Ministry of Environment
of the Slovak Republic

STATE OF THE ENVIRONMENT REPORT SLOVAK REPUBLIC 2010

Slovak Environmental Agency

• WATER

Key questions and key findings

♦ Key questions

- What is the situation and trend in the use of water in terms of preserving the water sources?
- Has there been a reduction to the pressure on the surface water quality expressed by the volume of pollution discharged into surface water?
- What is the quality of water in Slovakia?
- What is the trend in connectedness of the public to public water supplies and sewerage systems?

♦ Key findings

- In 2010, there was an increase in surface water abstraction by almost 60%, compared to the previous year. Significant increase was detected in the category of industry. In terms of comparing the long-term trends (2000 - 2010), decreasing trend was recorded until 2007, which was followed by a period of increase in 2008, decrease in 2009, and another increase in 2010. Abstractions in 2010 represented approximately 60% of all abstractions in 2000.
- Ground water abstractions in 2010 dropped by 2.04%, compared to 2009. This points to a continuing long-term trend in ground water use. Ground water abstractions in 2010 represented a reduction in yearly abstracted volumes by 24%, compared to the abstractions in 2000.
- In 2010, 20% more waste water was discharged into surface water than in 2009. From the perspective of long-term trend we can see a reduction in waste water in 2010 by 40% compared to 2000 with a significant change in the proportion of treated to untreated waste water discharged into watercourses with a significant reduction in waste water contamination.
- Surface water quality at all monitoring sites complied with the limits for selected general indicators and the radioactivity indicators. Exceeded limit values were recorded mainly for synthetic and non-synthetic substances, hydrobiological and microbiological indicators, and nitrite nitrogen.
- Condition of surface water formations was classified as adverse and critically adverse in 3.4% of water formations, reaching the length of 1 179.95 km. 86 water formations (5%) do not show favourable chemical balance.
- Monitoring for ground water chemical balance in 2010 was carried out within the framework of basic monitoring (175 objects) and operational monitoring (211 objects). Both types of monitoring showed exceeded values for set contamination limits.
- Drinking water quality has long been of the high level. In 2010, the share of favourable drinking water analyses for compliance to limit values reached 99.39%.
- Altogether, of 38 swimming areas, 94.4% (34 swimming recreational areas) which complied with the bathing water quality criteria. This represents an increment of 3%, compared to the previous year. 15 bathing sites complied with the recommended limit values, which is 41.7% and represent a reduction by 46.5%. In 2010, Delňa was the only water formation classified in the system of European monitoring that was assessed as a site that does not comply with the criteria of the Directive on recreational water. This was due to a high concentration of Escherichia coli. Bathing prohibition was issued for one recreational site, Zemplínska Šírava - Hôrka, due to exceeded values for the following indicators: intestinal enterococci, E.coli, and coliform bacteria.
- Number of inhabitants connected to drinking water from public water supplies reached 86%. This value does not reach the values shown by the neighbouring countries.
- Number of inhabitants connected to public sewerage systems reached 60.4%. This level is comparable to Hungary, Poland; however, it is significantly lower than that of the Czech Republic and Austria.

Surface water

♦ Water balance

Significant part of the Slovak surface water fund flows in from the neighboring states and the usability of this fund is limited. In total, the long-term in-flow average is approximately 2.514 $m^3.s^{-1}$ of water, which is about 86% of our total surface water fund. In the long run, there is approximately 398 $m^3.s^{-1}$ of water springing in Slovakia, which represents 14% of the water fund.

Annual inflow to Slovakia in 2010 was 71 810 mil.m^3, which was abreast of the previous year 2009. **Runoff** from the territory has grown by 12 978 mil.m^3, compared to the previous year.

Total water volume as of 1.1.2010, in water reservoirs was 931 mil.m^3, which represented 80% of total usable water volume in water reservoirs. As of 1.1.2011, total available volume of the assessed accumulation tanks compared to the previous year 2010 incerased to 1 003.3 mil.m^3, which represents 86% of total exploitable water.

Total hydrological balance of water resources in the SR

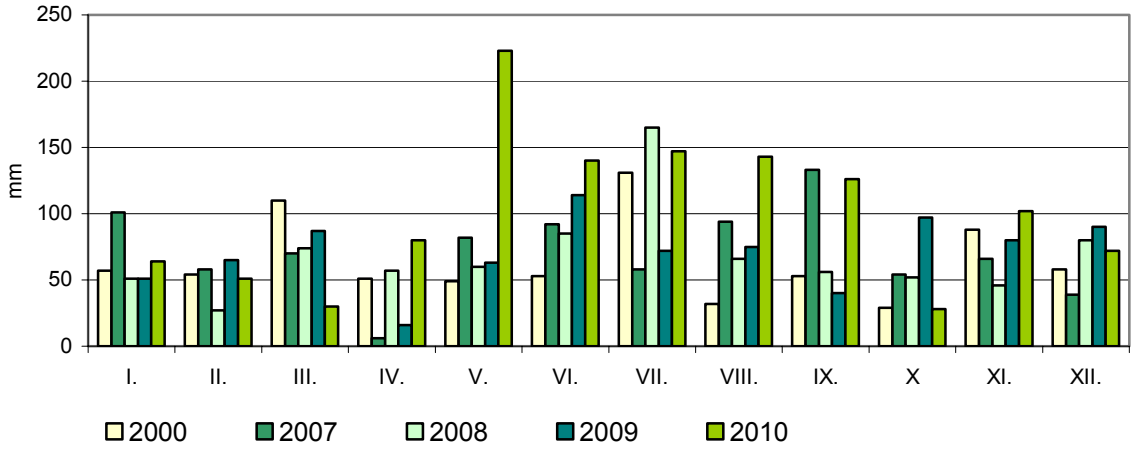
	Volume (mil. m^3)		
	2008	**2009**	**2010**
Hydrological balance			
Rainfall	40 049	41 715	59 117
Annual inflow to the SR	69 005	71 767	71 810
Annual runoff	73 387	85 546	98 524
Annual runoff from the territory of the SR	10 146	10 382	22 939
Water management balance			
Total abstraction of the surface and ground water in the SR	664.6	627.81	602.27
Evaporation from water reservoirs and dams	51.9	61.68	48.08
Discharge into surface waters	608.9	605.27	698.49
Impact of water reservoirs (WR)	12.6	123.27	72.00
	accumulation	**accumulation**	**accumulation**
Total volume in WR as of 1st January of the following year	809.4	931.1	1 003.3
% of supply volume in accumulation WR in the SR	70	80.30	86.0
Rate of water exploitation (%)	6.55	5.80	2.63

Source: SHMI

♦ Precipitation and runoff conditions

Total **atmospheric precipitations** in the Slovak territory in 2010 reached the value of 1 206 mm, which represents 158% of the normal level. In terms of precipitations, this year had been considered exceptionally humid. Total excess of precipitations reached the value of 444 mm.

Average monthly precipitation in the area of the SR in 2000 and 2007- 2010



Source: SHMI

In 2010, based on the rainfall indicators, all Slovakian watersheds were exceptionally humid when expressed in % (144 to 185% of the corresponding normal values). The lowest volume of precipitations expressed in % was shown for the Morava region. (144% of the corresponding normal values, which is 983 mm).

Average rates of precipitation and runoff in particular catchment areas

Catchment area	Dunaj		Váh		Hron			Bodrog a Hornád				SR
Subcatchment area	*Morava	*Dunaj	Váh	Nitra	Hron	*Ipeľ	Slaná	Bodva	Hornád	*Bodrog	*Poprad a Dunajec	
Catchment area extent (km^2)	2 282	1 138	14 268	4 501	5 465	3 649	3 217	858	4 414	7 272	1 950	49 014
Average precipitation (mm)	983	954	1 243	1 081	1 294	1 183	1 285	1 253	1 153	1242	1 371	1 206
% of normal	144	152	147	156	164	173	163	185	164	170	163	158
Character of rainfall period	MV	MV	MV	MV	MV	MV	MV	MV	MV	MV	MV	MV
Annual runoff (mm)	220	48	510	279	554	383	520	544	472	494	630	468
% of normal	167	133	161	195	192	282	275	259	159	301	183	179

* watercourses and corresponding data only for the Slovak part of the watershed Source: SHMI
Characteristics of the precipitation season: N - normal, S - dry, SS - very dry, V – humid, VV – very humid, MV – exceptionally humid

Average annual run-off from the Slovak territory was 468 mm, which is 179% of the long-term normal value. In individual partial watersheds, the run-off values fluctuated between 48 mm (partial Danube watershed) and 630 mm (watersheds of Poprad and Dunajec). The lowest percentage of normal values was recorded for the Danube watershed (1.33%), the highest percentage of normal values was shown for the Bodrog watershed (301%).

♦ Surface water abstraction

In 2010, surface water abstractions increased to 446.7 mil.m^3, which is 59.6% more than in the previous year. Abstractions for industry in 2010 were at 392.7 mil. m^3, which was a significant growth by 176.3 mil.m^3, i.e. 81.5%, compared to 2009. A slight reduction was recorded also in surface water

abstractions for waterlines, which, compared to the previous year, dropped by 2.8 mil.m^3, that is 5.6%. Surface water abstractions for irrigation grew and reached the value of 5.8 mil.m^3.

Surface water exploitation in the SR (mil.m^3)

Year	Public water-supplies	Industry	Irrigation	Other agriculture	Total	Discharging
2000	70.571	575.872	90.540	0.0440	737.027	989.825
2008*	52.057	251.797	9.133	0.0040	312.991	608.997
2009*	51.045	216.397	12.319	0.0020	279.763	605.271
2010*	48.200	392.700	5.800	0.0000	446.700	744.600

* data from database „Aggregate balance sheet of water“ Source: SHMI

♦ Surface water quality

Surface water quality assessment has been carried out on the basis of data obtained during the water level monitoring process. In 2010, surface water quality monitoring in the Slovak Republic was divided by the **MoE SR Resolution 418/2010 Coll. on implementation of selected provisions of the Water Act** into basic monitoring, operational monitoring, and monitoring of protected areas (PA). Quality surface water indicators in 2010 were monitored in compliance with the approved Programme of Water Balance Monitoring for 2010. 277 sites were monitored under the basic and operational monitoring schemes.

The number of monitored surface water sampling sites in 2010

Sub-basin	The number of monitoring sites per type of monitoring		
	Basic	Operational	Basic and Operational
Morava	8	12	8
Dunaj	11	2	4
Váh	19	64	15
Hron	3	26	7
Ipeľ	6	18	2
Slaná	1	8	4
Bodrog	8	14	2
Hornád	3	16	2
Bodva	-	2	3
Dunajec and Poprad	4	4	1
Total	**63**	**166**	**48**

Source: SHMI

Quality indicators monitored at all monitoring sites (basic and operational) in 2010 were assessed pursuant to the **SR government Regulation 269/2010 Coll. which sets forth criteria for achieving a favourable water balance.** General requirements for surface water quality were met at all monitoring sites for the following indicators: **general indicators** (part A) - total organic carbon, dissolved substances (dried as well as annealed), magnesium, sodium, chlorides, free ammonia, organic nitrogen, surface active substances, non-polar extractable substances (UV, IR) phenolic index, chlorobenzene, dichlorbenzenes. Also, **radioactivity indicators** complied with the requirements (part D): bulk volume alpha and beta activity, tritium, stroncium, and caesium.

Surface water quality criteria were exceeded in the **synthetic substances** category (part B) by the indicators for arsenic, cadmium, copper, lead, zinc. In the category of **non-synthetic substances** (part C) the following substances did not comply with the criteria for the annual average: atrazine, di-(2-ethyl hexyl) phtalate (DEHP), fluoranthene, naphtalene, 4-nonylphenol, tetrachloroethylene, trichloromethane, cyanides, and 4-methyl-2 6-di-tert-butylphenol. **Hydrobiological and microbiological indicators** (part E) included the bioseston saprobic index, abundance of phytoplankton, chlorophyll a, coliform bacteria, thermotolerant coliform bacteria, intestinal enterococci. Nitrite nitrogen indicator has often been exceeded in all partial watersheds for the **general indicators** group. Most exceeded criteria in the group of hydrobiological and microbiological indicators included those for intestinal enterococci (in 7 partial watersheds), thermotolerant coliform bacteria (in 9 partial watersheds), and coliform bacteria (in 5 partial watersheds).

♦ Evaluation of status of surface water bodies

Assessment of surface water formations balance is based on the assessment of their ecological condition, i.e. their ecological potential and chemical balance.

Resulting water balance is determined by the worse of the pair of chemical or ecological balance that forms the basis for the subsequent activities relating to the compliance with one of the environmental quality goals under Framework Water Directive (FWD) - to reach a favourable water balance for all water formations by 2015.

In total, 1 760 surface water formations of Slovakia have been assessed.

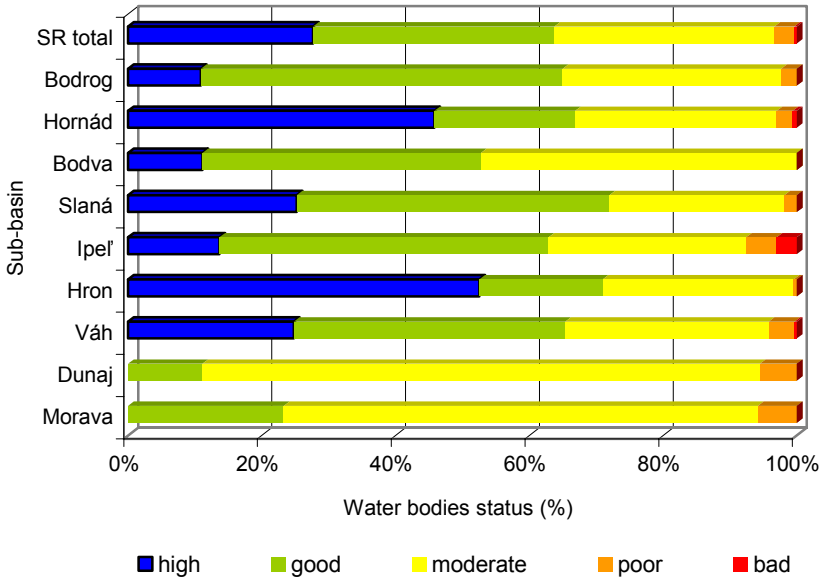
Classification of ecological status/potential of surface water bodies in SR years 2007 – 2008

	Water body status (number)				
	high	**good**	**moderate**	**poor**	**bad**
Danube River Basin District	426	630	563	51	7
Vistula River Basin District	61	5	16	1	0
SR total	**487**	**635**	**579**	**52**	**7**

Source: MoE SR

Of the total number of water formations, very favourable and favourable ecological balance/potential was shown for 63.7% of them. In terms of water formations' length, the number represents 53.9%. (10 265.44 km) A relatively high number of water formations showed average balance/potential, specifically 32.9% of them, which represents the length of 7 600.78 km. Condition of surface water formations was classified as adverse and critically adverse in 3.4% of water formations, reaching the length of 1 179.95 km.

Share of the total number of water bodies classified into the individual ecological status/potential in the river basin of SR



Source: MoE SR

Assessment of water **chemical balance** involved assessing the occurrence of 41 priority substances in surface water formations. Compliance of the outcomes of monitoring with the environmental quality standard (EQS) means compliance with the criteria for favourable chemical balance. Monitoring of priority substances in 2007 and 2008 was implemented in 132 water formations. Scope of the monitored indicators and the frequency of their monitoring differed.

Based on the performed assessment, of total number of 1 760 water formations, 1 674 of them (95.0%) showed a favourable chemical balance, while 86% of them do not.

Evaluation of chemical status of water bodies per river basin district

River basin	Water bodies achieving good chemical status		Water bodies not achieving good chemical status	
	number	length (km)	number	length (km)
Morava	95	822.10	8	197.10
Dunaj	16	318.08	2	56.20
Váh	609	6 324.50	32	777.94
Hron	204	1 828.45	13	261.00
Ipeľ	124	1 517.20	8	103.30
Slaná	106	1 077.50	1	13.00
Bodva	35	309.25	1	35.80
Hornád	158	1 551.65	8	151.35
Bodrog	247	2 498.30	10	301.80
Danube River Basin District	1 594	16 246.95	83	1 897.49
Vistula River Basin District	80	786.85	3	115.10
SR total	**1 674**	**17 033.80**	**86**	**2 012.59**
	95.0%	**89.4%**	**5.0%**	**10.6 %**

Source: MoE SR

Groundwater

♦ Water resources

In 2010, based on the hydro-geological assessment and surveys in the SR, there were **78 672 l.s^{-1} available groundwater resources**. In comparison with the previous year 2009, there was observed a slight increase of the efficient groundwater volume by 115 l.s^{-1}, i.e. by 0.15%. In the long-term evaluation, the increase of the efficient volume in comparison with 1990 makes 3 897 l.s^{-1}, i.e. 5.2%.

On the basis of assessment of water management balance expressed by the balance status (proportion of abstractable volumes/abstractions), which is the indicator that shows the rate of wate sources abstraction, we see that in **2010, out of total number of 141 hydro-geological regions in SR, 126 regions show good balance status, 14 regions show acceptable status and one region show critical status.** Emergency balancing state did not occur in any region.

♦ Groudwater levels

In 2010, compared to 2009, **average annual levels** in Slovakia showed almost consistent elevations in ground water levels. Average annual values for ground water levels grew in most instances up to + 60 cm, occasionally up to +300 cm ,in all watersheds of Slovakia, with the exception of Morava and Danube where the growth was up to +40 cm. Occasional drops of up to -10 cm occurred in the Danube watershed.

Average annual levels in 2010, compared to long-term average annual levels, almost consistently grew up to +110 cm in the whole territory, with more intensive values in the watersheds of the Central and Eastern Slovakia. Occasional reductions of up to -50 cm were recorded in the watersheds of Danube and middle and upper Váh.

♦ Well capacities

Increase, for the most part, of up to 200% in the Slaná watershed, compared to the previous year, was recorded, give the **average annual** spring **yields.** Occasional drops in the average annual yields were recorded in the watersheds of the upper Váh, Turiec, Morava, and Hornád. (from 83% to 97%).

Average annual yields compared to long-term average yields grew almost consistently up to 200% in the watershed of Slaná, and even beyond 300% of the watershed of Bodva. Occasional drops were recorded in the watersheds of Morava, Upper Váh, Orava, Turiec, Nitra, and Poprad (from 71% to 99%).

♦ Groundwater abstraction

In 2010 there was being **extracted 10 820 l.s^{-1} of ground water in average** by the users (which are subjects to reporting obligation) in Slovakia that was 13.8% of the documented efficient volume. During the year 2010 the groundwater extractions slightly decreased by 225.1 l.s^{-1} which means 2.04% in comparison with year 2009.

Groundwater extraction in 2010 according to the purpose of use ($l.s^{-1}$)

Year	Public water supplies	Food-processing industry	Other industr.	Agricult. and Livestock	Vegetable prod. Irrigation	Social purposes	Others	Total
2007	8 441.59	383.87	891.32	267.84	146.25	333.44	901.65	11 365.96
2008	8 468.82	284.98	823.02	253.29	67.52	271.23	953.23	11 122.09
2009	8 475.40	268.13	762.18	232.07	93.80	249.44	963.58	11 044.60
2010	8 295.00	265.00	781.00	217.20	48.70	254.40	967.20	10 819.50

Source: SHMI

♦ Monitoring of groundwater quality

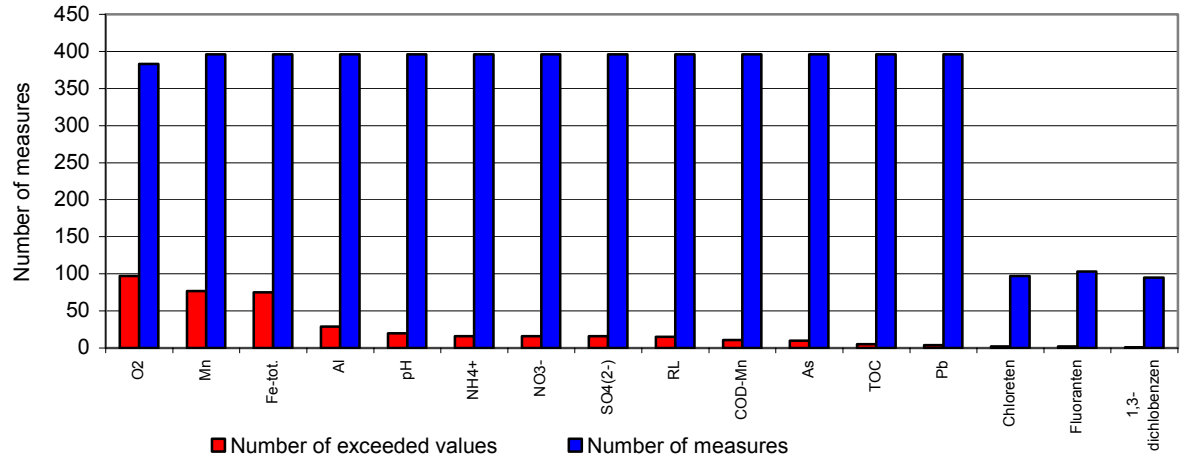
Pursuant to the WFD requirements, the older system of dividing Slovakia into significant water management areas was abandoned. Since 2007, classification has been based on delineation of groundwater formations. Monitoring of ground water chemical situation has been divided into:

- basic monitoring,
- operation monitoring.

In 2010, ground water quality was monitored at 175 basic monitoring facilities. Ground water samples were extracted 2 times from 53 quaternary objects, 1 times in 64 pre-quaternary objects, and 4 times in 56 pre-quaternary karst objects.

Adverse **oxidation-reduction** conditions dominate at ground water **basic monitoring** facilities, apparently caused by most frequent occurrences of exceeded acceptable concentrations of total Fe (75 times), Mn (77 times), and NH_4^+ (16 times). Besides these indicators, there has been an untypical event of exceeded concentrations in the group of **physical - chemical indicators,** specifically in the case of the Cl^-, SO_4^{2-}, and NO_3^- anions, COD_{Mn} and H_2S. Most frequently recorded excessive concentrations in **trace elements** included Al (29 times), As (10 times), Pb (4 times), Sb (8 times), Hg (1 time) and Ni (1 time). Contamination by **specific organic substances** shows only local character and the majority of specific organic substances was recorded below the detection limit. In 2010 was recorded exceeding the limit values in the group of pesticides, follow in group of polyaromatic hydrocarbons, volatile aromatic hydrocarbons and group of volatile aliphatic hydrocarbons.

Occurrence of exceeded indicators at basic monitoring facilities pursuant to the SR Government Directive 496/2010 Coll. in 2010



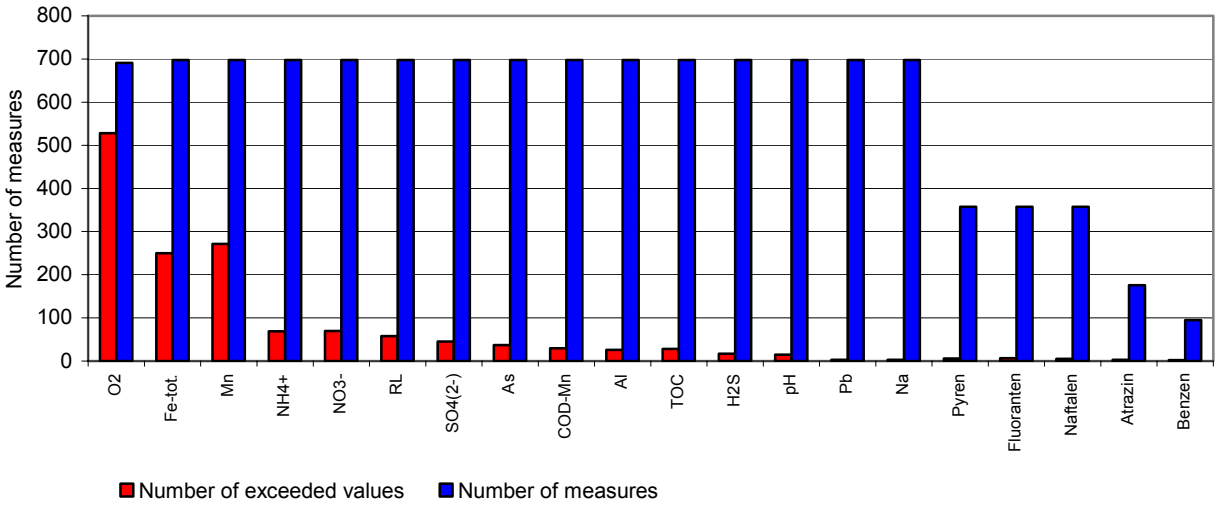
Source: SHMI

Operational monitoring was conducted at all ground water formations that were assessed as high-risk in terms of not being able to reach a favourable chemical balance. In 2010, within the operational monitoring 211 objects were monitored with the assumption to detect a potential penetration of contaminants from a potential contamination source or group into the ground water. The area of Žitný ostrov forms a separate part of the SHMI monitoring network, since it plays an important role within the whole process of water quality changes in Slovakia, and since the area itself represents a reservoir of drinking water for our territory.

Ground water at **operation monitoring** is relatively low in oxygen, with the exception of the Žitný ostrov area. This is also apparent from the fact that the recommended percentage value for oxygen water saturation was reached only in 23.59% of the samples. Most frequently exceeded indicators include Mn and total Fe, which suggests persisting adverse **oxidation-reduction situations.** Exceeded Cl^- and SO_4^{2-} limit values also indicate the impact of anthropogenic pollution on ground water quality. The limits for the following basic parameters were exceeded: soluble substances at 105°C (58 times), H_2S (17 times), Mg (5 times) and Na (3 times). Character of land use (agricultural exploitation) is reflected into increased contents of oxidized and reduced nitrogen forms in ground water, with ammonia ions NH_4^+ (69 times) and NO_3^- (70 times) being the most prevalent. In 2010, the acceptable value set by legislation was exceeded in **6 trace elements** (Al, As, Sb, Cd, Ni, and Pb) at operation monitoring facilities. Most frequently recorded increased contents include Al (26 times) and As (37 times). The impact of anthropogenic activity on groundwater quality is indicated by the increased concentration of COD_{Mn} (30 times). The limit for non.polar substances ui (NEL_{UV}) were exceeded 8 times and for TOC 18 times. The presence of specific organic substances in groundwater is an indicator of the impact of human activity. A wider range of **specific organic substances** was recorded within the operational monitoring.

The most exceeded limit values were recorded in indicators from the pesticides group (phenmedipham, S-metolachlor, desethylatrazine, bentazon, atrazine, metamitron, prometryn, propisochlor, clopyralid) and polyaromatic hydrocarbons (fluoranthene, naphtalene, phenanthrene, chrysene, acenaphtene, b(a,h)anthracene). Exceeded were also the limit values in the group of volatile aromatic hydrocarbons and volatile aliphatic hydrocarbons.

Occurrence of exceeded indicators at operation monitoring facilities pursuant to the SR Government Directive 496/2010 Coll. in 2010



Source: SHMI

♦ The groundwater status assessment

75 water formations have been designated in Slovakia (16 quaternary and 59 pre-quaternary) that were in 2010, with the exception of 2 pre-quaternary formations.

Objects were assessed for each water formation based on compliance to the Slovak Government Resolution no. 496/2010 Coll. which amends Slovak Government Resolution no. 354/2006 Coll. **which sets forth criteria for water for human consumption and its quality assessment.** Objects showing the exceeded threshold value set by legislation by at least one indicator were labelled as unfavourable.

On the basis of assessment of the ground water chemical balance, of the total number of 75 ground water formations:

- 13 ground water formations were declared as those with unfavourable chemical balance - 7 quaternary and 6 pre-quaternary
- 62 ground water formations were declared as those with favourable chemical balance.

Summary of chemical status evaluation in the groundwater bodies in SR

SR water bodies	Chemical status classification				Total area
	good		poor		
	km^2	%	km^2	%	
Quaternary	6 081	57.1	4 565	42.9	10 646
Pre - quaternary	39 446	80.5	9 536	19.5	48 982
SR total	**45 527**	**76.4**	**14 101**	**23.6**	**59 628**

Source: MoE SR

Favourable chemical balance was indicated for 82.7% of groundwater formations, i.e. 76.4% of total size of formations (quaternary and pre-quaternary). Favourable chemical balance was indicated for 17.3% of groundwater formations, i.e. 23.6% of total size of formations (quaternary and pre-quaternary).

Quantitative balance of groundwater formations involves assessing the impact of the documented phenomena on the groundwater formation as such. In Slovakia, this involves assessing the impact of groundwater abstractions. For the purposes of assessment of the quantitative balance of groundwater formations within quaternary sediments and pre-quaternary rocks, outcomes of four assessments have been summarised. 5 groundwater formations in the territory of the Slovak Republic have been classified as having an adverse quantitative balance.

Waste water

In 2010, 744 756 thous.m^3 of **waste water** were discharged into the surface water, which represents a growth by 124 416 thous.m^3 (20.0%) compared to the previous year. When compared with 2000, it is less by 302 925 thous.m^3 (40.1%)

Volumes of organic pollution in the surface water characterised by the oxygen demand parameters: chemical oxygen demand by dichromate (CODcr) and biochemical oxygen demand (BOD) remained at the level of last year. The indicator for insoluble substances (IS) recorded a more significant growth by 1 311 thous.t. per year.

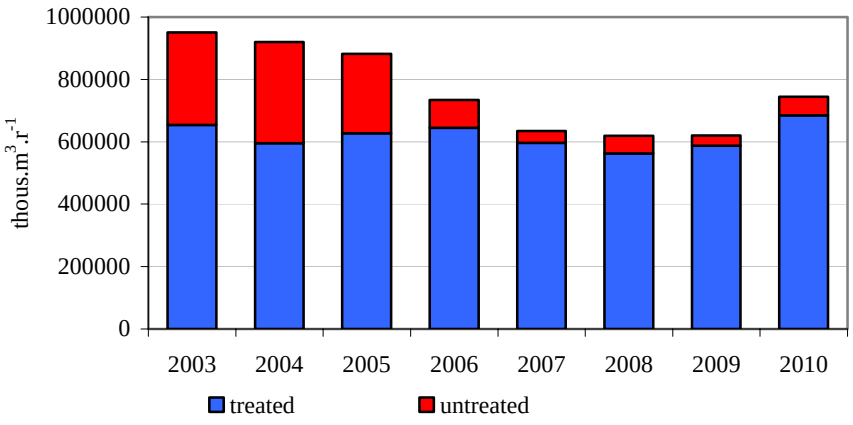
Percentage of discharged treated waste water to **total volumes of waste water** discharged into watercourses in 2010 was 91.94%.

Load of the balanced contamination sources discharged into surface watercourses in the period of years 2000-2010

Discharged waste water	Volume (thous.$m^3.y^{-1}$)	IS ($t.y^{-1}$)	BOD_5 ($t.y^{-1}$)	COD_{Cr} ($t.y^{-1}$)	NES_{uv} ($t.y^{-1}$))
2000	1 047 681	23 825	20 205	61 590	298
2007*	634 419	9 405	6 521	26 913	58
2008*	619 286	8 736	6 641	26 688	31
2009*	620 340	7 707	5 546	25 660	31
2010*	744 756	9 018	5 580	25 750	32

* data from database „Aggregate balance sheet of water“ Source: SHMI

Trend in discharging of the treated and untreated waste waters into watercourses in the period of 2003-2010



Source: SHMI

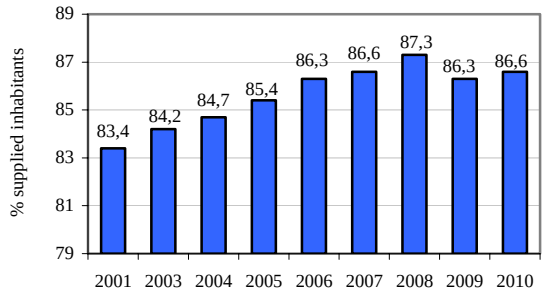
Public water supplies, sewerage lines, and wastewater treatment plants

♦ Public water supplies

Number of inhabitants supplied with drinking water from the public water supply in 2010, reached the number of 4 705 thousand, which represented 86.6% of supplied inhabitants. There were in the SR 2 297 individual municipalities that were supplied with public water supply, and their portion on total SR municipalities was 79.5%.

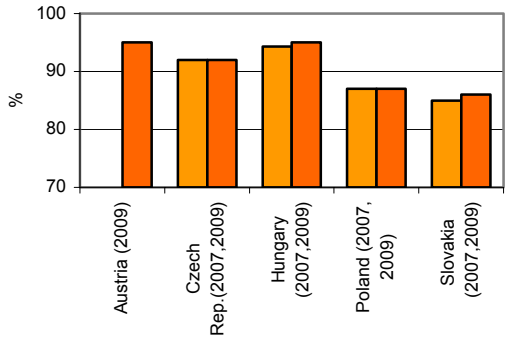
In 2010, major changes were registered in drinking water abstraction. **Volume of produced drinking water** reached the value of 313 mil. m^3 of drinking water, which, compared to 2009, represents a reduction by 1 mil. m^3. Of all groundwater sources, 267 mil.m^3 was produced (increased by 3 mil.m^3), while 46 mil.m^3 of drinking water was produced of all surface water sources (reduction by 4 mil.m^3) Of total water produced at water management facilities, **water losses** by pipe network were 27.6% in 2010. **Specific water consumption by households** decreased to 83.4 l per person per day. This is alarming not only due to the fact that these abstractions are close to the sanitary limits, but mainly because the high drinking water prices motivate the people to build their own drinking water sources whose drinking water quality is, in most cases, far below the sanitary standards.

Drinking water supplying of the inhabitants from the public water supplying in the SR



Source: SO SR, VRI

Comparison of the drinking water supplying of the inhabitants from the public water supplying in selected countries

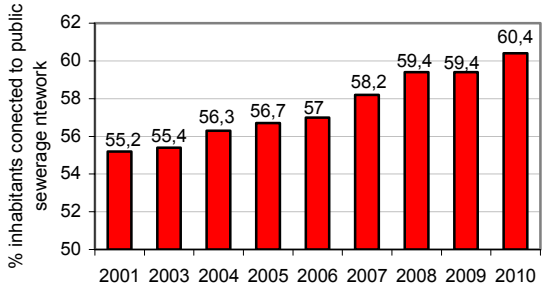


Source:Eurostat, SO SR

♦ Sewerage system

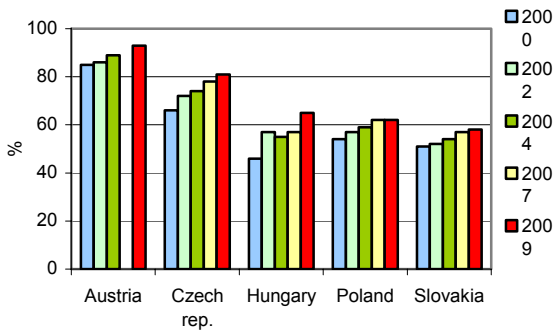
Development of public sewerage systems lags behind that of public water supplies. **Number of inhabitants** living in households **connected to public sewerage systems** in 2010 reached the number of 3 282 thous. inhabitants, which is 60.4% of all inhabitants. Of the number of 2 891 of stand-alone municipalities in 2010, 908 of them had public sewerage systems in place (i.e. 31.4% of all Slovak municipalities).

Connecting of the inhabitants to the public sewerage network in the SR (%)



Source: SO SR, WRI

Comparison of the connecting of the inhabitants to the public sewerage network in the selected countries (%)



Source: Eurostat

♦ Waste water treatment plants

In 2010, 607 waste water treatment plants were in the Administration of water supplies and water sewerage systems (VaK) scheme, of which greatest share had mechanical-biological WWTPs (93.5%). WWTP's capacity was reaching the value of 2 196.9 $m^3.day^{-1}$ in 2010.

In 2010, watercourses with public sewerage system (administered by municipalities and water management companies) received 507 mil.m^3 of discharged waste water, which was by 80 mil.m^3 more than in the previous year, and the volume of treated waste water discharged into the public sewerage system reached 497 mil.m^3.

Volume of the discharged wastewater by the public sewerage system (in administration of VaK and in administration of the municipalities) in 2010

Water discharged by the public sewerage and WWTP	Sewage	Industrial and other	Precipitation	Separate	Administration of the municipalities	Total
	(thous.$m^3.year^{-1}$)					
Treated	113 762	92 514	61 125	229 638	0	497 039
Untreated	3 084	776	1 946	4 217	0	10 023
Total	116 846	93 290	63 071	233 855	0	507 062

Source: WRI

Sludge from WWTPs is a necessary by-product of the waste water treatment process. Sludge volumes produced in Slovakia at WWTPs operated by regions or water management companies remained virtually unchanged, with fluctuations within 53 - 58 thous. tonnes of sludge dry matter.

Sludge produced in the waste water treatment plant

Year	Amount of the sludge (tons of dry residue)							
	Total	Used			Disposed			
		Applied into the agricultural soil	Applied into the forest soil	Composted and used in other way	Incine-rated	Land filled		In other way
						Total	Suitable for the further use	
2006	54 780	0	0	39 405	0	9 245	8 905	6 130
2007	55 305	0	0	42 315	0	3 590	583	9 400
2008	57 810	0	0	38 368	0	8 676	0	10 766
2009	58 582	0	0	47 056	0	2 696	0	8 830
2010	54 760	923	0	35 289	0	16	0	6 681

Source: WRI

Drinking water

♦ Drinking water quality monitoring and assessment

Drinking water indicators are defined under the **SR Government Regulation 354/2006 Coll.,** which stipulates requirements on water designated for human consumption and its quality control. Water quality control for radioactivity follows the **Resolution of the Ministry of Health no. 528/2007 Coll.** which stipulates details on requirements to limit the level of irradiation from natural radiation.

Besides the **complete water analysis**, the implemented **minimum analyses** - e.g. analyses of 28 water quality indicators, is carried out to monitor and obtain periodic information on the stability of water bodies and effectiveness of water treatment, mainly water desinfection, biological quality and the sensoric properties of drinking water.

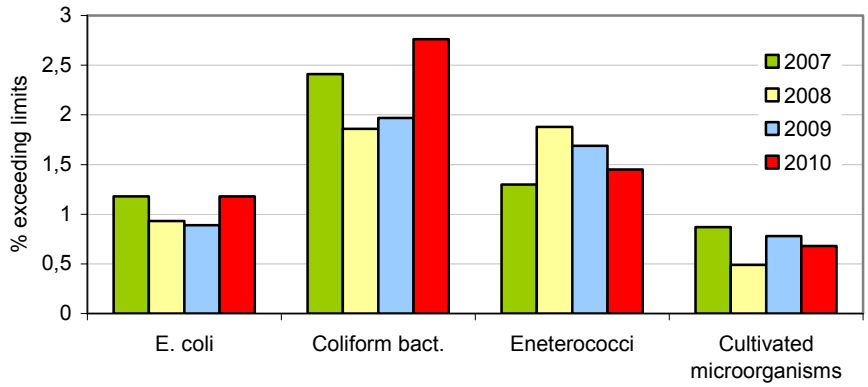
In 2010, were analysed at operation laboratories of water management companies 8 542 samples. The samples were abstracted at sites located within distribution networks and 246 263 analyses were carried out to monitor individual drinking water quality indicators. Share of drinking water analyses that complied with the sanitary limits in 2010 reached 99.39% (in 2009 it was 99.46%). Percentage of samples that meet drinking water quality demands for all indicators reached 90.51% (in 2009 it was 91.20%). These samples did not include the active chlorine indicator, as this test was done separately, in relation to the microbiological quality of drinking water.

Exceeding limits in drinking water samples in accordance with the SR Government Resolution no. 354/2006 Coll. on demands on drinking water and drinking water control

	2008	2009	2010
Share of drinking water samples that do not meet the NMH and MHRR limit.	2.34%	1.77%	2.03%
Share of drinking water quality indicators analyses that do not meet NMH and MHRR	1.02%	0.88%	0.87%
NMH - maximum threshold values, MHRR – threshold values of the reference risk			

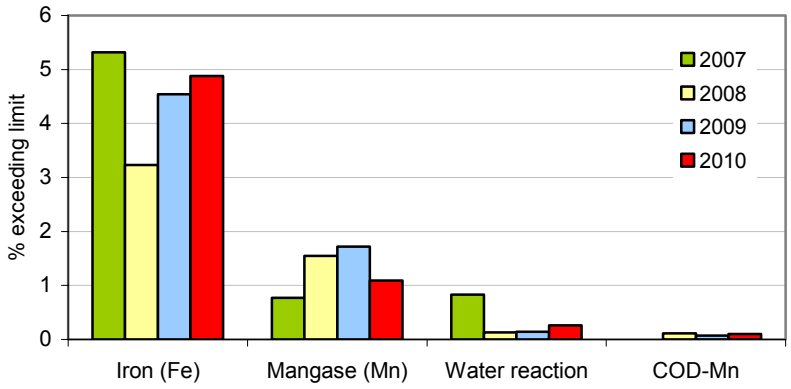
Source: WRI

Results of monitoring the microbiological and biological indicators of drinking water within Slovakia's distribution networks



Source: WRI

Results of physical and chemical drinking water indicators monitoring within Slovakia's distribution networks - indicators that cannot adversely affect drinking water sensorial quality



Source: WRI

Bathing water

♦ Bathing water quality

Through **Act no. 355/2007 Coll. on protection, support and promotion of public health and amendments to other laws as amended by Act no. 140/2008 Coll., as well as through the Slovak Government Regulation no. 87/2008 Coll. on requirements on natural recreational water formations**, the Slovak Republic designated a responsibility for carrying out monitoring of water formations appropriate for bathing for the National and Regional Public Health Authority of the Slovak Republic and for site operators, in line with the appropriate frequency and methods set forth by Directive 2006/7/EC concerning the management of recreational water quality.

The assessment included 77 natural sites - gravel pits, sand pits, and enclosed water tanks used for a number of purposes, including recreation. Of this, recreational activities are organised at 18 sites and

their operation was licensed by the Regional Public Health Authority. Some sites host so-called partially organised recreational activities, i.e. only the surrounding beaches were operated excluding the water surface, or the municipality and the operators of facilities on the surrounding beaches co-administered the water surface. At other sites there were unorganised recreational activities, which monitoring by the Regional Public Health Authority was carried out in relation to the number of visitors and the actual situation. In 2010, 36 monitored natural sites in Slovakia were declared by generally binding resolutions issued by Regional Environmental Offices as those with water suitable for bathing. Frequency in water quality monitoring was roughly every other week and depended on the site's significance.

Over the season, 531 water samples were extracted and 6 883 tests were done on chemical, physical, microbiological, and biological water quality indicators. Limit value (LV) for set indicators was exceeded for 241 samples and in 373 indicators, which is 45.39% of total number of samples. (increased by app. 7%, compared to the previous year). When assessed by indicators, proportion of non-compliant indicators is only 4.81%, since with almost each non-compliant sample only one water quality indicator was exceeded. A number of water surfaces showed physical and chemical indicators that were impacted by weather conditions. These represented 80.4% of total number of non-compliant indicators. Most frequently occurring physical and chemical indicators included: transparency, colour, total phosphorus, water reaction, phenols, and less frequently total nitrogen and water oxygen saturation. The greatest number of non-compliant microbiological indicators included intestinal enterococci, less E. coli, and occasional coliform bacteria. Notwithstanding the occasionally exceeded limit values for microbiological and biological indicators, over this year's recreation season no diseases or health complications have been detected that would relate to bathing at a natural bathing water surface.