 60% of Q_{355} is not secured (large rivers);
 - b. Abstractions, downstream of which a discharge of Q_{355} is not secured (small rivers).

Invasive alien species (both neozoa and neophyta) and accidental pollution were considered as other significant pressures. The major causes of contamination by accidental pollution are wastewater discharges and oil pollution.

4.5 Protected areas

The following protected areas are addressed in the RBMP:

- Drinking Water Protected Areas;
- Bathing water areas (Directive 76/160/EEC);
- Sensitive areas and vulnerable zones;
- Natura 2000 sites designated under Directive 92/43/EEC (Habitats) and Directive 79/409/EEC (Birds).

RBD	Number of PAs									
	Article 7 Abstraction for drinking water	Bathing	Birds	European Other	Fish	Habitats	Local	National	Nitrates	Shellfish UWWT
SK30000	11				8	9			1	
SK40000	202	36	38		65	372			1523	1
<i>Total</i>	<i>213</i>	<i>36</i>	<i>38</i>		<i>73</i>	<i>381</i>			<i>1524</i>	<i>1</i>

Table 4.5.1: Number of protected areas of all types in each RBD and for the whole country, for surface and groundwater³

Source: WISE

³ This information corresponds to the reporting of protected areas under the WFD. More/other information may have been reported under the obligations of other Directives.

5. MONITORING

5.1 General description of the monitoring network

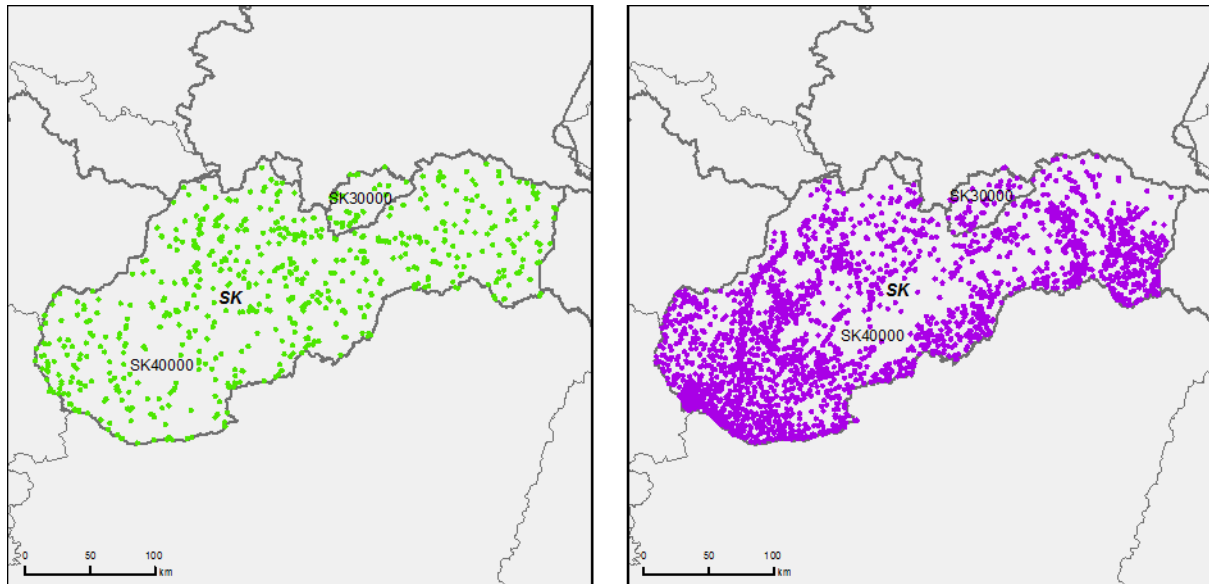


Figure 5.1: Maps of surface water (left) and groundwater (right) monitoring stations

- River monitoring stations
- Lake monitoring stations
- Transitional water monitoring stations
- Coastal water monitoring stations
- Unclassified surface water monitoring stations
- Groundwater monitoring stations
- River Basin Districts
- Countries outside EU

Source: WISE, Eurostat (country borders)

WFD compliant monitoring has been established in Slovakia based on a “Monitoring programme for Slovak Waters”, which is periodically updated. It includes monitoring of surface waters, groundwaters and protected areas.

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

Table 5.1.1: *Quality elements monitored*

	QE Monitored
	QE Not monitored
-	Not Relevant

Source: WISE

RBD	Rivers		Lakes		Groundwater		
	Surv	Op	Surv	Op	Surv	Op	Quant
SK30000	31	29	-	-	8	8	39
SK40000	529	565	23	7	122	1098	1468
<i>Total by type of site</i>	<i>560</i>	<i>594</i>	<i>23</i>	<i>7</i>	<i>130</i>	<i>1106</i>	<i>1507</i>
<i>Total number of monitoring sites⁴</i>	<i>698</i>		<i>23</i>		<i>2421</i>		

Table 5.1.2: Number of monitoring sites by water category.
Surv = Surveillance, *Op* = Operational, *Quant* = Quantitative
Source: WISE

5.2 Monitoring of surface waters

In surface waters, all quality elements as required by the WFD were monitored with the exceptions reported below. Both the operational and surveillance monitoring programmes had two sub-programmes, one for rivers and one for lakes. Composition, abundance and age structure of fish was not monitored in rivers (fish monitoring is expected to be included under next RBM planning cycles as indicated in the RBMP). In lakes only phytoplankton was monitored among BQEs and no hydromorphological quality elements were reported.

Operational monitoring is based on the results of the characterisation and impact assessment carried out in accordance with Article 5 which identified water bodies *at risk*. Sampling sites are revised on an annual basis. Sampling sites are located in the lower parts of the catchments or downstream the significant pollution sources. There is no information given in the RBMP as to the relationship between the pressures and the BQEs that indicate the pressure. The major aims of operational monitoring in Slovakia are in line with WFD:

- establishing the status of those bodies identified as being at risk of failing to meet their environmental objectives,
- assessing any changes in the status of such bodies resulting from the programmes of measures,
- monitoring of water quality and quantity in relation to impacts from water uses.

The selection of biological quality elements and physico-chemical quality elements monitored in water bodies *at risk* took account of the causes of risks and the expected impacts. Water bodies *at risk* included in the monitoring programme for 2007 and 2008 were located mainly on medium and large watercourses, and most of them were candidates for, or had already been designated as heavily modified water bodies.

All substances listed in Annex I of the Directive 2008/105/EC were monitored in surface water bodies – at representative sample points specified for the assessment of the chemical status. However in most of the water bodies not all priority substances were analysed. Priority

⁴ The total number of monitoring sites may differ from the sum of monitoring sites by type because some sites are used for more than one purpose.

substances were monitored 12 times per year, while the other river basin specific substances four times per year. This is in agreement with WFD Annex V 1.3.4. Monitoring of priority substances in sediments or biota was not carried out; therefore no trends in these matrices were assessed.

Chapter 4.1.4 of the Slovak WISE report provides information only about national and RBD-specific monitoring activities. However, according to the International Danube RBD Management Plan there is an international monitoring network for the Danube River Basin District in place (ICPDR TNMN). This monitoring is based on the national monitoring activities but it is focussed on addressing the monitoring requirements for an international river basin district. More details can be found at www.icpdr.org.

Surface water monitoring in border areas of the Vistula RBD was part of the Water Status Monitoring Programme in 2007 and Water Status Monitoring Programme for 2008 – 2010. This monitoring programme in the border areas was agreed with Polish partners in accordance with WFD requirements.

5.3 Monitoring of groundwater

The groundwater monitoring network includes both chemical and quantitative monitoring. In 2007 there were 541 sites used for GW chemical monitoring and 1505 sites for groundwater quantitative monitoring (both surveillance and operational). Operational monitoring is carried out in all GW bodies being at risk of not achieving WFD environmental objectives. The sites included in the network were those located in the direction of groundwater flow from a potential pollution source and those suitable for monitoring of diffuse pollution sources. The design of the monitoring network took into account the results of the pressure and impact analysis, regional conceptual models, groundwater flow directions, the existing monitoring sites, groundwater vulnerability, inventories of point sources of pollution, land use and vulnerable zones according to the Nitrates Directive. One of the goals of the monitoring assessment was the detection of significant and sustained upward trends in pollutants, however no trends were evaluated.

In the International Danube RBD, similarly to surface waters, there is an international monitoring network for groundwater in place under the ICPDR. This monitoring is based on the national monitoring activities but it is focussed on addressing the monitoring requirements jointly agreed by the ICPDR for the international Danube River Basin District. The ICPDR WFD Art.8 report listed 97 sites used for GW quality monitoring and 420 sites for groundwater quantity monitoring in Slovakia for the international purposes. There is no information on international coordination of monitoring in the Vistula RBD.

5.4 Monitoring of protected areas

At present there are 1777 drinking water sources used in Slovakia with the respective protected area of 8 616 km², *i.e.* 17.5% of the country area. Monitoring is carried out in line with the Law 354/2006 by public water supply management companies. It comprises 15 microbiological and 71 physico-chemical and radiochemical parameters. There was no information found to indicate whether all priority substances discharged into a water body and all other substances discharged in significant quantities that could affect the status of the

body of water and which are included in the requirements of the Drinking Water Directive are monitored in drinking water protected areas.

RBD	Surface waters									Ground-water drinking water
	Surface drinking water abstraction	Quality of drinking water	Bathing water	Birds sites	Fish	Habitats sites	Nitrates	Shellfish	UWWT	
SK30000	3	0	0	0	2	0	0	0	0	2*
SK40000	49	0	0	0	33	0	0	0	0	47*
<i>Total</i>	<i>52</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>35</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>49</i>

Table 5.4.1: Number of monitoring stations in protected areas⁵.

Note: *Number of monitoring sites reported at programme level.

Source: WISE

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

RBD	Total	High		Good		Moderate		Poor		Bad		Unknown	
		No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
SK30000	83	61	73.5	5	6.0	16	19.3	1	1.2	0	0	0	0
SK40000	1617	422	26.1	610	37.7	532	32.9	46	2.8	7	0.4	0	0
<i>Total</i>	<i>1700</i>	<i>483</i>	<i>28.4</i>	<i>615</i>	<i>36.2</i>	<i>548</i>	<i>32.2</i>	<i>47</i>	<i>2.8</i>	<i>7</i>	<i>0.4</i>	<i>0</i>	<i>0</i>

Table 6.1: Ecological status of natural surface water bodies.

Source: WISE

RBD	Total	High		Good		Moderate		Poor		Bad		Unknown	
		No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
SK30000	0	0	0	0	0	0	0	0	0	0	0	0	0
SK40000	60	4	6.7	21	35.0	30	50.0	5	8.3	0	0	0	0
<i>Total</i>	<i>60</i>	<i>4</i>	<i>6.7</i>	<i>21</i>	<i>35.0</i>	<i>30</i>	<i>50.0</i>	<i>5</i>	<i>8.3</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>

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

Source: WISE

⁵ Number of sites calculated from data reported at site level. If no data reported at site level, then table supplemented with data reported at programme level.

RBD	Total	Good		Poor		Unknown	
		No.	%	No.	%	No.	%
SK30000	83	80	96.4	3	3.6	0	0
SK40000	1617	1550	95.9	67	4.1	0	0
<i>Total</i>	<i>1700</i>	<i>1630</i>	<i>95.9</i>	<i>70</i>	<i>4.1</i>	<i>0</i>	<i>0</i>

Table 6.3: Chemical status of natural surface water bodies.

Source: WISE

RBD	Total	Good		Poor		Unknown	
		No.	%	No.	%	No.	%
SK30000	0	0	0	0	0	0	0
SK40000	60	43	71.7	17	28.3	0	0
<i>Total</i>	<i>60</i>	<i>43</i>	<i>71.7</i>	<i>17</i>	<i>28.3</i>	<i>0</i>	<i>0</i>

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

Source: WISE

RBD	Total	Good		Poor		Unknown	
		No.	%	No.	%	No.	%
SK30000	4	4	100	0	0	0	0
SK40000	97	58	59.8	13	13.4	26	26.8
<i>Total</i>	<i>101</i>	<i>62</i>	<i>61.4</i>	<i>13</i>	<i>12.9</i>	<i>26</i>	<i>25.7</i>

Table 6.5: Chemical status of groundwater bodies.

Source: WISE

RBD	Total	Good		Poor		Unknown	
		No.	%	No.	%	No.	%
SK30000	4	4	100	0	0	0	0
SK40000	97	66	68	5	5.2	26	26.8
<i>Total</i>	<i>101</i>	<i>70</i>	<i>69.3</i>	<i>5</i>	<i>5</i>	<i>26</i>	<i>25.7</i>

Table 6.6: Quantitative status of groundwater bodies.

Source: WISE

RBD	Total	Global status (ecological and chemical)					Good ecological status 2021		Good chemical status 2021		Good ecological status 2027		Good chemical status 2027		Global exemptions 2009 (% of all SWBs)			
		Good or better 2009		Good or better 2015		Increase 2009 - 2015									Art 4.4	Art 4.5	Art 4.6	Art 4.7
		No.	%	No.	%	%	No.	%	No.	%	No.	%	No.	%	%	%	%	%
SK30000	83	65	78.3	66	79.5	1.2									20	0	0	0
SK40000	1677	1024	61.1	1061	63.3	2.2									37	0	0	0
<i>Total</i>	<i>1760</i>	<i>1089</i>	<i>61.9</i>	<i>1127</i>	<i>64</i>	<i>2.2</i>									<i>36</i>	<i>0</i>	<i>0</i>	<i>0</i>

Table 6.7: Surface water bodies: overview of status in 2009 and expected status in 2015, 2012 and 2027⁶

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

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

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

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

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

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

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

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

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

⁶ Data for 2009 and 2015 extracted from WISE. Data for 2021 and 2027 established during the compliance assessment of the RBMPs.

RBD	Total	Ecological status					Good ecological status 2021		Good ecological status 2027		Ecological exemptions (% of all SWBs)			
		Good or better 2009		Good or better 2015		Increase 2009 -2015					Art 4.4	Art 4.5	Art 4.6	Art 4.7
		No.	%	No.	%	%	No.	%	No.	%	%	%	%	%
SK30000	83	66	79.5	66	79.5	0					20.5	0	0	0
SK40000	1617	1032	63.8	1035	64.0	0.2					36.3	0	0	0
<i>Total</i>	<i>1700</i>	<i>1098</i>	<i>64.6</i>	<i>1101</i>	<i>64.8</i>	<i>0.2</i>					<i>35.5</i>	<i>0</i>	<i>0</i>	<i>0</i>

Table 6.8: Natural surface water bodies: ecological status in 2009 and expected status in 2015, 2012 and 2027⁷
Source: WISE (for data on status in 2009, 2015 and exemptions) and RBMPs (for data on status in 2021 and 2027)

RBD	Total	Chemical status					Good chemical status 2021		Good chemical status 2027		Chemical exemptions (% of all SWBs)			
		Good or better 2009		Good or better 2015		Increase 2009 -2015					Art 4.4	Art 4.5	Art 4.6	Art 4.7
		No.	%	No.	%	%	No.	%	No.	%	%	%	%	%
SK30000	83	80	96.4	83	100	3.6					0	0	0	0
SK40000	1617	1550	95.9	1617	100	4.1					0	0	0	0
<i>Total</i>	<i>1700</i>	<i>1630</i>	<i>95.9</i>	<i>1700</i>	<i>100</i>	<i>4.1</i>					<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>

Table 6.9: Natural surface water bodies: chemical status in 2009 and expected status in 2015, 2012 and 2027⁸
Source: WISE (for data on status in 2009, 2015 and exemptions) and RBMPs (for data on status in 2021 and 2027)

⁷ Data for 2009 and 2015 extracted from WISE. Data for 2021 and 2027 established during the compliance assessment of the RBMPs.

⁸ Data for 2009 and 2015 extracted from WISE. Data for 2021 and 2027 established during the compliance assessment of the RBMPs.

RBD	Total	GW chemical status					Good chemical status 2021		Good chemical status 2027		GW chemical exemptions (% of all GWBs)			
		Good or better 2009		Good or better 2015		Increase 2009 -2015					Art 4.4	Art 4.5	Art 4.6	Art 4.7
		No.	%	No.	%	%	No.	%	No.	%	%	%	%	%
SK30000	4	4	100	4	100	0					0	0	0	0
SK40000	97	58	59.8	58	59.8	0					13	0	0	0
<i>Total</i>	<i>101</i>	<i>62</i>	<i>61.4</i>	<i>62</i>	<i>61.4</i>	<i>0</i>					<i>13</i>	<i>0</i>	<i>0</i>	<i>0</i>

Table 6.10: Groundwater bodies: chemical status in 2009 and expected status in 2015, 2012 and 2027⁹

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

RBD	Total	Groundwater quantitative status					Good quantitative status 2021		Good quantitative status 2027		GW quantitative exemptions (% of all GWBs)			
		Good or better 2009		Good or better 2015		Increase 2009 -2015					Art 4.4	Art 4.5	Art 4.6	Art 4.7
		No.	%	No.	%	%	No.	%	No.	%	%	%	%	%
SK30000	4	4	100	4	100	0					0	0	0	0
SK40000	97	66	68.0	71	73.2	5.2					0	0	0	0
<i>Total</i>	<i>101</i>	<i>70</i>	<i>69.3</i>	<i>75</i>	<i>74.3</i>	<i>5.0</i>					<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>

Table 6.11: Groundwater bodies: quantitative status in 2009 and expected status in 2015, 2012 and 2027¹⁰

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

⁹ Data for 2009 and 2015 extracted from WISE. Data for 2021 and 2027 established during the compliance assessment of the RBMPs.

¹⁰ Data for 2009 and 2015 extracted from WISE. Data for 2021 and 2027 established during the compliance assessment of the RBMPs.

RBD	Total HMWB and AWB	Ecological potential					Good ecological potential 2021		Good ecological potential 2027		Ecological exemptions (% of all HMWB/AWB)			
		Good or better 2009		Good or better 2015		Increase 2009 -2015					Art 4.4	Art 4.5	Art 4.6	Art 4.7
		No.	%	No.	%	%	No.	%	No.	%	%	%	%	%
SK30000	0	0	0	0	0	0					0	0	0	0
SK40000	60	25	41.7	26	43.3	1.7					60	0	0	0
<i>Total</i>	<i>60</i>	<i>25</i>	<i>41.7</i>	<i>26</i>	<i>43.3</i>	<i>1.7</i>					<i>60</i>	<i>0</i>	<i>0</i>	<i>0</i>

Table 6.12: Heavily modified and artificial water bodies: ecological potential in 2009 and expected ecological potential in 2015, 2012 and 2027¹¹

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

RBD	Total HMWB and AWB	Chemical status					Good chemical status 2021		Good chemical status 2027		Chemical exemptions (% of all HMWB/AWB)			
		Good or better 2009		Good or better 2015		Increase 2009 -2015					Art 4.4	Art 4.5	Art 4.6	Art 4.7
		No.	%	No.	%	%	No.	%	No.	%	%	%	%	%
SK30000	0	0	0	0	0	0					0	0	0	0
SK40000	60	43	71.7	60	100	28.3					0	0	0	0
<i>Total</i>	<i>60</i>	<i>43</i>	<i>71.7</i>	<i>60</i>	<i>100</i>	<i>28.3</i>					<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>

Table 6.13: Heavily modified and artificial water bodies: chemical status in 2009 and expected status in 2015, 2012 and 2027¹²

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

¹¹ Data for 2009 and 2015 extracted from WISE. Data for 2021 and 2027 established during the compliance assessment of the RBMPs.

¹² Data for 2009 and 2015 extracted from WISE. Data for 2021 and 2027 established during the compliance assessment of the RBMPs.

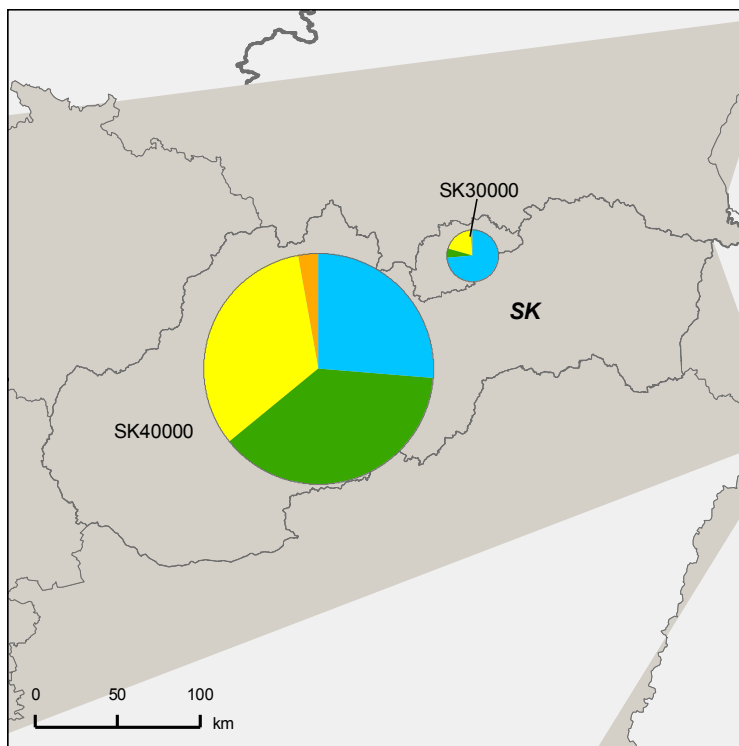


Figure 6.1: Map of ecological status of natural surface water bodies 2009

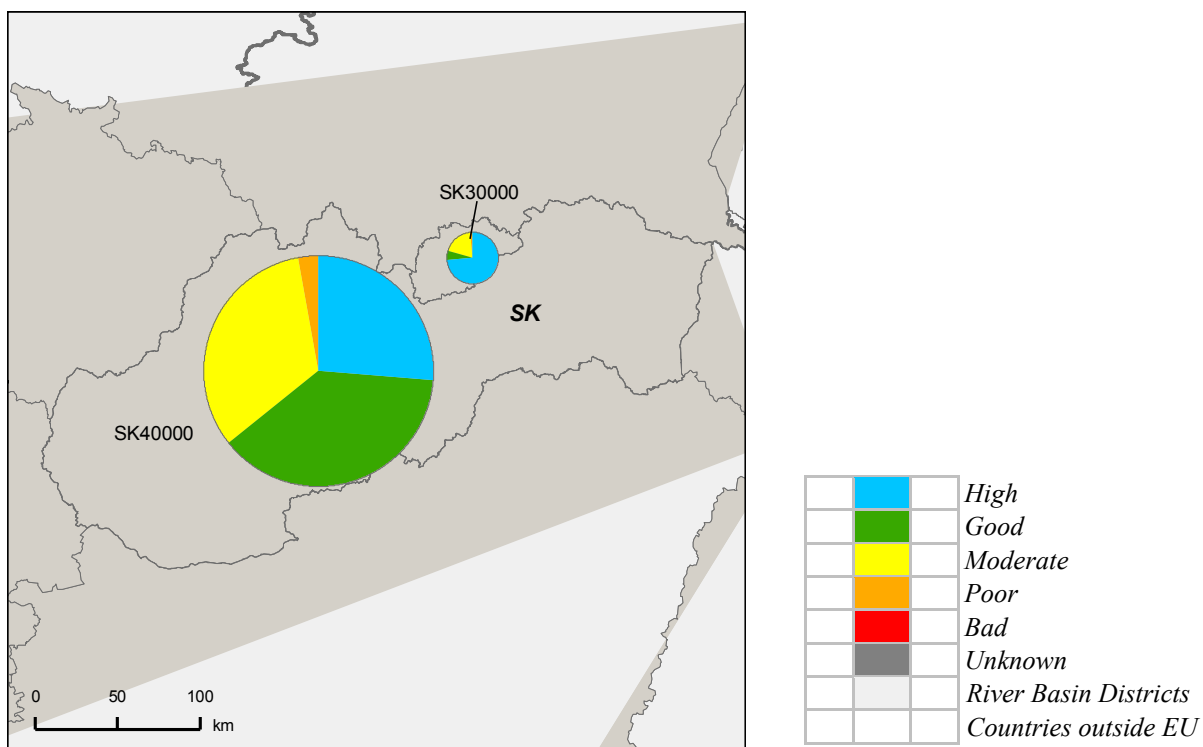


Figure 6.2: Map of ecological status of natural surface water bodies 2015

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

Source: WISE, Eurostat (country borders)

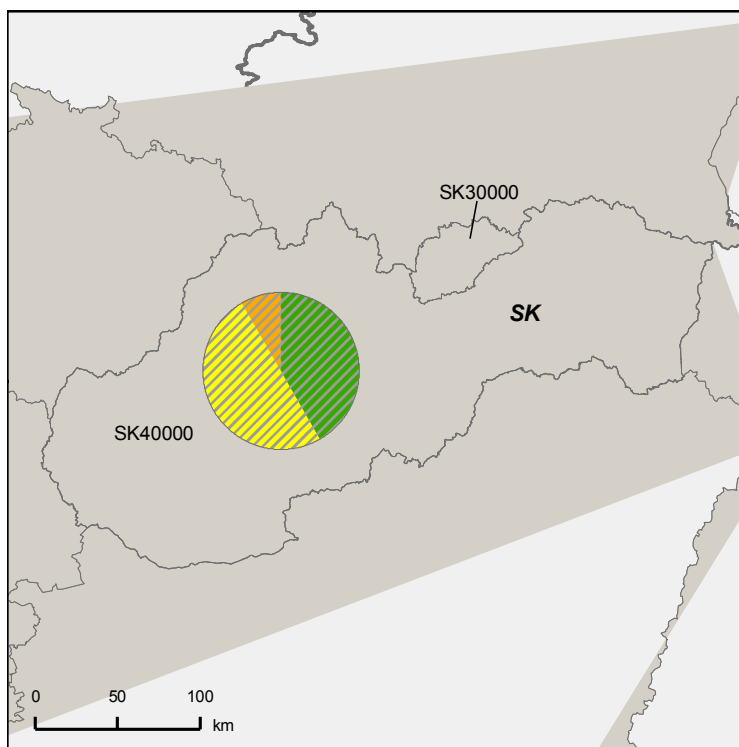


Figure 6.3: Map of ecological potential of artificial and heavily modified water bodies 2009

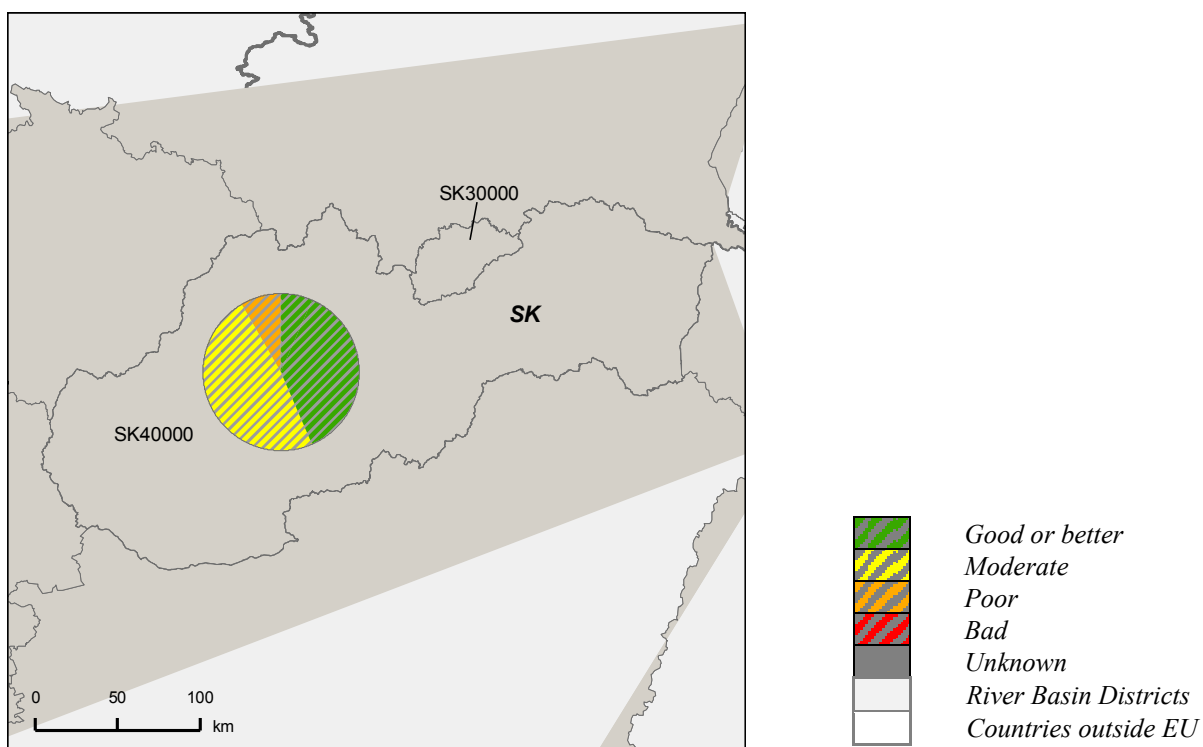


Figure 6.4: Map of ecological potential of artificial and heavily modified water bodies 2015

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

Source: WISE, Eurostat (country borders)

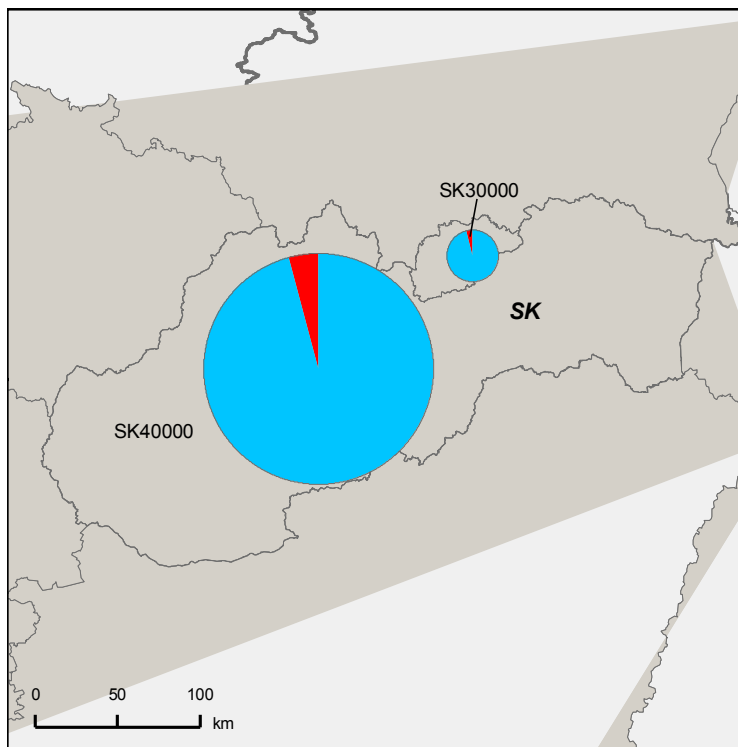


Figure 6.5: Map of chemical status of natural surface water bodies 2009

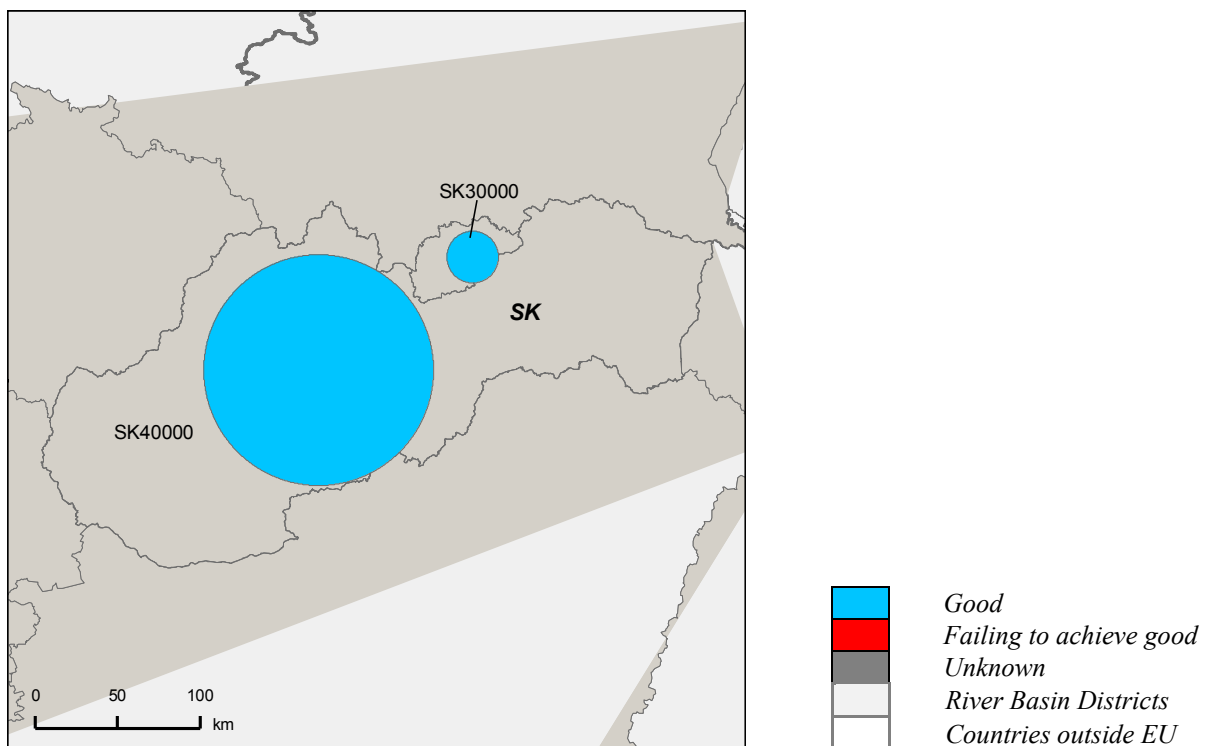


Figure 6.6: Map of chemical status of natural surface water bodies 2015

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

Source: WISE, Eurostat (country borders)

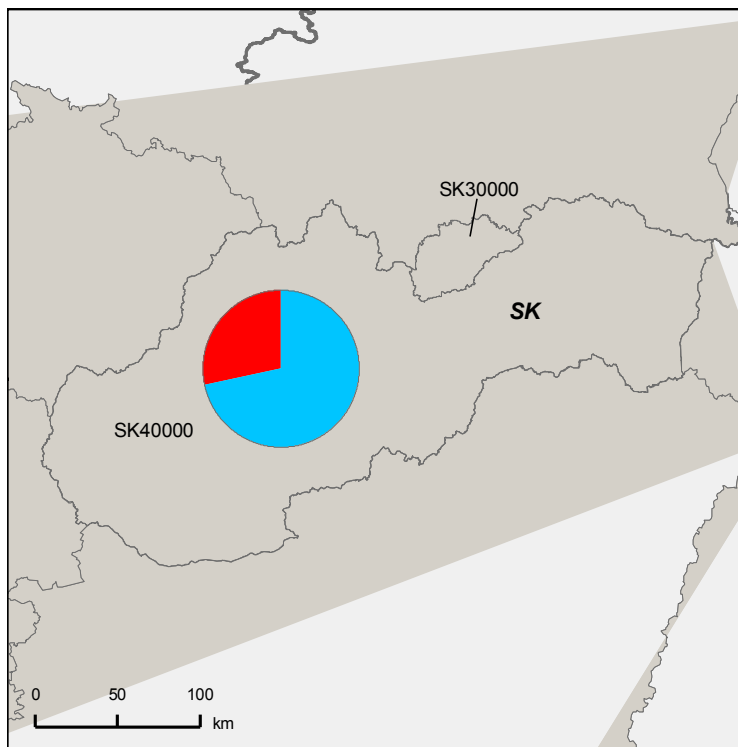


Figure 6.7: Map of chemical status of artificial and heavily modified water bodies 2009

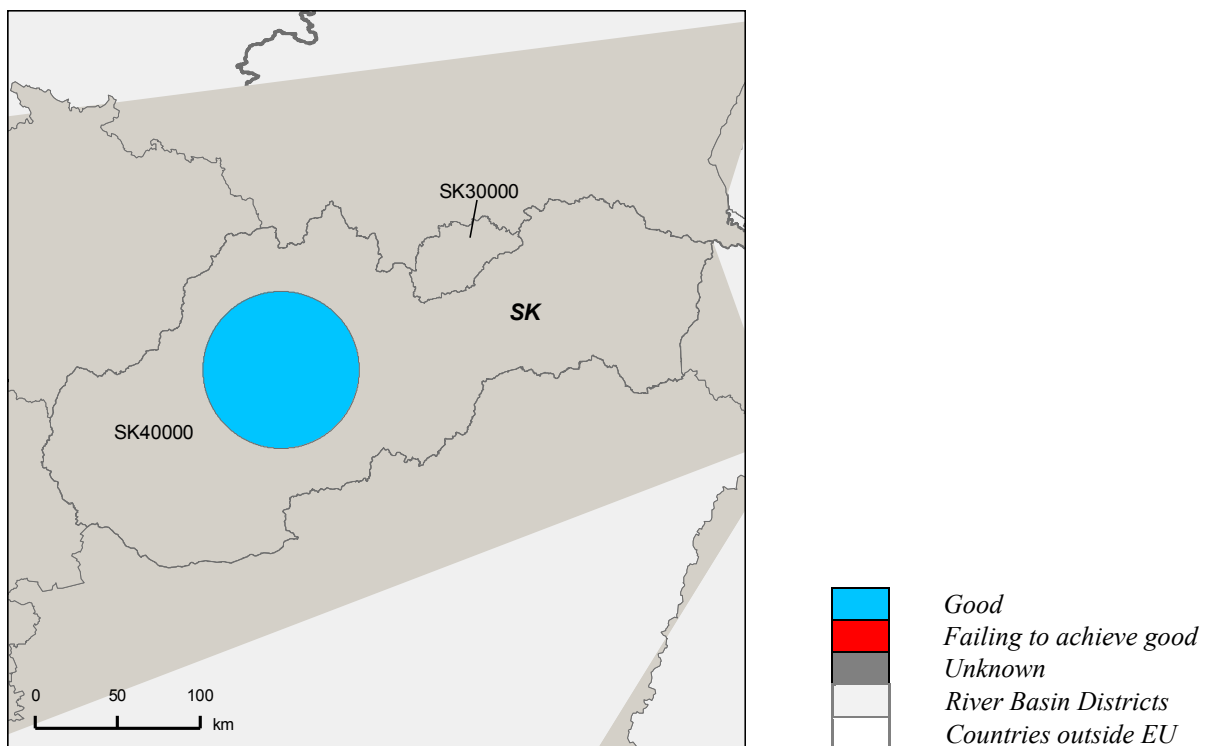


Figure 6.8: Map of chemical status of artificial and heavily modified water bodies 2015

Note: Standard colours based on WFD Annex V, Article 1.4.3.
Source: WISE, Eurostat (country borders)

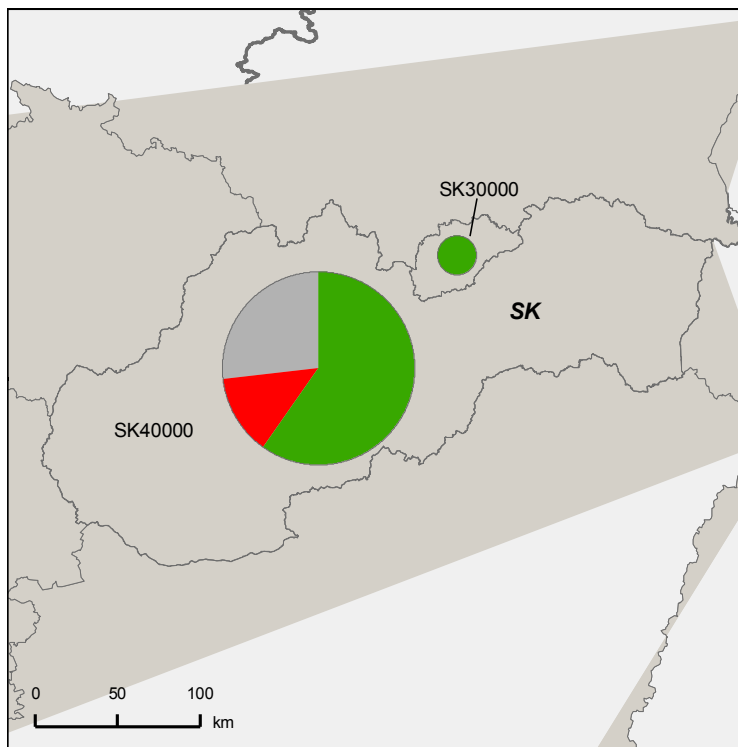


Figure 6.9: Map of chemical status of groundwater bodies 2009

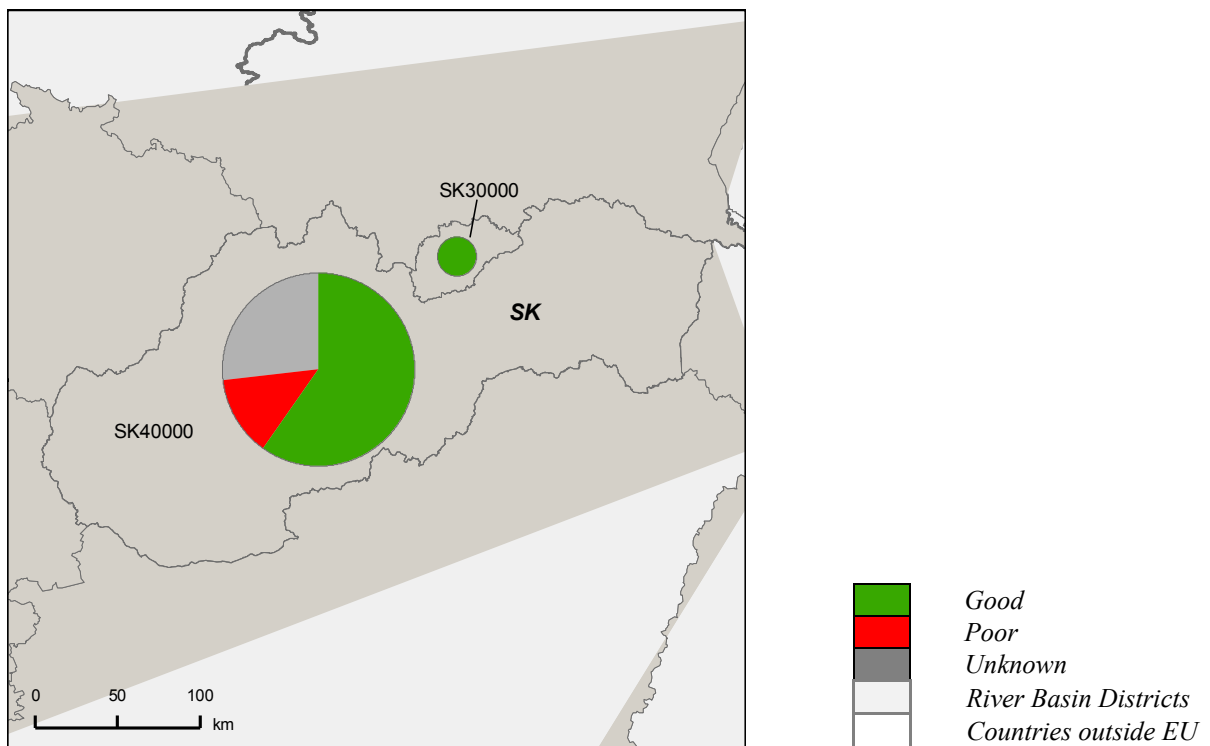


Figure 6.10: Map of chemical status of groundwater bodies 2015

Note: Standard colours based on WFD Annex V, Article 2.4.5.

Source: WISE, Eurostat (country borders)

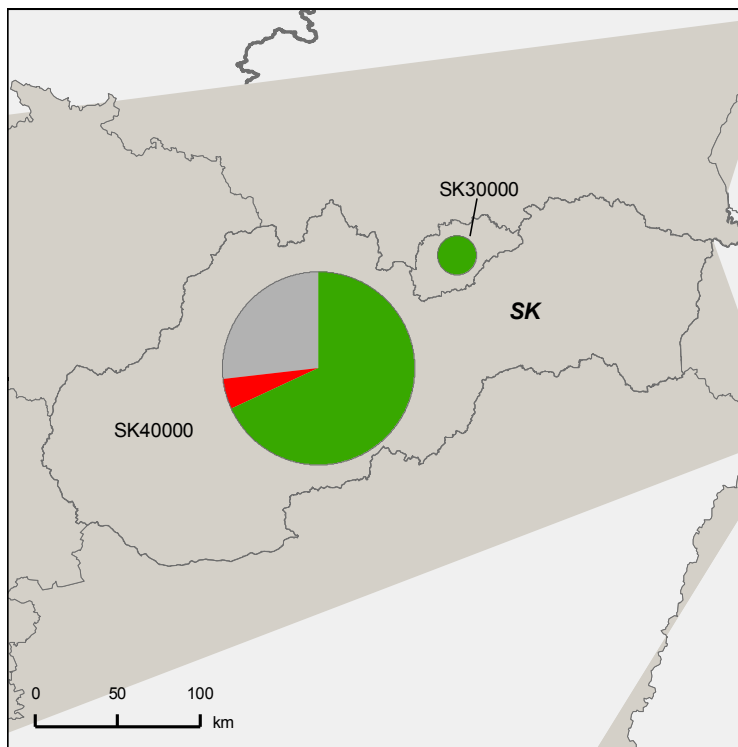


Figure 6.11: Map of quantitative status of groundwater bodies 2009

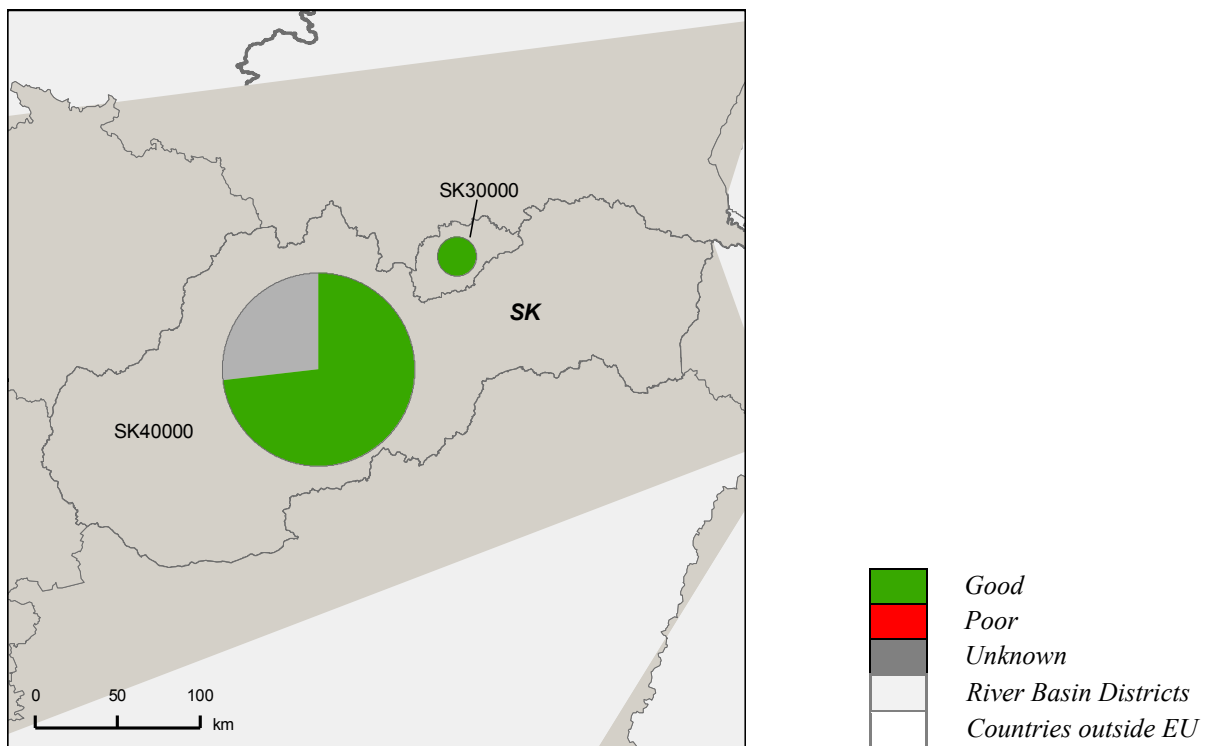


Figure 6.12: Map of quantitative status of groundwater bodies 2015

Note: Standard colours based on WFD Annex V, Article 2.2.4.

Source: WISE, Eurostat (country borders)

7. ASSESSMENT OF ECOLOGICAL STATUS OF SURFACE WATERS

In Slovakia the ecological status assessment was based on the WFD CIS Guidance document No. 13 “Overall approach to the classification of ecological status and ecological potential”, which was identically applied for both the Danube and Vistula RBDs. The ”one-out-all-out” principle has been applied to derive the overall ecological status. Classification systems are type specific and cover all types.

RBD	Rivers							Lakes							Transitional							Coastal						
	Phytoplankton	Macrophytes	Phytobenthos	Benthic invertebrates	Fish	Physico-Chemical	Hydromorphological	Phytoplankton	Macrophytes	Phytobenthos	Benthic invertebrates	Fish	Physico-Chemical	Hydromorphological	Phytoplankton	Macroalgae	Angiosperms	Benthic invertebrates	Fish	Physico-Chemical	Hydromorphological	Phytoplankton	Macroalgae	Angiosperms	Benthic invertebrates	Physico-Chemical	Hydromorphological	
SK30000								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
SK40000															-	-	-	-	-	-	-	-	-	-	-	-	-	

Table 7.1: Availability of biological assessment methods

-

Assessment methods fully developed for all BQEs

Assessment methods partially developed or under development for all or some BQEs

Assessment methods not developed for BQEs, no information provided on the assessment methods, unclear information provided

Water category not relevant

Source: RBMPs

The assessment methods for classification of ecological status were fully developed for all BQEs with the exception of fish (the method for fish using the EFI index was under development but was not available for the first RBMP; this BQE will be included in the next RBM planning cycle). The ecological status assessments in rivers lack the assessment of fish, and therefore do not comply with the WFD requirements.

For the assessment of benthic macroinvertebrates, the multihabitat assessment using multimetric index was applied. Phytoplankton abundance and phytoplankton biomass expressed in terms of chlorophyll-a were used for the analysis of phytoplankton. Benthic diatoms were selected as a representative group for phytobenthos assessment. A multimetric method was applied also for the analysis of macrophytes. All these methodologies for BQE assessment were type-specific and used reference conditions. The above facts support the statement that the assessment of BQEs in rivers (except fish) was close to being WFD compliant, however, the full compliance would require a complete intercalibration (see text below).

There were no assessment methods available for macrophytes, phytobenthos and benthic invertebrates in lakes (reservoirs). The ecological status assessments for lakes are thus based only on phytoplankton, which is not in compliance with the WFD. The ecological status assessments do not include hydromorphological quality elements since there are no natural lakes in Slovakia with an area larger than 0.5km².

The assessment methods have been developed for all physico-chemical quality elements (QEs) relevant for the main pressures affecting the water bodies in the RBD. This assessment was WFD compliant. The class boundaries for the physico-chemical QEs relevant for the main pressures were calculated using the long-term monitoring data and EQR. EQR were set to 0,8; 0,6; 0,4 and 0,2 and the threshold values were calculated using the percentiles from the monitoring data. Relationships between the biological class boundaries and the physico-chemical and hydromorphological class boundaries were defined during preparation of the classification schemes. Individual BQEs (characterised by metrics) were tested by statistical methods, particularly together with physico-chemical QEs. Simultaneously, harmonisation was made between individual quality elements in terms of the classification schemes for individual types of watercourses.

Ecological improvement was assessed at the sub-unit (sub-basins) level using organic pollution indicators (BOD₅, COD_{Cr} and nutrient pollution (N_{total} and P_{total})). The effectiveness of the implemented measures will be shown by the assessment of the status/potential of water bodies and/or quality of surface waters in analysis pursuant to Article 5 of the WFD and in further planning cycles.

Evaluation of the ecological status of surface water bodies is based on evaluation of data from monitoring at representative sampling points. Criteria for the selection of representative sampling points were defined in the “Assessment of the status of surface water bodies in Slovakia for 2007”.

Uncertainties in the assessment were elaborated as a determination of the reliability of the assessment of the ecological status of surface water bodies. Reliability was expressed on a three-level scale (low, medium and high) in accordance with the method used in the International Danube RBMP. A brief description of this method is provided in Chapter 5.1.2

of the Slovak Water Plan and details can be found in the “Assessment of the status of surface water bodies in Slovakia for 2007”.

The assessment methods for hydromorphological QEs includes a methodology for the hydromorphological assessment of rivers, a methodology for setting reference conditions for hydromorphological QEs and a procedure for setting classification schemes for hydromorphological QEs. The characteristics for setting reference conditions were based on data on the hydrological regime, river continuity and morphological conditions in line with the requirements of WFD.

The confidence and precision for both Slovak RBDs was assessed using a modified methodology that was developed by the Monitoring and Assessment Expert Group of the ICPDR.

Compliance with the good/moderate boundary for benthic invertebrates from the intercalibration exercise has been assured. The results of intercalibration, published by the Commission Decision (2008), were used for the assessment of the ecological status for benthic invertebrates for three types of water courses. Phytobenthos, macrophytes and fish were included in the second intercalibration phase (2009–2011) so they were not intercalibrated in the Eastern continental GIG within the EU Intercalibration phase 1. Consideration was taken of the intercalibration metrics agreed under the Central Baltic Geographical Intercalibration Group for establishing of classification schemes for benthic invertebrates in other types of water courses and for macrophytes and phytobenthos. These schemes were then used for assessing ecological status. Based on the above, the boundaries published in the Commission Decision were taken into account for assessing the state of surface waters for the other national types as well.

There was also no intercalibration for lakes among the countries in the EC GIG in IC phase 1, therefore no assessment system for lakes has been intercalibrated.

Environmental quality standards (EQS; both MAC-EQS and AA-EQS) were developed for 26 river basin specific pollutants relevant for both Slovak RBDs, and were used for the ecological status assessment. These standards have been set in accordance with the procedure described in the WFD Annex V 1.2.6. Substances 4-methyl-2,6-di-tertbutylphenol, bisphenol-A, arsenic, zinc and copper were responsible for the failure WBs to achieve good ecological status.

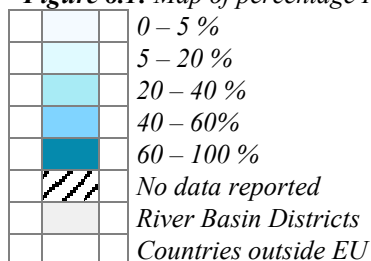
RBD	CAS Number	Substance	Percentage Water Bodies Failing Status (%)
SK30000			
SK40000		4-methyl-2,6-di-tertbutylphenol	
SK40000	7440-38-2	Arsenic	
SK40000		bisphenol-A	
SK40000	7440-50-8	Copper	
SK40000	7440-66-6	Zinc	

Table 7.2: River basin specific pollutants causing failure of status
Source: RBMPs

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



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



Source: WISE, Eurostat (country borders)

8.1 Designation of HMWBs

53 HMWBs have been designated in Slovakia, which represents 3% of the total number of water bodies. A national approach for the designation of HMWBs was followed in the early 2000s, which has since been replaced by procedures described in the HMWB Guidance No. 4. The Slovak RBMP specified the following water uses for which water bodies have been designated as HMWB: navigation including port facilities, storage for drinking water supply, storage for power generation, flood protection, urbanisation and wider environment.

The following types of physical modifications were considered in the designation of HMWBs: locks; weirs/ dams/ reservoirs; channelization/ straightening/ bed stabilisation; bank reinforcement/ embankment; flood protection measures; changes of lateral profile; and water abstractions.

The evaluation of the significant adverse effects of restoration measures on the use and the wider environment was carried out according to the so-called “first determination test”, which was the first step of the standard HMWB designation procedure applied at the national

level. The impact of several alternatives of restoration measures on the water use (e.g. flood protection, water abstraction for drinking water production) and on the wider environment was explored. If the test confirmed that the proposed restoration measures will not have any significant adverse impact on the water use and on wider environment, the water body was designated as natural. More detailed description of the approach for defining significant adverse effects was not provided in the RBMP, thus the criteria applied were not fully clear. The RBMP does not discuss the issue of uncertainty in relation to the designation of HMWB.

8.2 Methodology for setting good ecological potential (GEP)

GEP is defined. A two-step procedure was applied for the definition of GEP. The ‘reference-based approach’ according to the WFD CIS Guidance Document No. 4 was applied deriving GEP from reference conditions of a comparable water body. The methodology for setting GEP is water body specific, a special passport was prepared for each candidate water body.

However, it should be pointed out that the assessment methods for the BQEs are not yet finalised and therefore the methodology for defining GEP is also incomplete. The Slovak authorities confirm that missing data will be collected by the monitoring programmes in the next planning cycle that will serve for updating of the evaluation systems and classification.

Group	Class	Overall N (%)	High confidence N (%)	Medium confidence N (%)	Low confidence N (%)
Artificial water bodies – SK40000	High	1 (14.29)			1 (14.29)
	Good	4 (57.14)		1 (14.29)	3 (42.86)
	Moderate	2 (28.57)			2 (28.57)
	Poor	0			
	Bad	0			
	Total	7 (100.00)		1 (14.29)	6 (85.71)
Heavily modified water bodies – SK40000	High	3 (5.66)			3 (5.66)
	Good	17 (32.08)		5 (9.43)	12 (22.64)
	Moderate	28 (52.83)		12 (22.64)	16 (30.19)
	Poor	5 (9.43)		1 (1.89)	4 (7.55)
	Bad	0			

Table 8.1: Assessment methods for HMWB and AWB

Source: WISE

9. ASSESSMENT OF CHEMICAL STATUS OF SURFACE WATERS

Good surface water chemical status means the chemical status required to meet the environmental objectives for surface waters established in WFD Article 4(1)(a). That is the chemical status achieved by a body of surface water in which concentrations of pollutants do not exceed the EQSs established in WFD Annex IX and under WFD Article 16(7), and under

other relevant Community legislation setting EQSs at Community level. The Directive 2008/105/EC (EQSD) lays down EQSs for priority substances and certain other pollutants as provided for in WFD Article 16, with the aim of achieving good surface water chemical status.

In Slovakia all EQSs laid down in Part A of Annex I of the Directive 2008/105/EC have been applied for the assessment of the chemical status of surface water bodies, but in most of the water bodies not all priority substances were monitored. All priority substances pursuant to the draft (at that time) EQSD were monitored at representative monitoring points for the assessment of chemical status of surface water bodies. Slovakia did not opt to apply EQSs for biota for mercury and its compounds, hexachlorobenzene, or for hexachlorobutadiene according to Article 3(2a) of the EQSD, nor were EQSs for sediment and/or biota derived for the priority substances.

The chemical status assessment was, in principle, compliant with the WFD, following the provisions of the EQSD, but more clarity is needed as to the description of which priority substances were monitored in which water bodies. In addition, in the event that some substances were not analysed because they were considered as not relevant based on the pressures and impacts analysis, a justification should be added.

Background concentrations for heavy metals have been set using the available data from chemical monitoring activities in 1993-2007 in combination with information on geological characteristics, chemical composition of river sediments and groundwaters, and on the surface water typology. Mixing zones were not used for chemical status assessment. There was no explanation found on how the bioavailability factors of metals were considered in the assessment of compliance with EQS.

The priority substances responsible for exceeding the EQSs set by the EQSD are shown in the table below including percentage of water bodies failing good chemical status:

Priority substance	% of water bodies failing good chemical status
Cadmium	0.2
Lead	0.1
Mercury	1.5
Trifluralin	0.2
Brominated diphenylether	0.1
Di(2-ethylhexyl)phthalate (DEHP)	1.8
Nonylphenol	0.1
Flouranthene	0.1
Benzo(g,h,i)perylene	0.1
Indeno(1,2,3-cd)pyrene	0.1

Table 9.1: Substances responsible for exceedances

Source: RBMPs

10. ASSESSMENT OF GROUNDWATER STATUS

Information on groundwater status was based on the assessment of groundwater chemical and quantitative status. 13 out of 75 GW bodies were found to be at risk of not meeting good chemical status (all of them in the Danube RBD - groundwater bodies in the Vistula RBD were all in a good chemical status). The following numbers of groundwater bodies or groups of groundwater bodies (in brackets) were found to be at risk of not meeting good chemical status due to the following pollutants: sulphates (6), chlorides (5), ammonium (6), nitrates (3), arsenic (2), atrazine (4), simazine (2), cadmium (1), trichloroethylene (1) and tetrachloroethylene (1).

The RBMP provides information that GW quality standards or threshold values (TVs) for some pollutants have been exceeded and GWBs – in line with the Directive 2006/118/EC – are still considered being of good chemical status. No details about these GWBs and/or pollutants are reported, which is a drawback of the plan.

All substances in Annex II Part B of the Directive 2006/118/EC have been taken into account at the establishment of groundwater threshold values. The reference values used for the calculation of threshold values were derived from drinking water standards.

Investigations as to whether concentrations of pollutants in groundwater bodies result in a failure to achieve the environmental objectives for associated surface waters, or in any significant diminution of surface water chemistry and ecology, or in any significant damage to groundwater dependent terrestrial ecosystems were not carried out due to missing data, methodologies and criteria. It is foreseen to perform such assessment in the second RBM cycle. Trend assessment was not carried out under the first plan. It is mentioned in the RBMP that trend assessment is foreseen in the second planning cycle.

For the assessment of groundwater quantitative status the following criteria were applied:

- The available groundwater resource is not exceeded by the long term annual average rate of abstraction;
- Failure to achieve the environmental objectives specified under Article 4 for associated surface water bodies resulting from anthropogenic water level alteration or change in flow conditions;
- Significant damage to groundwater dependent terrestrial ecosystems resulting from an anthropogenic water level alteration.

The RBMP indicates that 'available groundwater resource' has been fully applied in accordance with the definition provided in WFD Art. 2.27. A comparison of annual average groundwater abstraction against 'available groundwater resource' has been reported to be calculated for every groundwater body and two GW bodies in the Danube RBD failed to achieve good quantitative status because of this criterion. The balance between recharge and abstraction of groundwater is assessed in line with WFD requirements.

Co-ordination with the neighbouring countries was reported to be considered in the context of bilateral transboundary Commissions at the establishment of threshold values. However, it

was not mentioned in the RBMP with which countries such co-ordination was carried out and no further details were provided.

RBD	Good	Failing to achieve good	Unknown
SK30000	2		
SK40000	168		
<i>Total</i>	<i>170</i>	<i>0</i>	<i>0</i>

Table 10.1: Status of groundwater drinking water protected areas
Source: WISE

11. ENVIRONMENTAL OBJECTIVES AND EXEMPTIONS

Article 4 of the WFD defines a number of exemptions to the general objectives that allow for an extension of deadlines beyond 2015, less stringent objectives, a temporary deterioration, or deterioration for the implementation of new projects, provided a set of conditions are fulfilled. The exemptions for WFD Article 4 are the provisions in Article 4(4) (extension of deadline), 4(5) (lower objectives), 4(6) (temporary deterioration) and 4(7) (new modifications).

Slovakia reported in the RBMP that for both RBDs, given the large number of measures required for achieving environmental objectives, it would not be possible to complete those objectives by the deadline set by the WFD from financial (necessary budgets not available) and technical/capacity problems. Therefore the application of exemptions according to Article 4(4) is foreseen but no further details concerning application of exemptions according to Article 4(4) and 4(5) was provided. An approach based on comparison of costs of the proposed combination of measures with the "ability to pay" of the investors responsible for financing the measures was used to assess whether the implementation of the measures would incur a disproportionate cost. Financial implications of the planned measures were assessed using the average unit prices based on the past experience with implementation of similar measures.

Exemptions according to Article 4(6) were not applied. No information was provided in the RBMP on exemptions according to Article 4(7).

The need for the application of exemptions stemmed primarily from the low confidence in the status assessment and from insufficient knowledge of the relationship between biological, chemical and hydromorphological quality elements.

In the Danube RBD technical infeasibility has been used as a justification for exemptions in relation to hydromorphological measures. Technical infeasibility was assessed in relation to the required implementation date for the proposed measures, *i.e.* by 22 December 2012. Measures proposed for the elimination of hydromorphological changes (ensuring river continuity) include alterations of the existing constructions and modifications or newly planned constructions (e.g., constructing a bio-corridor). Considering the time needed for providing the required documentation (as required by projects operated under conditions of

public procurement) it was found that meeting the deadline of 22 December 2012 is not realistic.

The question of disproportionate cost was used to assess the technical and economic options, taking into account the impacts on employment, economic stability and prosperity. Time constraints for implementing individual measures were considered when drafting the implementation plan. Deadlines extending beyond 2015 were thus proposed based on an analysis of the needs and options (technical and economic) and considering the available capacities. External impacts were also considered, such as the impact of recession and economic instability in production and sales. This analysis revealed that plans to meet the WFD requirements by 2015 are not realistic and extended implementation deadlines are needed. Failure to take account of the above mentioned facts could result in negative financial consequences for investors with adverse impacts to the implementation of measures. Slovakia therefore adopted an approach which will ensure achievement of the required environmental objectives, even though their achievement would need longer time periods. This approach is in line with the provisions of the WFD Art. 4 (4) (a).

The exemptions due to natural conditions were defined for groundwater. Despite the basic and supplementary measures that were reported to have been applied in the 1st RBM cycle to achieve the good GW status, the physico-chemical properties of polluting substances as well as their environmental fate including sorption and degradation rates would not make it possible to see the effects of the measures by 2015. Based on the establishment of the inventory of exemptions from measures required to prevent or limit inputs of pollutants into groundwater, a monitoring programme is planned for the 2nd RBM cycle.

The application of exemptions was co-ordinated in a transboundary context in the Danube RBD. In the international Danube RBMP the exemptions applied in the different Danube countries have been put together to provide a basin wide overview. In the Vistula RBD the coordination of implementation of the WFD between the Slovak Republic and Poland is provided by the Slovak-Polish "WFD Working Group" set up under the Slovak-Polish Committee for Border Waters on the basis of the Agreement of the Slovak and Polish Governments on Water Management of Border Waters. The application of exemptions in the transboundary water bodies was harmonized by this working group.

RBD	Global ¹³					
	Technical feasibility		Disproportionate costs		Natural conditions	
	Article 4(4)	Article 4(5)	Article 4(4)	Article 4(5)	Article 4(4)	Article 4(5)
SK30000	17	0	0	0	0	-
SK40000	623	0	0	0	0	-
<i>Total</i>	<i>640</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>-</i>

Table 11.1: Numbers of Article 4(4) and 4(5) exemptions
Source: WISE

¹³ Exemptions are combined for ecological and chemical status.

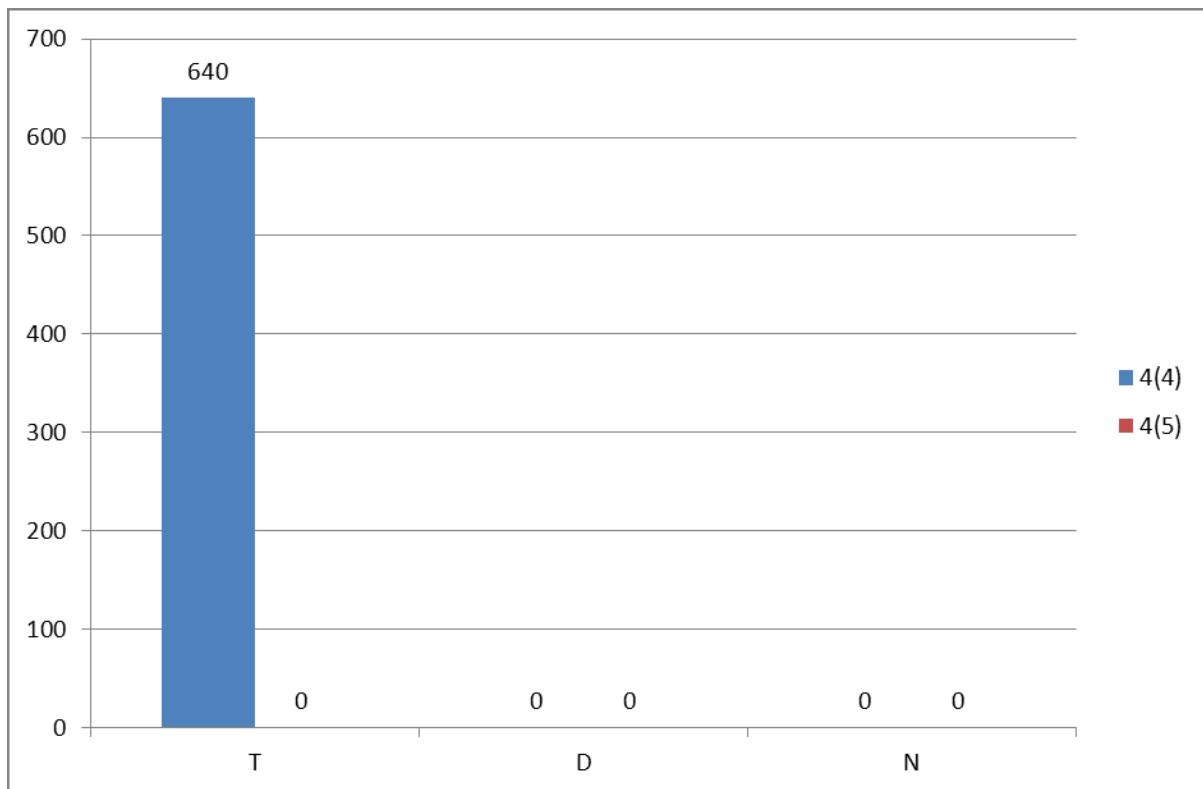


Figure 11.1: Numbers of Article 4(4) and 4(5) exemptions

T = Technical feasibility

D = Disproportionate costs

N = Natural conditions

Blue = Article 4(4) exemptions

Red = Article 4(5) exemptions

Source: WISE

12. PROGRAMMES OF MEASURES

12.1 Programme of measures – general

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

It therefore does not include a comprehensive assessment of compliance with the requirements of Article 11(3)¹⁴ on basic measures. It focuses in particular on key sets of measures. Member States will report to the Commission by December 2012 on the full implementation of their PoMs, including on the progress on the implementation of basic measures as required by Article 11(3). The Commission will assess what Member States report and will publish its assessment in accordance with Article 18 WFD.

Slovakia reported significant pressures at the sub-unit level (sub-basins). Measures were proposed in relation to the risk analysis accomplished in accordance with WFD Art. 5, which defined the significant water management issues. Measures were based on the programmes approved by the government (e.g., Slovak National Programme for Implementing Council Directive 91/271/EEC concerning urban waste water treatment, Programme of Pollution Reduction by hazardous substances and priority hazardous substances and others). Ecological improvement was assessed at the sub-unit level using organic pollution indicators (BOD₅, COD_{Cr}) and nutrient pollution (N_{total} and P_{total}). However, any detailed information on the links between pressures and status, and the respective measures for surface waters was missing so it is not clear if the proposed measures are based on the status assessment of surface water bodies. This means that the programme of measures for surface waters has been based on the risk analysis rather than on monitoring data or status assessment, which is a serious misunderstanding. It was stated in the Slovak RBMP that the programme of measures is linked to the necessity of achieving environmental objectives by 2015 but a clear reference to the results of the status assessment was not reported. The planning therefore misses the ecological perspective introduced by the WFD.

For each groundwater body failing to achieve good quantitative status a list of basic and supplementary measures was provided.

An overview of measures has been provided for sub-basins, river basin districts and at the national level. The structure of the programme of measures refers to the significant water management issues (organic pollution, pollution by nutrients and hazardous substances, hydromorphological alterations, groundwater quantity and quality). The overview of measures in the RBMP provides detailed information such as the number of planned interventions to ensure the longitudinal connectivity (per sub-basin), number of WWTPs to be built/reconstructed, specification of transitional period for IPPC permits for key polluters, etc.

The Slovak Ministry of Environment is responsible for the implementation of the programme of measures and co-operates in this respect with other ministries, local authorities, enterprises and NGOs. The RBMP does not specify any formal responsibilities of other actors, there is only the reference to the overall responsibility of the national authority.

Total costs of programme of measures in the Danube and Vistula RBDs for 2010 - 2027 are €2724 million. There is a breakdown of costs by pressure provided in the plan addressing

¹⁴ These are the minimum requirements to be complied with and include the measures required under other Community legislation as well as measures to achieve the requirements of other WFD Articles and to ensure appropriate controls on different activities affecting water management

point sources, diffuse sources, morphological alterations, specific measures in protected areas and monitoring activities.

Measures implementation time plan is as follows:

- Legislative measures – their implementation is required by 2012 at latest;
- Administrative measures – their implementation will follow the legislation;
- Technical measures
 - In agglomerations – construction of collecting systems and WWTPs – the implementation timetable is based on the needs to fulfil obligations arising from the Treaty on Accession to the EU (in accordance with the requirements of Council Directive 91/271/EEC) published in the EU Official Journal no. 17 of 23. 9. 2003;
 - Industry – sources subject to the IPPC Directive – within the meaning of the accession agreement between Slovakia and the Commission for implementation of that directive;
 - Agriculture – application of the Programme of agricultural activities in declared vulnerable zones, which has been implemented since the introduction of the first action programme in 2004; completion of storage capacities where required for livestock manure in vulnerable areas depending on the focus of production and number of animals;
 - The implementation of hydromorphological measures (with the exception of measures to improve the hydrological regime) is based on a longer timeframe – to 2027.

A cost assessment of the programme of measures in the RBMP provides budget lines from 2010. However, it is obvious that the whole programme will not be operational by 2012 as there are measures that will become operational later (up to 2027).

There is a clear allocation of financing responsibilities for the programme of measures among the state budget, budgets of municipalities, EU funds and other funds. The RBMP provides information on the proportion of the total budget for the programme of measures from different contributors.

An international Joint Programme of Measures (JPM) has been developed for the whole Danube River Basin District. The JPM is firmly based on the national programmes of measures, which shall be made operational by December 2012, and describes the expected improvements in water status by 2015. Priorities for the effective implementation of national measures on the basin-wide scale are highlighted and form the basis of further international co-ordination. Some additional joint initiatives and measures on the basin-wide level that show transboundary character and are undertaken through the framework of the ICPDR are presented in the JPM as well. There is a basin-wide WFD compliant monitoring programme in place under the ICPDR and jointly agreed EQSs for chemical pollutants.

In the Vistula RBD the coordination of the programme of measures between the Slovak Republic and Poland is organized by the Slovak-Polish "WFD Working Group" set up under the Slovak-Polish Committee for Border Waters on the basis of the Agreement of the Slovak and Polish Governments on Water Management of Border Waters.

12.2 Measures related to agriculture

Measures are set at the national level (jointly for the Danube and Vistula RBDs). Agriculture is considered as a key source of pollution by nutrients, organic substances and pesticides. There are only few significant point sources related to agricultural production. The major release of pollutants from agriculture occurs through diffuse sources. Only 3.6% of groundwater use was attributed to agriculture in 2007 in Slovakia. The self-abstraction of water is not referred to in the RBMP. This issue should be addressed in the RBMP update. Morphological modifications due to agriculture have not been indicated as a significant pressure. The major impact caused by pollution by nutrients in Slovakia is eutrophication. Agriculture is reported as one of the sources of nutrients. Soil erosion is considered as one of key sources of organic pollution and pollution by nutrients but no specific reference to agriculture is provided.

The Programme of Measures reports on a number of measures related to agriculture, such as reduction or modification of fertilisers and pesticide application, measures against soil erosion, compensation for land cover, implementation and enforcement of existing older EU legislation, awareness raising, setting up or redefining codes of agricultural practice, advice and training and environmental permitting and licensing. Basic measures stem from the implementation of the Nitrates Directive and are defined in action programmes in vulnerable zones. Supplementary measures include application of codes of agricultural practice, provision of guidance for farmers, ecological awareness rising, enhanced checking mechanisms, financial support for organic farming and compensation policies. The scope of the measures was not reported.

A number of measures related to pesticides in groundwater were indicated:

- Basic measures:
 - A number of legislative acts setting rules for the handling and monitoring of hazardous substances;
 - Preparation of risk analyses of contaminated sites, remediation of old contaminated sites;
 - Preparation of monitoring programmes;
 - Revision of emission permits.
- Supplementary measures:
 - Preparation of an action plan for sustainable use of pesticides;
 - Monitoring programme for pesticides in groundwaters;

- Implementation of economic and financing tools – polluter pays principle;
- Ecological awareness raising.

As mentioned above the measures are planned for years 2010 - 2027. Construction of WWTPs and building of storage facilities for nitrates is planned for 2010 – 2015¹⁵. The agricultural measures will be primarily funded by the State budget, EU funds and from private sources.

Complementary to the RBMP, the Slovak Authorities informed the Commission that consultation with farmers occurred through representatives of the farming sector nominated to the Interdepartmental coordination group for WFD implementation and to the working group for public participation. The activities of the working group for public participation were intended to inform stakeholders about the actual development of the whole implementation process, to analyse and create a process of public participation in the next period and provide the implementation team with information and opinions from stakeholders.

The approach follows the basic provisions of WFD Art. 11 and the Nitrates Directive but there is no link to the chemical and ecological status results and no detailed timing for the implementation.

¹⁵ They are not detailed in the reported information

Measures	SK30000	SK40000
Technical measures		
Reduction/modification of fertiliser application	✓	✓
Reduction/modification of pesticide application		✓
Change to low-input farming (e.g. organic farming practices)		
Hydromorphological measures leading to changes in farming practices	✓	
Measures against soil erosion	✓	✓
Multi-objective measures (e.g. crop rotation, creation of enhanced buffer zones/wetlands or floodplain management)		
Technical measures for water saving		
Economic instruments		
Compensation for land cover	✓	✓
Co-operative agreements		
Water pricing specifications for irrigators		
Nutrient trading		
Fertiliser taxation		
Non-technical measures		
Additions regarding the implementation and enforcement of existing EU legislation	✓	✓
Institutional changes		
Codes of agricultural practice	✓	✓
Farm advice and training	✓	✓
Raising awareness of farmers	✓	✓
Measures to increase knowledge for improved decision-making	✓	✓
Certification schemes		
Zoning (e.g. designating land use based on GIS maps)		
Specific action plans/programmes		
Land use planning		
Technical standards		
Specific projects related to agriculture		
Environmental permitting and licensing		✓

Table 12.2.1: Types of WFD measures addressing agricultural pressures, as described in the PoM
Source: RBMPs

12.3 Measures related to hydromorphology

There are clear links between uses and hydromorphological pressures. Measures to be taken to achieve GES/GEP are: Fish ladders; bypass channels; removal of structures (weirs, barriers, bank reinforcement); reconnection of meander bends or side arms; restoration of bank structure; and operational modifications for hydropeaking. No information was found in the RBMP on guidelines/regulations on the definition of an ecologically based flow regime. The only related activity reported in the Plan was the planned revision of operational procedures for flow regulation at several dams on the Vah River to reduce hydropeaking. The programme of hydromorphological measures was prepared simultaneously with the

designation of HMWB but there is no evidence in the RBMP as to whether hydromorphological measures have been considered in the HMWB (and not only in natural water bodies).

The RBMP refers to the planning of necessary hydromorphological measures for reaching good ecological status/potential through flood management programmes. It is mentioned that the reconnection of meander bends or side arms and floodplain restoration (lateral connectivity enhancement) will have a positive impact on flood protection.

Mitigation measures were proposed for the existing pressures based on:

- Results of screening;
- Additional photographic documentation from monitoring of barriers performed by the Slovak National Countryside Protection Body;
- Opinions of biologists, including fishermen and technical staff of the Slovak Water Authority.

An improvement of the ecological status/potential is expected and the level of improvement will be demonstrated by monitoring results.

The time plan for the implementation of measures extends beyond 2015. Technical infeasibility has been used as a justification for exemptions in relation to hydromorphological measures. Therefore, prioritization of measures related to river continuity restoration was made and approx. 7% of the longitudinal connectivity interruptions will be removed in the first cycle. The time plan for implementation of measures ensuring lateral connectivity goes up to 2027, applying an exemption according to Art. 4 (4).

The overall planned budget for the implementation of measures related to hydromorphology in 2011 - 2027 amounts to €64.9 million.

In general, the national approach to implementation of measures related to hydromorphology follows the provisions of WFD Art. 11 (3) (i), but it lacks information on the links to the ecological status of the surface waters.

Measures	SK30000	SK40000
Fish ladders	✓	✓
Bypass channels	✓	✓
Habitat restoration, building spawning and breeding areas		
Sediment/debris management		
Removal of structures: weirs, barriers, bank reinforcement	✓	✓
Reconnection of meander bends or side arms	✓	✓
Lowering of river banks		
Restoration of bank structure	✓	✓
Setting minimum ecological flow requirements		
Operational modifications for hydropeaking	✓	✓
Inundation of flood plains		
Construction of retention basins		
Reduction or modification of dredging		
Restoration of degraded bed structure		
Remeandering of formerly straightened water courses		

Table 12.3.1: Types of WFD measures addressing hydromorphological pressures, as described in the PoM
Source: RBMPs

12.4 Measures related to groundwater

To tackle over-exploitation of groundwater resources the following basic measures were applied:

- Regulation of groundwater abstraction;
- Development of interconnected water supply systems;
- Augmentation of groundwater bodies;
- Regulation of surface water abstraction in water bodies with hydraulic interconnection with groundwater bodies;
- Reduction of water losses in water supply systems; and
- Hydrogeological exploration and preparation of new sources.

The supplementary measures addressing groundwater overexploitation include:

- Reconsideration of exploitable groundwater resources in relation to climate change;
- Revision of abstraction permits;

- Obligation of monitoring of level/discharge at sources;
- Recording of abstracted volumes;
- Fines for illegal abstractions;
- Improvement of technologies for groundwater processing;
- Artificial recharge;
- Land-based water retention;
- Rainwater management;
- Training of professionals; and
- Awareness raising.

A number of basic measures were implemented to prevent inputs of hazardous substances into groundwater, such as, legislative acts setting the rules of handling with and monitoring of hazardous substances; preparation of risk analyses of contaminated sites; remediation of old contaminated sites; preparation of monitoring programmes; and revision of emission permits.

Supplementary measures were also applied such as the preparation of an action plan for sustainable use of pesticides, monitoring programme for pesticides in groundwater, implementation of economic and fiscal tools (polluter pays principle) and ecological awareness raising.

In general, measures are taken in groundwater bodies not achieving good status. No reference was provided in the RBMP on international co-ordination of measures related to GW bodies.

The RBMP does not provide any information that requirements stemming from groundwater dependent terrestrial ecosystems have been taken into account in the definition of required measures.

The programme of measures for achieving environmental objectives concerning groundwater quality and quantity provides information about the various technical details of planned basic and supplementary measures, but provides no overview of the detailed implementation time plan and of the effectiveness of the proposed measures.

12.5 Measures related to chemical pollution

There is an inventory of sources of pollution which covers priority substances, non-priority specific pollutants or main pollutants identified by Slovakia at the river basin level, and nutrients. Total N and total P emissions and a list of relevant priority substances and national river basin specific pollutants are provided for key sources and for all sub-basins. The relevant national river basin specific pollutants include aniline, benzothiazole, PCBs, MCPA, 4-methyl-2,6-di-tert-butylphenol, bisphenol-A, dibutylphthalate, diphenylamine, phenanthrene, zinc, arsenic, chromium, copper, cyanides, toluene and xylenes. The RBMP identifies industrial emissions (including wastewater from mining industry), emissions from households

through public sewers, atmospheric deposition and emissions of pesticides from agriculture as significant sources of chemical pollution. The inventories are based on reporting to the European Pollutant Release and Transfer Register (EPRTTR) according to Regulation EC No. 166/2006.

Revision of permits/authorisations and construction of wastewater treatment plants are among the key measures to be taken to tackle chemical pollution. No information is provided in the RBMP on substance specific measures.

Reduction of pollution by priority substances and the phasing out or cessation of emissions, discharges and losses of priority hazardous substances will be accomplished by issuing permits for waste water discharges into surface waters pursuant to Section 21 (2) (d) of the Slovak Water Act and in accordance with point 3 of Part A of the Annex to Government Regulation No. 279/2011. In the permit, the state water management authority shall also specify measures and the timeframe of implementation to achieve environmental objectives, taking account of the availability, effectiveness and complexity of the technical solution according to an industry branch. If a detected spill of dangerous substances into water endangers the water body, corrective measures must be taken by the subject responsible for handling these substances, *i.e.* the polluter.

The application of the gradual phasing out of the emissions, discharges and losses of priority hazardous substances is based on the Section 17 (4) of the Slovak Water Act which states that *"For discharge of waste water from an industrial source the priority substances contained in it must be progressively reduced and priority hazardous substances progressively limited with the aim of phasing out or ceasing their emissions, discharges and leakages."*

The national approach to the implementation of measures related to chemical pollution follows the provisions of WFD Art. 11 (3) (g,h,k,l), information has not been provided on the effectiveness of the planned measures as well as on the links to the chemical and ecological status of surface waters. It is assumed that by 2015 assuming discharges of chemical substances from waste water will be fully compliant with the provisions of EU legislation and best available technologies will be applied by all significant industrial polluters.

12.6 Measures related to Article 9 (water pricing policies)

Article 9 of the WFD includes the concepts of incentive pricing, cost recovery (including environmental and resource costs) and the polluter-pays principle. In addition, it also introduces the concepts of water 'services' and water 'uses'.

The following activities were identified in Slovakia as water uses for Article 9 purposes: drinking water production and supply, wastewater collection and treatment, hydropower and water abstraction. The RBMP identified the following water services: abstraction, agriculture (water abstraction and water supply), industry (water abstraction, water supply, wastewater treatment), households (wastewater treatment, water supply), hydropower (water abstraction, use of hydro energetic potential), cooling water use, impoundment, storage and distribution of surface water or ground water, wastewater collection and treatment for households, treatment and distribution of surface water or groundwater.

There is an incentive pricing policy in place in Slovakia that takes into account the polluter-pays principle. This is based on payments for drinking water supply, waste water collection for households, surface and groundwater abstraction and waste discharges into surface waters. Resources gathered from the payments are used i.a. for financing of measures needed for achieving WFD environmental objectives. The revision of water pricing policy is foreseen in order to adjust the water pricing policy in such a way that it would provide better incentives for sustainable and effective use of water resources.

The cost recovery principle has been applied in Slovakia, but only a general explanation is provided in the RBMP: that an adequate contribution to cost recovery is ensured through specific policies, instruments and legislation in place. The adequate contribution of the different water uses to the recovery of the costs is based on the polluter-pays principle, e.g., payments for wastewater discharges are based on such principle. Further analysis of this adequateness principle is foreseen in the next RBM cycles.

The economic analysis conducted according to Article 5 (Annex III), which was undertaken in 2004, did not address all issues sufficiently and it was updated for the RBMP. However, no further details on this issue were provided in the RBMP.

The structure of the cost recovery rates calculation includes water supply for households, water supply for industry, water supply for agriculture, wastewater collection and treatment for households, wastewater collection and treatment for industry, hydroenergetic potential, surface water abstraction and abstraction of water for energy production. Cost recovery levels are calculated covering the whole RBD/Member State. The calculation of recovery levels includes capital costs, operating costs, maintenance costs and administrative costs. Financial cost data was collected at river basin level.

The assessment of subsidies, particularly cross-subsidies, was done for the whole RBD/Member State. Cross-subsidies are no longer in use— the unified rates for drinking water supply and wastewater treatment were set in 2007 for all users/sectors. The only subsidies were those received from the EU. Environmental and resource costs have not been estimated due to missing methodology.

The recovery levels calculation was based on drinking water supply, wastewater treatment technical costs (material), water abstraction costs (or wastewater discharge costs), energy costs, repair costs, other services, personal costs, taxes, other operating costs and depreciation.

WFD Article 9.4 states that Member States shall not be in breach of the WFD if they decide, in accordance with established practices, not to apply the provisions of paragraph 1 (second sentence) and for that purpose the relevant provisions of paragraph 2, for a given water-use activity, where this does not compromise the purposes and the achievement of the objectives of the WFD. Slovakia did not fully apply Article 9 requirements (as provided for in Art. 9(4)) because the detailed economic analysis had not been completed (this analysis was planned for 2010, *i.e.*, after publishing of the RBMP), and because the current practices (e.g., no charges for irrigation) do not compromise the achievement of the WFD objectives.

In general, the adequate contribution to cost-recovery is stated in the Slovak RBMP, but it is not explained, there is no detailed economic analysis and calculation, and, in practice, an

adequate contribution of agriculture sector to cost recovery is questionable as irrigation is free of charge. The environmental and resource costs are not considered due to lack of data and an appropriate methodology. All these issues are planned to be addressed in more details in the next RBMP update.

12.7 Additional measures in protected areas

The RBMP chapter on costs of programme of measures lists the measures and their costs related to Birds Directive (79/409/EEC), Habitats Directive (92/43/EEC), Bathing Water Directive (2006/7/EC and 76/160/EEC) and Drinking Water Directive (80/778/EEC, as amended by Directive 98/83/EC).

The water bodies in Slovakia do not need additional measures to reach the more stringent objectives relating to protected areas. It was reported that only all basic and complementary measures will have a positive effect also on protected areas (NATURA 2000 and bathing water) in the reduction of pollution pressures and hydromorphological pressures.

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

13.1 Water Scarcity and Droughts

Water scarcity and droughts were not considered as relevant in the two Slovak RBDs. No major decreasing trend of minimum flows was reported.

Hydrological assessment was based on:

- Daily discharges;
- Minimum discharges for different time periods (years, seasons, months, etc.);
- N-years minimum discharges;
- 7-days Q100;
- Non-discharge characteristics (duration of low discharge periods).

To develop future prognoses for water availability, trends were assessed for daily and monthly average flows as well as for monthly minimum flows at stations which are in operation since 1971 and earlier. Based on these analyses the trend levels were determined and applied for the Slovak rivers. The most decreasing trend was observed for the Ipel, Morava and Slana river basins and for selected tributaries of the Hron.

No data on future water demand trend scenarios were provided, Water scarcity and droughts were not considered as significant water management issue and no exact future prognoses were provided.

Even though water scarcity and droughts is not considered to be a significant water management issue in Slovakia, it has been addressed in the international RBMP for the Danube RBD as a future challenge in relation to the impact of a climate change. Reference to this issue was also made in the international Tisza RBMP (sub-basin of the DRB District shared by RO, HU, UA, SK and RS), which was under preparation at the time of completing the Slovak RBMP.

13.2 Flood Risk Management

Flood risk management issues are addressed in the RBMP in a separate chapter reviewing the key provisions of the EU Floods Directive (carrying out the preliminary flood risk assessment and designation of areas of potential significant flood risk, preparation of flood hazard maps and flood risk maps and development of flood risk management plans) and also plans for preparation of flood risk management plans in the Danube and Vistula RBDs including aspects of international coordination. Future coordination of river basin management with the implementation of the Floods Directive is clearly mentioned in the RBMP.

13.3 Adaptation to Climate Change

The issue of climate change was addressed in the first RBMP in a separate chapter on climate change.

The issues referred to in relation to adaptation to climate change were as follows:

- Climate change impacts specific monitoring;
- Analysis of variability and changes of selected hydrological and climatic elements;
- Impacts on agricultural production;
- Impacts on forest ecosystems;
- Proposal of adaptation measures in water management.

A supplementary measure was applied to reconsider exploitable groundwater in the context of climate change in connection to groundwater quantity. A climate check of the Programme of Measures has not been carried out.

It is not described how climate change will be further integrated in subsequent planning cycles. No information is provided on the potential establishment of a national climate change adaptation strategy. A National Climate Change Programme has been in place since 1993, managed by the Ministry of Environment.

14. RECOMMENDATIONS

Following the steps of river basin planning as set out in the WFD should ensure that water management is based on a better understanding of the main risks and pressures in a river

basin and as a result, interventions are cost effective and ensure the long term sustainable supply of water for people, business and nature.

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

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

- There is one plan for two RBDs and the plan does not always provide a clear guide as to whether an issue/problem is relevant for both or only for one RBD. It was often difficult to identify RBD-specific information. Future RBMPs need to be more transparent in this respect, and it is recommended that Slovakia develops one RBMP per national part of the RBD on its territory.
- More information needs to be included in the plan on the involvement of interested parties and consultation, since it is not clear from the RBMP which stakeholders were involved, and what impact the consultation had on the content of the RBMP.
- Where there are currently high uncertainties in the characterisation of the RBDs, identification of pressures, and in the assessment of status, these need to be addressed in the current cycle, to ensure that adequate measures can be put in place before the next cycle. Regarding characterisation, for instance, reference conditions should be established for all BQEs.
- The RBMPs need to provide more information on the links between pressures and status, and the respective measures for surface waters.
- There are a number of gaps in the monitoring programmes which need to be addressed. There is no adequate fish monitoring in rivers, only phytoplankton is monitored in lakes, there is no monitoring of priority substances in sediments and biota, and not all priority substances were monitored in all water bodies. These gaps in the monitoring design resulted in an incomplete status assessment of surface water bodies, which has to be improved. In particular, mercury, hexachlorobenzene and hexachlorobutadiene should be monitored in biota for comparison with the biota standards in the EQSD, unless water EQS providing an equivalent level of protection are derived, and trend monitoring in sediment or biota for at least the substances specified in EQSD Article 3(3) will also need to be reflected in the next RBMP.
- The ecological status assessment in rivers lacks the assessment of fish, and for lakes it is only based on phytoplankton. The ecological status assessment does not include hydromorphological quality elements. No assessment system for lakes has been intercalibrated. Most of the BQEs have not been intercalibrated, and have thus not been used in the classification. All these shortcomings need to be addressed.

- More information needs to be included in the RBMPs on priority substances, such as a detailed description of which priority substances are monitored in which water bodies and, when substances are not assessed, a clear explanation of the reasons, in order to fully assess the chemical status.
- The designation of HMWBs should comply with all the requirements of Article 4(3). The assessment of significant adverse effects on their use or the environment and the lack of significantly better environmental options should be specifically mentioned in the RBMPs. This is needed to ensure transparency of the designation process.
- The methodology for defining GEP in Slovakia is incomplete because the assessment methods for the biological quality elements are not yet fully developed. More work needs to be done fulfilling the requirements of WFD Art. 4.1.(a)(iii), collecting the missing data, and updating evaluation systems and classification.
- A methodology for trend analysis in groundwater assessment should be in place, even if it was not possible to carry out such an analysis during the first RBMP cycle. This needs to be in place for the second cycle.
- A large number of exemptions have been applied in this first cycle of RBMPs. While the WFD provides for exemptions, specific criteria must be fulfilled for their use to be justified. The application of exemptions needs to be more transparent and the reasons for the exemptions should be clearly justified in the plans. The high number of exemptions applied in these first RBMPs is a cause for concern. The Slovakia should take all necessary measures to bring down the number of exemptions for the next cycle, including the needed improvements in the characterisation process, monitoring networks and status assessment methods, as well as reducing significantly the degree of uncertainty.
- It is unclear whether there are new physical modifications planned in RBMPs. If this is the case, the use of exemptions under Article 4(7) should be based on a thorough assessment of all the steps as requested by the WFD, in particular an assessment of whether the project is of overriding public interest and whether the benefits to society outweigh the environmental degradation, and regarding the absence of alternatives that would be a better environmental option. Furthermore, these projects may only be carried out when all possible measures are taken to mitigate the adverse impact on the status of the water. All conditions for the application of Article 4(7) in individual projects must be included and justified in the RBMPs as early in the project planning as possible.
- Only little improvement of the water status is expected by 2015 and the objectives for subsequent planning deadlines are not always clear. Objectives should be clearly indicated and transparent in order to be able to reach good status of waters in a reasonable timeframe.
- It is not clear if the measures proposed in the Plan have been based on the assessment of the status of surface water bodies. This means that the programme of measures for surface waters may be based on the risk analysis rather than on monitoring data or status assessment, this is a shortcoming to be addressed. Meaningful information regarding the scope, the timing and the funding of the measures should be included in the PoM so that the approach to achieve the objectives is clear. All the relevant information on basic and

supplementary measures should be included in the summary of the PoM to ensure transparency of the planned actions for the achievement of the environmental objectives set out in the WFD.

- Agriculture is indicated as exerting a significant pressure on the water resources in Slovakia. This should be translated into a clear strategy that defines the basic/mandatory measures that all farmers should adhere to and the additional supplementary measures that can be financed. This should be developed with the farming community to ensure technical feasibility and acceptance. There needs to be a very clear baseline so that any farmer knows the rules this can be adequately advised and enforced and so that the authorities in charge of the CAP funds can adequately set up Rural Development programmes and cross compliance water requirements.
- The cost-recovery should address a broad range of water services, including impoundments, abstraction, storage, treatment and distribution of surface waters, and collection, treatment and discharge of waste water, also when they are "self-services", for instance self-abstraction for agriculture. The cost recovery should be transparently presented for all relevant user sectors, and environment and resource costs should be included in the costs recovered. Information should also be provided on the incentive function of water pricing for all water services, with the aim of ensuring an efficient use of water. Information on how the polluter pays principle has been taken into account should be provided in the RBMPs.