

MINISTRY OF ENVIRONMENT OF THE SLOVAK REPUBLIC

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**Water Management
in the Slovak Republic in 2012**

Bratislava 2013

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1 The Role of Water Management

Water management (WM) in the Slovak Republic is a complex of legislative, organizational, technical, ecological and economical activities and measures related to systematic water resources protection of the country.

The role of water management is meaningful, economical and sustainable water utilization; universal water protection including water and water dependent ecosystems; maintaining or improving water status; river basin management; improving the quality of environment and its components; flood protection or minimizing the impact of floods on the country and human society using available technical and technological means and measures; mitigation of unfavourable impacts of drought and maintaining the functions of water courses and water structures.

Management and protection of water are more and more important mainly because the availability of water sources becomes one of global world problems.

These facts are also mentioned in the Declaration of the Slovak Government for the years 2012 – 2016 where the Slovak Republic Government declares that the increased attention will be paid to the protection and improvement of water status, optimization of water use and protection against their harmful effects, including flood protection measures.

2 Water Legislation

2.1 Legislative Process

In 2012 the following procedural regulation was prepared and approved to the Act no. 364/2004 Coll. on Water and on the Amendment of the Act of the Slovak National Council no. 372/1990 Coll. on Offences as Amended (Water Act) as Amended:

- Regulation of the Slovak Government 398/2012 Coll. amending the Regulation of the Slovak Government 269/2010 Coll. determining the requirements for reaching good water status.

Water Act was also amended as follows:

- In the Article II of the Act no. 306/2012 Coll. amending the Act no. 355/2007 Coll. on protection, support and development of public health as amended and on amendment of the Act no. 364/2004 Coll. on Water and on the Amendment of the Act of the Slovak National Council no. 372/1990 Coll. on Offences as Amended (Water Act) as Amended

2.2 Standardization

The WRI Department of Programmes and Conceptions and SHMI Hydrological Standardization Centre carry out activities in the field of technical standardization for water management sector and cooperate with international and European standardization organizations.

The list of the Slovak Technical Standards is available on the WRI website (<http://www.vuvh.sk/>).

The Slovak Institute for Technical Standardization is a member of the international and European standardization structures on behalf of the Slovak Republic. The institute charged the WRI Bratislava with assuring international

cooperation in international ISO/TC 113, ISO/TC 147, ISO/TC 224) and European (CEN/TC 164, CEN/TC 230, EN/TC 308) standardization committees.

The representative of the SHMI Hydrological Standardization Centre is a coordinator of international cooperation through the participation in the European standardization committee CEN/TC 318 on Hydrometry.

3 Implementation of the Water Framework Directive

3.1 WFD Implementation Strategy

The WFD implementation process ran in compliance with the work and time schedule of activities aimed at the development of river basin management plans.

In 2012 for the purpose of the WFD implementation process, the activities aimed at the finalization of works within the 1st planning period and activities related to the WFD implementation within the 2nd planning period continued in the following spheres:

- assessment of the progress reached in the introduction of the programme of measures in the Water Plan of Slovakia and the Regulation of the Slovak Government no. 279/2011 Coll. declaring the obligatory part of the Water Plan of Slovakia containing the programme of measures for taking the environmental goals into practice,
- proposal of the work and time schedule of the second cycle of preparing the river basin management plans including the communication plan
- water monitoring,
- updating the assessment systems/classification schemes for the assessment of the status/potential of surface water (for selected types of water courses, for selected biological elements of quality, heavily modified and artificial water bodies),
- assessment of surface water quality, status, potential and quantity
- assessment of groundwater quality, quantity and chemical status,
- updating the selected characteristics of river basin districts (biological validation of typology water bodies, register of protected areas),
- water management balance,
- preparation of documents and data processing for the need of Article 9 WFD
- water scarcity and draught,
- data collection and database administration,
- legislation process at national and international level,
- Elaboration of the assessment of the first river basin management plans at the EU level (in Slovakia it will be the Water Plan of Slovakia)

In 2012 the Ministry of Environment of the Slovak Republic sent *the report describing the progress reached in the implementation of planned programmes of measures* to the European Commission through the Slovak Environmental Agency according to the Article 15 (3) of the Water Framework Directive.

Broader version of the report and the information about the WFD implementation in the Slovak Republic are available at <http://www.vuvh.sk/rsv2/>.

3.1.1 Conception for Water Resources Protection

In June 2012 there was the meeting of informal council of ministers in Cyprus related to the topic Blueprint. Environmental ministers of individual member states

approved the Conception for Water Resources Protection (Blueprint) and in November it was officially published by the European Commission.

The conception is focused on the assessment of river basin management plans and other reporting duties. It defines and offers solutions for significant pressures in the sphere of water resources protection.

3.2 Implementation of other EU Water Directives

The implementation of other EU water directives was carried out in compliance with the implementation programmes for particular directives/regulations. The core action within this process aimed at the implementation of the Directive 91/271/EEC concerning urban wastewater treatment and collection in agglomerations over 2000 p.e. The fulfilment of requirements results from the Accession Treaty of the Slovak Republic to the European Union.

In 2012, the Ministry of Environment SR submitted the following materials on implementation programmes to the European Commission in accordance with the EU legal regulations:

- *National Programme of the Slovak Republic for executing the Council Directive 91/271/EEC concerning urban wastewater treatment in the wording of the Commission Directive 98/15/EC and the Regulation of the European Parliament and of the Council 1882/2003/EC, update as of 31 December 2010*
- *Situation report on disposal of urban waste water and sewerage sludge in the Slovak Republic for the years 2009 and 2010.*
- *Report on the implementation of the Council Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources in the Slovak republic, 2012*
- *Preliminary assessment of flood risk in the Slovak Republic*

Ministry of Environment of the Slovak Republic provided the reporting for the European Environmental Agency through the Slovak Hydro-meteorological Institute.

3.3 Projects for Implementation of Directives Financed by EU Funds

Operational Programme – Environment is a programme document of the Slovak Republic for spending the financial resources from EU funds for the environmental sector for the years 2007 – 2013.

The grants in the amount of 1,137.452 million € were allocated within this Operational Programme – Environment as the non-refundable financial contribution (NFC).

Detailed breakdown of the Priority Axis 1 and 2 is shown in the tables 3.3.1 and 3.3.2.:

Development of the Priority Axis 1 Implementation as of 31/12/ 2012 Table 3.3.1

Main Topic	Op. goal	No. of accepted claims for NFC	No. of approved claims for NFC	No. of contracted projects	No. of duly finalized projects	No. of unexpectedly finished projects
45 – Management of water and its distribution (drinking water)	1.1.	93	29	27	6	0
46 – Water processing (waste water)	1.2.	339	134	127	19	3
54 – Other measures for environmental protection and risk prevention	1.3.	15	10	4	2	2
Total		408	161	148	25	5

Financial Breakdown of Structural Fund/Cohesion Fund and State Budget in €

Main Topic	Op. goal	Amount of claimed contribution (NFC)	Amount of approved contribution (NFC)	Amount of contracted means (NFC)	Amount of duly finalized projects ¹	Amount of unexpectedly finished projects
45 - Management of water and its distribution (drinking water)	1.1.	295,403,556	78,085,111	65,033,191	8,671,651	0
46 - Water processing (waste water)	1.2.	2,167,578,975	924,662,592	802,425,330	35,504,940	8,422,379
54 - Other measures for environmental protection and risk prevention	1.3.	46,444,744	34,011,407	11,259,385	3,952,774	9,618,718
Total		2,509,427,274	1,036,759,111	878,717,906	48,129,365	18,041,097

As of 31 December 2012 the amount of almost 224 million € was spent from the Cohesion Fund for the Priority Axis 1 which is 24.46 % out of total contribution for the priority axis in this programming period.

Development of the Priority Axis 2 Implementation as of 31/12/ 2012 Table 3.3.2

Main Topic	No. of accepted claims for NFC	No. of approved claims for NFC	No. of contracted projects	No. of duly finalized projects	No. of unexpectedly finished projects
53 - Risk prevention (including plans and measures to avoid natural and technological risks)	391	67	67	25	2
Total	391	67	67	25	2

Financial Breakdown of Structural Fund/Cohesion Fund and State Budget in €

Main Topic	Amount of claimed contribution (NFC)	Amount of approved contribution (NFC)	Amount of contracted means (NFC)	Amount of duly finalized projects	Amount of unexpectedly finished projects
53 - Risk prevention (including plans and measures to avoid natural and technological risks)	510,354,068	100,692,393	100,692,393	17,732,727	650,950
Total	510,354,068	100,692,393	100,692,393	17,732,727	650,950

As of 31 December 2012 the amount of 27 million € was spent from the Cohesion Fund within related priority axis which is 22.52 % out of total contribution for the priority axis 2 in this programming period.

4 International Cooperation in Water Sector

The Ministry of Environment of the Slovak Republic – the Section of Waters is a coordinator of expert participation in the following meetings of:

- Water and Sea Directors of the European Union, Strategic Coordination Group, Committee to the Article 21 WFD, working groups, expert groups and ad hoc groups and all workshops organized by the European Commission within the Implementation Strategy 2010 - 2012
- working group of the Environmental Council related to priority substances (update of the Directive 2008/105/EC)
- working group WPE within the Council of Europe related to the update of the Directive concerning priority substances 2011/04429 (COD) Directive of the European Parliament and the Council 2008/105/EC.

Ministry of Environment SR together with the SHMI organized the meeting of Water Scarcity and Droughts Expert Group on 4 – 5 December 2012. Detailed information is placed on the SHMI web site (<http://www.shmu.sk/sk/?page=1741&p=13>).

In 2012, international cooperation continued in terms of the following intergovernmental agreements, international treaties and conventions. Committees on transboundary waters continued working as well.

Multilateral Cooperation of the Slovak Republic with neighbouring countries

- Multilateral harmonization of river basin management in the region CEFAME (Slovakia, Austria, Czech Republic and Hungary).
- Using the rivers Morava and Dyje for recreational navigation - MoRe – Restoration of the Morava River; MreNa (Morava river – Recreation Navigation).
- CARESS@danube („Connecting All REscue - and Support Services on the Danube“).
- WANDA - WASTE management for inland Navigation on the DANUBE

- CO-WANDA – COvention for WAstE management for inland Navigation on the DANube
- NEWADA - Network of Danube Waterway Administrations
- NEWADA duo - Network of Danube Waterway Administrations – data and user orientation.
- DANUBE FLOODRISK - preparation of the atlas containing flood risk and flood hazard maps (including damage maps) in the scale 1:100 000 and for the pilot territories in the scale 1:25 000.

European Union Strategy for the Danube Region

Danube Strategy (Figure 4.1) is a tool for better enforcement of partnership policy within European countries (member and non-member states of the EU). Participating countries make an effort to take measures for environmental protection in a harmonized way.

Danube Strategy (1 river – 14 countries – 1 strategy)

Figure 4.1



In connection with the Danube strategy there were many significant events in 2012:

- 2nd meeting of national contact points, coordinators of priority areas and European Commission representatives (Bucharest, 30 - 31 January 2012)
- meeting of ministers of the Danube countries (Luxembourg, 7 June 2012) and authorization of the Declaration on preserving the effective maintenance of water way infrastructure on the Danube and its tributaries
- official visit of Commissioner Hahn (DG REGIONAL POLICY) in Slovakia (Gabčíkovo water structure) on 28 June 2012
- meeting of Priority Areas Coordinators 4, 5, 6 of the Pillar 2 (Vienna, 18 September 2012),

- First Annual Forum of the Danube Strategy (Regensburg, 27 – 28 November 2012) with the participation of Commissioner Hahn (DG REGIONAL POLICY) and German Counsellor Angela Merkel.

Within the Priority Area 4 To Restore and Maintain the Quality of Waters of the Pillar 2 there were 2 meetings of the Steering Group (4 - 5 June 2012 in Bratislava and 5 November 2012 in Budapest). Also the Report on the Danube Strategy Implementation for the Priority Area 4 was sent to the European Commission as of 30 June 2012.

National Contact Point (Office of the Slovak Government) summoned 2 meetings of the Consultation Group for the Danube Strategy (28 May and 6 December 2012).

Detailed information can be found on the following website: <http://groupspaces.com/WaterQuality/> a www.vuvh.sk.

Presidency in the Council of European Union (SK PRES)

Preparation of the presidency of the Slovak Republic in the Council of European Union in 2012 is in compliance with the Programme Declaration of the Slovak Government for the years 2012 – 2016. In the Slovak Government Resolution 392/2012 there is a chapter „Political priorities of presidency“ stating that the key topic of SK PRES could be WATER in its broadest meaning („Water – EU basis“ – climate change, strategic resource, environmental protection, environmental friendly transport, etc.).

Further detailed information can be found on the following website: http://www.mzv.sk/sk/europske_zalezitosti/predsednictvo_v_rade_eu_-_slovenske_predsednictvo_v_rade_eu.

5 Property Structure

5.1 Watercourses

The Slovak Water Management Enterprise has a crucial position in managing the watercourses of Slovakia in accordance with the Water Act 364/2004.

The administration of small water courses is also provided through the following state organisations of forest management: Forests of the Slovak Republic Banská Bystrica, Forest and Agricultural Property Ulič, Military Forests and Property of the Slovak Republic, Pliešovce and National Forests TANAP. One percent of the total length of watercourses in Slovakia is managed by other administrators while seven percent of their length has no administration authority.

The table 5.1.1 shows the development overview on rivers and hydraulic structures between 2008 and 2012.

Table 5.1.1

Indicator	Unit	Years				
		2008	2009	2010	2011	2012
Length of watercourses	km	38,217	38,217	38,215.7*	38,215.7*	38,215.7*
thereof: trained watercourses	km	8,208.9	8,304.2	8,313.6	8,314.8	8,387.0
Major rivers and water supply watercourses	km	11,850	11,850	11,850	11,850	11,850
Length of protection dikes	km	3,135.2	3,135.5	3,142.5	3,147.7	3,148.0

Indicator	Unit	Years				
		2008	2009	2010	2011	2012
Length of artificial channels and feeders	km	67	67	67	67	67
Weirs	number	216	216	238	238	238
Number of navigation locks	number	15	15	15	15	15**
Pumping stations	number	72	70	73	73	75***
Water reservoirs (total)	number	277	277	277	278	278
thereof: water supply reservoirs	number	8	8	8	8	8
Total capacity of water reservoirs	mil. m ³	1,908	1,908	1,908	1,908	1,908
Dry reservoirs -polders	number	20	20	20	21	22
Historical hydraulic structures	number	23	23	23	23	23

Source: SWME, Banská Štiavnica - annual report on the operation of rivers and water structures, Economy Yearbook.

* in the total length of the rivers there is included the length of small water courses of 3rd delimitation stage (2006, 2007)

** out of which 2 in Gabčíkovo are operated by SWME, 1 in Čunovo is operated by WM Construction

*** out of which 3 are historical and are out of operation (Žitavská Tôň, Čergov, Viničné)

Increase in the length of trained water courses and protection dikes compared to 2011 is caused by regulation of water courses.

In 2012 the polder in Dobrá Niva was built.

The total length of the river system in Slovakia is 61,147 km. The length of rivers is measured based on more precise digital processing of the river inventory by using qualitatively more precise data for water management maps (scale M 1:50, 000).

5.2 Water Supply and Sewerage Systems

The following table shows the development overview on the systems managed by water companies, local authorities, municipalities and other entities in 2010 – 2012.

Table 5.2.1

Parameter	Unit	Year					
		2010	2011	2012			Total
				water comp.	Municipal	other *	
Length of water supply system (without service connections)	km	28,092	28,777	26,625	2,374	89	29,088
Length of service connections	km	6,515	6,708	5,994	925	35	6,954
Service connections	number	846,704	863,786	790,202	86,019	4,696	880,917
Length of sewerage system (without service connection)	km	10,751	11,210	9,656	1,913	86	11,655
Length of sewer service connections	km	2,700	2,868	2,361	702	22	3,085
Sewer service connections	number	370,609	393,825	332,549	85,575	4,115	422,239
WWTP	number	607	616	283	345	3	631

Source: WRI

6 River Basin Districts

6.1 Climate Conditions

The total precipitation in the Slovak territory for 2012 reached 711 mm which represents 93 percent of average. The year 2012 is considered normal regarding precipitation. Monthly rainfall totals for 2012 are shown in table 6.1.1.

Average rainfall in Slovakia for 2012

Table 6.1.1

Month	I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.	XII.	Total
mm	74	42	13	43	42	101	130	22	47	103	48	48	711
% of average	161	100	28	78	55	117	144	27	75	169	77	91	93
Excess(+)/Deficit(-)	28	0	-34	-12	-34	15	40	-59	-16	42	-14	-5	-49
Description of precipitation period	VW	A	VD	D	D	A	W	VD	D	VW	D	A	A

Notice: VD – very dry, D – dry, A – average, W – wet, VW – very wet

Rainfall totals for 2012 per river basin are shown in table 6.1.2. Average river basins were the following: Nitra, Hron, Ipeľ, Bodva, Hornád, Bodrog and Poprad (92 to 104 % of average). Dry river basins were Morava, Váh and Slaná (84 to 89 % of average). Danube River Basin is considered to be very dry (78 % of average which is 490 mm).

Average rainfall totals per river basin in Slovakia for 2012

Table 6.1.2

River Basin Districts	Sub-basin	Catchment area [km ²]	Average precipitation [mm]	% of average	Precipitation period
Danube	Morava*	2,282	570	84	D
	Danube*	1,138	490	78	VD
	Váh	14,268	755	89	D
	Nitra	4,501	640	92	A
	Hron	5,465	771	98	A
	Ipeľ *	3,649	630	92	A
	Slaná	3,217	704	89	D
	Bodrog*	7,272	727	103	A
	Bodva	858	697	95	A
Vistula	Hornád	4,414	704	104	A
	Dunajec and Poprad	1,950	804	96	A
Slovakia		49,014	711	93	A

* only Slovak part of river basins

6.2 Hydrological Conditions

Water Resources in 2012

In 2012, the average annual runoff from the Slovak territory was 155 mm, which is 59 percent of the long-term average. The runoff per river basin was in the range from 13 mm (Danube sub-basins) to 307 mm (Poprad and Dunajec river basins). The lowest runoff was recorded in the Ipeľ River Basin (26 %) while the highest was recorded in the Poprad and Dunajec river basins (89 %). The values of annual runoff

for each river sub-basin and overall water resources balance are shown in tables 6.2.1 and 6.2.2.

Average annual runoff per river basin in Slovakia for 2012

Table 6.2.1

River Basin Districts	Sub-basin	Catchment area [km ²]	Annual runoff [mm]	% of average
Danube	Morava*	2,282	86	65
	Danube*	1,138	13	36
	Váh	18,769	246	78
	Nitra	4,501	85	59
	Hron	5,465	159	55
	Ipeľ *	3,649	36	26
	Slaná	3,217	79	42
	Bodrog*	7,272	148	50
	Bodva	858	50	30
	Hornád	4,414	109	52
Vistula	Dunajec and Poprad	1,950	307	89
Slovakia		49,014	155	59

* only Slovak part of river basins

Total water balance of water resources in Slovakia

Table 6.2.2

Balance	Volume [mil. m ³]
	2012
<i>Hydrological balance:</i>	
Precipitation	34,853
Annual inflow to the Slovak territory	68,645
Annual runoff	76,678
Annual runoff from the Slovak territory	7,597
<i>Water balance:</i>	
Total water intake (Slovakia)	675.39
Vapour from water reservoirs	57.25
Discharge into surface water	646.60
Impact of water reservoirs	47.5
	Accumulation
Total volume in water reservoirs	722.3
% of volume in accumulation water reservoirs	62.0
Water use rate (%)	8.89

Surface Water Quality

Surface water quality parameters were monitored in accordance with the Programme of Water Status Monitoring for 2012. The Programme included 314 sites within the surveillance and operational monitoring (Table 6.2.3).

Quality parameters monitored at all monitoring sites (surveillance and operational) were evaluated according to the Article 3, Paragraph 3 of the Regulation of the Slovak Government 269/2010 determining the requirements for reaching good water status.

Number of surface water monitoring sites
according to sub-basins in 2012

Table 6.2.3

Sub-basin	Number of monitoring sites			
	Surveillance	Operational	Surveillance and operational	Total
Morava	8	6	8	22
Danube		6	11	17
Váh	41	31	46	118
Hron	5	8	21	34
Ipeľ		3	23	26
Slaná	1	5	8	12
Bodrog	15	2	20	37
Hornád	9		14	23
Bodva	2		4	6
Dunajec and Poprad	5	2	10	17
Total	86	63	165	314

Generally, the monitoring frequency is evenly distributed during the year, i.e. 12 times a year in accordance with the Programme of Monitoring.

A lower frequency of monitoring is established for some biological parameters monitored on the seasonal basis (frequency: 2 – 7 times a year), radioactivity parameters (frequency: 4 times a year) and relevant substances (4 times a year).

The requirements for surface water quality defined under the Regulation of the Slovak Government 269/2010 were met at all monitoring sites for the following parameters:

- general parameters (part A): magnesium, sodium, sulphates, free ammonia, fluorides, surface-active chemicals, phenol index, chromium (VI), vanadium, chlorobenzene and dichlorobenzene
- radioactivity parameters (part D): total volume alpha and beta activity, tritium, strontium and caesium

The limit values defined under the Annex 1 to the Regulation 269/2010 were most frequently exceeded regarding the following surface water quality parameters: general parameters - nitrite nitrogen (limit exceeded in all sub-basins), hydrobiological and microbiological parameters - coliform bacteria (in 7 sub-basins), thermotolerant coliform bacteria (in 6 sub-basins) and intestinal enterococci (exceeded in 6 sub-basins).

6.3 Hydro-geological Conditions

Groundwater Resources

According to the data of the Water Management Balance, the natural groundwater resources of Slovakia are $146.7 \text{ m}^3 \cdot \text{s}^{-1}$ on average including available groundwater resources of $78,938.93 \text{ l} \cdot \text{s}^{-1}$, i.e. more than 53 % of natural resources.

Total available groundwater resources registered as of December 31, 2012:

- validated by the committee	47,974.33 $\text{l} \cdot \text{s}^{-1}$
- <u>not validated by the committee</u>	<u>30,964.60 $\text{l} \cdot \text{s}^{-1}$</u>
Total	78,938.93 $\text{l} \cdot \text{s}^{-1}$

According to aforementioned information we can say that present and expected water demand is highly secured.

Groundwater balance

Out of the total number of 141 groundwater zones in Slovakia, 130 groundwater zones were in good balance state, 11 zones were in satisfactory balance state and 1 zone was in a critical balance state according to the results of water balance for 2012. None of groundwater zones was in strained or emergency state. It is necessary to say that in several hydro-geological zones with good or satisfactory balance state there was recorded strained, critical or emergency balance state which means improper and excessive use of ground water resources. Unfavourable balance state (critical and emergency) indicates the need to find new and additional sources or to reduce abstraction from already used water resources. Favourable balance state (good and satisfactory) indicates the possibility of further use of ground water resources.

There was recorded an increase of available groundwater resources thanks to which the balance state of Slovak ground water has improved.

Assessment of Groundwater Regime in the Hydrological Year 2012

Groundwater levels

In 2012, the highest groundwater levels were recorded mainly in June and July, less frequently in March and October. Minimum groundwater levels were measured during the autumn period in September and October, somewhere also in January and February.

Due to very dry second half of the year 2012 there was almost no increasing the long-term maximum water levels or decreasing the minimum water levels.

Discharge of Springs

In 2012 maximum annual discharge of springs were observed mainly in June and July, rarely in March and minimally in September and October.

Groundwater quality

The monitoring of groundwater quality and chemical status was divided in accordance with the WFD into the following groups:

- surveillance monitoring
- operational monitoring.

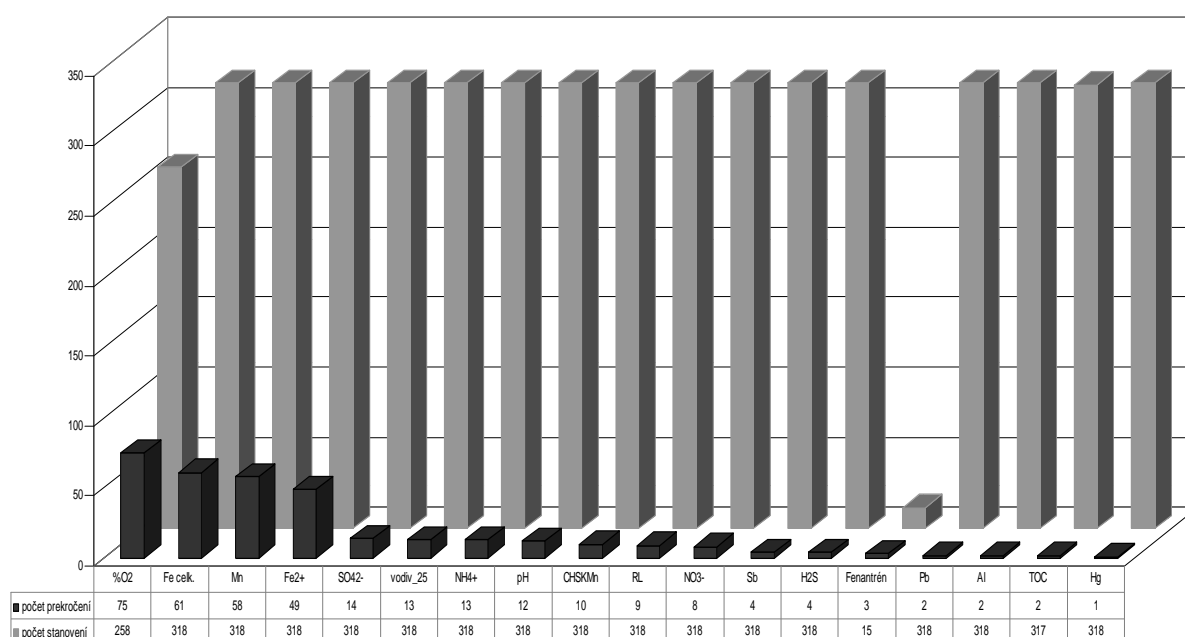
In 2012, the ground water quality was monitored in 171 sites of the surveillance monitoring. These are sites included in the national monitoring network of the Slovak Hydro-meteorological Institute or springs not affected by point sources of pollution. Groundwater samples were taken at monitoring sites depending on a type of rock environment as follows: once in 67 pre-quaternary objects and 11 quaternary objects, twice in 39 quaternary objects and 3 times in 54 pre-quaternary fissured-karst objects.

Operational monitoring was done in all groundwater bodies that were assessed as being at risk of failing to achieve good chemical status. In 2012 there were 295 sites monitored within the operational monitoring programme (except the region of Žitný ostrov) where potential input of pollution to the groundwater from potential source/sources of pollution is expected. The sampling frequency was 1 - 4 times a year depending on a type of rock environment. The samples were taken in spring and autumn when the extreme condition of groundwater could be monitored. The region of Žitný ostrov represents a separate part of the SHMI monitoring network as it plays an important role in the process of monitoring the changes in water quality in Slovakia since this region is the most significant drinking water resource in our territory. The monitoring network of Žitný ostrov comprises 34 piezometric multi-layer wells (84 layers) that are monitored 2 – 4 times a year.

The results of laboratory analyses were assessed under the Regulation of the Slovak Government 496/2010 amending the Regulation 354/2006 defining the requirements for drinking water intended for human consumption, and for drinking water quality monitoring. The assessment of results was done through a comparison between measured values and limit values for each of analysed parameters. The results are published in the annual report “Groundwater Quality in Slovakia for 2012” and biennial report “Groundwater Quality in Žitný ostrov for 2011 – 2012.”

Exceeded limits of parameters at surveillance monitoring sites according to the Regulation 496/2010 in 2012

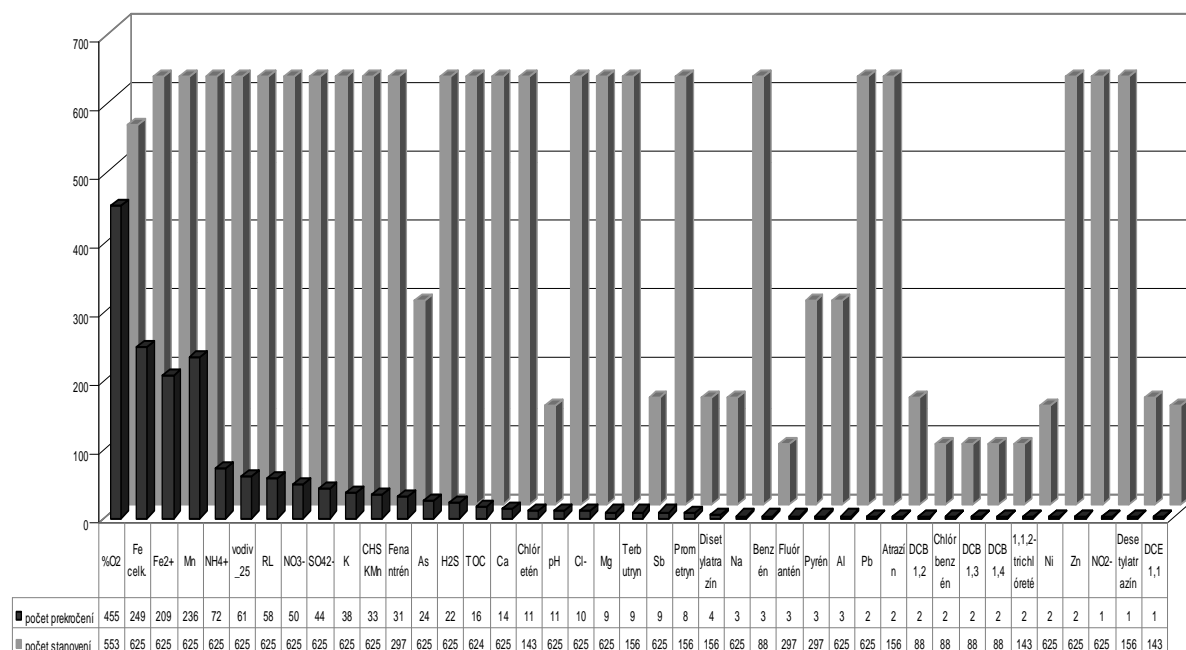
Figure 6.3.1



Source: SHMI

Exceeded limits of parameters at operational monitoring sites according to the Regulation 496/2010 in 2012

Figure 6.3.2



Source: SHMI

In compliance with the monitoring programme, the sites of surveillance monitoring are situated in the areas not affected by human activity. This is the reason why groundwater shows better quality in comparison with the sites of operational monitoring designed to monitor the impact of significant sources of groundwater pollution.

6.4 Protected Areas

Updated list of protected areas included in the register is in the Table 6.4.1.

Table 6.4.1

Protected area category	number of protected areas	area (km ²)
Protected areas of international importance		
Protected areas intended for drinking water abstraction		
- protection zones of water supply resources	1,350	8,617
- protected water management areas	10	6,942
Bathing waters	33	-
Protected areas sensitive to nutrients		
- sensitive areas (whole territory of Slovakia)	1	49,041
- vulnerable areas	1,520	13,685
Protected areas for conservation of animal and plant species and their habitats		
- wetlands of international importance - „RAMSAR type“	14	407
- protected bird areas	41	12,828
- sites of Community importance	473	5,844

Protected area category	number of protected areas	area (km ²)
- large protected areas	23	11,106
- national parks	9	3,179
- protection zones of national parks	9	2,701
- protected landscape areas	14	5,226
Protected areas of national importance		
Protected areas intended for drinking water abstraction		
- water supply streams (catchments)	102	5,423
Protected areas for conservation of animal and plant species and their habitats		
- wetlands of national importance	72	1,473
- small protected areas:	1,105	1,111
- protected fishing areas	29	-

7 Water Use

7.1 Surface Water

Surface water resources of Slovakia are used for:

- service water supply (sanitary water, industrial water),
- drinking water,
- hydropower potential,
- irrigation systems,
- water ways,
- fishery.

Service Water Supply

In 2012, the volume of abstracted surface water was 305,821 thous. m³. This represents an increase by 63,215 thous. m³ as compared to the previous year. The increase in surface water abstraction was recorded in industry, mainly Vojany power plant.

The most significant consumers of surface water are the following companies: Vojany power plant (77,955 thous. m³); Slovnaft Bratislava (35,999 thous. m³); U. S. Steel Košice (24,828 thous. m³); Mondi SCP Ružomberok (23,187 thous. m³) and SE Bratislava – EBO Jaslovské Bohunice (22,021 thous. m³).

Revenues for surface water increased only by 626 thous. € (2.44 %) in comparison with the year 2011. Compared to high increase of surface water abstraction in m³, there was only small increase of revenues. The main reason for this is the price of surface water approved by the Regulatory Office for Network Industries for the year 2012 in the same amount as in 2011. Revenue surface water supply and its development in the years 1995 to 2012 is in the Tables 7.1.1, 7.1.2 and the Figure 7.1.1.

The Slovak Water Management Enterprise Banská Štiavnica (SWME) is a dominant entity carrying out regulated activities in this sector.

Surface water supply (revenue water) in 2012 [thousand m³]

Table 7.1.1

	Bratislava Branch	Piešťany Branch	Banská Bystrica Branch	Košice Branch	SWME Total
Surface water supply (total):	39,615	82,611	45,118	138,477	305,821
public water supply	0	11,478	11,481	23,779	46,738
industry and others	39,615	70,073	33,637	114,698	256,023
agriculture	0	1,060	0	0	1,060

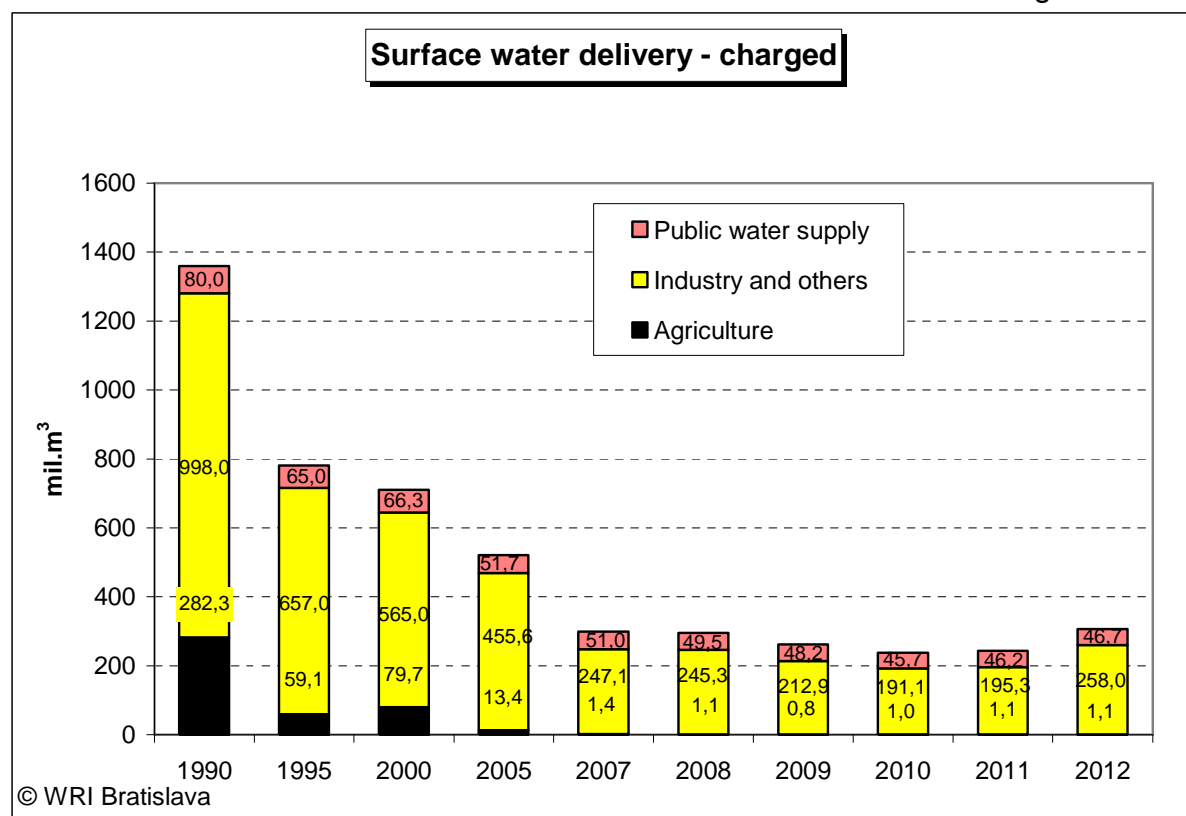
Surface water abstraction up to 1,250 m³ per month or 15,000 m³ per year is free of charge pursuant to the Water Act, Paragraph 6. Water abstracted for irrigation in agriculture is also free of charge in compliance with the Water Act.

Development of surface water supply (revenue water) [mil. m³]

Table 7.1.2

	1995	2000	2005	2010	2011	2012
Surface water supply (total):	781.1	711.0	508.8	237.8	242.6	305.8
public water supply	65.0	66.3	51.7	45.7	46.2	46.7
industry and others	657.0	565.0	455.6	191.2	195.3	258.0
agriculture	59.1	79.7	1.5	0.9	1.1	1.1
thereof: irrigation	55.4	77.5	0	0	0	0

Figure 7.1.1



Hydropower Potential

Hydropower plants generate annually 13 – 20 % of the total production of electric power in Slovakia. In 2012 it was 15,1 % (4.344 GWh) out of total production 28,393 GWh. Hydropower plants including Gabčíkovo represent about 40 % of the Power Grid of the Slovak Republic capacity.

The operation of all water management and energy structures of the Gabčíkovo Dam and Hydropower Plant was managed by the Water Management Construction Company. The production of hydropower was influenced by hydrological conditions on the Danube (higher discharges compared to the previous years). Gabčíkovo Hydropower Plant generated and supplied 2,430,147 MWh of electric power. In comparison with the previous year, the power supply increased by 549,945 MWh (Table 7.1.3).

Table 7.1.3

Indicator	2008	2009	2010	2011	2012
Power production in MWh	2,182,507	2,404,911	2,374,495	1,910,255	2,459,334
Power supply in MWh	2,154,877	2,376,476	2,345,902	1,880,202	2,430,147

The Hydropower Plant Žilina generated 123,661 MWh of electric power and supplied 122,562 MWh to the power grid in 2012.

Small hydropower plant in Dobrohošť generated 12,962 MWh until the end of 2012.

Current status of using the hydropower potential of water courses in Slovakia and potential, environmental options of its further usage are included in the material *Concept of using the hydropower potential of water courses in Slovakia by 2030*

(<http://www.minzp.sk/sekcie/temy-oblasti/voda/koncepcne-aplanovacie-dokumenty/koncepcia-vyuzitia-hydroenergetickeho-potencialu-vodnych-tokov-sr-do-roku-2030/>).

Irrigation systems

In 2012 the irrigation units were rented to agro-entrepreneurs and farmer associations.

In 2012 as many as 209 pumping stations were rented within the irrigation systems, covering an area of about 187,574 hectares. Only 82 pumping stations were actually used during the irrigation season.

In recent years the irrigation is used only by farmers growing such crops where the irrigation costs can be included in their total price accepted at the market.

Actually irrigated area in 2012 was of the size 44,000 ha with the total abstraction of irrigation water in the amount of 21,385,273 m³:

Region	Water abstraction (m ³)
Záhorie	1,533,783
Danube Region	4,624,916
Lower Váh Region	10,150,721
Upper Váh Region	4,112,580
Nitra Region	285,237
Hron and Ipeľ Region	660,954
Bodrog and Hornád	17,082
Total	21,385,273

Irrigation abstraction from other sources than state facilities is not stated here because the Ministry of Agriculture and Rural Development SR has no chance to monitor it.

Waterways

The Slovak Water Management Enterprise (SWME) is an administrator of waterways in Slovakia. The main activities of the enterprise were focused on the maintenance of the Danube international waterway and the Lower Váh waterway.

Total costs for the Danube and Váh waterway maintenance were 2,797,459 € in 2012. This amount included the costs for setting out the shipway of the Danube and Váh rivers which were 486,459 €.

The Morava waterway is monitored up to 6.000 river kilometre belonging to the category of the Danube River parameters. Then up to the border with the Czech Republic it is a waterway used currently only for sport and recreational navigation but it is assumed to be monitored in the future.

The Small Danube River is a waterway without monitoring used only for sports and recreation. The maintenance of the river is regular activity to make it passable for floods and navigation.

Hron and Ipeľ rivers are assumed to be monitored in the future.

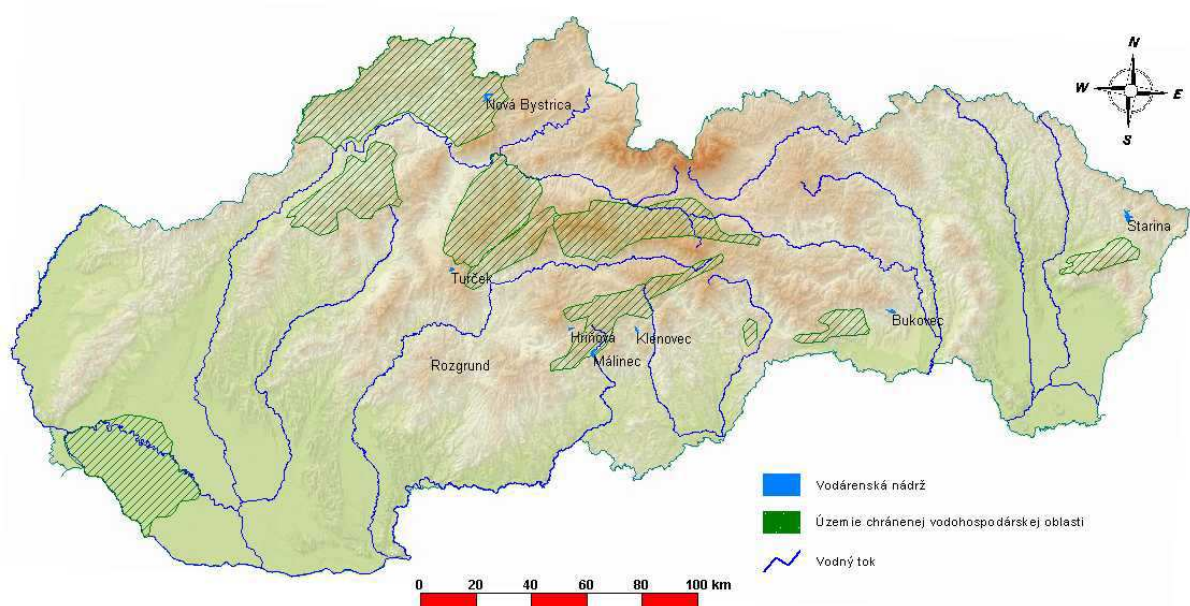
The Slovak Water Management Enterprise also controls the waterways established on the water reservoirs of Liptovská Mara, Orava, Veľká Domaša, Zemplínska Šírava and Ružín I. Operation of small vessels without motor is carried out on water structures Počúvadlo, Bátovce, Ružiná, Teplý Vrch, Kuríneč and Pálcianska Maša.

The Bodrog River in the section from the state border with Hungary up to the confluence of the Latorica River and Ondava River is also included in the category of waterways. SWME Košice provides delineation of shipway.

Special-purpose Fish Management

The following water reservoirs were used within the special-purpose fish management: Turček, Nová Bystrica, Hriňová, Klenovec, Málinec, Rozgrund, Bukovec a Starina (Figure 7.1.1):

Figure 7.1.1



The appropriate fish management measures were implemented in the water reservoirs in order to improve water quality in the relevant water reservoirs.

In 2012 water supply reservoirs were given the following fish species – river trout, rainbow trout, northern pike, pikeperch and huchen. Total costs for putting this fish species into water reservoirs were 41,897 €.

7.2 Groundwater

Groundwater is primarily intended for drinking water supply under § 3, section 4 of the Act 364/2004 on Waters and on the Amendment of the Act of the Slovak National Council no. 372/1990 Coll. on Offences as Amended (Water Act).

Groundwater abstraction has been experiencing the downward trends in Slovakia since 1990. In 2012 there was recorded slight increase in abstracted amounts - the consumers used $10,719.35 \text{ l.s}^{-1}$ of groundwater that is more by 117.55 l.s^{-1} (1.11 %) compared to 2011.

The data on groundwater abstraction are included in the SHMI water abstraction register. The data are provided by the consumers under the obligations defined in accordance with the Water Act and the Regulation of the Ministry of Agriculture, Environment and Regional Development SR 418/2010.

According to the data of water abstraction register, there were 5,252 groundwater resources used for abstraction in Slovakia in 2012. An overview according to the purpose of groundwater use for 2011 and 2012 is shown in the following table 7.2.1.

Table 7.2.1

Purpose of use	Water abstraction [l.s^{-1}]		Difference	
	2011	2012	[l.s^{-1}]	[%]
Public water supply	8,071.10	8,149.70	78.6	0.97
Food industry	206.20	256.60	50.4	24.44

Purpose of use	Water abstraction [$\text{l}\cdot\text{s}^{-1}$]		Difference	
	2011	2012	[$\text{l}\cdot\text{s}^{-1}$]	[%]
Other industrial sectors	802.20	797.80	-4.4	-0.55
Agriculture – animal production	210.20	221.20	11.0	5.23
Agriculture – plant production	81.10	108.40	27.3	33.66
Social needs	237.80	218.40	-19.4	-8.16
Other	993.20	967.25	-26.0	-2.61
Total	10,601.80	10,719.35	117.6	1.11

Source: SHMI Bratislava

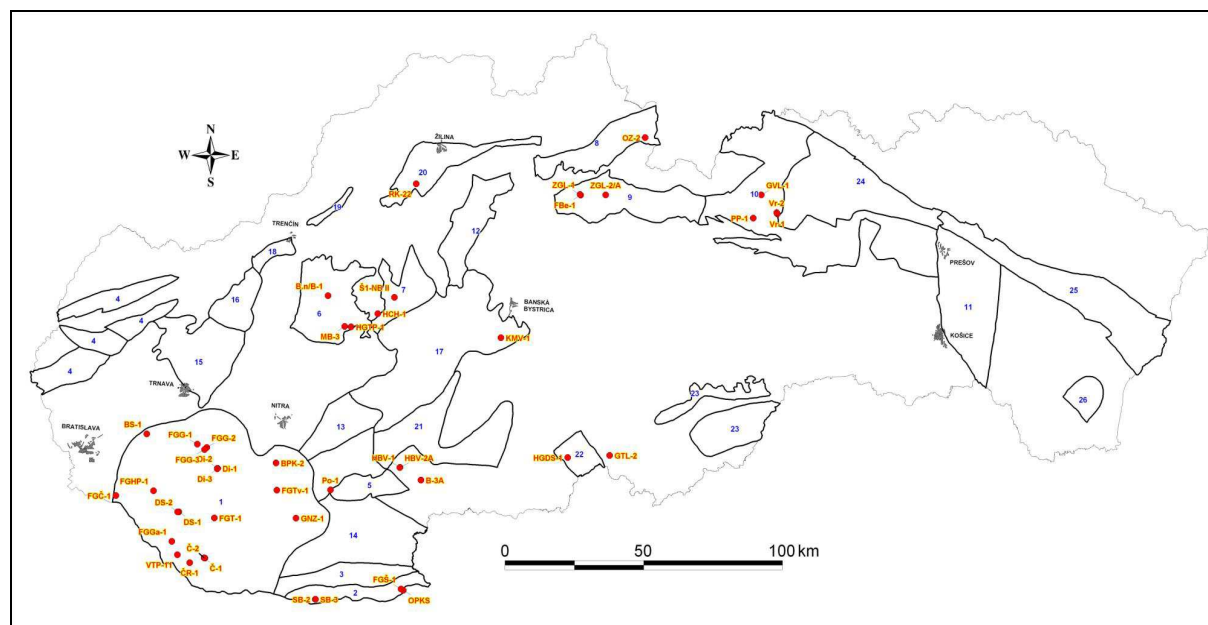
Geothermal water

Geothermal water is mainly used as energy source but also in agriculture and tourism. Geothermal energy utilization is of economic and ecological importance.

In the years 1971 – 2011 there were made 141 geothermal wells in 27 geothermal areas with the amount of $2,084 \text{ l}\cdot\text{s}^{-1}$ geothermal water in Slovakia. In the years 2000 – 2012 as many as 46 geothermal wells were used in 35 localities (Figure 7.2.1). These wells are not in the register of the Spa and Spring Inspection Office.

Active geothermal wells in 2000 - 2011

Figure 7.2.1



Explanatory notes:

- 12 number of geothermal area
- **FGHP-1** marked geothermal well

Geothermal areas (Remšík, 2011): 1 – Central Depression of the Danube Basin, 2 – Komárno High Floe, 3 – Komárno Marginal Depression, 4 – Vienna Basin, 5 – Levice Floe, 6 – Topoľčiansky Bay, 7 – Horná Nitra Basin, 8 – Skorušinská Basin, 9 – Liptov Basin, 10 – Levoča Basin W and S part, 11 – Košice Basin, 12 – Turčianska Basin, 13 – Komjatická Depression, 14 – Dubnícka Depression, 15 – Trnava Bay, 16 – Piešťany Bay, 17 – Central Slovakia neo-vulcanites NW part, 18 – Trenčín Basin, 19 – Ilava Basin, 20 – Žilina Basin, 21 – Central Slovakia neo-vulcanites SE part, 22 – Hornostrhársko-trenčská Depression, 23 – Rimavská Basin, 24 – Levoča Basin NE part, 25 – Humenský Ridge, 26 – Beša-Čičarovce Structure, 27- Lučenec Basin.

Geothermal energy is currently mostly used for *recreational purposes* (87 %). It is used in season summer swimming pools (11 wells in 10 localities) and thermal swimming pools (29 wells in 23 localities).

House heating is supplied from 22 wells (48 %), e.g. hospitals and residential areas in Galanta and aqua parks.

Agriculture uses 11 wells in 10 localities (24 %) in winter for heating the plastic greenhouses. Geothermal water in one locality is used for fish farming.

In the years 2000 – 2010 the amount of 46 used geothermal wells produced 6,323,167 m³.year⁻¹ (326.65 l.s⁻¹) of geothermal water on average.

7.3 Drinking Water Supply

The total number of inhabitants supplied with drinking water from public water supply network decreased in 2012 compared to the previous year by 15.8 thousand inhabitants to 4,707.0 thousand inhabitants that is 87.0 % out of the total number of population of the Slovak Republic (Table 7.3.1 and Figure 7.3.1).

In 2012 the number of municipalities with public water supply network was 2,349 which is 81.3% of the total number of municipalities in the Slovak Republic. Construction of public water supply network also helped to increase the number of technical facilities and structures. Compared to 2011 the total length of water supply systems in Slovakia (water companies, local authorities and other subjects) increased by 311 km up to the total length 29 088 km (table no. 7.3.2) which created conditions for supplying new consumers with drinking water from public network.

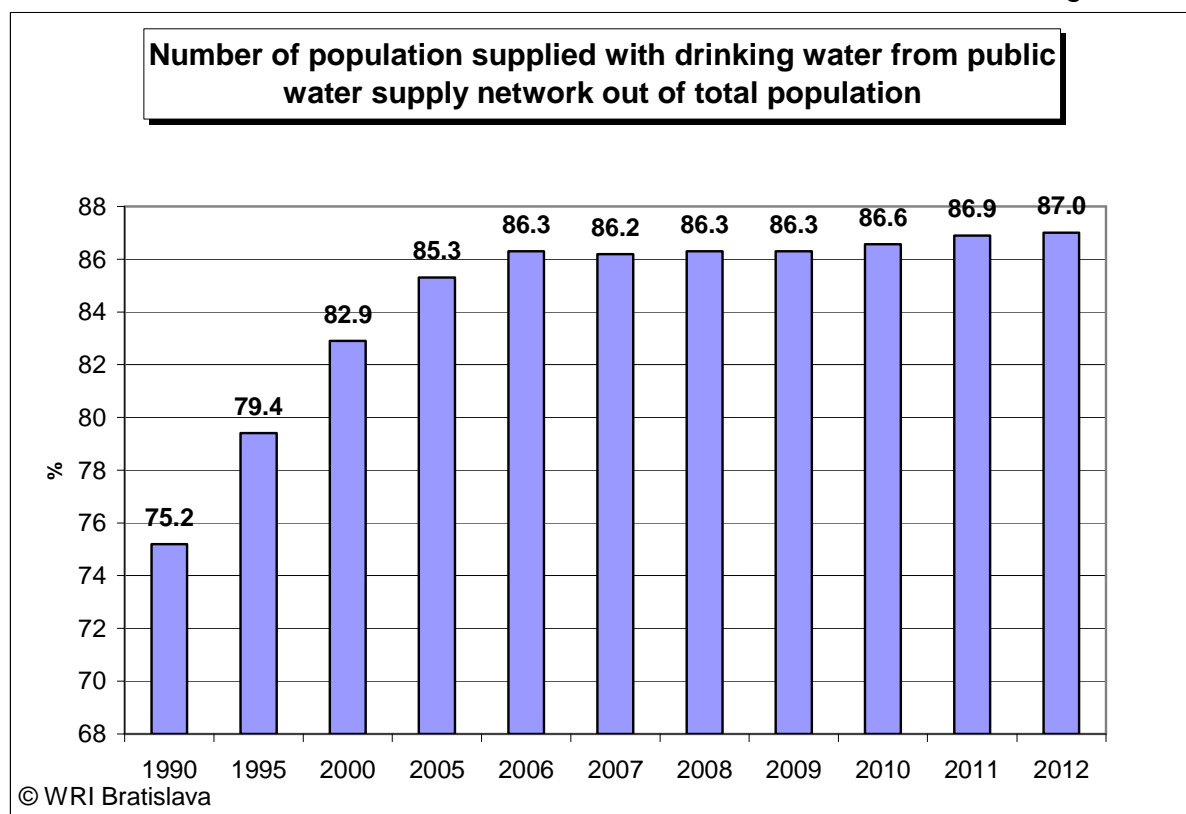
Development of the total number of inhabitants and the number of inhabitants supplied with drinking water from public water supply network administrated by water companies, local authorities and other organizations [in thous.]

Table 7.3.1

	1995	2000	2005	2010	2011	2012
Total number of inhabitants	5,363.7	5,400.6	5,386.7	5,435.3	5,435.3	5,410.8
Supplied with drinking water from public water supply network	4,256.8	4,479.2	4,594.1	4,704.7	4,723.8	4,707.0
Proportion [%]	79.4	82.9	85.3	86.6	86.9	87.0

Prepared by: WRI using the data of water companies, local authorities and other organizations

Figure 7.3.1



In the facilities of water companies, local authorities and other subjects the volume of 302.5 mil. m³ of drinking water was produced in 2012 which was increase by 3.1 mil. m³ compared to the year 2011. The amount of revenue water and revenue water for households slightly increased the same way as the amount of produced water. The amount of revenue water represented 67.5 % of the water volume intended for use.

Specific consumption of drinking water for households has been increasing and in 2012 it reached the value 80.8 l.inhab.⁻¹.day⁻¹. It is an alarming situation, since it means the hygiene minimum.

The amount of non-revenue water was 99.2 mil. m³ what is 32.5 % of water intended for use. Out of this number the loss in pipe network represents 84.4 % (27.6 % of water intended for use). It is necessary to adopt and implement the measures related to decreasing the water loss in pipes to acceptable amount corresponding with European trends.

Data related to water supply and to development of public water supply system are in the following table 7.3.2 and figures 7.3.2 and 7.3.3:

Drinking water supply and development of water supply network administrated by water companies, local authorities and other subjects Table 7.3.2

No	Indicator	Unit	Year				
			2010	2011	2012	Expectation	
						2013	2014
1	Number of inhabitants supplied from water supply network	thous.	4,704.7	4,723.8	4,707.0	4,749.1	4,782.1
2	Capacity of water resources	l.s ⁻¹	33,875	33,527	33,130	33,151	33,165
3	Length of water supply networks	km	28,092	28,777	29,088	29,279	29,428
4	Capacity of ground water resources	l.s ⁻¹	28,844	28,538	28,128	28,157	28,162
5	Water produced in WM facilities	mil. m ³	306.7	299.4	302.5	298.7	298.7
	Of which: water produced from ground water		266.9	253.9	256.1		
6	Water intended for use	mil. m ³	310.5	303.8	305.6	301.9	302.0
7	Revenue water in total	mil. m ³	210.2	206.3	206.4	205.9	205.9
	Included: for households		143.3	137.7	138.8	138.2	138.6
8	Non-revenue water	mil. m ³	100.3	97.5	99.2	96.0	96.1
	Of which: water loss in pipes		85.8	83.7	84.4	81.7	81.0
9	Specific water consumption (of revenue water in households)	l.inhb. ⁻¹ .day ⁻¹	83.4	79.9	80.8	79.7	79.4

Prepared by: WRI using the data of water companies, local authorities and other organizations

Figure 7.3.2

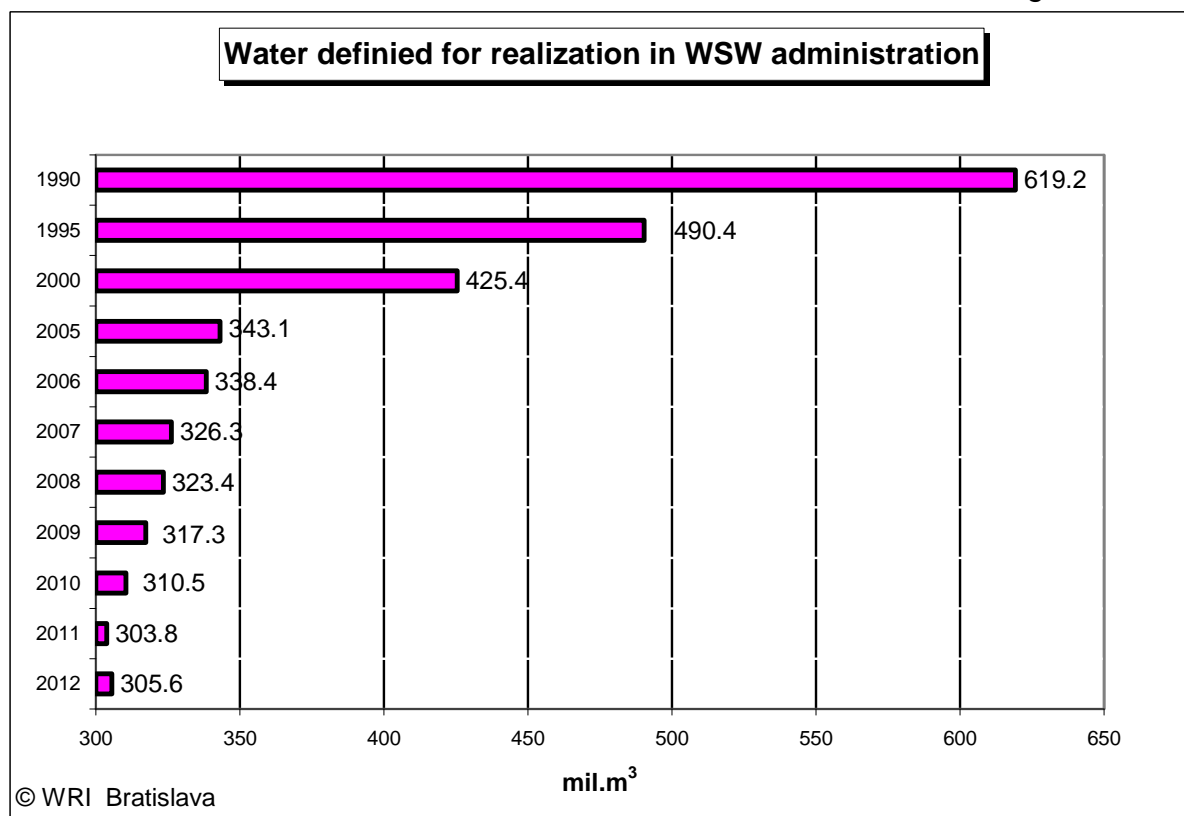
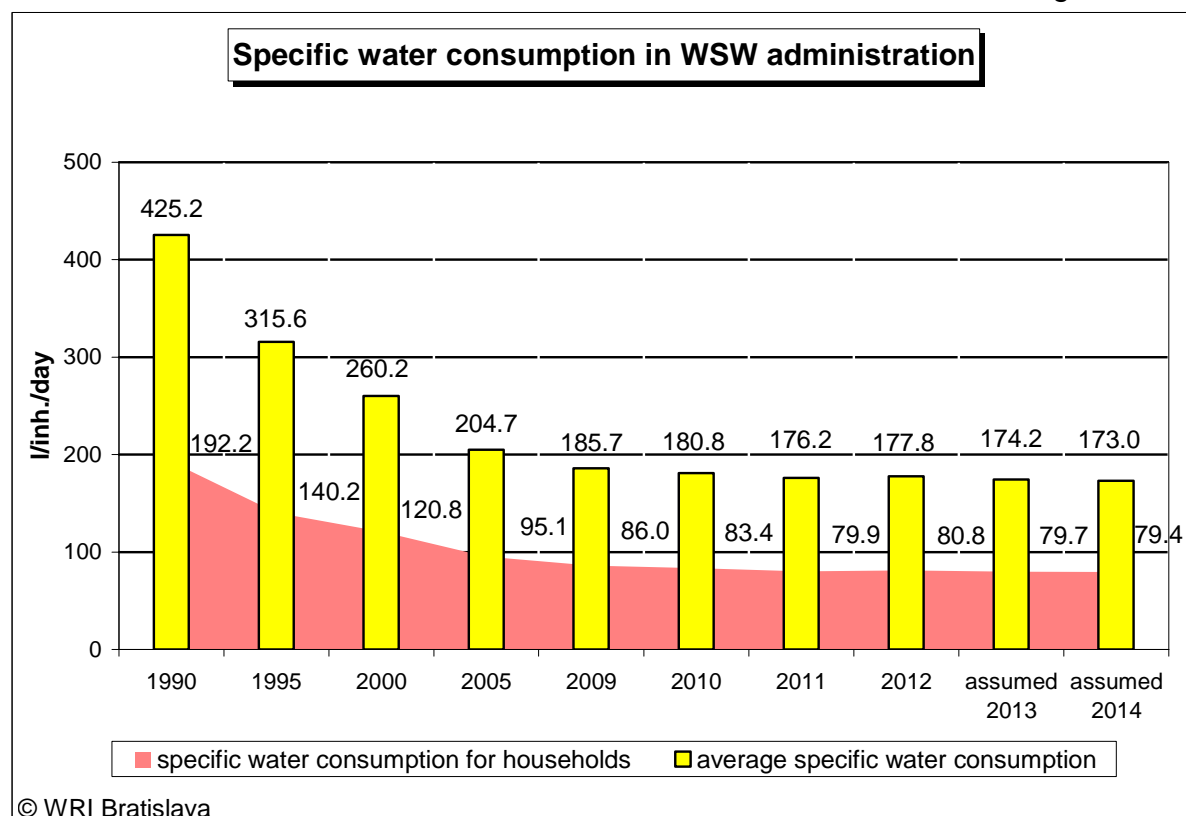


Figure 7.3.3



Drinking Water Quality

Assessment of drinking water quality in public water supply systems is based on the results of the control of water utilities. Water quality is assessed on the basis of the number of determinations of individual drinking water quality parameters exceeding related hygienic limits.

Drinking water quality parameters were assessed according to the Regulation of the Slovak Republic Government no. 354/2006 Coll. as amended (Regulation of the Slovak Republic Government no. 496/2010 Coll.) determining the requirements for water intended for human consumption and according to the Decree of the Ministry of Health no. 528/2007 Coll. on details of requirements for irradiation limitation from natural sources.

In 2012 as many as 9,274 drinking water samples from sampling sites in water distribution network were analyzed in laboratories of water companies. In these laboratories 251,195 analyses were done concerning particular parameters of drinking water quality. This assessment did not include results from Bratislava Water Company (data were not available).

Mostly microbiological and biological parameters of drinking water quality were determined and 93,484 analyses were performed. Next numerous group was represented by the parameters affecting sensory properties of drinking water where 86,921 drinking water analyses were carried out.

Exceeding the limit values in drinking water samples in line with the Government Regulation no. 354/2006 Coll. as amended (Regulation of the Slovak Republic

Government no. 496/2010 Coll.) on requirements for drinking water and drinking water quality control:

Table 7.3.3

Year	2008	2009	2010	2011	2012
Amount of drinking water samples not meeting the limits with HLV	2.34 %	1.77 %	2.99 %	0.91 %	0.65 %
Amount of analyses of drinking water quality parameters not meeting the limits with LV, HLV and IV	1.02 %	0.88 %	0.93 %	0.82 %	0.73 %
Amount of analyses meeting hygienic limits (%)*	99.45 %	99.48 %	99.30 %	99.60 %	99.67 %
Amount of samples meeting the requirements for drinking water quality in all parameters (%)*	91.84 %	91.67 %	89.72 %	92.05 %	94.27 %

IV – indicating values, LV – limit values, HLV – highest limit values *

* Parameter free chlorine is not included in the amounts

Not meeting the hygienic limits in drinking water in distribution network was mainly found out in the following parameters in 2012:

- *microbiological and biological parameters:*
Escherichia coli, coliform bacteria, Enterococci, cultivable micro-organisms at 36 °C, micromycetes specifiable by microscope, abio seston,
- *inorganic and physical-chemical parameters:*
nitrates, colour, manganese, sulphates, turbidity, iron;
- *radiological parameters:*
total volume activity alpha; radon 222 volume activity
- *disinfectants and their by-products:*
free chlorine.

7.4 Wastewater Collection and Treatment

In 2012 the number of residents connected to public sewerage system increased by 29.6 thousand to the total number of 3,376.9 thousand inhabitants representing 62.41 % out of the total number of population. Regional connection to public sewerage system is not very favourable.

Development of public sewerage system and the volume of urban waste water discharged through public sewerage system administrated by water companies, local authorities and other subjects are documented by the Table 7.4.1 and the Figure 7.4.1.

Urban wastewater discharge and development of sewerage system managed by water companies, local authorities and other subjects Table 7.4.1

No	Indicator	Measure	Year				
			2010	2011	2012	Expectation	
						2013	2014
1	Number of inhabitants connected to public sewerage system	thous.	3,281.7	3,347.3	3,376.9	3,454.1	3,469.8
	Of that: in houses connected to sewerage system with WWTP	thous.	3,202.9	3,260.0	3,301.7	3,359.2	3,384.7
2	Length of sewerage networks	km	10,751	11,210	11,655	11,828	11,984
3	Water discharged to water courses altogether	mil.m ³	507.1	414.6	389.	407.2	406.3
	Of that: treated wastewater	mil.m ³	497.0	406.5	381.0	398.4	398.5
4	Volume of discharged wastewater*	mil.m ³	202.6	200.3	202.7	202.1	201.8
	Of that: sewerage water	mil.m ³	118.0	115.7	117.1	117.6	117.3
	Industrial and other wastewater	mil.m ³	84.6	84.6	85.6	84.5	84.5

* Amount of discharged urban wastewater (water collected - charged) includes only water companies and other entities: Water and Sewage Company, Ltd., Hlohovec; Mondi SCP, Ružomberok; PreVak, Stará Turá; (without data concerning local authorities)

Source: Water Research Institute

Figure 7.4.1

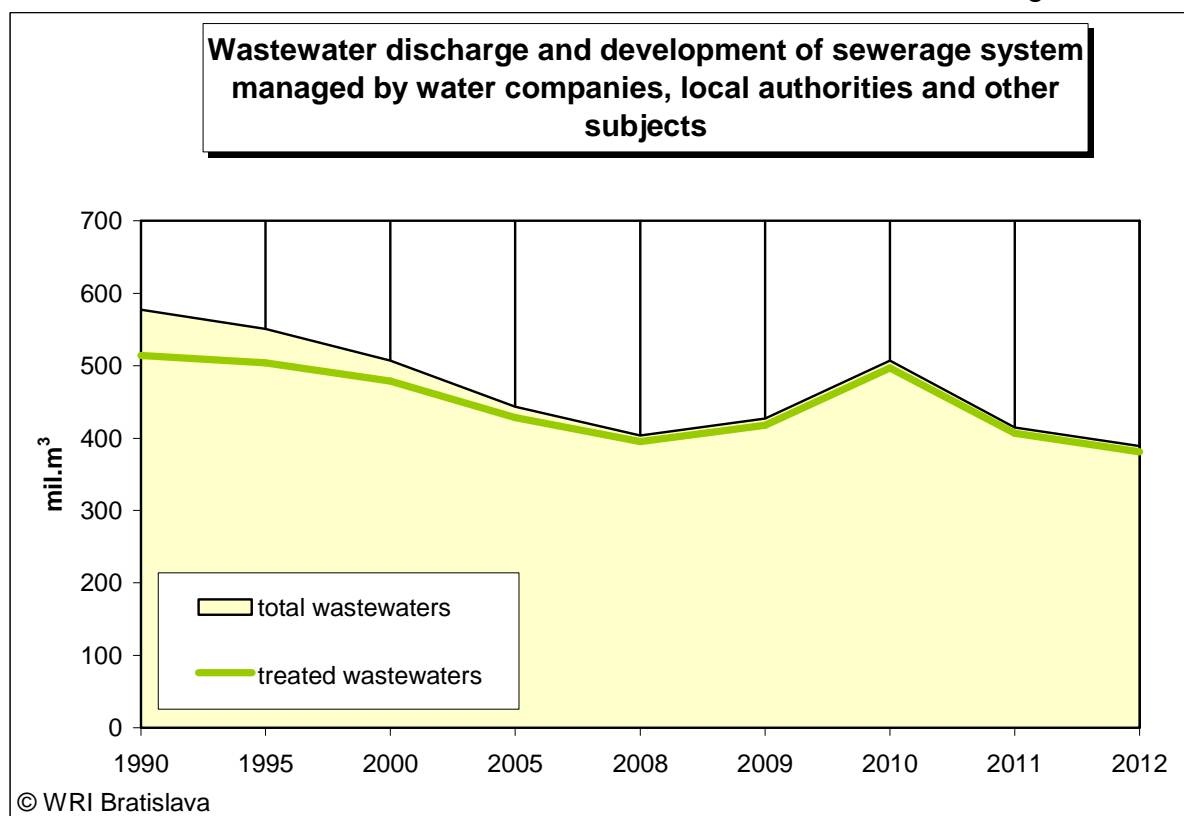
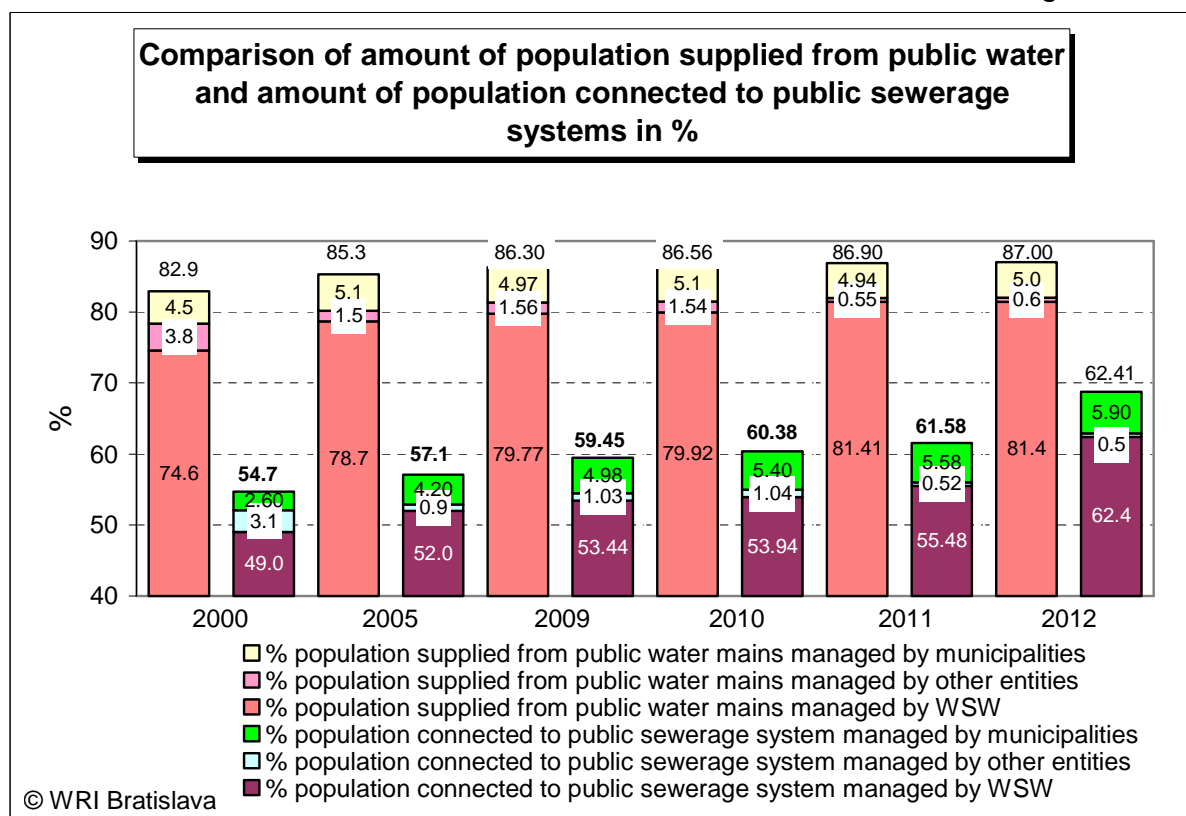


Figure 7.4.2



According to the data from the Comprehensive Water Register (Slovak Hydro-Meteorological Institute database), in 2012 the total volume of waste water discharged into surface water was 647.159 mil.m³.year⁻¹. Out of the total volume of discharged waste water from point pollution sources, treated waste water was approximately 82 %. The volume 53 % of this treated waste water is represented by sewage and urban waste water (Table 7.4.2).

Volume of treated and not treated discharged waste water in 2012:

Table 7.4.2

Volume of discharged waste water	Total [thous.m ³ .year ⁻¹]	Kind of waste water [thous.m ³ .year ⁻¹]			
		industrial	sewage and urban	agricultural production	other activities
Treated	528,243.996	185,766.373	337,545.038	242.559	4,690.027
Not-treated	118,914.837	106,107.962	5,109.217	127.907	7,569.751
Total	647,158.833	291,874.335	342,654.255	370.466	12,259.778

Source: SHMI

Data on the volume of discharged waste water in the Tables 7.4.1 and 7.4.2 differ because the SHMI according to the Water Act monitors only discharged waste water above 10,000 m³ per year or 1,000 m³ per month.

Overview of the total volumes of pollutants discharged into water courses in 2012 in selected pollution parameters (BOD₅, COD_{Cr}, N_{total} and P_{total}) was prepared from

the database of the Comprehensive Water Register and is presented in the Table 7.4.3.

Load of balanced sources of pollution discharged into surface water according to individual sub-basins Table 7.4.3

Sub-basin	Volume of waste water [thous. m ³ .year ⁻¹]	BOD ₅	COD _{Cr}	N _{total}	P _{total}
		[t.year ⁻¹]			
Danube	27,168.579	651.831	2,034.506	404.241	24.537
Morava	13,052.604	55.241	368.235	165.276	6.973
Váh	298,726.796	2,244.101	11,305.118	3,037.947	174.862
Hron	76,898.146	417.557	1,775.556	486.768	52.565
Ipeľ	10,311.678	169.643	485.153	101.204	7.694
Slaná	10,337.984	68.717	257.101	74.190	5.208
Bodrog	109,431.879	430.851	1,884.208	257.154	20.498
Hornád	73,197.562	358.746	1,346.334	562.020	36.752
Bodva	2,453.007	14.004	47.677	0.947	0.134
Dunajec & Poprad	25,580.598	151.187	353.863	133.660	15.008
SR total	647,158.833	4,561.878	19,857.751	5,223.407	344.231

Source: SHMI

7.5 Sewage Sludge Production and Disposal

In 2012 sludge production covered 58,706 tons of dry mass. The overview of sewage sludge generation for WWTP and sludge disposal methods in the period from 2001 to 2012 is shown in the Table 7.5.1.

Table 7.5.1

Year	Sludge production (dry mass) t/year	Of which					
		Assessment (soil processes, etc)		Temporarily stored		Put on disposal site	
		t/year	%	t/year	%	t/year	%
2001	53,350	37,855	71.0	8,493	15.9	7,002	13.1
2002	51,270	41,960	81.8	4,870	9.5	4,440	8.7
2003	54,340	39,330	72.4	6,900	12.7	8,110	14.9
2004	53,110	42,530	80.1	5,860	11.0	4,720	8.9
2005	56,360	39,120	69.4	8,710	15.5	8,530	15.1
2006	54,780	39,405	71.9	6,130	11.2	9,245	16.9
2007	55,305	42,315	76.5	9,400	17.0	3,590	6.5
2008	57,810	38,368	66.4	10,766	18.6	8,676	15.0
2009	58,582	47,056	80.3	8,830	15.1	2,696	4.6
2010	54,760	48,063	87.8	6,681	12.2	16	0.03
2011	58,718	50,469	86.0	5,943	10.1	2,306	3.9
2012	58,706	50,782	86.5	6,195	10.6	1,729	2.9

In soil processes there were used 47,586 t of dry mass (81.06 %) – the amount of 1,140 t (1.94 %) was directly applied to agricultural land; 36,830 t of sludge dry

mass were used for production of compost and 9 616 t of sludge for soil processes. The amount of 3,196 t of dry mass was turned into energy compost.

8 Monitoring and Information System

Monitoring System

In 2012 surface and ground water monitoring was carried out according to the Water Monitoring Programme 2012 (hereinafter „Monitoring Programme“) which is a basic planning document for water monitoring in Slovakia resulting from the Framework Water Status Monitoring Programme 2010 – 2015 approved by the Operative Meeting of the Minister of Environment SR no. 15 of 15 August 2008, Resolution no. 121.

Monitoring Programme can be found in the following website: http://www.vuvh.sk/rsv2/download/02_Dokumenty/23_Program_Monitorovania_2012/0_2012_text.pdf.

It has been prepared jointly for the Danube River Basin District and the Vistula River Basin District: It is divided as follows:

- Surface Water Monitoring Programme,
- Ground Water Monitoring Programme,
- Monitoring Programme of Protected Areas.

➤ Surface Water Monitoring Programme

Surface Water Quantity Parameters

In 2012 the monitoring of surface water quantity parameters was planned in 418 gauging stations. Water level was monitored in 418 stations, water discharge was calculated in 405 stations, water temperature was monitored in 412 stations and the samples of suspended load (water turbidity) were taken and evaluated in 17 stations. Data related water level, discharge and temperature are recorded every hour and the data related suspended load once a day. In fact, 2,376 measurements were made. Common measurements with neighbouring countries on transboundary rivers were taken as it is stated in the Table no. 8.1. following bilateral agreements:

Common measurements on transboundary courses Table 8.1

Country	Number of common profiles	Number of hydrometerings
Hungary	30	137
Austria	3	21
Czech Republic	4	24
Poland	5	26
Ukraine	2	10
Total	44	218

Source: SHMI

Surface Water Quality Parameters

In 2012 there were 314 locations monitored in basic and operational monitoring.

Normally the frequency of monitoring is equally distributed during the year, i.e. 12 times a year according to the monitoring programme. Lower frequency is related to

some biological parameters which are monitored seasonally (twice to 7 times a year), radioactivity parameters (4 times a year) and relevant substances (4 times a year).

Monitoring results are archived in local databases of related organizations and they are centrally stored in the Oracle database operated by the Slovak Hydro-meteorological Institute. They are made available according to the Act 211/2000 Coll. on Free Access to Information as Amended and presented by the report Surface Water Quality Assessment in Slovakia in 2012.

➤ Ground Water Monitoring Programme

Ground Water Quantity Parameters

In 2012 the monitoring was done in 1 495 monitoring places divided as follows:

- *Monitoring Network of Springs (361)*
- *Monitoring Network of Ground Water Levels (1 134)*

Monitoring results are made available according to the Act 211/2000 Coll. on Free Access to Information as Amended and presented through special publications – the Ground Water Hydrology Year Book, Water Management in the Slovak Republic and the Report on Environment.

Ground Water Quality Parameters

The monitoring of groundwater chemical status was divided as follows:

- *surveillance monitoring*
- *operational monitoring*

In 2012 ground water quality was monitored in 171 surveillance monitoring sites. Groundwater samples were taken at these monitoring sites depending on a type of rock environment: once in 67 pre-quaternary sites and 11 quaternary sites, twice in 39 quaternary sites, 3 times in 54 pre-quaternary fissured-karst sites.

In 2012 there were 295 sites monitored within the operational monitoring programme (except the region of Žitný ostrov) where potential input of pollution to the groundwater from potential source/sources of pollution is expected. The sampling frequency was 1 - 4 times a year depending on a type of rock environment. (once in 28 quaternary and 31 pre-quaternary sites, twice in 184 quaternary sites and 3 times in 12 pre-quaternary fissured-karst sites and 4 times in 40 sites of Žitný ostrov). The region of Žitný ostrov represents a separate part of the SHMI monitoring network as it plays an important role in the process of monitoring the changes in water quality in Slovakia since this region is the most significant drinking water resource in our territory. The monitoring network of Žitný ostrov comprises 34 piezometric multi-layer wells (84 layers) that are monitored 2 – 4 times a year.

Results of laboratory analyses are presented through special publications: „Slovakia Ground Water Quality 2012“ and „Žitný ostrov Ground Water Quality 2011-2012“.

Information Systems

Ministry of Environment SR uses the following information systems (IS) related water management:

➤ ENVIROPORTAL (www.enviroportal.sk)

is a basic platform for publishing the outcomes from information systems which serves the needs of users who want integrated approach to information provided in water management of the Slovak Republic.

➤ EnviroInfo (<http://enviroinfo.enviroportal.sk>)

is an internet database application available to the general public providing the possibility of standardized production, collection and assess to descriptive information on documents.

➤ Information System of Environmental Authorities (www.sazp.sk/isuzp)

provides information support for state administration in the field of environmental protection. It has 2 main subsystems and 7 specialized subsystems. Within the subsystem "Water" the information system "Comprehensive Water Register" was created for the needs of state water administration. This register is a basic register related to water status, rights and duties of legal entities and natural persons in water management and protection. It contains decisions of water administration bodies, data related to ground and surface water condition assessment, etc.

➤ National infrastructure of spatial information in the Slovak Republic

Hydrography is one of the topics which are part of the INSPIRE Directive and its transposition into the Act of the Slovak Parliament no. 3/2010 Coll. on the National Infrastructure for Spatial Information (NIPI). Spatial data (GIS, digital map materials) within Hydrography are under the competence of the Ministry of Environment of the Slovak Republic (obligatory person), namely WRI, SHMI, WMC, SWME.

9 Risk Factors of Water Management, Causes and Consequences

9.1 Floods

The Consequences of Floods in 2012

The total costs and damage caused by floods in 2012 (Table No. 9.1.1 and Figure. 9.1.1) were quantified at 3.26 million €. Flood damage to property of state was in the amount of 0.59 mil. €, to property of residents in the amount of 0.04 mil. €, to property of municipalities in the amount of 0.69 mil. € and to property of higher territorial units in the amount of 0.90 mil. €. Damage to property of legal entities and natural persons was amounted to 0.21 mil. €.

In total, the floods affected 146 villages and towns. Floods damaged 269 houses; 64 non-residential premises; 352.76 ha of agricultural land; 24.00 ha of forest soil and 161.12 ha of the areas of municipalities.

Financial consequences of floods in 2005 - 2012

Table 9.1.1

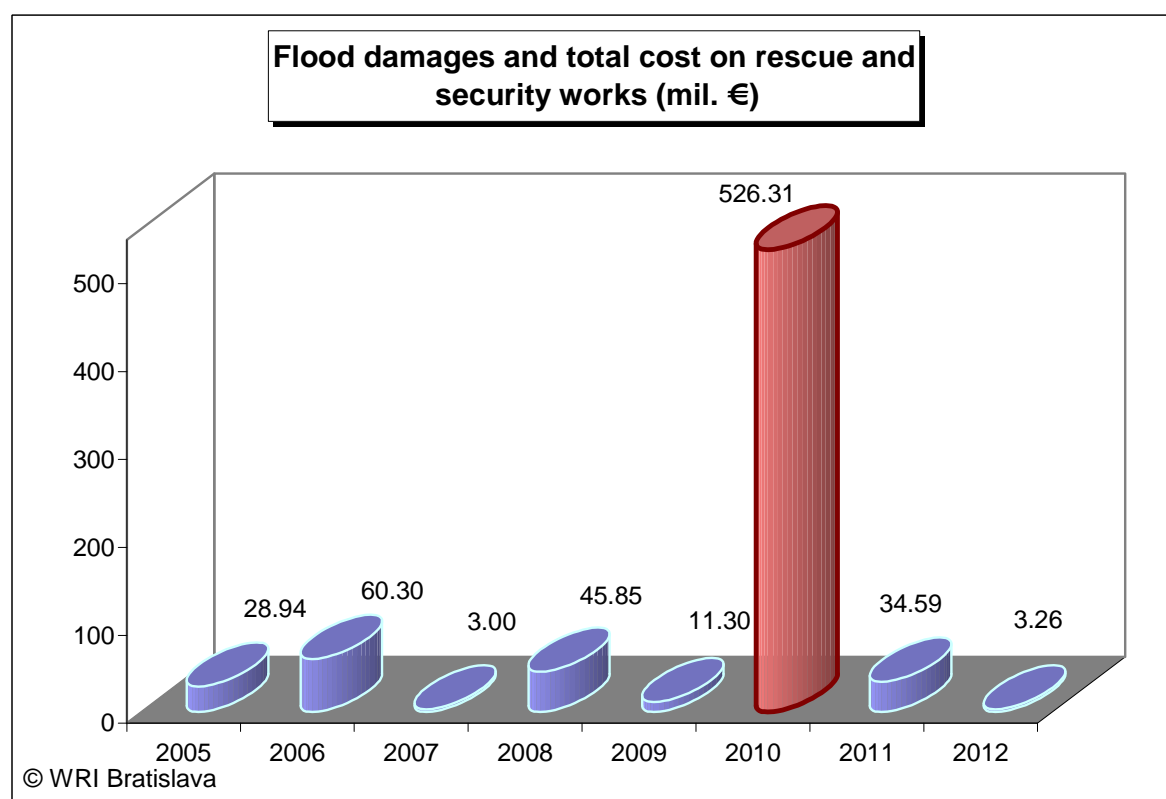
Floods - year	Number of municipalities affected by floods	Flooded areas in hectares	Flood damage (in mil. €)	Costs (in mil. €)		Total costs and damage (in mil. €)
				Rescue operations	Protection operations	
2005	237	9,236.8	24.03	2.24	2.67	28.94
2006	512	30,729.7	47.90	5.98	6.42	60.30
2007	60	339.5	2.49	0.30	0.21	3.00

Floods - year	Number of municipalities affected by floods	Flooded areas in hectares	Flood damage (in mil. €)	Costs (in mil. €)		Total costs and damage (in mil. €)
				Rescue operations	Protection operations	
2008	188	3,570.0	39.75	3.59	2.51	45.85
2009	165	6,867.2	8.41	1.59	1.30	11.30
2010	1,100	103,005.6	480.85	17.93	27.53	526.31
2011	1,808	3,076.8	20.10	2.00	12.58	34.59
2012	146*	537.9	2.43	0.37	0.46	3.26

Source: Reports on floods in Slovakia 2005 – 2012 (Ministry of Agriculture SR and the Ministry of Environment SR)

* Number of municipalities with the 3rd level of flood activity

Figure 9.1.1



9.1.1 Sustainable Flood Protection Action Programme in the Danube River Basin

In 2012 SWME provided the construction of new hydro-technical flood protection infrastructure through 22 investment actions within the activities related to the Sustainable Flood Protection Action Programme in the Danube River Basin. It also provided maintenance of existing hydro-technical flood protection infrastructure (protection dykes, water reservoirs, polders, water courses, pump stations and canal network of inland waters...) which represented the amount of 29,266 thous. € out of the property administrated by the SWME in 2012.

9.1.2 Implementing the Directive of the European Parliament and the Council no. 2007/60/EC on Flood Risk Assessment and Management

The following was prepared for the reporting according to the Article 4, Point 4 of the Directive 2007/60/EC in 2012:

- data about basins having negative impact on human health, environment, culture heritage and economic activity,
- data about geographic areas affected by floods with negative impact
- text information submitted to the European Commission (EC).

Files XLM, layers GIS and prepared text parts for the Danube River Basin District and for the Vistula River Basin District were reported to the European Commission. These are available to the public on the following website: <http://cdr.eionet.europa.eu/sk/eu/floods> excluding GIS data which cannot be made available.

Reporting about the implementation of the Directive 2007/60/EC submitted to the EC contains only the description of floods which occurred in 2010. The year 2010 was exceptional for Slovakia due to flood development and the size of flooded territory. Descriptions of causes, development and consequences of floods which occurred in Slovakia during the years 1997 – 2010 are located in special materials available to the public on the website of the Ministry of Environment SR.

The work and time schedule of the preparation of the first flood risk management plans was elaborated and published at the website of the Ministry of Environment SR (<http://www.minzp.sk/files/sekcia-vod/casovy-a-vecny-harmonogram-navrhu-prvych-planov-manazmentu-povovodnoveho-rizika.pdf>) before 22 December 2012 according to the Act 7/2010 Coll. on Flood Protection, §13 Flood Inspection.

International Commission for the Protection of the Danube River (ICPDR) coordinates the implementation of the Directive 2007/60/EC in the Danube international river basin. States associated in the ICPDR agreed on the division of the Danube River Basin into 17 international sub-basins. Slovakia participates in the implementation of the Directive 2007/60/EC in 4 of these basins:

1. *Preliminary assessment of flood risk in the Danube sub-basin*
2. *Preliminary assessment of flood risk in the Morava sub-basin*
3. *Preliminary assessment of flood risk in sub-basins of the rivers Váh, Hron and Ipeľ*
4. *Preliminary assessment of flood risk in sub-basins of the rivers Bodrog, Bodva, Hornád and Slaná*

9.2 Drought and Water Scarcity

Fear of drought and water scarcity in the EU has increased during the last decade mainly in connection with long-term unbalance between water demand and water accessibility in Europe. In 2011 and 2012 a large part of southern, western and northern Europe¹ was affected by drought. Slovakia² was considerably affected by drought as well.

Drought and water scarcity can cause economic loss in key sectors using water and can have environmental impact on biodiversity, water quality, devaluation and destruction of wetlands, soil erosion, devaluation and desertification of soil. Some

changes are short-time and reversible but some can be permanent. (Communication, 2012a).

European Environmental Agency (EEA) elaborated the summary report „Water resources in Europe in the context of vulnerability“ (EEA, 2012)¹, where can also be found the comments on drought and floods in the context of land use and climate change within the EU. For example the drought in Europe in the years 2003, 2011, 2012 was compared. Historical comparison of drought was compiled between 1971 – 2011. Part of the analysis dealt with good ground water status and situation within the EU according to the first river basin management plans.

In November 2012 the EC issued the „Report on the Review of the European Water Scarcity and Droughts Policy“ (Communication, 2012a). The report basically contains described extremes which affected the EU mainly in the years 2000 – 2012. EC is focused there on preparation and description of the policy during drought and water scarcity in Europe in the years 2014 – 2020. Detailed information can be found at the website <http://ec.europa.eu/environment/water/water-framework/pdf/COM-2012-672final-EN-cov.pdf>.

Working group Water Scarcity and Drought (WS&D) EC dealt with the indicators of drought and water scarcity, risk maps and drought management plans in the years 2010 – 2012 (CIS, 2009). Slovakia actively participates in the activities of this working group at the European level, since it has rich experience in this field and plenty of sound hydrology experts. In 2012 Slovakia tested several drought indicators. Slovak experts tested the methodology designed by the EC how to calculate the index for the drought and water scarcity assessment (WEI+ index) in the pilot territory of the Bodva River.

Identification of the territories with water scarcity risk was updated and classification according to specific drought degrees within Slovakia was made pursuant to the changes in water utilization in 2011 and 2012.

9.3 Quality Control in Water Protection and Solutions to Emergency Water Quality Deterioration

Work of the Water Protection Inspection and the Slovak Environmental Inspection related to the Water Act was in 2012 mainly focused on the control and approval of prevention measures related to the leakage of harmful substances into environment and emergency plans.

218 (19.85 %) cases of law violation was reported from the total number of 1,098 checks in 2012. The percentage is lower than in 2011 (25.33%).

Emergency Water Quality Deterioration

In 2012 as many as 117 cases of emergency water quality deterioration were reported by the Slovak Environmental Inspection (SEI).

¹ EEA, 2012: Water resources in Europe in the context of vulnerability, ISSN 1725-9177, EEA Report, No. 11/2012, Brusel

² <http://www.agroserver.sk/news/>

Overview of reported cases in the years 2005 – 2012

Table 9.2.1

Year	Emergency water quality deterioration						
	Number of reported cases	Surface water			Ground water		
		Total number	Rivers and reservoirs	Boundary rivers	Total number	Pollution	At risk
2005	119	66	2	5	53	2	51
2006	151	94	1	3	57	6	51
2007	157	97	1	4	0	4	56
2008	102	49	0	6	53	4	49
2009	101	50	1	3	51	7	44
2010	100	42	40	2	58	2	56
2011	115	59	2	5	56	1	55
2012	117	67	0	7	50	2	48

Reported cases in the years 2005 – 2012 according to pollutants

Table 9.2.2

Year	Water quality deterioration caused by										
	Oil substances	Corrosives	Pesticides	Fertilizers	Silage juices	Industrial fertilizers	Other toxic substances	Solids	Waste water	Other substances	Undetected substances
2005	69	0	0	14	0	0	4	4	10	8	10
2006	69	3	2	14	0	0	4	3	28	6	22
2007	76	4	0	12	0	0	5	3	24	7	24
2008	65	2	0	7	0	0	2	2	15	3	6
2009	65	0	0	2	0	0	1	2	17	1	13
2010	60	3	0	10	0	1	1	4	12	6	3
2011	76	0	0	10	0	0	3	0	14	7	5
2012	66	1	0	13	0	0	3	3	14	3	14

Reported cases in the years 2005 – 2012 according to the cause of origin

Table 9.2.3

Year	Human factor	Bad condition of facility due to			Emergency		Climatic influences	Transport and Transfer		Deterioration originated outside Slovakia	Other	Undetected
		Bad maintenance and spare parts	Wrong technical process	Insufficient capacity of structure	Fire	Explosion		Transport	Transfer of HS & PHS*			
2006	30	7	13	5	2	2	4	38	6	1	20	23

Year	Human factor	Bad condition of facility due to			Emergency		Climatic influences	Transport and Transfer		Deterioration originated outside Slovakia	Other	Undetected
		Bad maintenance and spare parts	Wrong technical process	Insufficient capacity of structure	Fire	Explosion		Transport	Transfer of HS & PHS*			
2007	32	5	12	6	0	4	3	50	4	0	10	31
2008	10	10	9	2	1	2	2	38	6	0	10	12
2009	13	10	3	1	1	1	1	27	5	0	24	15
2010	9	9	7	5	0	3	4	24	4	0	22	13
2011	22	11	9	0	1	2	4	28	5	1	25	12
2012	34	13	13	0	1	1	7	17	1	1	10	19

*HS – harmful substances, PHS – particularly harmful substances

Source: Annual Report of SEI in 2005 – 2012, Report on Emergency Water Quality Deterioration in Slovakia 2005 – 2012

10 Economic Analysis

An overview on achieved economic results for individual groups of state enterprises, water companies and other entities providing drinking water supply and waste water collection is shown in the Table 10.1.

[thous. €]

Table 10.1

Indicator	Year	WC+ other entities	SWME	WMC	WM total
Revenues	2011	441,281	100,495	97,944	639,720
	2012	461,362	102,387	119,266	683,015
	Index 2012/2011	1.05	1.02	1.22	1.07
Expenditures	2011	439,540	119,045	95,860	645,626
	2012	464,103	120,615	117,085	675,880
	Index 2012/2011	1.06	1.01	1.22	1.05
Net income after taxation	2011	7,431	-18,551	2,084	- 9,036
	2012	3,337	-18,228	2,181	-12,710
	2012-2011	-4,094	323	- 97	- 3,674

In 2012 the revenues increased by 43,295 thous. € compared to 2011. It is approximately 1.00% of Slovakia gross domestic product (71.5 billion €), see the Tables 10.1 and 10.2.

In 2012 there was a decrease in the number of employees by 71 in the Slovak Water Management Enterprise, Water Management Construction and water

companies. The average salary was increased by 10 € compared to the year 2011 (Table 10.2).

Table 10.2

Indicator	Unit	Year							
		2009		2010		2011		2012	
		m. j.	index 2009/2008	m. j.	index 2010/2009	m. j.	index 2011/2010	m. j.	index 2012/2011
Gross domestic product	billion €	63.3	0.94	65.9	1.04	69.1	1.05	71.5	1.03
of which (SWME,WMC,WC)	billion €	0.64	0.96	0.67	1.05	0.64	0.96	0.68	1.06
Average number of employees in SR economy sector	thous.	2,176.6	0.96	2,317.5	1.07	2,351.4	1.02	2,329.0	0.99
of which (SWME,WMC,WC)	no.	12,020	0.99	11,932	0.99	11,829	0.99	11,758	0.99
Average month salary	€	744.5	1.03	769.0	1.03	786.0	1.02	805.0	1.02
of which (SWME,WMC,WC)	€	797	1.02	830	1.04	890	1.07	900	1.01

Source: Statistical Office SR, Statistic Report on Basic Development Tendencies in SR Economy in 2009, 2010, 2011 and 2012; state enterprises and water companies (WC)

10.1 Effect of Economic Tools

Water Tariffs

The trend in average drinking water and wastewater tariffs in 2008 – 2012 is shown in the tables and figures 10.1.1 and 10.1.2.

Drinking water

Table 10.1.1

	Unit	2008	2009	2010	2011	2012
Eligible costs	thous. €	186,261	183,118	185,889	185,291	197,361
Drinking water supply	thous. m ³	220,861	206,694	201,998	197,440	196,888
Average eligible costs	€·m ⁻³	0.84	0.89	0.92	0.94	1.00
Average tariff (VAT excluded)	€·m ⁻³	0.83	0.89	0.93	0.96	1.01

Wastewater

Table 10.1.2

	Unit	2008	2009	2010	2011	2012
Eligible costs	thous. €	140,754	160,780	169,879	170,928	186,918
Wastewater amount	thous. m ³	207,006	201,384	202,600	200,360	202,839
Average eligible costs	€·m ⁻³	0.68	0.80	0.84	0.85	0.92
Average tariff (VAT excluded)	€·m ⁻³	0.73	0.79	0.84	0.86	0.90

Figure 10.1.1

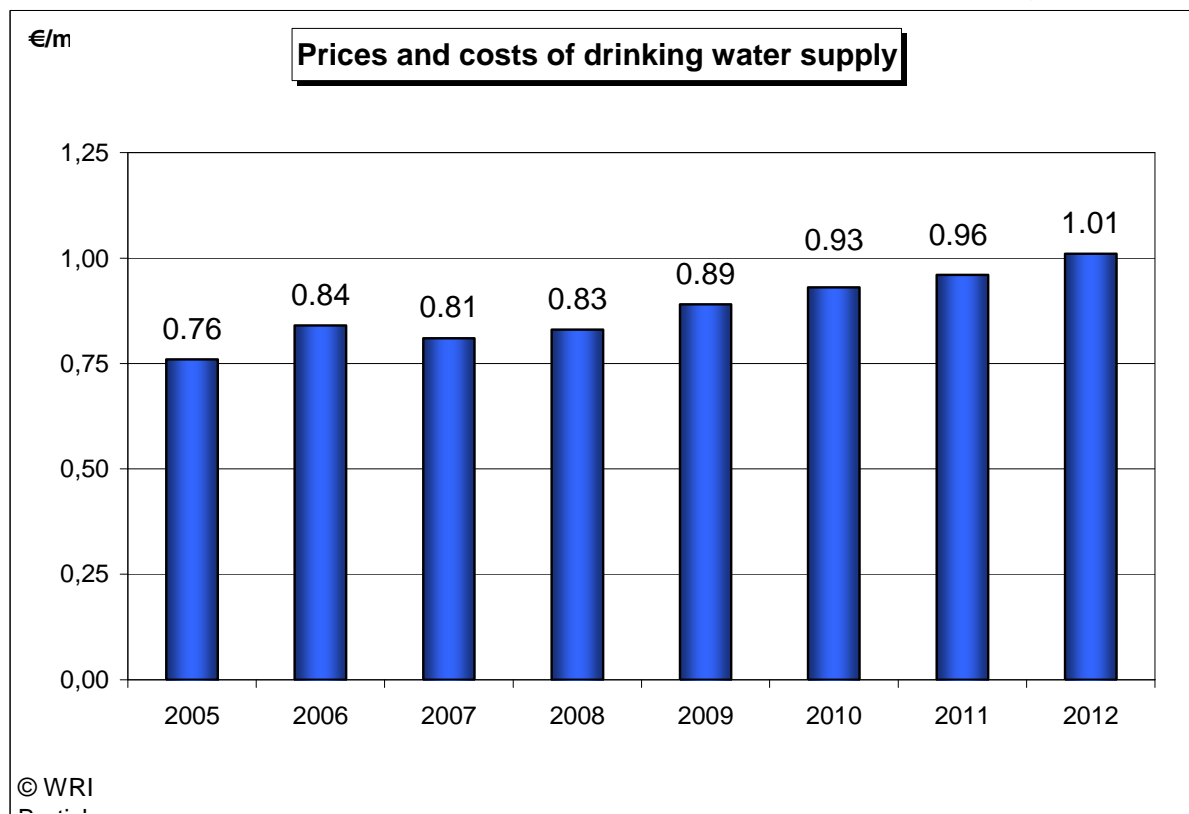
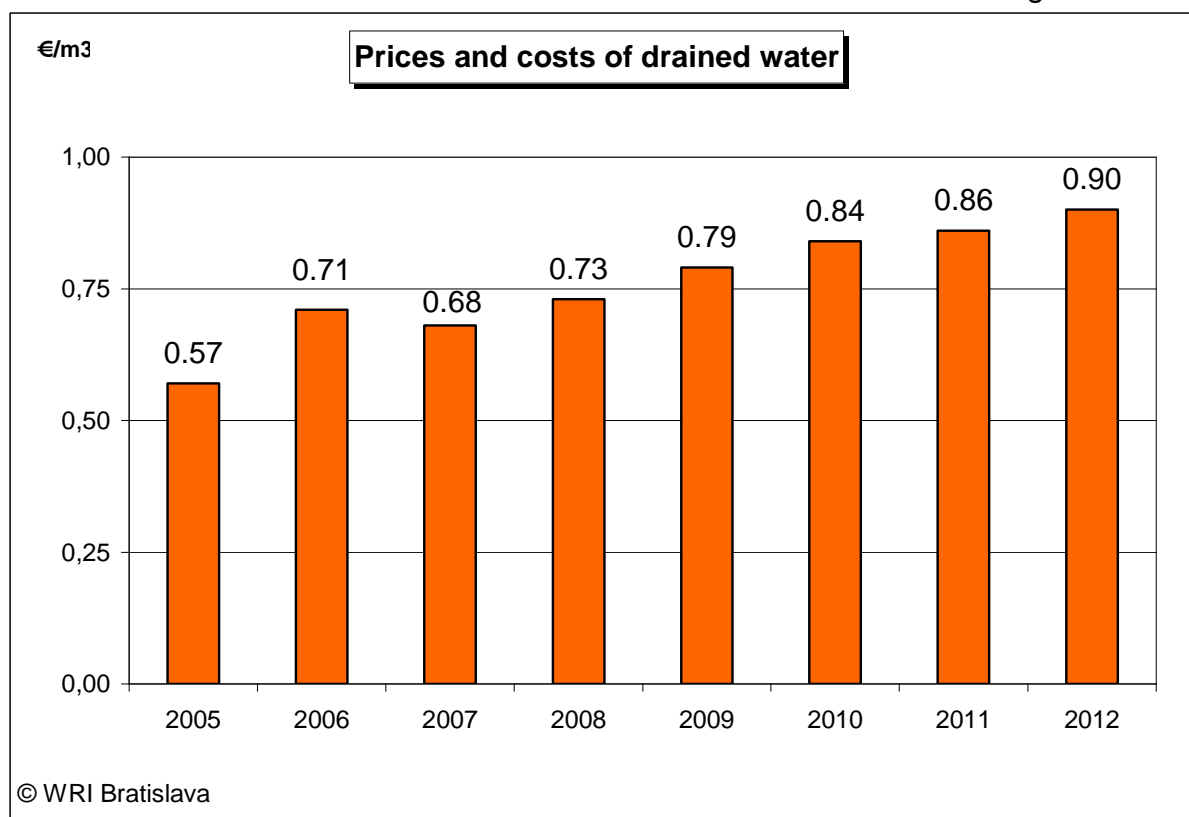


Figure 10.1.2



In 2012, the maximum price of surface water abstraction from a watercourse for the regulated entity SWME Banská Štiavnica increased by 5.95 % compared to 2011. The average price of the use of hydropower potential increased only at the level of inflation by 1.82 %, while different maximum prices were applied to different groups of hydropower potential users according to the installed capacity of hydropower plants. The maximum price of energy water consumption from a watercourse increased by 5.9%.

Price of water management services (VAT excluded) Table 10.1.3

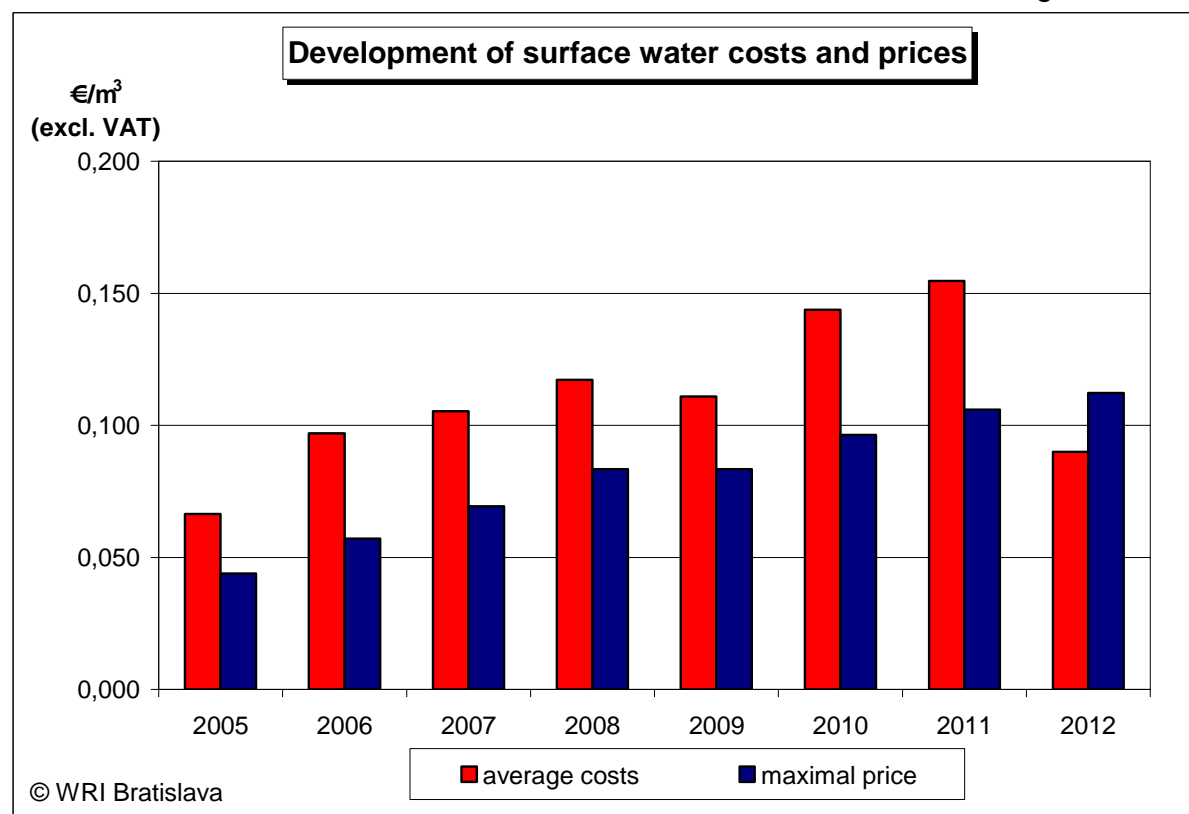
	2010	2011	2012
	€	€	€
Price per 1 m ³ of surface water	0.0963	0.1059	0.1122
Average price of the use of hydropower potential per 1MWh	14.9674	15.1021	15.3770
Price of energy water per thousand m ³	0.1492	0.1492	0.1580

The trend in prices and costs of surface water abstraction in 2007 - 2012 is presented in the table 10.1.4. Average values are shown in the figure 10.1.3.

Trends in surface water prices based on revenues (VAT excluded) in 2007 - 2012 for SWME Table 10.1.4

	Unit	2007	2008	2009	2010	2011	2012
Average cost	€·m ⁻³	0.1052	0.1172	0.1109	0.1437	0.1547	0.0956
Maximum price (according to the Regulatory Office)	€·m ⁻³	0.0694	0.0833	0.0833	0.0963	0.1059	0.1122

Figure 10.1.3



Taxes

The range of tax burden by individual taxes can be seen in the following Table 10.1.5. (in thous. €):

Table 10.1.5

Taxes	2008	2009	2010	2011	2012	Index 2012/2011
Value added tax	19,792	19,483	20,478	22,618	26,233	1.16
Immovable property tax	1,474	1,288	1,019	1,005	1,061	1.06
thereof : land tax	855	720	434	440	445	1.01
tax on construction	599	568	585	561	616	1.10
Road tax	959	996	971	1,019	1,029	1.01
Legal entity income tax	21,237	16,621	21,883	17,558	25,923	1.48

Loans

Bank loans and financial aid increased by 11 364 thousand € compared to 2011.

[thous. €]

Table 10.1.6

	2008	2009	2010	2011	2012	Index 2012/2011
Bank loans and financial aid	119,548	143,125	158,992	183,611	194,975	1.06
thereof: long-term loans	95,521	112,077	131,467	142,363	158,517	1.11
current bank loans	24,028	29,683	27,524	41,246	36,458	0.88

10.2 Labour force, salaries

Annual average number of employees calculated for the public water management enterprises (SWME and Water Management Construction) and joint-stock water companies was 11,829 for the year ending 31 December 2012.

An overview of the number of employees and salary indicators for the public water management enterprises (SWME and Water Management Construction) and joint-stock water companies is shown in the table 10.2.1.

Table 10.2.1

Indicator	2008	2009	2010	2011	2012	Difference 2012- 2011	Index 2012/ 2011
Employees of water companies and public WM enterprises (total)	8,233	8,163	8,069	7,990	7,961	- 29	1.00
SWME employees	3,708	3,663	3,644	3,609	3,572	- 37	0.99
Employees of other public enterprises (WMC)	213	194	219	230	225	- 5	0.98
Employees total	12,154	12,020	11,932	11,829	11,758	- 71	0.99

Indicator	2008	2009	2010	2011	2012	Difference 2012- 2011	Index 2012/ 2011
Average salary total (SWME, WMC, water companies) (€)	778	797	830	890	900	10	1.01
Average salary in water companies (€)	723	754	772	858	889	31	1.04
Labour productivity from revenues (thous. €/employee)	55	53	57	54	58	4	1.07

10.3 State Budget Relations

In 2012, water management organizations managed by the Ministry of Environment spent funds of 22,599,588 € in total.

Budget spending is shown in the following table:

	Expenditure	thereof:	Spent for
SWME Banská Štiavnica	capital 0 €		N/A
	current 17,137,623 €	15,000,000 €	Repayment of refundable financial aid received by SWME from Transpetrol Company
		1,617,632 €	Flood protection measures
		138,874 €	Projects - South East Europe Programme - DANUBE FLOODRISK (125,872 €) NEWADA. (13,002 €)
		381,117 €	Flood protection activities and measures during the 2nd and 3rd level of flood activity
WRI Bratislava	capital 0 €		N/A
	current 2,196,862 €		WRI operation; tasks and activities in accordance with the MoE SR Contract and the Plan of Main Tasks for 2012
SHMI Bratislava	capital 0 €		N/A
	current 3,265,103 €	3,064,288 €	Activities in the field of water management, including monitoring system
		200,815 €	POVAPSYS
TOTAL	22,599,588 €		

No funds were allocated for the Water Management Construction Enterprise from the state budget in 2012. The same applies to water companies and other entities in water management sector.

10.4 Investment construction and its financing in water management

The year 2012 was financially insufficient regarding the investments in the SWME Banská Štiavnica, as no funds have been allocated for the investment area from the budget of the Ministry of Environment since 2008. This has a negative effect on the implementation of flood prevention measures and the renewal of machinery and transportation fleet of the enterprise.

Flood protection investments within the Flood Protection Programme of the Slovak Republic were in the amount of 5,859.4 thous. €, i.e. 52 % of the total investments (11,230.7 thous. €) made in 2012. Out of the total investments to flood protection, the implementation of investment projects amounted to 4,817.5 thous. € and the preparation of investment projects for the next years to 1,041.9 thous. €.

In 2012, the investment construction was financed according to the following structure of funds:

Funds for investment construction - total	11,230.7 thous. €	100.00 %
thereof: own resources	8,316.3 thous. €	74.05 %
state budget co-financing to EU funds	390.0 thous. €	3.47 %
EU funds	2,477.2 thous. €	22.06 %
other resources	47.2 thous. €	0.42 %

In 2012, the **Water Management Construction** made investments using the total amount of 21 119 thousand €, consisting mainly of its own financial resources (21,024 thous. €, i.e. 99.55 %).

An overview of the investments in construction between 2010 – 2012 is shown in the table below:

Investments in thous. €	2010	2011	2012
Gabčíkovo – Nagymaros Hydropower plant and Dams	10,961	21,769	19,021
Žilina Hydropower Plant and Dam	557	762	68
construction in the preparation phase	206	188	170
- from grants	38	0	94
other	1,077	1,964	1,860
Total	12,801	24,683	21,119

The **water companies** made investments from own resources in the total amount of 109.197 mil. €:

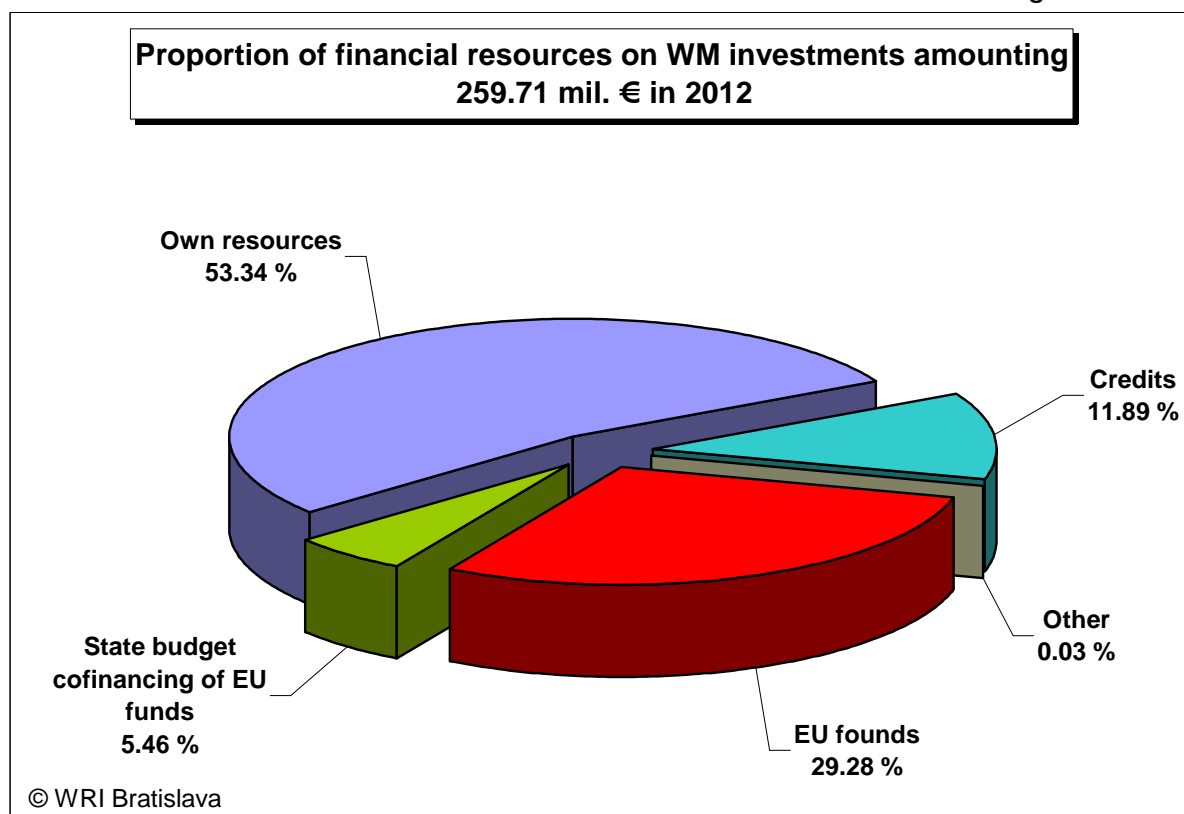
BVS, a. s.	40.309 mil. €	TURVOD, a. s.	2.473 mil. €
TAVOS, a. s.	3.008 mil. €	PovVS, a. s.	2.752 mil. €
ZsVS, a. s.	16.051 mil. €	VSR, a. s.	1.201 mil. €
TVa K, a. s.	1.833 mil. €	StVS, a. s.	6.430 mil. €
SEVAK, a. s.	4.818 mil. €	VVS, a. s.	45.681 mil. €
OVS, a. s.	1.554 mil. €	PVS, a. s.	3.598 mil. €
LVS, a. s.	0.498 mil. €	KOMVaK, a. s.	0.762 mil. €

An overview of the funds for investment construction in 2011 and 2012 is presented in the Table 10.4.1 and Figure 10.4.1 (amounts are indicated in millions).

Table 10.4.1

Financial resources	SWME		WM Construction		Water companies		Total WM	
	2011	2012	2011	2012	2011	2012	2011	2012
State budget	-	-	-	-	-	-	-	-
Own resources	9.20	8.32	105.52	109.20	22.62	21.02	137.34	138.54
EU funds	7.66	2.48	75.17	73.52	-	0.05	82.83	76.05
State budget co-financing to EU funds	1.32	0.39	13.40	13.73	-	0.05	14.72	14.17
Loans		-	29.46	30.87	-	-	29.46	30.87
Others		0.04	0.10	0.04	2.06	-	2.16	0.08
TOTAL	18.18	11.23	223.65	227.36	24.68	21.12	266.51	259.71

Figure 10.4.1



11 Research, Education, Environmental Trainings and Promotion

11.1 Research

WRI Bratislava dealt with the following projects of international, national and local scope in 2012:

- Morava River Restoration: Plan of measures prepared in accordance with the EU directives on the protection of environment and water – MoRe;
- HESTIA Project - Harmonization and evaluation of sampling techniques for the monitoring of trends in aquatic environment;
- Development of the supporting system for decision making process on reducing the risk of environmental pollution on the Bosna River;
- New microbial isolates containing genes of catabolic and detoxification trajectories and their use in biotechnology;
- Development of environmental technologies for flood protection of the Little Carpathian area – case study Modra;
- WATLIFE Project - Enhancement of Public Awareness of the Importance of Water for Life, its Protection and Sustainable Use in accordance with WFD;
- Protection of the Central European Tundra Vole (*Microtus oeconomus mehelyi*);
- Water status monitoring and assessment;
- Applied research and verification of the technologies of catalytic dehalogenation of water contaminated by industrial ecological loads by using reactive barriers;
- Restoration of the Danube flood plains to strengthen flood protection and enhance ecological value of the river ecosystem in the stretch between Szap and Szob;
- Assistance in the implementation of the EU Directive on flood risk assessment and management in Georgia;
- WANDA Project - Waste Management for Inland Navigation on the Danube;
- CO-WANDA Project -Convention for Waste Management for Inland Navigation on the Danube
- MODYN – Prognosis of morphological changes in alluvial rivers affected by human activity

In 2012, the National Water Reference Laboratory received 7 575 samples for analyses and carried out totally 159 865 analyses out of which 109 417 were accredited and 59 938 were not accredited.

Authorized Calibration Laboratory of Water Meters verified 15 water meters measuring cold water volumes, 24 heat meters and calibrated 7 flow meters and 60 current meters.

The activities of **SWME Banská Štiavnica** under the basin development and water planning include mainly provision of technical tasks and documents to manage water flows, water works, management of river basins, national water management, training and updating of river basin management plans, spatial planning, regional development, conservation and other sectoral strategies

The activities of the SWME aimed mainly at the following tasks within the water management development and planning in 2012: dealing with technical tasks and providing background data for water courses and hydraulic structures administration, river basin management, state water administration, preparation and updating of river

basin management plans, regional development, land-use planning, environmental protection and other strategies of the department.

SWME participated in solving the tasks defined under the WFD implementation timetable and work plan for 2012. Following the requirements established under the Water Plan for Slovakia and RBMP, the enterprise dealt with activities aimed at Hydromorphological measures – Measures for elimination of significant interruption of longitudinal continuity of rivers and habitats.

SWME also dealt with the project „Flood risk and flood hazard maps for water courses in Slovakia“ and was charged with coordinating preparation and development of flood risk management plans for each sub-basin.

Water management development also dealt with the tasks resulting from the implementation of related EU legislation as well as national and international standardization.

International cooperation included mainly the following projects: NEWADA; DANUBE FLOOD RISK; CEFROME; MORE; Automated exchange of data in hydrological area of the Morava and Dyje river basins; Slovak-Hungarian hydrological information portal for the Danube and its tributaries (TELEDAN); Restoration of the Danube flood plains to strengthen flood protection and enhance ecological value of the river ecosystem – DuReFlood; Assessment of the flood protection potential using remote sensing methods; Development of joint integrated hydrological system for the Ipeľ river basin, providing real-time forecasts and data (DIWA); Integration of principles and procedures of ecology management into landscape and water management of the East Slovakia Lowland (Laborec – Uh region).

The **SHMI Bratislava** dealt with one own research-development project aimed at the interaction between surface water and groundwater and participated in other six research-development projects in the field of water management:

H-SAF Project, Climate Water Project, Applied research on the methods for determining climatic and hydrological design parameters, Identification of changes in hydrological regime, Quantification of the effect of input model data and parameters on accuracy of the outputs of surface stream dispersion simulation models, Development of regional run-off models.

11.2 Education, environmental training

WRI Bratislava organized the conference “Hydrochemistry 2012 – New analytical methods in water chemistry”. In addition, it was involved in national and international conferences. The WRI experts participated in several scientific workshops and working and expert group meetings (ICPDR and committees on transboundary waters)

In 2012, the WRI also organized scientific courses and workshops: Workshop for employees of radiochemical laboratories management, Groundwater and wastewater sampling course, Microbiological course, Training course for water managers I and II, Hydrobiological course – 1st level, Methodology day for surface water monitoring – classification schemes derivation, Principles of microbiology in laboratory, Hydrometering course, Workshop on water protection issues and Workshop on groundwater protection.

In addition, the WRI organized several excursions to the hydro-technical laboratories and National water reference laboratory during the year.

The WRI has traditionally been involved in the preparation of the national conference on World Water Day. In 2012, the WRI organized the Water and Food Security Seminar in cooperation with the Ministry of Agriculture and Regional Development. In cooperation with the Ministry of Environment it has made available their workplaces for journalists and general public within the Open Day.

In 2012 the education and environmental trainings were performed by the **SWME Banská Štiavnica** through the following activities:

- activities related to organising the World Water Day and the Open Day,
- presentations of employees in electronic media (in radio and television),
- presentations of employees in press media,
- organizing press conferences for media,
- publication activity of employees,
- referee's reports, (bachelor's degree final theses, master's degree final theses, dissertation theses, tasks of science and technology, etc.),
- publication of own journals (e.g. „Voice of the Váh River“ and „Voice of the River Basin“),
- organizing expert conferences and workshops.

SWME in cooperation with the Association of Employers in Water Management Sector (AEWMS) in Slovakia provide the following:

- Assessment of the works for the „Conference of young water managers“
- Competition for the AEWMS Prize for the best master's degree final theses in the field of water management and hydrology

Activities of the **SHMI Bratislava** in 2012 related to environmental education can be summarized as follows:

- workshops on the occasion of the World Water Day and the end of the hydrological year,
- conferences of young experts not older than 35 connected to the competition in three disciplines: hydrology, water management, meteorology and climatology,
- SHMI Open Day,
- excursions, presentations for students of primary, secondary schools and universities,
- presentations for schools and organizations on request,
- contributions to press and electronic media,
- cooperation with the civic association Young Slovak Scientists on the project named Blue School.

Slovak Environmental Agency (SEA) Banská Bystrica performs professional activity in the field of informal environmental education at national level (Department of Environmental Education – DEE) and regional level (Centre of Environmental Education Dropie – CEE).

In 2012 the SEA organized:

- *national competitions* – ProEnviro, EnvirOtázniky, Hypericum, Green World;
- *workshops and conferences* – ENVIROFILM 2012, Fair of Environmental Education Programmes – ŠIŠKA 2012

In 2012, SEA trained 16 employees of the Regional Environmental Office, District Environmental Office and Slovak Environmental Inspection along with 24 employees of municipal offices in the field of water protection, water management, public water supply and public sewerage.

11.3 Promotion

The **WRI Bratislava** published 2 books and 3 scientific papers in foreign professional journals (current contents) in 2012. Comprehensive publication activity can be found on: http://www.vuvh.sk/index.php/sk_SK/kniznica/kniznica-publikacna-cinnost.

The *Water Management Journal* has been prepared and edited in the WRI and published by the Association of Employers in Water Management in Slovakia.

The SWME Banská Štiavnica:

- publishes its own scientific, promotion and information materials, and periodicals ("Hlas Váhu" and "Hlas Povodia"),
- cooperates with professional water management periodicals, e.g. Water Management Journal, Enviromagazine and Water Management Magazine,
- actively supports presentation activities of its employees at scientific conferences and workshops.

Publication activities of the **SHMI Bratislava** for 2012 are included in the SHMI annual report. In 2012, the SHMI published about 85 scientific articles, conference and workshop contributions, reports and yearbooks.

It cooperates with other scientific periodicals (Water Management Magazine, Water Management Journal, Acta Hydrologica Slovaca, and Environment Magazine).

In 2012, the **SEA Banská Bystrica** participated in the project "Enhancement of public awareness of the importance of water for life, its protection and sustainable use in accordance with the WFD", coordinated by the WRI Bratislava. The project aims to change generally practiced water use patterns, which are inefficient and polluting.

The following books were published in cooperation with the WRI and Daphne – Institute of Applied Ecology: "Water World" (picture book), "Let's reveal the secrets of water" (handbook for the 1st level of primary schools), "Insight into the world of water" (handbook for the 2nd level of primary schools), "Every drop counts" (handbook for secondary schools).