

**MINISTRY OF ENVIRONMENT OF THE SLOVAK REPUBLIC**

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**Water Management  
in the Slovak Republic in 2011**

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## 1 The Role of Water Management

In 2011, the water management sector of the Slovak Republic continued in the process of fulfilling objectives and commitments in accordance with the requirements of water policy at the national and international levels.

The priority actions of water sector were aimed at the following:

- drinking water supply and sewerage systems,
- comprehensive water protection and development of water resources,
- flood protection.

The activities were also focused on performing the tasks resulting from the implementation of the WFD and other EU directives related to the membership of Slovakia in the European Union.

The objective of all activities was to meet the requirements under the national water policy aimed at water which is a basic landscape-ecological component and a part of sustainable land development.

## 2 Organizational Structure, Management, Macroeconomics and Property Structure of Water Management Sector

### 2.1 Organizational Structure and Management

The water management sector is regulated by the Ministry of Environment of the Slovak Republic through its strategic and conceptual documents. The activities defined under the strategic documents and water policy concepts are carried out by organizations, institutes and other bodies established by the Ministry.

**The Ministry of Environment of the Slovak Republic** is a central body of the state administration responsible for development and protection of environment

**The Section of Waters** is an organizational unit of the Ministry of Environment and it is managed directly by the State Secretary.

The Section of Waters:

- is responsible for transposition and implementation of the EU water legislation;
- manages and methodologically controls the following institutions and organizations:
  - Water Research Institute (WRI),
  - Slovak Hydro-Meteorological Institute (SHMI)
  - Slovak Environmental Inspection (water section),
  - Regional and local environmental authorities in the field of water and fisheries,
  - Slovak Water Management Enterprise, Banská Štiavnica (SWME),
  - Water Management Development, Bratislava (WMD).

*Other Organizations and Special Interest Associations in water management sector:*

- Slovak Environmental Agency, Banská Bystrica
- State Geological Institute of Dionýz Štúr, Bratislava
- Association of Employers in Water Management Sector in Slovakia

- Slovak Fishery Union, Žilina Council
- Association of Water Companies

## 2.2 Development of Selected Water Management Indicators in relation to the National Economy

The total revenues of SWME, Water Management Development and water companies were 639,720 thousand € for 2011. The revenues decreased by 34,657 € as compared to 2010. In relation to the GDP of the Slovak Republic (69.1 billion €) it represents 1.00 % (table 2.2.1 and 10.2).

SWME shared 15.71 % of the total revenues in the water sector, i. e. 100,497 thousand €. The revenues of water companies shared 68.98 % in amount of 441, 81 thousand €, i. e. more than a half of the total revenues in water management. Water Management Development generated the revenues in amount of 97,944 thousand € that is 15.31 % of the total revenues in the water sector

The total costs for particular activities in the field of water management were in the amount of 645,626 thousand €, where water companies shared 68.1 %, SWME 17.4 % and other water management enterprises 14.5 % of the total costs (table 10.2).

The number of employees in the water sector was reduced by 103 in 2011. The average salary has increased by 60 € compared to 2010 (table 2.2.1 and 10.2).

Table 2.2.1

Parameter	Unit	Year							
		2008		2009		2010		2011	
		Unit	index 2008/2007	Unit	index 2009/2008	Unit	index 2010/2009	Unit	index 2011/2010
GDP	Bill. €	67.2	1.09	63.3	0.94	65.9	1.04	69.1	1.05
thereof: SWME,WMD, water companies	Bill. €	0.67	1.06	0.64	0.96	0.67	1.05	0.64	0.96
Average number of employees in Slovakia	Thous	2,280.0	1.03	2,176.6	0.96	2,317.5	1.07	2,351.4	1.02
thereof: SWME,WMD, water companies	Number	12,154	0.95	12,020	0.99	11,932	0.99	11,829	0.99
Average monthly salary	€	723.0	1.08	744.5	1.03	769.0	1.03	786.0	1.02
thereof: SWME,WMD, water companies	€	778	1.08	797	1.02	830	1.04	890	1.07

Source: Statistic Office SR, Statistic Report on Basic Development Trends in the Slovak Economy in 2006, 2007, 2008, 2009, 2010, 2011; state enterprises and water companies

## 2.3 Relation to the State Budget

In 2011, water management organizations managed by the Ministry of Environment spent funds from the state budget as follows:

	Expenditures	thereof	spent for
SWME Banská Štiavnica	capital 29,423 €		Flood protection activities and measures during the 2nd and 3rd level of flood activity
	current 9,688,335 €	9,659,532 €	Flood protection activities and measures during the 2nd and 3rd level of flood activity
		28,803 €	Projects within the Southeast Europe Operational Programme
WRI Bratislava	capital 0 €		No funds
	current 2,076,862 €		WRI operation; tasks and activities in accordance with the MoE SR Contract and the Plan of Main Tasks for 2011
SHMI Bratislava	capital 0 €		No funds
	current 3,020,612 €	2,816,288 €	Activities in the field of water management, including monitoring system
		204,324 €	POVAPSYS
TOTAL	14,815,232 €		

No funds were allocated for the Water Management Development Enterprise from the state budget in 2011. The same was for water companies and other entities in water management sector.

## 2.4 Property Structure

### 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 2.4.1 shows the development overview on rivers and hydraulic structures between 2007 and 2011.

Table 2.4.1

Indicator	Unit	Years				
		2007	2008	2009	2010	2011
Length of watercourses	km	38,217	38,217	38,217	38,215.7	38,215.7
thereof: trained watercourses	km	8,202.5	8,208.9	8,304.2	8,313.6	8,314.8
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	3,135.2	3,135.5	3,142.5	3,147.7
Length of artificial channels and feeders	km	67	67	67	67	67
Weirs	Numb.	217	216	216	238	238
Number of navigation locks	Numb.	15	15	15	15	15
Pumping stations	Numb.	72	72	70	73	73
Water reservoirs (total)	Numb.	278	277	277	277	278
thereof: water supply reservoirs	Numb.	8	8	8	8	8
Total capacity of water reservoirs	mil. m <sup>3</sup>	1,908	1,908	1,908	1,908	1,908
Dry reservoirs -polders	Numb.	20	20	20	20	21
Historical hydraulic structures	Numb.	23	23	23	23	23

Source: SWME Banská Štiavnica

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).

### **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 2009 – 2011.

Table 2.4.2

Parameter	Unit	Year					
		2009	2010	2011			
				water companies	Municipal	other *	total
Length of water supply system (without service connections)	km	27,532	28,092	26,358	2,330	89	28,777
Length of service connections	km	6,386	6,515	5,905	768	35	6,708
Service connections	Numb.	827,861	846,704	766,612	82,487	4,687	863,786
Length of sewerage system (without service connection)	km	9,659	10,751	9,334	1,791	85	11,210
Length of sewer service connections	km	2,500	2,700	2,225	624	20	2,868

Parameter	Unit	Year					
		2009	2010	2011			
				water compa- nies	Muni- cipal	other *	total
Sewer service connections	Numb.	341,728	370,609	309,347	80,388	4,090	393,825
WWTP	Numb.	587	607	276	337	3	616

\* Other entities: Water and Technical Service Hlohovec, PreVaK, Stará Turá and Mondi SCP Ružomberok  
Source: WRI

### 3 Water Legislation

#### 3.1 Legislative Process

The following legal regulations were prepared and approved in 2011:

1. *procedural regulations to the Act 364/2004 on waters and on amendments to the Slovak National Council Act 372/1990 on offences as amended by later regulations and by the Act 384/2009:*
  - Regulation of the Slovak Government 201/2011 establishing the specifications for chemical analysis and water status monitoring;
  - Regulation of the Slovak Government 279/2011 declaring the binding part of the Water Plan of Slovakia containing the programme of measures to achieve environmental objectives;
  - Regulation of the Slovak Government 416/2011 on the assessment of chemical status of groundwater bodies ;
  - Decree of the Ministry of Environment of the Slovak Republic 73/2011 defining the specifications for identification of significant and sustained upward trends in concentrations of pollutants in groundwater and for the definition of processes for trend reversals.
2. *procedural regulations to the Act 7/2010 on flood protection:*
  - Decree of the Ministry of Environment of the Slovak Republic 112/2011 defining the specifications for content, reassessment and updating of flood risk management plans.

The amendments to certain provisions of the Water Act were made in 2011 (§ 12, § 15 and Annex 6 - on the sustained geological storage of carbon dioxide and the assessment of the effects of certain actions and programmes on the environment.

#### 3.2 Standardization

The WRI Department of Water Planning 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 Department of Water Planning with assuring international cooperation through participation in:



- international standardization committees:
  - ISO/TC 147 Water Quality
  - ISO/TC 224 Standardization of service operations related to drinking water supply and sewerage systems – quality criteria for service and operational indicators
- European standardization committees:
  - CEN/TC 164 Water supply
  - CEN/TC 230 Water analysis
  - CEN/TC 308 Sludge Characteristics

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.

## **4 Implementation of Water Framework Directive and other EU Water Directives**

### **4.1 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 and in accordance with the National Strategy for WFD Implementation for 2010-2012/2015.

The core activities were aimed at the finalization of works within the 1st planning period and activities related to the WFD implementation within the 2nd planning period:

- water monitoring,
- assessment of surface water quality, status, potential and quantity,
- assessment of groundwater quality, quantity and chemical status,
- update of selected characteristics of river basin districts (typology, water bodies, register of protected areas),
- cataloguing,
- water management balance,
- preparation of documents and data processing for the need of Article 9 WFD,
- water scarcity and droughts,
- data collection and database administration
- participation in legislation process within the Environmental Council in relation to updates of the Directive on priority substances 2011/04429 (COD) of the Directive of the European Parliament and of the Council 2008/105/EC.

### **4.2 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 2011, the Ministry of Environment SR submitted the following materials on implementation programmes to the European Commission in accordance with the EU legal regulations:

- UWWTD Questionnaire 2011 (Urban Wastewater Treatment Directive) in accordance with Article 15, Council Directive 91/271/EEC on urban wastewater treatment
- Information according to the Article 7 and Annex II of the European Parliament and the Council Directive 2008/56/EC establishing a framework for community action in the field of marine environmental policy

#### *Cooperation between the Slovak Republic and the European Environmental Agency*

The reporting to the European Environmental Agency (EEA) is among responsibilities of the Ministry of Environment of the Slovak Republic. The SHMI, as an organization coordinated by the Ministry, prepared and submitted the following priority data flows to EEA: River quality (EWN - 1), Lake quality (EWN - 2), Groundwater quality (EWN - 3), State & Quantity of Water Resources (EWN – 4), pilot data for Water emission quality (WISE – 1) and in cooperation with the WRI also Biological data (WISE – 2).

### **4.3 Projects for Implementation of Directives Financed by the EU Funds**

The grants in the amount of 870.228 million € were allocated within the Operational Programme – Environment (of December 31, 2011). The EU funds were 757.929 million € while the co-financing by the state budget amounted to 112.299 mil. €.

Detailed breakdown is shown in the following table:

[in €]

Table 4.3.1

Priority axis	EU funds	State budget	Approved sum of a grant (EU funds + state budget)
1 Integrated protection and rational use of water resources	671 956 599,65	99 507 715,99	771 464 315,64
2 Flood protection	85 972 888,36	12 791 072,97	98 763 961,33
<b>Total</b>	<b>757 929 488,01</b>	<b>112 298 788,96</b>	<b>870 228 276,97</b>

Source: Ministry of Environment SR – Section of Environmental Programmes and Projects

The projects funded by the ISPA Programme and Cohesion Fund within the programme period 2004 - 2006 were completed in 2011.

## **5 International Cooperation in Water Sector**

The Ministry of Environment of the Slovak Republic – the Section of Waters is a coordinator of expert participation in working groups, expert groups and ad hoc groups within the Implementation Strategy 2010 - 2012

In 2011, international cooperation continued in terms of the following intergovernmental agreements, international treaties and conventions:

#### *Intergovernmental agreements and international treaty*

- Agreement between Czechoslovak Socialist Republic and Hungary on Transboundary Waters.
- Agreement between Slovakia and Ukraine on Transboundary Waters
- Agreement between Slovakia and Poland on Transboundary Waters

- Agreement between Slovakia and Czech Republic on Cooperation on Transboundary Waters
- Treaty between Czechoslovak Socialist Republic and Austria on Transboundary Waters.

The Agreement between Slovakia and Austria concerning Water Management Cooperation on Transboundary Waters is the process of ratification.

### ***International Cooperation within the Committees on Trans-boundary Waters***

The following committees were established under the intergovernmental agreements:

1. Slovak – Austrian Committee on Transboundary Waters
2. Slovak – Hungarian Committee on Transboundary Waters
3. Slovak – Ukrainian Committee on Transboundary Waters
4. Slovak – Polish Committee on Transboundary Waters
5. Slovak – Czech Committee on Transboundary Waters

- *Trans-boundary rivers with Austria*

The working groups participated in the joint projects in accordance with the conclusions of the 19th Committee meeting. The project tasks included regular maintenance works on rivers, joint water quality monitoring, water status assessment, exchange of analyses results and joint discharge measurements on the Morava River.

The Committee discussed the following projects:

1. Bridge for bikers and pedestrians connecting Schloßhof (Austria) and Bratislava - Devínska Nová Ves (Slovakia);
2. Integrated River Engineering Project – Danube East of Vienna. The project is still in the phase of environmental impact assessment.
3. Bilateral Project ETC – MoRe – Morava River Restoration: detailed programme of measures prepared in accordance with the EU directives on water and nature conservation;
4. CARESS@danube („Connecting All REscue - and Support Services on the Danube“);
5. Joint training centre for firemen in Marcheg;
6. Ratification process between Slovakia and Austria concerning cooperation on transboundary rivers.

- *Trans-boundary Rivers with Hungary*

The actions included the joint water quality monitoring at the Slovak-Hungarian stretches of the Danube, Tisza, Ipeľ and other tributaries of trans-boundary rivers, including the monitoring of the effect of the Gabčíkovo-Nagymaros Hydraulic Structure on the environment of adjacent region situated in Slovakia. The results show a positive effect on the environment of relevant region.

The following activities and projects were conducted in 2011:

- Investigation of boundary region of the Ipeľ River Basin;
- Protection of Endangered Bird Species in Natural Habitats in the Inland Danube Delta;
- Restoration of the Istragov Marshes;
- construction of bridges over the Ipeľ River.

Four project proposals were submitted within the 4th Call of the ProgrammeV rámci 4. výzvy Programu cezhraničnej spolupráce Slovensko – Maďarsko 2007 – 2013 boli predložené 4 projekty:

1. *Development of joint integrated hydrological system for the Ipeľ River Basin providing forecasts and information in real time.* The project leader is KDV VIZIG and the project partner is SWME - Banská Bystrica;
2. *Establishment of institutional framework for development of projects in order to achieve good ecological status of waters in the Ipeľ River Basin.* The project leader is KDV VIZIG and the project partners are SWME - Banská Bystrica, State Nature Conservancy and Slovak Fishery Union;
3. *Reliable water supply from the Ipeľ River and development of environment at the section of intake structure Rárospuszta;*
4. *Integration of measures proposed by water management organizations within the Ipeľ river basin management plans.* The project leader is KDV VIZIG and the project partner is WRI.

*Responsibilities of the Slovak Government Proxy for the Construction and Operation of the Gabčíkovo-Nagymaros Dam and Hydropower Plant*

Peter Hatiar, the Slovak Government Proxy for the Construction and Operation of the Gabčíkovo-Nagymaros Dam and Hydropower Plant, and Zoltán Illés, State Secretary for Environment of the Ministry of Rural Development of Hungary, signed the *Joint Annual Report on the environment monitoring for 2010* in Budapest on December 16, 2011.

- *Trans-boundary Rivers with Ukraine*

The joint activities were carried continued within the monitoring of water quality on trans-boundary rivers (Tisa, Uh, Latorica, Ulička and Ublianka), the exchange of the results of water quality analyses and regular maintenance works on the rivers.

- *Trans-boundary Rivers with Poland*

The joint activities were carried out in compliance with the conclusions of the 11th Meeting of the Slovak-Polish Committee on Trans-boundary Waters. The works were focused on the quality monitoring of trans-boundary rivers (Dunajec, Poprad, Čierna Orava, Piekielnik and Biela Voda), the exchange of the results of water quality analyses and regular maintenance activities on the rivers. WFD Working Group dealt with the assessment of status and potential of trans-boundary water bodies.

- *Trans-boundary Rivers with the Czech Republic*

The Slovak-Czech Committee and related working groups (WFD and water quality protection) continued in activities in accordance with the conclusions of the 11th meeting (regular maintenance works on transboundary rivers, joint water quality monitoring, exchange of analyses results and joint discharge measurements on the Morava River).

The discussions on comments to and their compliance with the Agreement between Slovakia and the Czech Republic concerning temporary use of the Slovak territory and property for the purpose of building the waterway Otrokovice – Rohatec on the Radejovka River within the project “*Extended Navigability on the Waterway between Otrokovice and Rohatec*”.

### ***Multilateral Cooperation between Slovakia and the Neighbouring Countries***

The committees promoted cooperation with all neighbouring countries through the following projects and activities:

- Environmentally Friendly Flood Protection Measures at the Confluence of Morava and Dyje: flood forecasting system for Morava and Dyje was developed;
- 12th meeting of the Trilateral Ramsar Platform aimed at the cooperation among Slovakia, Austria and the Czech Republic in the protection of wetlands of international importance “Floodplain on the Confluence of Morava – Dyje – Danube”;
- Multilateral harmonization of flood management in the region CENTROPE (Slovakia, Austria, the Czech Republic and Hungary). The flood risk maps are being developed within the Working Package 4 (Potential damage and risks) and flood strategies within the Working Package 5 (Flood management strategies).
- WANDA - WASTE management for inland Navigation on the DANUBE: Collection of bilge water from ships using special mobile vessel was provided free of charge at the Austrian and Hungarian sections of the Danube River in June and September 2011. WRI, the Slovak project partner, organized the conference on ship waste management. The project will be finished in March 2012. More information about the WANDA Project is available on the following website: [www.wandaproject.eu/](http://www.wandaproject.eu/).
- DANUBE FLOODRISK – the project is focused on implementation of the objectives under the EU Directive on flood risk assessment and management along the Danube River. The goal of the project is to develop an atlas of flood risk (including maps of flood damage) and flood hazard maps at a scale of 1:100 000 and for pilot areas at a scale of 1:25 000. The project will be finished in October 2012. More information about the project is available on <http://www.danube-floodrisk.eu/>.
- NEWADA - Network of Danube Waterway Administrations. More detailed information about the project is available on: [www.newada.eu/newada/](http://www.newada.eu/newada/).
- The project “PLUSK - information system for trans-boundary waters between Slovakia and Poland” is completed and its results are available on geo-portal ([www.plusk.eu](http://www.plusk.eu)).

In addition to the mentioned above, the most significant international projects focused on water management development are the following:

- WATLIFE – Enhancement of Public Awareness on Importance of Water for Life, its protection and Sustainable Use;
- UNDP/GEF - Integration of the principles and strategies of ecological management into the landscape and water management in the region of Eastern Slovakia Basin (region of Laborec – Uh);
- WACO – cooperation with the Dutch experts of the Regge and Dinkel Water Board;
- HESTIA – harmonization and evaluation of sampling techniques, trans-national cooperation;
- TICAD - Territorial assessment of the Tisa catchment area;
- Development of supporting system for decision making process on reducing the risk of environmental pollution on the Bosna River (NATO project);
- Article exchange among water management experts of V4;
- Assistance to the implementation of the EU Directive on flood risk assessment and management in Georgia;
- Specific tasks in accordance with the rules of the NORMAN Association;
- CEFROME (Central European Flood Risk Assessment and Management);

- MORE – Morava River Restoration;
- ClimateWater (within the 7th EU framework programme);
- H - SAF - Continuous development and operative phase (CDOP1) of the satellite applications concerning hydrology and water management (EUMETSAT).

### ***EU Strategy for the Danube Region (EUSDR)***

The EU Strategy for the Danube Region was endorsed in June 2011 by the European Council. It is a macro-regional strategy for joint development of the Danube Region countries (figure 5.1). The EUSDR includes priority areas that are coordinated by the Danube Region countries. Slovakia is a co-coordinator of the Priority Area 4 – *To Restore and Maintain Water Quality* (together with Hungary) and the Priority Area 7 – *To Develop the Knowledge Society* (together with Serbia). The Water Research Institute is charged by the Ministry of Environment SR with coordinating the Priority Area 4.

Two meetings of the PA4 Steering group were held in 2011. The steering group was officially established at the kick-off meeting held in Bratislava, where the framework of the Steering Group activities was agreed. One of the main goals of the second meeting held in Budapest was to discuss eight projects submitted by the project lead partners. The submitted projects shall contribute to meeting the objectives of the Danube Strategy. All projects submitted to the PA 4 Steering Group were approved based on the agreed criteria and were awarded a Letter of Recommendation, which is one of the annexes to the application for funding these projects. A letter of recommendation should underline the added value of the project.

The activities were specified for each priority area in order to achieve EUSDR objectives. The milestones of activities are included in the implementation reports for each priority area.

More detailed information is available on [www.vuvh.sk](http://www.vuvh.sk) and [www.danube-region.eu](http://www.danube-region.eu).

Figure 5. 1



## 6 Description of Natural Conditions in Relation to Water and Water Management

### 6.1 Natural Conditions

#### Climate

The total precipitation in the Slovak territory for 2011 reached 649 mm which represents 85 percent of average. The year 2011 is considered dry regarding precipitation. Monthly rainfall totals for 2011 are shown in table 6.1.1.

Average rainfall in Slovakia for 2011

Table 6.1.1

Month	I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.	XII.	Total
mm	31	16	45	35	68	124	162	44	18	42	1	63	649
% of average	67	38	96	64	89	144	180	54	29	69	2	119	85
Excess(+)/Deficit(-)	-15	-26	-2	-20	-8	38	72	-37	-45	-19	-61	10	-113
Description of precipitation period	A	D	A	D	A	W	VW	D	VD	A	ED	A	D

Notice: ED - extremely dry, VD – very dry, D – dry, A - average, W - wet, VW – very wet, EW – extremely wet

Rainfall totals for 2011 per river basin are shown in table 6.1.2. According to the precipitation period characteristics, all river basins in Slovakia can be considered average up to very dry in 2011.

Average rainfall totals per river basin in Slovakia for 2011

Table 6.1.2

River Basin Districts	Sub-basin	Catchment area [km <sup>2</sup> ]	Average precipitation [mm]	% of average	Precipitation period
Danube	Morava*	2,282	616	90	A
	Dunaj*	1,138	429	68	VD
	Váh	14,268	703	83	D
	Nitra	4,501	576	83	D
	Hron	5,465	668	85	D
	Ipeľ*	3,649	508	74	VD
	Slaná	3,217	622	79	VD
	Bodrog*	7,272	647	92	A
	Bodva	858	598	82	D
Vistula	Hornád	4,414	656	97	A
	Dunajec a Poprad	1,950	851	101	A
Slovakia		49,014	649	85	D

\* only Slovak part of river basins

#### Hydrological Conditions

The geographic location of Slovakia on a watershed divide of the Black Sea and Baltic Sea (watershed divide passes along the Slovak - Polish state border and at the stretch between Štrba and Čič – it passes over the Slovak territory) along with natural conditions predetermines the situation of water management in our country. Water from 96 % of the Slovak territory flows through the Danube and Tisa into the Black Sea, while the remaining 4 % flows through the Vistula River tributaries into the Baltic Sea. The streams rising in our territory are rather unstable. High discharges occur regularly in spring from March to April (on Danube, Poprad and Dunajec rivers

approximately 2 months later). Low discharges are observed during the summer and autumn periods.

A density of the river system varies from 0.1 km.km<sup>-2</sup> in karst plains up to 3.4 km.km<sup>-2</sup> in Paleogene rocks of the flysch mountains. The average density of the river system is 1.1 km.km<sup>-2</sup>.

### **Water Resources in 2011**

In 2011, the average annual runoff from the Slovak territory was 191 mm, which is 73 % of the long-term average. The runoff per river basin was in the range from 37 mm (Danube sub-basins) to 404 mm (Poprad and Dunajec river basins). The lowest runoff was recorded in the Hron River Basin (40 %) while the highest was recorded in the Poprad and Dunajec river basins (117 %). The values of annual runoff for each river basin are shown in table 6.1.3

Average annual runoff per river basin in Slovakia for 2011

Table 6.1.3

River Basin Districts	Sub-basin	Catchment area [km <sup>2</sup> ]	Annual runoff [mm]	% of average
Danube	Morava*	2,282	102	77
	Danube*	1,138	37	103
	Váh	18,769	373	161
	Nitra	4,501	115	80
	Hron	5,465	116	40
	Ipeľ *	3,649	107	79
	Slaná	3,217	176	93
	Bodrog*	7,272	136	83
	Bodva	858	194	92
	Hornád	4,414	195	66
Vistula	Dunajec a Poprad	1,950	404	117
Slovakia		49,014	191	73

\* only Slovak part of river basins

Total water balance of water resources in Slovakia

Table 6.1.4

Balance	Volume [mil. m <sup>3</sup> ]
	2011
<i>Hydrological balance:</i>	
Precipitation	31,813
Annual inflow to the Slovak territory	55,643
Annual runoff	69,245
Annual runoff from the Slovak territory	9,362
<i>Water balance:</i>	
Total water intake (Slovakia)	568.64
Vapour from water reservoirs	54.65
Discharge into surface water	601.95
Impact of water reservoirs	366.72
	Accumulation
Water use rate (%)	6.07



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## **Assessment of Groundwater Regime in the Hydrological Year 2011**

### *Groundwater levels*

In 2011, the highest groundwater levels were recorded mainly in December and January when the effect of above-average rainfall totals of 2010 led to the rise of groundwater levels with maximum annual values. Maximum groundwater levels were rarely observed also in March and July. Minimum groundwater levels were measured during the autumn period in September and October.

### *Discharge of Springs*

In 2011, maximum annual discharge of springs decreased almost in all river basins of Slovakia, except Poprad river basin. The decrease reached the level from 40 to 90 % of maximum annual discharge rates of 2010. On the contrary, the increase in annual maximum discharges up to 130 % were recorded in the river basins of Morava, Upper Váh, Poprad, Hornád and Bodrog.

A decrease in maximum annual discharge of springs in 2011 is more significant as compared to the long-term maximum discharge rates

Minimum annual discharges of springs are more variable as compared to 2010. An increase in minimum discharge of springs is dominant in river basins of Morava, Lower Váh, Hron, Slaná and Bodva except Orava (in the range of 105 - 160 %, rarely 250 %). A decrease in minimum discharges was recorded almost in all river basins (70 - 98 %, rarely only 30%). A decrease in minimum discharges is dominant in the Middle Váh catchment area (60 - 98 %).

Minimum annual discharge of springs in 2011 were more significant (from 150 % to 200 % and occasionally more than thousand percent) as compared to the long-term minimum discharge rates.

There is a clear decrease in average annual discharges of springs as compared to the previous year - 60 to 90 % of the values measured in the last year.

Average annual discharge rates of springs increased up to 200 % (more than 300 % in the Poprad catchment area) compared to the long-term average discharges.

### **Surface Water Quality**

Surface water quality parameters were monitored (surveillance and operational monitoring sites) in accordance with the Programme of Water Status Monitoring for 2011 and evaluated according to the Article 3, Paragraph 3 of the Regulation of the Slovak Government 269/2010.

The Programme included 427 sites within the surveillance and operational monitoring.

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): bio-chemical oxygen demand, magnesium, sodium, free ammonia, surface-active chemicals, chromium (VI), 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 6 sub-basins), thermotolerant coliform bacteria (in 6 sub-basins) and intestinal enterococci (exceeded in 4 sub-basins).

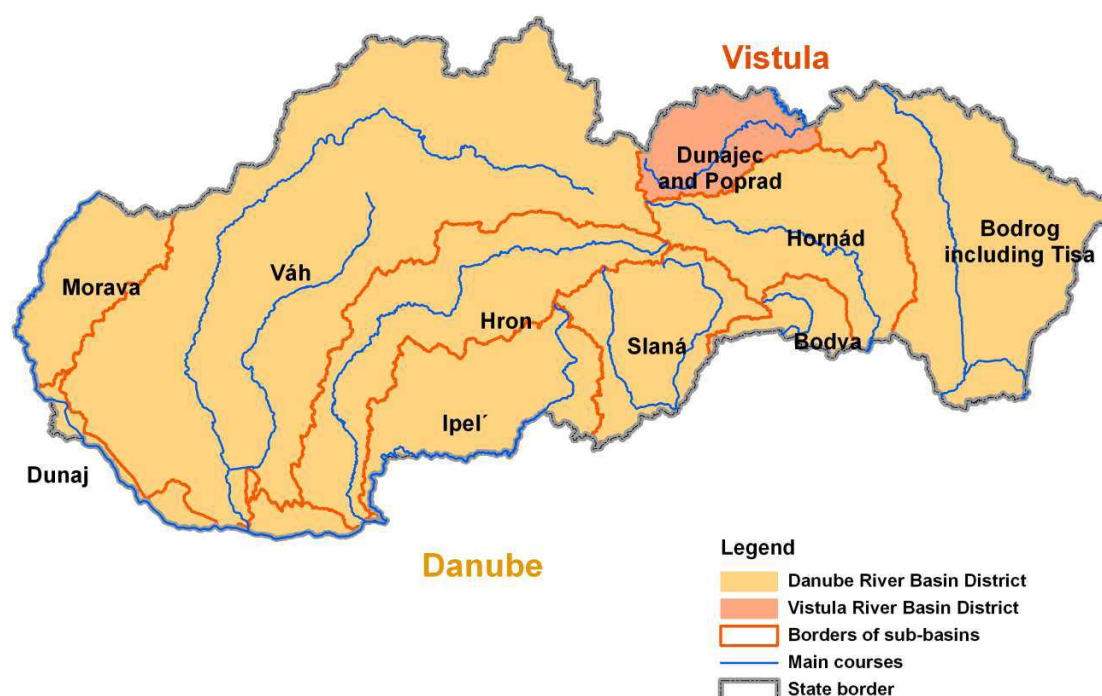
The comprehensive report is available on:  
[http://www.vuvh.sk/rsv2/download/02\\_Dokumenty/19\\_Hodnotenie\\_kvality\\_vody\\_2010/Sprava\\_final\\_2010\\_8\\_2011\\_last.pdf](http://www.vuvh.sk/rsv2/download/02_Dokumenty/19_Hodnotenie_kvality_vody_2010/Sprava_final_2010_8_2011_last.pdf).

## 6.2 River Basin Districts

In the territory of Slovakia there are two river basin districts (Danube and Vistula river basin districts) delineated according to natural hydrological boundaries:

International river basin	River basin district	Sub-basins
Danube 96 % of the Slovak territory	Danube Black Sea drainage area	Danube, Morava, Váh, Hron, Ipeľ, Slaná, Bodrog, Hornád, Bodva
Vistula 4 % of the Slovak territory	Vistula Baltic Sea drainage area	Dunajec and Poprad

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



Each sub-basin comprises related groundwater zones. The list of groundwater zones according to sub-basins is included in the Annex 1 to the Decree of the Ministry of Agriculture, Environment and Regional Development SR 2/2010 defining specifications for the designation of river basin districts; environmental objectives; economic analysis and water planning.

#### *Management of River Basin Districts*

The Danube and Vistula river basin districts are managed by the Slovak Water Management Enterprise Banská Bystrica, the administrator of major rivers in Slovakia. The Ministry of Environment SR is an authority competent to manage the river basin districts.

#### *Water Bodies*

There are 1,760 surface water bodies and 101 groundwater bodies identified within the 1st planning cycle in Slovakia. Out of this number, 1,737 surface water bodies are identified as natural streams and 23 water bodies as lakes (the category was changed from river to lake because of impounding). Designated water bodies should not be changed until the current river basin management plans (2010-2015) are in effect. The designation of water bodies can be further refined within the updated river basin management plans for the next planning cycle (2016-2021).

The list of surface water bodies is included in the Annex 2 to the Regulation of the Ministry of Agriculture, Environment and Regional Development 418/2010.

The list of groundwater bodies is included in the Annex 2 to the Government Regulation 282/2010 defining the threshold values and the list of groundwater bodies.

### **6.3 Protected Areas**

In 2011, several modifications were made within the regular update of the Register of Protected Areas in accordance with the Article 6, WFD:

- Bathing Water Sites

The number of bathing waters was reduced from 36 to 34 localities. Natural localities of Delňa and Vojčianske lake were removed from the register.

- Protected areas for conservation of animal and plant species and their habitats

- Sites of Community Importance

The list of Sites of Community Importance (SCI) was updated in line with the Decision of the Government SR 577/2011 of 31 August 2011 in order to meet EC requirements to add the areas for protection of certain species (e.g. fish, invertebrates, etc.) and habitats (e.g. floodplain forests) to the list. The SCI list was supplemented with 97 sites covering an area of 11 989 ha which is 11.9% of the total area of the Slovak territory (EU average is 13.6%).

- Protected Bird Areas

Protected bird areas were designated in compliance with the Act 543/2002 on nature and landscape protection. In 2011, the decrees of the Ministry of Environment came into effect for 6 protected bird areas: Malá Fatra, Slovenský raj, Tatras, Špačinsko-nižnianske polia, Čergov and Chočské vrchy. There were designated 40 protected bird areas out of the national list. The list of designated bird areas is available on the following website:

<http://www.sopsr.sk/natura/index1.php?p=2&lang=sk>.

Updated list of protected areas included in the register

Table 6.3.1

Protected area category	number of protected areas	area (km <sup>2</sup> )
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	34	-
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	408
- protected bird areas	41	13,089
- sites of Community importance	381	5,737
- large protected areas:	23	10,727
- national parks	9	2,936
- protection zones of national parks	9	2,323
- protected landscape areas	14	5,468
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	74.30
- small protected areas:	1,070	1,041
- directly dependent on water	312	-
- protected fishing areas	29	-

## 7 Water Use

### 7.1 Water Use in Water Bodies

According to § 3 of the Water Act, the waters are divided into surface water and ground water. Surface water is inland water except groundwater. Groundwater is all water located below the surface in saturated zone and in direct contact with the soil or subsoil including groundwater serving as a medium for accumulation, transport and exploitation of the earth's heat from the rocks environment (geothermal water).

#### 7.1.1 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 2011, the volume of abstracted surface water was 242,923 thousand m<sup>3</sup>. This represents an increase by 4,838 thousand m<sup>3</sup> as compared to the previous year. Slight increase in surface water abstraction was recorded in industry, food industry and in water companies for drinking water production.

The most significant consumers of surface water are the following companies and enterprises: Slovnaft Bratislava (40,099 thousand m<sup>3</sup>), U. S. Steel Košice (24,871 thousand m<sup>3</sup>), Mondi SCP Ružomberok (24,203 thousand m<sup>3</sup>) and SE Bratislava – EBO Jaslovské Bohunice (22,464 thousand m<sup>3</sup>).

Revenues for surface water increased by 2,795 thousand € (12.21 %) as compared to 2010. The revenues increased mainly because of higher tariffs for surface water supply. The balance of the compared period was positively influenced by an increase in surface water abstraction.

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 2011 [thousand m<sup>3</sup>] Table 7.1.1.1

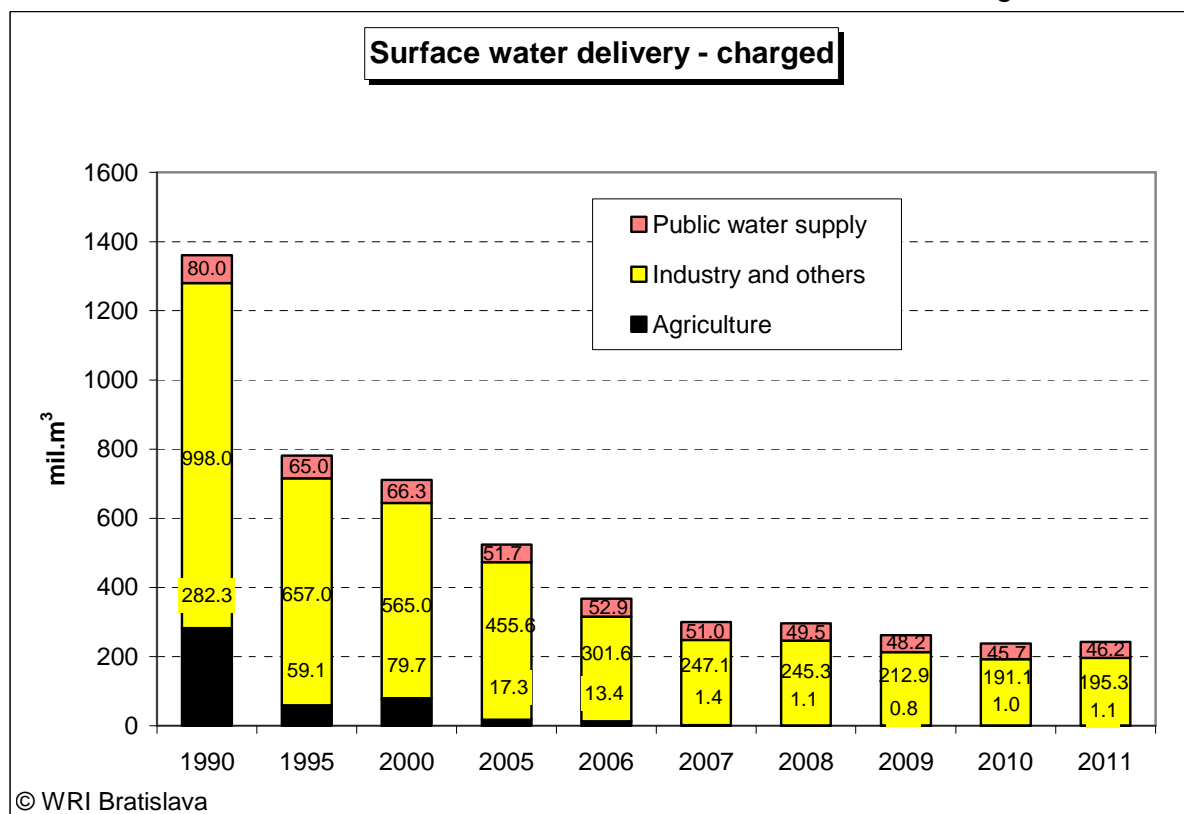
	Bratislava Branch	Piešťany Branch	Banská Bystrica Branch	Košice Branch	SWME Total
Surface water supply (total):	44,113	84,843	49,076	64,568	242,600
public water supply	0	10,731	11,701	23,777	46,209
industry and others	44,113	70,006	37,365	40,791	195,275
agriculture	0	1,106	10	0	1,116

Surface water abstraction up to 1,250 m<sup>3</sup> per month or 15,000 m<sup>3</sup> 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.m<sup>3</sup>] Table 7.1.1.2

	1995	2000	2005	2009	2010	2011
Surface water supply (total)	781.1	711.0	508.8	261.9	237.8	242.6
- public water supply	65.0	66.3	51.7	48.2	45.7	46.2
- industry and others	657.0	565.0	455.6	212.9	191.2	195.3
- agriculture	59.1	79.7	1.5	0.8	0.9	1.1
thereof: irrigation	55.4	77.5	0	0	0	0

Figure 7.1.1.1



The Regulatory Office for Network Industries sets the tariff for surface water use in accordance with the Water Act and the Regulation of the Government SR 755/2004 setting out the amount of non-regulated payments, fees and specifications related to water tariffs.

Price of water management services (VAT excluded)

Table 7.1.1.3

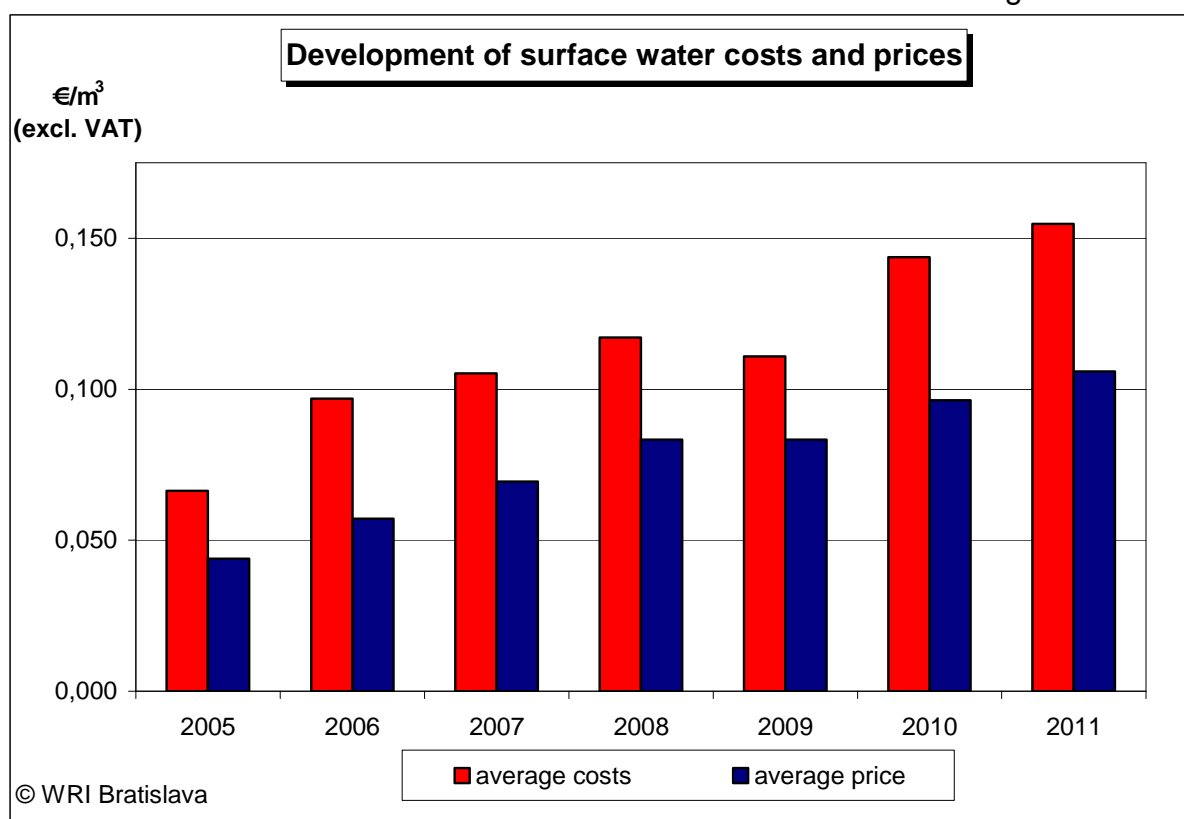
	2009	2010	2011
	€	€	€
Price per 1 m <sup>3</sup> of surface water	0,083317	0,0963	0,1059
Average price per 1 MWh for the use of hydropower potential (HPP)	14.462500	14.9674	15.1021
Price of energy water per thousand m <sup>3</sup>	0.132776	0.1492	0.1492

Surface water price development (VAT excluded)  
in 2006 - 2011 for SWME

Table 7.1.1.4

	Unit	2006	2007	2008	2009	2010	2011
Average cost	€.m <sup>-3</sup>	0.0969	0.1052	0.1172	0.1109	0.1437	0.1547
Average price	€.m <sup>-3</sup>	0.0571	0.0694	0.0833	0.0833	0.0963	0.1059

Figure 7.1.1.2

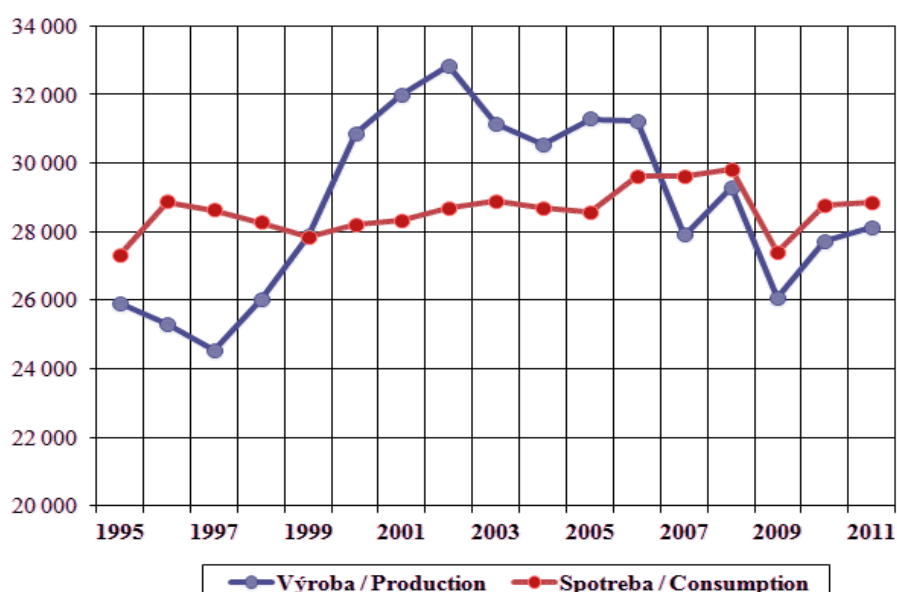


#### ▪ *Hydropower Potential*

In 2011, the Power Grid of the Slovak Republic (PG SR) worked in parallel within the European network ENTSO-E. Electric power production and consumption increased as compared to 2010. The production of electric power reached 28,135 GWh and the total consumption was 28,862 GWh (figure 7.1.1.2). The power production and power consumption index 2011/2010 increased by 1 %.

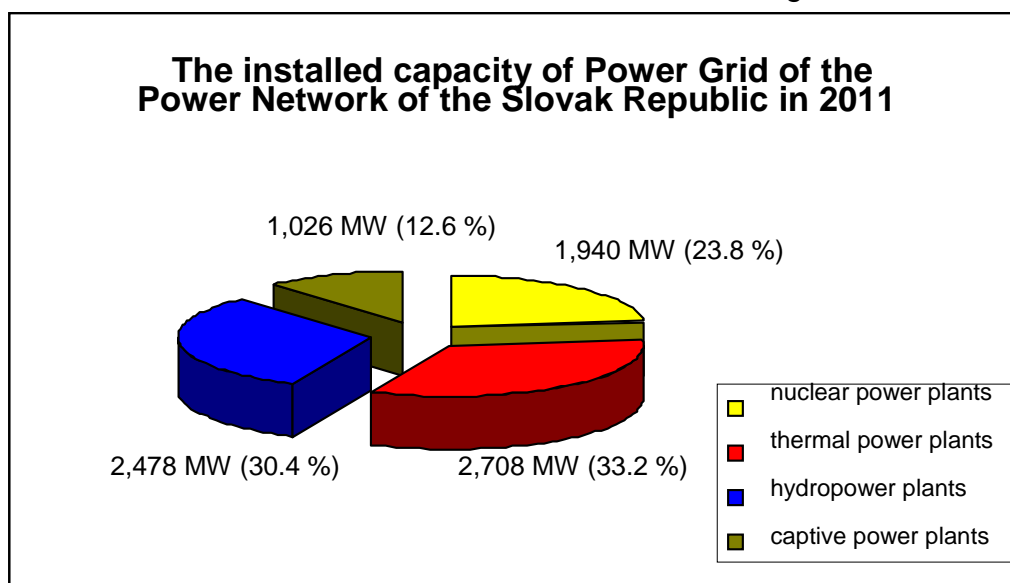
Figure 7.1.1.3

#### Annual electricity production and consumption (GWh) for 1995 – 2011



Installed capacity of power plants within the Power Grid of the Slovak Republic was 8,152 MW:

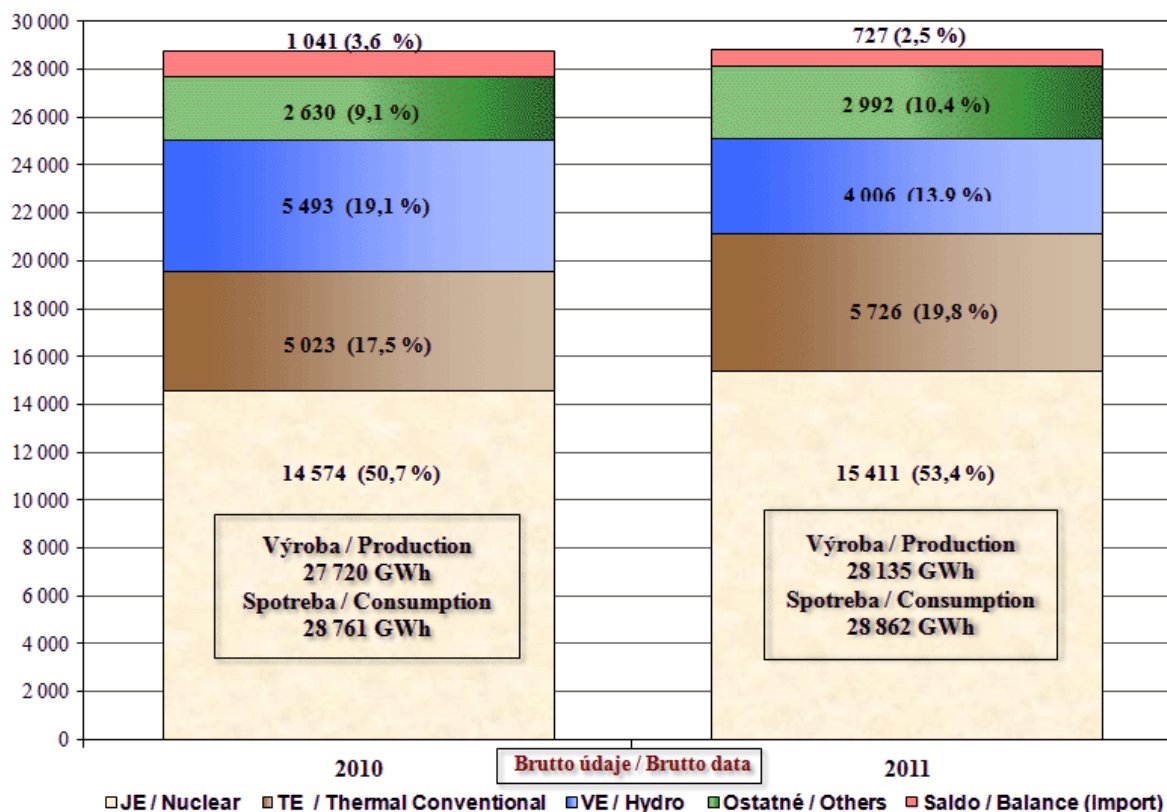
Figure 7. 1. 1. 4



The Power Grid of the Slovak Republic did not cover the consumption of electric energy from domestic sources in 2011. About 727 GWh of electric power was imported from abroad. The sources covering annual power consumption in Slovakia are shown in the figure 7.1.1.5.

Figure 7.1.1.5

### Share of resources covering power consumption (GWh)





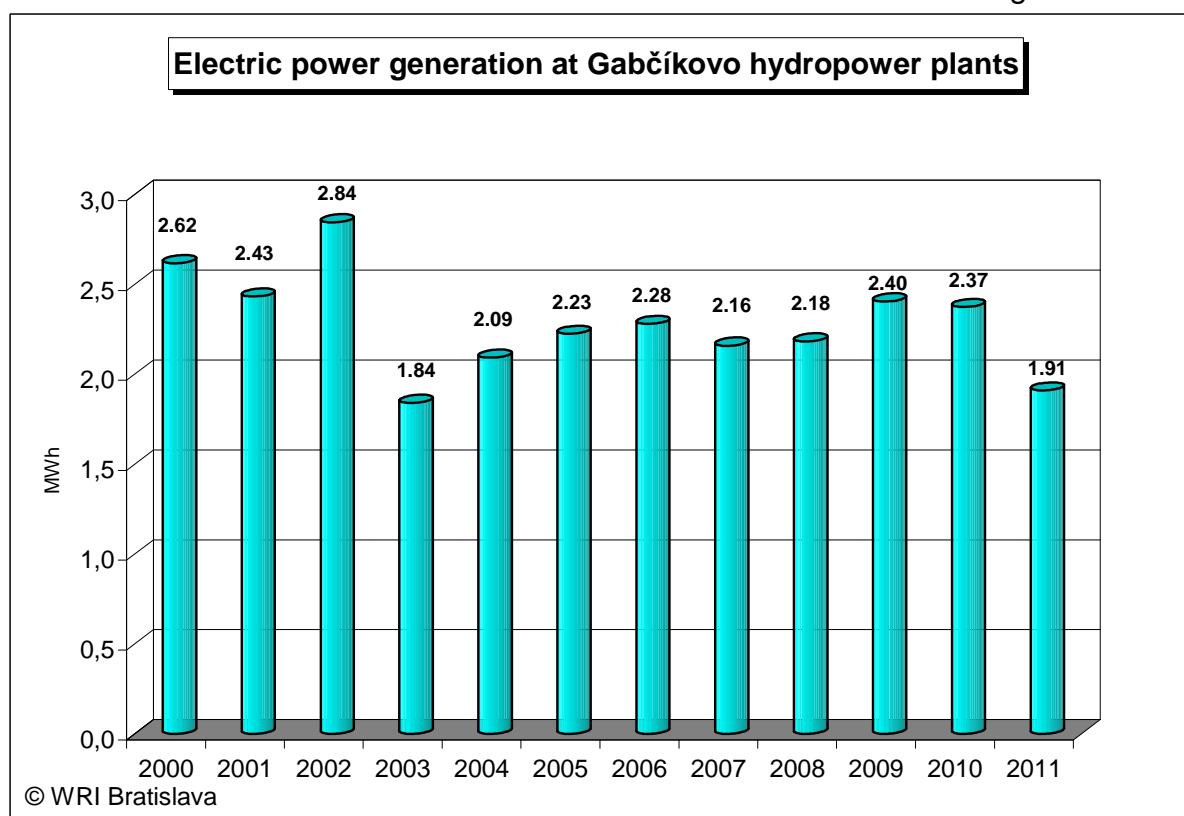
The operation of all water management and energy structures of the Gabčíkovo Dam and Hydropower Plant was managed by the Water Management Construction Company. The production of hydropower was influenced by hydrological conditions on the Danube (lower discharges compared to the previous years). Gabčíkovo Hydropower Plant generated and supplied 1,880,202 MWh of electric power. In comparison with the previous year, the power supply dropped by 465,700 MWh:

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

The Gabčíkovo Hydropower Plant generated 43,313,333 MWh of electric power for the power grid since the start of its operation (october 1992).

An overview of the power production of the Gabčíkovo Hydropower Plant for the period 1992 – 2011 is shown in the figure 7.1.1.6.

Figure 7.1.1.6



The Hydropower Plant Žilina generated 137,975 MWh of electric power and supplied 136,292 MWh to the power grid in 2011. The power production decreased by 77,109 MWh compared to 2010 mainly due to unfavourable hydrological conditions.

The Hydropower Plant Žilina has generated 2,208,480 MWh and supplied 2,189,367 MWh of electric power since the start of its operation (December 1997).

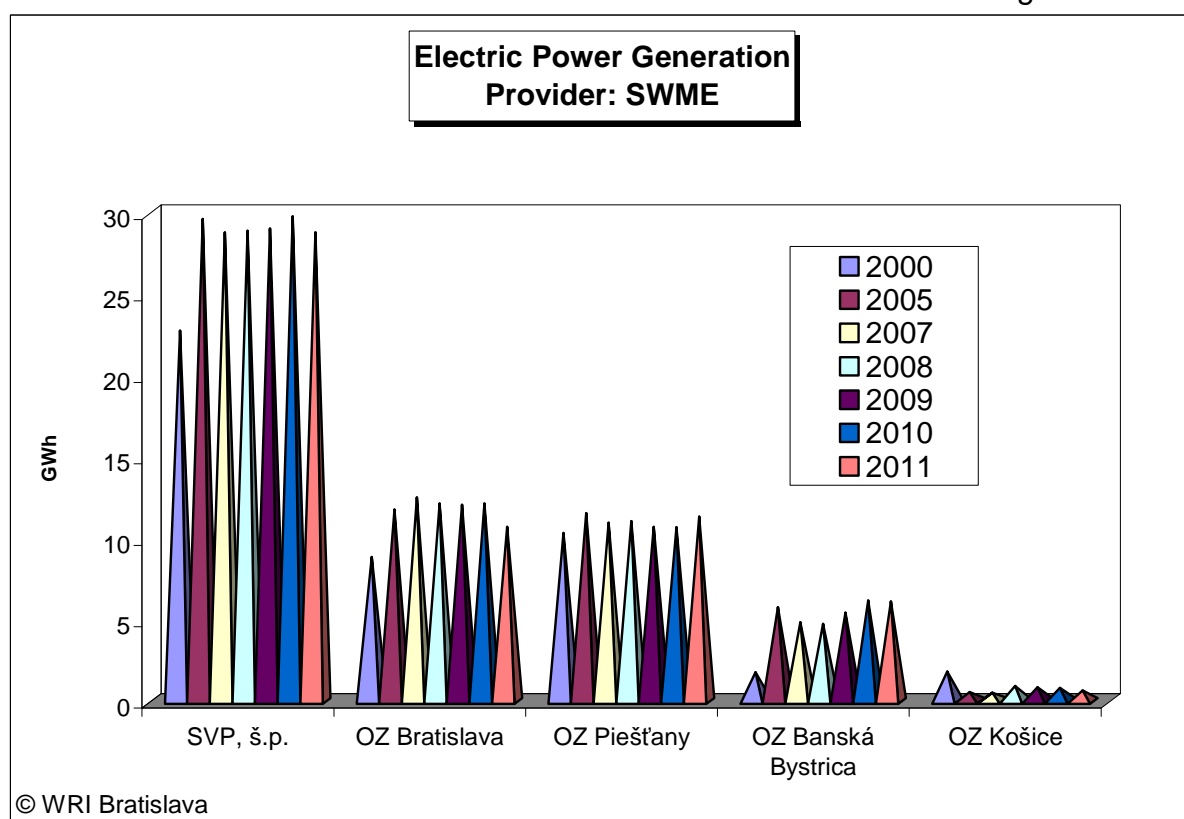
Small hydropower plant in Dobrohošť was launched into pilot operation in December 2011. It generated 555 MWh until the end of 2011.

The organizational units of the Slovak Water Management Enterprise managing the operation of small hydropower plants generated 28.761 GWh of electric power in 2011. This is the increase in production by 0.982 GWh compared with 2010.

Table 7.1.1.5

SWME branch	Number of Small HP plants	Electric power production [GWh]							
		2011	2004	2005	2006	2007	2008	2009	2010
Bratislava	5	12.26	11.75	12.669	12.477	12.123	12.044	12.116	10.690
Piešťany	14	12.03	11.53	11.332	10.947	11.047	10.701	10.665	11.314
Banská Bystrica	12	6.11	5.75	6.793	4.824	4.740	5.430	6.162	6.099
Košice	2	0.57	0.55	0.891	0.507	0.933	0.829	0.800	0.658
SWME Total	33	30.98	29.58	31.685	28.755	28.843	29.004	29.743	28.761

Figure 7.1.1.7



#### ▪ **Irrigation systems**

The state irrigation systems cover an area of 321 thousand ha of agricultural land. There are 441 irrigation systems and 487 pumping stations in Slovakia. The drainage systems covering an area of 326 thousand ha and drainage canals in the total length of 5,850 km were built within the system for regulation of water regime on agricultural land.

Hydromelioration Bratislava - state enterprise has been administrating the main irrigation and drainage systems and facilities since 2003. The enterprise rents the irrigation units to agro-entrepreneurs and farmer associations.

In 2011, Hydromelioration Bratislava rented 214 pumping stations within the irrigation systems, covering an area of about 194,215 ha.

Actually, only 62 pumping stations were used for irrigation (corresponding to agricultural land of 72,565 ha). Irrigated crops were grown on the agricultural land covering 12 to 15 thousand ha. The amount of water used within the national irrigation system was 8,670,402 m<sup>3</sup>:

Region	Irrigation Area (ha)	Number of irrigation units	Water abstraction (m <sup>3</sup> )
Záhorie	11,047	11	1,202,444
Danube	60,162	68	2,171,809
Lower Váh	53,561	50	5,075,895
Upper Váh	34,111	37	79,552
Nitra	9,612	25	128,942
Hron and Ipel	11,354	12	0
Bodrog and Hornád	14,368	11	11,760
Total	194,215	214	8,670,402

#### ▪ **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. The SWME activities include delineation of shipways through the installation of navigation signs in river channels and at river banks, reconstruction of river bank protection, river regulation and removal of barriers from the channel.

The Morava waterway is monitored up to 6.00 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 the it passable for floods and navigation.

The section of the Hron River from Polomka to Kamenný Most is used for sport navigation and water tourism.

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. It provides delineation and monitoring of shipways as well as maintenance during the navigation season.

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 and Nová Bystrica* – in the catchment area administrated by SWME Piešťany,
- *Hriňová, Klenovec, Málinec and Rozgrund* - in the catchment area administrated by SWME Banská Bystrica
- *Bukovec and Starina* - in the catchment area administrated by SWME Košice.

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

### 7.1.2 Groundwater

The assessment of relationships between potentially available groundwater resources and groundwater used for human purposes is carried out by the Slovak Hydro-meteorological Institute through the annual water balance. The groundwater zone is a basic unit for the assessment of groundwater balance.

#### ▪ **Groundwater Resources**

Despite favourable hydrological and hydro-geological conditions for accumulation and circulation of groundwater the disadvantage is unbalanced distribution of groundwater resources in Slovakia. The most significant amounts of ground water are registered in the regions of Bratislava and Trnava. On the other hand, the lowest amount of ground water is registered in the regions of Prešov and Nitra.

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  $78,801.06 \text{ l} \cdot \text{s}^{-1}$ , i. e. more than 53 % of natural resources. The Committee for validation of available groundwater resources of the Ministry of Environment has validated  $47,866.62 \text{ l} \cdot \text{s}^{-1}$  of groundwater that is 60.7 % of available groundwater resources and 32.6 % of natural groundwater resources.

Total available groundwater resources registered as of December 31, 2011:

- validated by the committee	$47,866.62 \text{ l} \cdot \text{s}^{-1}$
- <u>not validated by the committee</u>	<u><math>30,934.44 \text{ l} \cdot \text{s}^{-1}</math></u>
Total	$78,801.06 \text{ l} \cdot \text{s}^{-1}$

#### ▪ **Groundwater Use**

Groundwater is primarily intended for drinking water supply under the Water Act 384/2009 , § 3, section 4.

Groundwater abstraction has been experiencing the downward trends in Slovakia since 1990. In 2011, the consumers used  $10,601.8 \text{ l} \cdot \text{s}^{-1}$  of groundwater that is less by  $217.7 \text{ l} \cdot \text{s}^{-1}$  (2.01 %) compared to 2010.

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 5114 groundwater resources used for abstraction in Slovakia in 2011. An overview according to the purpose of groundwater use for 2010 and 2011 is shown in the following table 7.1.2.2.

Table 7.1.2.2

Purpose of use	Water abstraction [l.s <sup>-1</sup> ]		Difference	
	2010	2011	[l.s <sup>-1</sup> ]	[%]
Public water supply	8,295.0	8,071.1	-223.9	-2.70
Food industry	265.0	206.2	-58.8	-22.19
Other industrial sectors	781.0	802.2	21.2	2.71
Agriculture – animal production	217.2	210.2	-7.0	-3.22
Agriculture – plant production	48.7	81.1	32.4	66.53
Social needs	245.4	237.8	-7.6	-3.10
Other	967.2	993.2	26.0	2.69
Total	10,819.5	10,601.8	-217.7	-2.01

Source: SHMI Bratislava

#### ▪ **Groundwater Balance**

Groundwater balance deals with the relationship between available groundwater resources and water demands in a given year. It is an indicator of the water resources exploitation (optimum use) expressed through the balance state. Out of the total number of 141 groundwater zones in Slovakia, 129 groundwater zones were in good balance state, 11 zones were in satisfactory balance state and 1 zone was in a strained balance state according to the results of water balance for 2011. None of groundwater zones was in critical or emergency state.

#### ▪ **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

The network of *surveillance monitoring* covers 74 groundwater bodies except one pre-Quaternary body SK200350FK - fissured and fissured-karst ground water body of Tatra Mountains in the Váh catchment area, where the monitoring is not expected in the future due to hydro-geological conditions of the groundwater body. In 2011, the ground water quality was monitored in 160 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.

*Operational monitoring* was done in all groundwater bodies that were assessed as being at risk of failing to achieve good chemical status. In 2011 there were 185 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

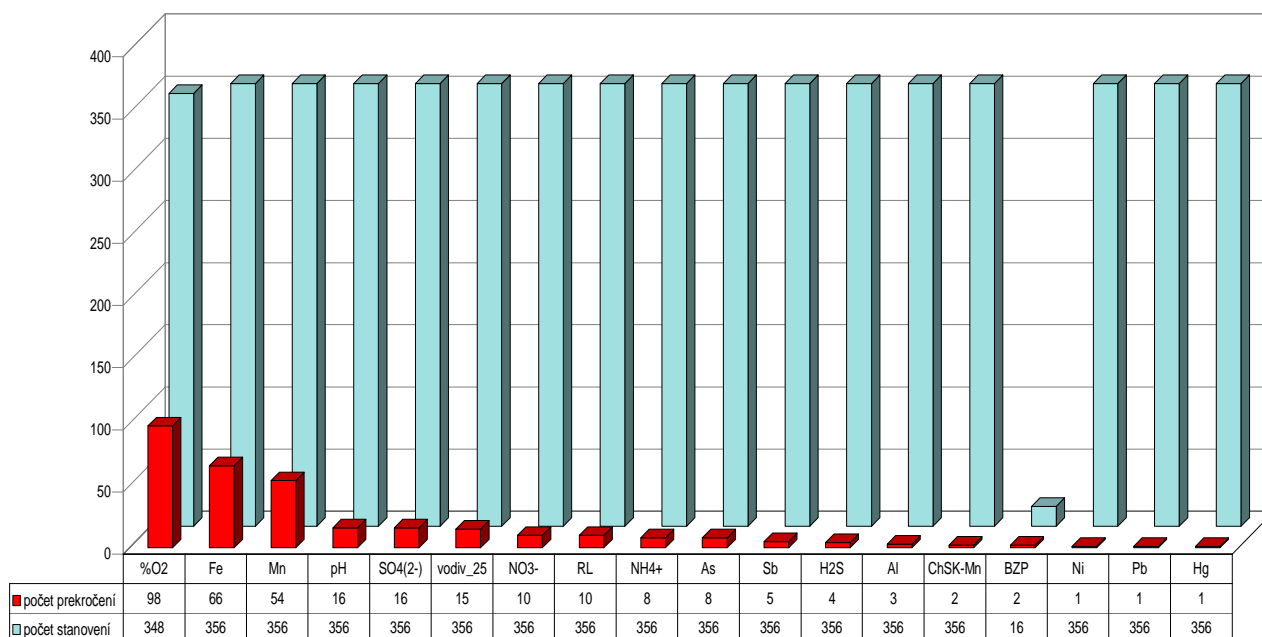
and autumn when the extreme condition of groundwater could be monitored. The region of Žitný ostrov represents a separate part of the SHMI monitoring network as it plays an important role in the process of monitoring the changes in water quality in Slovakia since this region is the most significant drinking 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 2011” and biennial report “Groundwater Quality in Žitný ostrov for 2011 – 2012.”

The frequency of exceeding acceptable concentrations (maximum permissible concentration set under the Regulation of the Slovak Government 496/2010) measured at surveillance monitoring sites is shown in figure 7.1.2.1. Recommended value of the water saturation by oxygen was reached in 71.8 % of samples.

Exceeded limits of parameters at surveillance monitoring sites according to the Regulation 496/2010 in 2011

Figure 7.1.2.1

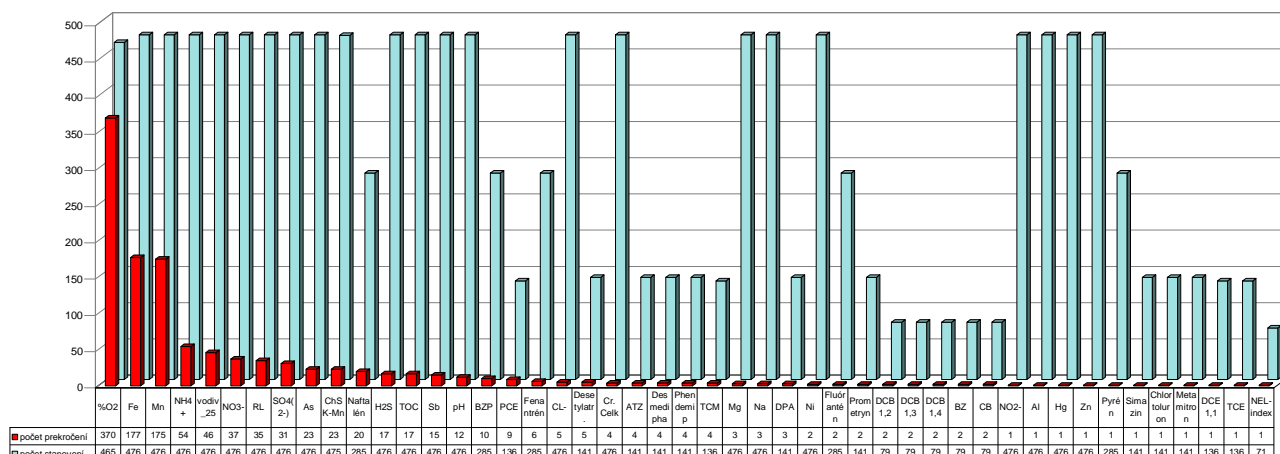


Source: SHMI

The frequency of exceeding the acceptable concentrations (maximum permissible concentration set under the Regulation of the Slovak Government 496/2010) measured within the operational monitoring is shown in figure 7.1.2.2. Groundwater has a relatively low oxygen level proved by the fact that recommended percentage of the water saturation by oxygen was reached only in 20.43 % of samples. The limit values were mostly exceeded for Mn and Fe<sub>total</sub> parameters. It shows that unfavourable oxidation-reduction conditions still persist.

## Exceeded limits of parameters at operational monitoring sites according to the Regulation 496/2010 in 2011

Figure 7.1.2.2



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.

## 7.2 Drinking Water Supply

The total number of inhabitants supplied with drinking water from public water supply network increased in 2011 compared to the previous year only by 19.1 thousand inhabitants to 4,723.8 thousand inhabitants that is 86.91 % out of the total number of population of the Slovak Republic.

In 2011 the number of municipalities with public water supply network was 2,348 which is 81.2 % 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 2010 the total length of water supply systems in Slovakia (water companies, local authorities and other subjects) increased by 684 km up to the total length 28,777 km (table no. 7.2.2) 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.]

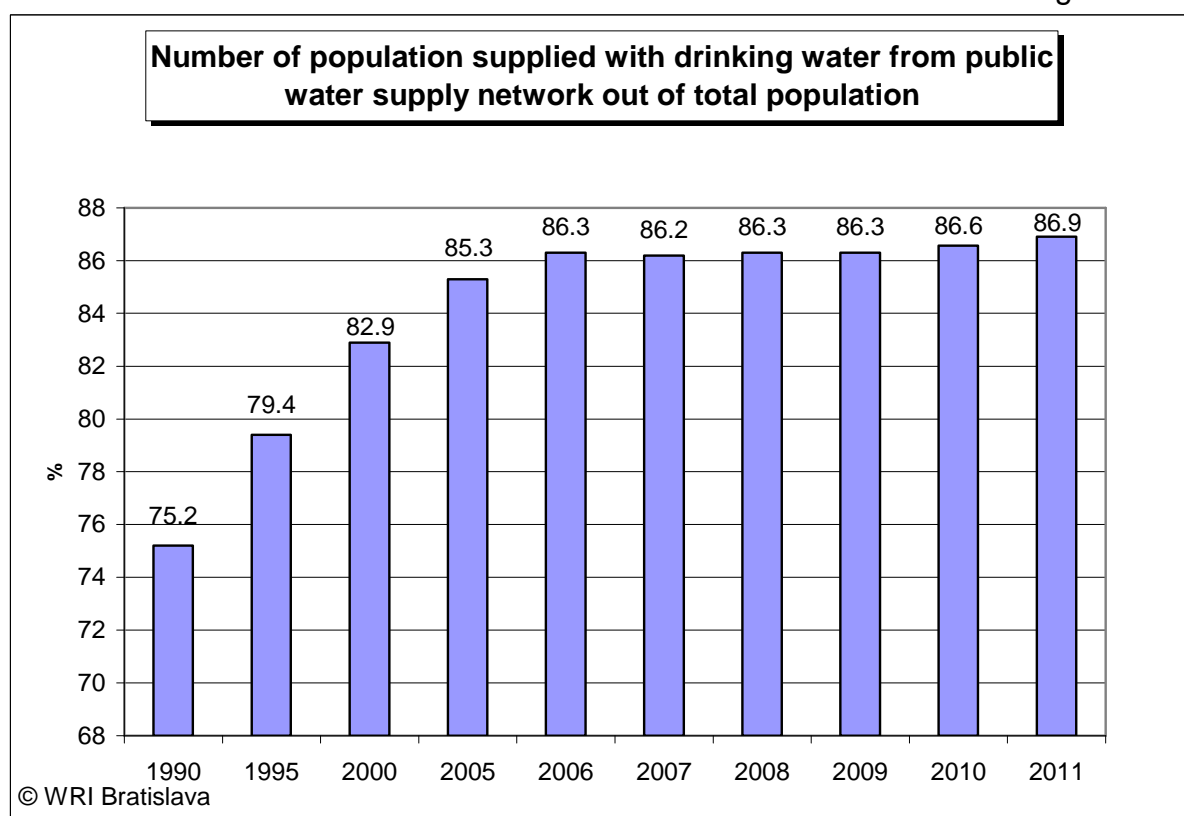
Table 7.2.1

	1995	2000	2005	2009	2010	2011
Total number of inhabitants	5,363.7	5,400.6	5,386.7	5,424.9	5,435.3	5,435.3
Supplied with drinking water from public water supply network	4,256.8	4,479.2	4,594.1	4,681.6	4,704.7	4,723.8
Proportion [%]	79.4	82.9	85.3	86.3	86.6	86.9

Since the data about the number of inhabitants living in municipalities in 2011 were not available at the moment of report preparation, the operators of drinking water supply and sewerage systems worked with the data related to the year 2010. Therefore it is necessary to compare the number of inhabitants supplied with drinking water and connected to sewerage system with the number of inhabitants living there in 2010.

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

Figure 7.2.1



In the facilities of water companies, local authorities and other subjects the volume of 299.4 mil. m<sup>3</sup> of drinking water was produced in 2011 which was decrease by 7.3 mil. m<sup>3</sup> compared to the year 2010. Table 7.2.2 indicates that the amount of revenue water and revenue water for households decreased the same way as the amount of produced water. The amount of revenue water represented 67.9 % of the water volume intended for use.

Specific consumption of drinking water for households has been decreasing and in 2011 it reached the value 79.9 l.inhab.<sup>-1</sup>.day<sup>-1</sup>. It is an alarming situation, since it means the hygiene minimum.

The amount of non-revenue water was 97.5 mil. m<sup>3</sup> what is 32.1 % of water intended for use. Out of this number the loss in pipe network represents 85.8 % (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:

Drinking water supply and development of water supply network administrated by water companies, local authorities and other subjects Table 7.2.2

No	Indicator	Unit	Year				
			2009	2010	2011	Expectation	
						2012	2013
1	Number of inhabitants supplied from water supply network	thous.	4,681.6	4,704.7	4,723.8	4,754.6	4,761.4
2	Capacity of water resources	l.s <sup>-1</sup>	33,606.0	33,875.0	33,527.0	33,506.0	33,498.0
3	Length of water supply networks	km	27,532.0	28,092.0	28,777.0	28,937.0	29,217.0



No	Indicator	Unit	Year				
			2009	2010	2011	Expectation	
						2012	2013
4	Capacity of ground water resources	l.s <sup>-1</sup>	27,725.0	28,844.0	28,538.0	28,504.0	28,492.0
5	Water produced in WM facilities	mil. m <sup>3</sup>	313.9	306.7	299.4	295.3	296.6
	Of which: water produced from ground water		264.1	266.9	253.9	250.0	250.0
6	Water intended for use	mil. m <sup>3</sup>	317.3	310.5	303.8	299.9	301.2
7	Revenue water in total	mil. m <sup>3</sup>	214.7	210.2	206.3	207.2	210.5
	Included: for households		147.0	143.3	137.7	137.3	139.0
8	Non-revenue water	mil. m <sup>3</sup>	102.6	100.3	97.5	92.7	90.7
	Of which: water loss in pipes		88.3	85.8	83.7	81.3	79.7
9	Specific water consumption (of revenue water in households)	l.inhb. <sup>-1</sup> .day <sup>-1</sup>	86.0	83.4	79.9	79.1	80.0

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

Figure 7.2.2

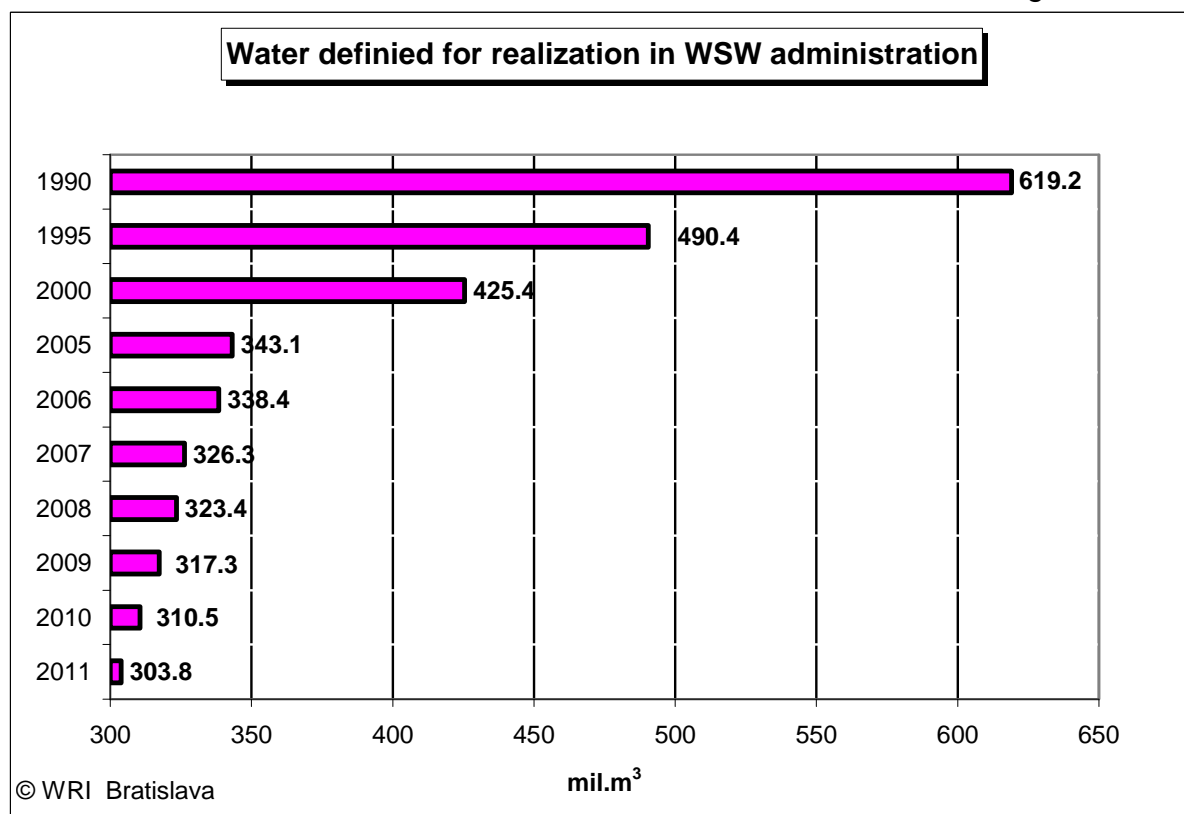
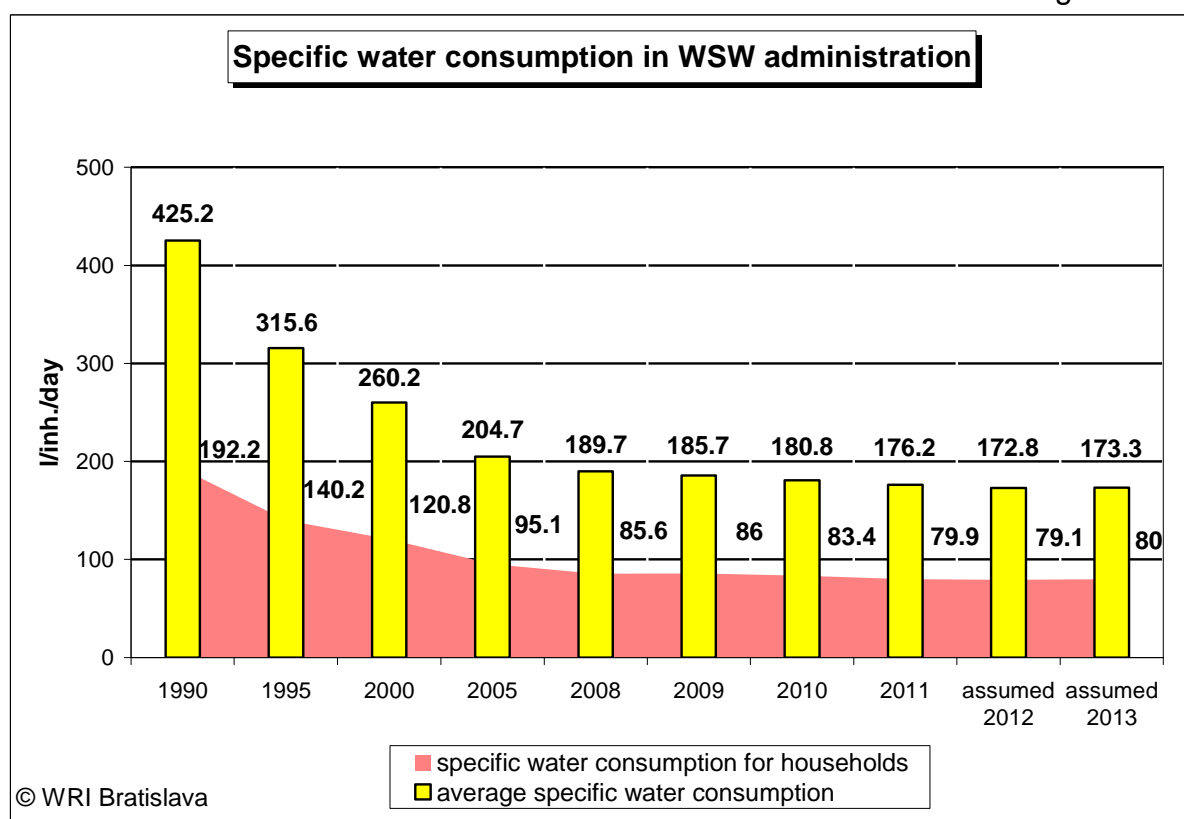


Figure 7.2.3



### 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 2011 as many as 7,807 drinking water samples from sampling sites in water distribution network were analyzed in laboratories of water companies. In these laboratories 228,325 analyses were done concerning particular parameters of drinking water quality. This assessment did not include results from the Western Slovakia Water Company (data were not available).

Mostly microbiological and biological parameters of drinking water quality were determined and 82,783 analyses were performed. Next numerous group was represented by the parameters affecting sensory properties of drinking water where 79,699 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 7.2.3

Year	2007	2008	2009	2010	2011
Amount of drinking water samples not meeting the limits with HLV	2.03 %	2.34 %	1.77 %	2.99 %	0.91 %
Amount of analyses of drinking water quality parameters not meeting the limits with LV, HLV and IV	2.46 %	1.02 %	0.88 %	0.93 %	0.82 %
Amount of analyses meeting hygienic limits (%)*	99.32 %	99.45 %	99.48 %	99.30 %	99.60 %
Amount of samples meeting the requirements for drinking water quality in all parameters (%)*	89.78 %	91.84 %	91.67 %	89.72 %	92.05 %

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 2011:

- *microbiological and biological parameters:*  
*Escherichia coli*, coliform bacteria, Enterococci, cultivable micro-organisms at 36 °C, living organisms (except colourless flagellata), abioseston, *Clostridium perfringens*;
- *inorganic and physical-chemical parameters:*  
colour, manganese, turbidity, iron;
- *radiological parameters:*  
total volume activity alpha;
- *disinfectants and their by-products:*  
free chlorine, chlorites.

### 7.3 Wastewater Collection and Treatment

In 2011 the number of residents connected to public sewerage system increased by 65.6 thousand to the total number of 3,347.3 thousand inhabitants representing 61.58 % out of the total number of population. Regional connection to public sewerage system varies considerably. Trnava, Nitra and Prešov regions lag behind the national average. At a district level the least favourable situation is in the districts of Námestovo, Čadca and Košice - surroundings where the portion of residents connected to public sewerage system is approximately 30 %.

In recent years there was achieved significant progress in urban waste water collection and treatment in the Slovak Republic. Currently the attention is mainly focused on construction of new WWPTs and sewerage networks, reconstructions of WWTPs and sewerage networks with the aim to fulfil the obligations of the Slovak Republic towards the European Union in the field of urban waste water collection and treatment in agglomerations > 2000 p. e. resulting from the Accession Treaty of the Slovak Republic to the European Union. Mainly with the support of the European Community financial resources and the state budget, there were built many public sewerage systems. Some systems are in the process of building and large constructions are ready with approved financing (namely part of it is in the approval process) by the European Commission (e. g. for Bratislava – Petržalka WWTP and Vrakuňa WWTP; next Partizánske WWTP, Topoľčany WWTP, Bánovce nad Bebravou WWTP, Trenčín WWTP – left bank and some more). These constructions

will considerably improve the situation in urban waste water collection and treatment in Slovakia; they decrease pollution of surface water, ground water and water ecosystems. Nowadays the attention is focused on the construction of new WWTPs and sewerage networks.

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 7.3.1 and the figure 7.3.1.

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

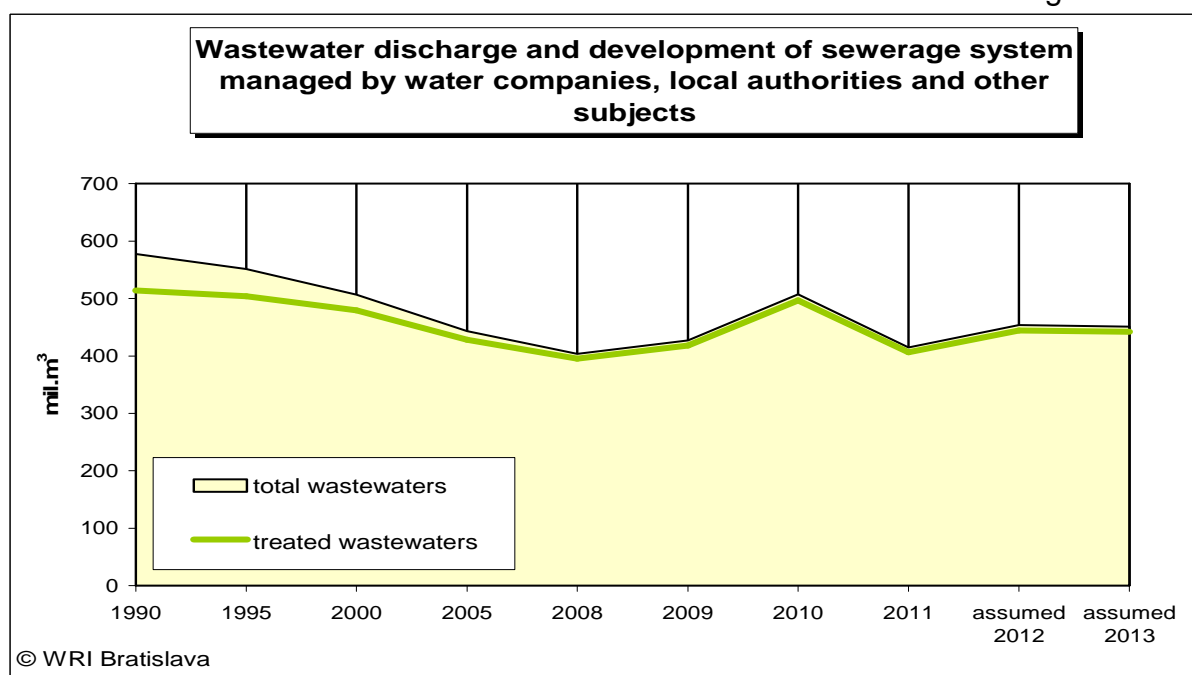
Table 7.3.1

No	Indicator	Measure	Year				
			2009	2010	2011	Expectation	
						2012	2013
1	Number of inhabitants connected to public sewerage system	Thous.	3,225.0	3,281.7	3,347.3	3,372.1	3,395.9
	Of that: in houses connected to sewerage system with WWTP	Thous.	3,141.7	3,202.9	3,260.0	3,292.3	3,316.5
2	Length of sewerage networks	km	9,659	10,751	11,210	11,379	11,518
3	Water discharged to water courses altogether	mil.m <sup>3</sup>	427.1	507.1	414.6	453.9	451.1
	Of that: treated wastewater	mil.m <sup>3</sup>	417.8	497.0	406.5	444.6	442.0
4	Volume of discharged wastewater*	mil.m <sup>3</sup>	204.7	202.6	200.3	200.1	200.6
	Of that: sewerage water	mil.m <sup>3</sup>	119.2	118.0	115.7	115.3	115.7
	Industrial and other wastewater	mil.m <sup>3</sup>	85.5	84.6	84.6	84.8	84.9

\* 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 7.3.1



According to the data from the Comprehensive Water Register (Slovak Hydro-Meteorological Institute database), in 2011 the total volume of waste water discharged into surface water was 612.374 mil.m<sup>3</sup>.year<sup>-1</sup>.

Out of the total volume of discharged waste water from point pollution sources registered in the database of the Comprehensive Water Register 2011, treated waste water was approximately 92 %. The volume 60 % of this treated waste water is represented by sewage and urban waste water (Table 7.3.2).

Volume of treated and not treated discharged waste water in 2011:

Table 7.3.2

Volume of discharged waste water	Total (thous.m <sup>3</sup> .year <sup>-1</sup> )	Kind of waste water (thous.m <sup>3</sup> .year <sup>-1</sup> )			
		industrial (BCEA: 10 - 40)	sewage and urban (BCEA:90)	agricultural production (BCEA:01)	other activities
Treated	563,182.945	194,149.013	364,940.913	26.501	4,066.518
Not-treated	49,191.273	37,224.236	5,470.528	244.300	6,252.209
Total	612,374.218	231,373.249	370,411.441	270.801	10,318.727

BCEA: Branch classification of economic activity  
Source: SHMI

Data on the volume of discharged waste water in the tables 7.3.1 and 7.3.2 differ because the SHMI according to the Water Act monitors only discharged waste water above 10,000 m<sup>3</sup> per year or 1,000 m<sup>3</sup> per month.

Overview of the total volumes of pollutants discharged into water courses in 2011 in selected pollution parameters (BOD<sub>5</sub>, COD<sub>Cr</sub>, N<sub>total</sub> a P<sub>total</sub>) was prepared from the database of the Comprehensive Water Register and is presented in the table 7.3.3.

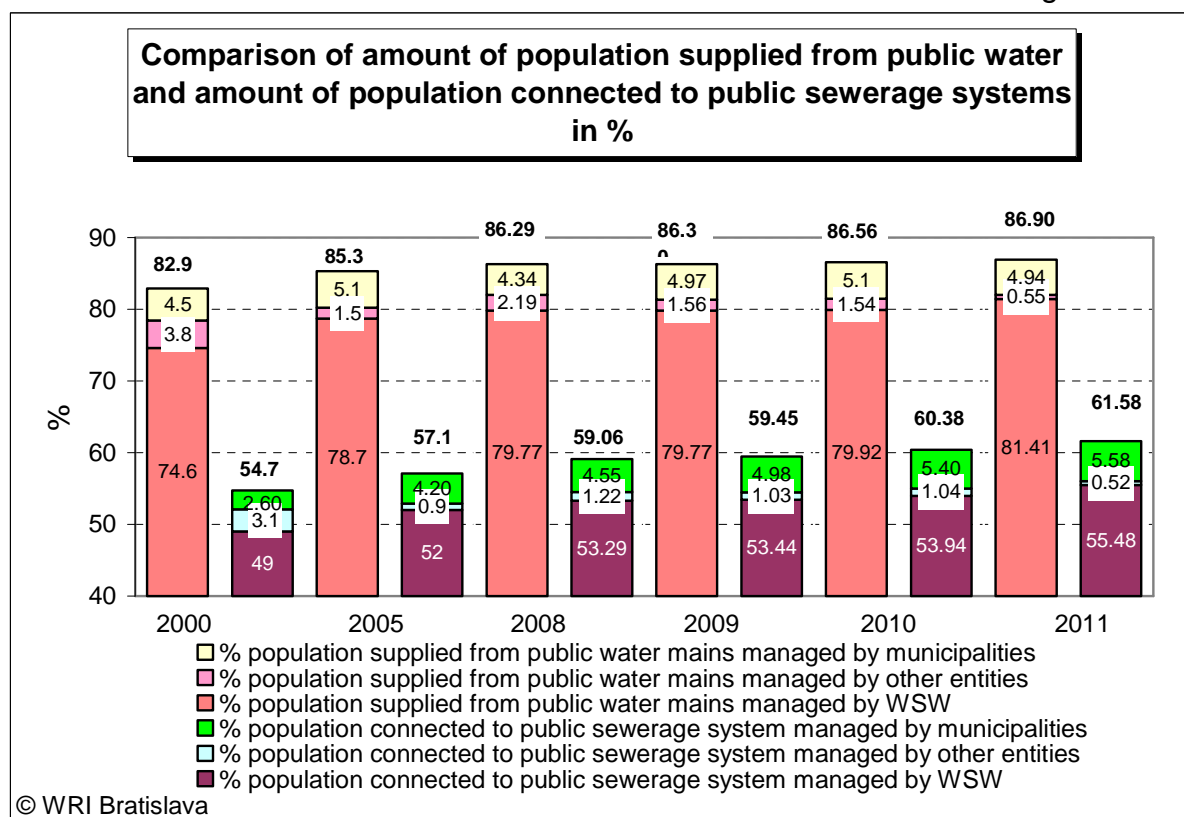
Load of balanced sources of pollution discharged into surface water according to individual sub-basins

Table 7.3.3

Sub-basin	Volume of waste water [thous. m <sup>3</sup> .year <sup>-1</sup> ]	BOD <sub>5</sub>	COD <sub>Cr</sub>	N <sub>total</sub>	P <sub>total</sub>
		[t.year <sup>-1</sup> ]			
Danube	27,633.795	650.823	2,116.420	378.065	26.465
Morava	14,997.065	76.228	424.351	166.819	8.706
Váh	315,193.018	2,380.300	11,860.240	3,182.301	208.290
Hron	86,865.796	424.704	1,895.850	685.854	56.626
Ipeľ	10,786.667	170.823	472.443	103.178	8.340
Slaná	11,287.206	78.030	297.572	85.299	5.795
Bodrog	36,082.392	387.515	2,145.530	328.875	19.632
Hornád	79,680.233	350.843	1,404.570	705.992	32.401
Bodva	2,690.370	19.885	64.911	0.590	0.044
Dunajec a Poprad	27,157.676	286.231	676.963	202.635	14.903
SR total	612,374.218	4,825.381	21,358.845	5,839.608	381.199

Source: SHMI

Figure 7.3.2



#### 7.4 Sewage Sludge Production and Disposal

In 2011 sludge production covered 58,718 t of dry mass. The overview of sewage sludge generation for WWTP and sludge disposal methods in the period from 2001 to 2011 is shown in the table no. 7.4.1. In 2011 the sewage sludge (358 t – 0.61 %) from 3 WWTPs was directly applied to agricultural land. 37,597 t (64.03 %) of sludge dry mass were used for production of compost and 12,515 (21.31 %) t of sludge for soil processes. The sludge was not disposed by combustion process.

Table 7.4.1

Year	Sludge production (dry mass) t/year	Of which					
		Application into soil		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

Data concerning the quantity of sludge applied to soil include also the sludge added to soil in the form of compost and sludge used otherwise in soil processes.

Measures adopted in the Waste Management Plan of the Slovak Republic 2011 – 2015 (WMP) to decrease the disposal of biodegradable load are focused on supporting separated collection of biodegradable load, waste separation, its evaluation and recycling. Within these activities the sewage sludge in municipalities with more than 15 000 inhabitants should head for the evaluation by anaerobic methods with the aim of producing biogas. At the same time the Action Plan how to support the placing of compost from biodegradable load on the market is being prepared.

## 8 Monitoring and Information System

### *Monitoring System*

Surface and ground water monitoring is performed globally in river basins and sub-basins. Its details are specified in the Decree of the Ministry of Agriculture, Environment and Regional Development of the Slovak Republic no. 418/2010 Coll. on executing some provisions of the Water Act.

In 2011 the monitoring was performed in the following monitoring sub-systems:

1. Surface Water Quantity Parameters
2. Ground Water Quantity Parameters
3. Surface Water Quality
4. Ground Water Quality
5. Thermal and Mineral Waters
6. Irrigation Waters
7. Recreational Waters

Subsystems 1 to 4 are within the competence of the Ministry of Environment of the Slovak Republic.

Ministry of Health is responsible for the subsystems 5 and 7 and the Ministry of Agriculture and Rural Development is responsible for the subsystem 6.

### *Surface Water Quantity Parameters*

In 2011 the monitoring of surface water quantity parameters was planned and done in 418 gauging stations where water status was monitored. In fact, 2,333 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	24	68
Austria	3	16
Czech Republic	4	10
Poland	5	17
Ukraine	2	4
Total	38	115

Source: SHMI

### *Surface Water Quality Parameters*

Performance of individual parts of the subsystem is carried out by the following organizations: SHMI, SWME and WRI.

In 2011 there were 427 locations monitored in basic and operational monitoring. 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 2011.

#### *Ground Water Quantity Parameters*

In 2011 the monitoring was done in 1,496 monitoring places. Outcomes of monitoring are stored into HIS database and into IS Oracle administrated by the SHMI. Monitoring outcomes are made available in accordance with the Act 211/2000 Coll. on Free Access to Information as Amended and they are presented through special publications – the Ground Water Hydrology Year Book, Water Management Report and the Report on Environment.

#### *Ground Water Quality Parameters*

In 2011 the monitoring of ground water quality was done in 435 places in which 844 samplings and determinations of terrain parameters in situ were carried out. Performance of individual parts of the subsystem is carried out by the SHMI and analytical determinations are made by accredited geo-analytical laboratories of the State Geological Institute of Dionýz Štúr in Spišská Nová Ves. Results of monitoring are stored, processed and archived in the database IS Oracle administrated by the SHMI. Monitoring outcomes are made available according to the Act 211/2000 Coll. on Free Access to Information as Amended and they are presented through special publications Slovakia Ground Water Quality Year Book and Žitný ostrov Ground Water Quality Year Book.

### **Information Systems**

- ENVIROPORTAL ([www.enviroportal.sk](http://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. Also it is the source of information on environment saved in databases of specialized organizations of the Ministry of Environment of the Slovak Republic or relevant organizations of other ministries as well as other related information. It meets the needs and requirements of citizens, businessmen and the public administration resulting from legal regulations valid in the Slovak Republic.

Enviroportal was redesigned technically and graphically in November 2011.

- 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](http://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). This act appoints so called obligatory persons who are responsible for the harmony (interoperability), reliability and quality of spatial data included in this topic. 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 2011*

The total costs and damage caused by floods in 2011 (Table 9.1.1 and Figure 9.1.1) were quantified at 34.59 million €.

Flood damage to property of state was in the amount of 2.15 mil. €, to property of residents in the amount of 1.45 mil. €, to property of municipalities in the amount of 3.26 mil. € and to property of higher territorial units in the amount of 12.50 mil. €. Damage to property of legal entities and natural persons was amounted to 0.65 mil. €. Further costs were related to rescues and protection operations.

In total, the floods affected 87 villages and towns. Floods damaged 1,808 houses; 734 non-residential premises; 1,517.62 ha of agricultural land; 150.10 ha of forest soil and 1,409.07 ha of the areas of municipalities. Floods affected 2,029 residents out of which 72 had to be evacuated.

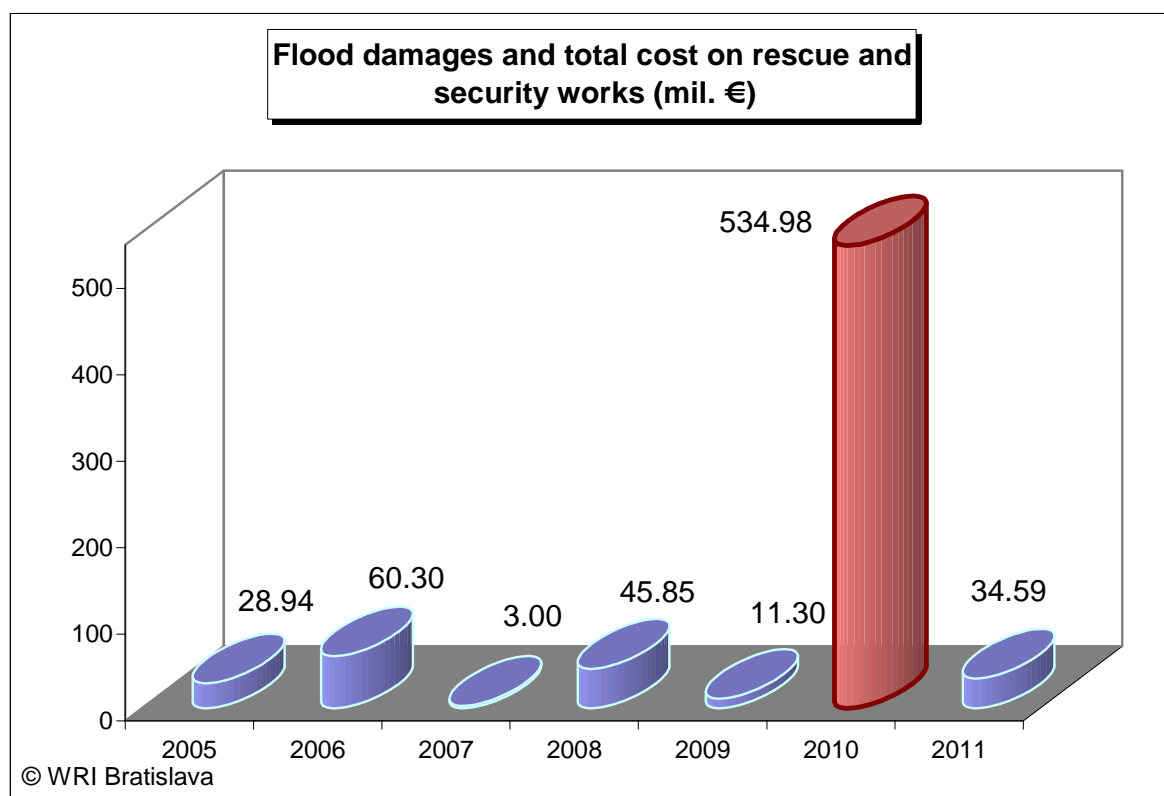
Financial consequences of floods in 2005 - 2011

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
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	3,076.79	20.1	2.00	12.58	34.59

Source: Reports on floods in Slovakia 2005 – 2011 (Ministry of Agriculture of the Slovak Republic and the Ministry of Environment of the Slovak Republic)

Figure 9.1.1



### 9.1.1. Flood Protection Programmes

#### *Flood Protection Programme in the Slovak Republic by 2010*

Investment measures implemented in 2011 within the Flood Protection Programme of the Slovak Republic were financed only from the own sources of the Slovak Water Management Enterprise, Banská Štiavnica and from the Cohesion Fund of the European Union (co-financed from the state budget) within the Programme Period 2007 – 2013.

Investment actions within the Flood Protection Programme represented totally the financial amount of 13,069,724 € in 2011 (including upcoming flood protection constructions – 1,209,138 €), out of which the amount of 7,269,987 € is from the EU Cohesion Fund, 4,516,797 € is from the own resources and 1,282,940 € relates to co-financing of the projects from the state budget (within the EU funds).

As of 31 December 2011 the Slovak Water Management Enterprise implemented flood protection measures in the amount of 198,320,000 € (representing 32 % of programme activities) within planned activities according to the Flood Protection Programme in the Slovak Republic. Total deficit related to flood protection need on water courses, water structures and catchments in SWME competence towards the Flood Protection Programme in the Slovak Republic is 412,947,000 € out of the total amount of 611,267,000 € which should have been given to SWME to perform these activities within the Flood Protection Programme according to the Slovak Government Decision no. 25/2003. This deficit is the subtraction of the amount of used financial amount in the years 2000 – 2011 and the amount necessary for flood protection according to the Flood Protection Programme.

## ***Flood Warning and Forecast System of the Slovak Republic (POVAPSYS)***

Up till now the POVAPSYS project includes provision and starting up necessary technical devices and solution of operational tasks connected to data monitoring, processing and evaluation as well as conception and development tasks resulting from building the system. SHMI communication network was upgraded; the following was put into operation – 260 new automatic hydrological stations (AHS) with data remote transfer and 140 AHS with local recording; 74 automatic precipitation-gauging stations and 7 automatic meteorological stations with data remote transfer. Simultaneously the software was installed for the collection centres and technology line of data processing in all four SHMI regional workplaces (Banská Bystrica, Bratislava, Košice and Žilina). Four fully equipped motor units were purchased to measure the water discharge. New Doppler meteorological radio locator was put into operation on Kojšova Hoľa. Local warning system for storm rainfalls was built in two villages Vrbovce (Myjava District) and Čierny Balog (Brezno District). More modern computer and one more necessary software and hardware were provided for ALADIN (meteorological forecasting model).

### **9.1.2 Analysis of Flood Protection in the Slovak Republic including the Implementation of the Flood Warning and Forecast System**

On 9 March 2011 the Slovak Government Decision no. 179 approved „Analysis on Flood Protection in Slovakia including POVAPSYS” which was prepared according to the Slovak Government Decision no. 472 of 14 July 2010, part B6.

### **9.1.3 Sustainable Flood Protection Action Programme in the Danube River Basin**

In 2011 SWME provided the construction of new hydro-technical flood protection infrastructure through 23 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 33,545 thous. € out of the property administrated by the SWME in 2011.

### **9.1.4 Directive of the European Parliament and the Council no. 2007/60/EC on Flood Risk Assessment and Management**

In 2011 the Directive 2007/60/EC was transposed into the Decree of the Ministry of Environment of the Slovak Republic 112/2011 Coll. determining the details about the content, re-evaluation and updating the flood risk management plans.

In Slovakia there were identified totally 559 areas with significant flood risk (Figure, page 45)

- 378 geographic areas with possibly significant flood risk,
- 181 geographic areas with potential probable significant flood risk

Sub-basin	Number of areas	Length of rivers (km)
Morava	51	125.3
Danube	0	0
Váh	192	460.1
Hron	54	169.7
Ipeľ	9	23.8

Sub-basin	Number of areas	Length of rivers (km)
Bodrog	129	237.4
Slaná	31	57.7
Hornád	57	122.0
Bodva	5	17.2
Dunajec a Poprad	31	73.4
Total	559	1,286.6

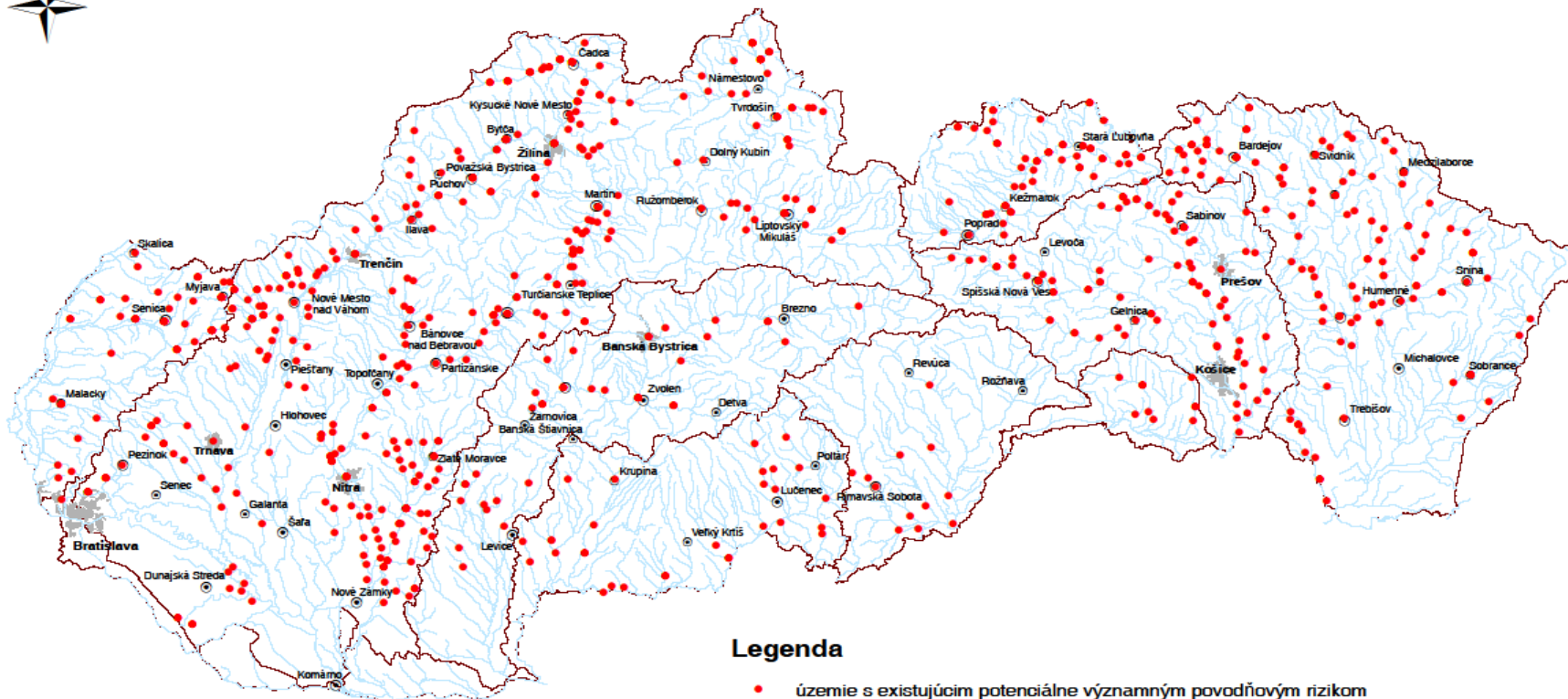
Preparation of the flood hazard maps and flood risk maps in the whole territory of the Slovak Republic is within the competence of the SWME. In 2011 the tender materials of the first stage of public procurement were prepared within the project implementation for the delivery of digital terrain model, database of colourful orthophotomap and database 2D of circumference of buildings for river basins in Slovakia.

Preliminary assessment of flood risk for individual sub-basins is published on the web page of the Ministry of Environment of the Slovak Republic <http://www.minzp.sk/sekcie/temy-oblasti/voda/ochrana-pred-povodnami/manazment-povodnovych-rizik/>.

Directive 2007/60/EC specifies the duty for the EU Member States to coordinate the identification of geographic areas with existing possibly significant flood risk and its expected occurrence which belong to international river basins.

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.

# Areas with significant flood risk



## Legenda

- územie s existujúcim potenciálne významným povodňovým rizikom
  - tok s plochou povodia viac ako 10 km<sup>2</sup>
  - hranica čiastkového povodia
  - krajské sídlo
- Veľkostná kategória okresných miest**
- menej ako 20000 obyvateľov
  - ◐ 20000 - 50000 obyvateľov
  - ◑ viac ako 50000 obyvateľov



## 9.2 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 2011 mainly focused on the control and approval of prevention measures related to the leakage of harmful substances into environment and emergency plans.

270 (25.3 %) cases of law violation was reported from the total number of 1,066 checks in 2011. The percentage is higher than in 2010 (20.9 %).

### Emergency Water Quality Deterioration

In 2011 as many as 115 cases of emergency water quality deterioration were reported by the Slovak Environmental Inspection (SEI).

Overview of reported cases in the years 2005 – 2011

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

Reported cases in the years 2005 – 2011 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

Table 9.2.3

Water quality deterioration according to the cause of its origin												
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*			
2005	21	6	13	5	2	0	1	40	5	3	7	16
2006	30	7	13	5	2	2	4	38	6	1	20	23
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

\*HS – harmful substances, PHS – particularly harmful substances

In 2011 there was for the first time activated the work of the Communication Unit of the Principal International Alert Centre (PIAC 04) Slovakia at the Water Protection Inspection within the Accident Emergency Warning System (AEWC) in the Danube River Basin. It was a standard report about water pollution from PIAC 02 (Austria) of 12 April 2011. Pollution by oil substances which originated near Vienna did not reach the territory of Slovakia.

## 10 Economic Analysis

### ***Slovak Water Management Enterprise, state enterprise, Banská Štiavnica***

The Slovak Water Management Enterprise, state enterprise, reached the profit of 100,495 thous. € in 2011, which represents decrease by 32,852 tis. € (24.64 %) compared to the year 2010.

Compared to the year 2010 the total costs decreased by 23,307 thous. € and reached the amount of 112,144 thous. €.

Total surface water abstraction in 2011 was in the amount of 242,600 thous. m<sup>3</sup> which is the increase by 4,838 thous. m<sup>3</sup> compared to preceding period. The revenues increased by 2,795 thous. € compared to preceding year.

Payments for using the hydro-energetic potential of water courses were lower by 13,952 thous. € compared to the year 2010 and they reached the amount of 24,823 thous. €. Revenues related to water used for power production in 2011 were 334 thous. €.

### **Water Management Construction, state enterprise, Bratislava**

In 2011 the company unfortunately reached the negative economic result in the amount of -5,290 thous. €. The main reason was unfavourable development of discharge of the Danube in the profile Gabčíkovo Water Structures and decrease of power electricity supply by almost 20 % in 2011 compared to previous period what resulted into decrease of the most important company profit by almost 16 mil. €. Despite this fact the company was able to provide safe and smooth operation of all parts of Gabčíkovo and Žilina water structures; fulfil all financial obligations toward the state as well as finance all internal needs mainly from own resources.

In 2011 the company generated the profit in the amount of 97,944 thous. €. The most important activity of the company related to the profit is the production of electricity in hydro-electric power plants of Gabčíkovo Hydraulic Structure which is distributed by Slovenské elektrárne (power generating company) which made 80,06% of the total company profit in 2011.

Total costs amounted to 93,942 thous. € which is a decrease by 12.82 % compared to the last year. Main costs of the company are the costs related to electricity, repairs and other service in connection with the operation of water structures and property depreciation. In 2011 the economic costs were 85,348 tis. €. Financial costs were 11,575 thous. €.

### **Water Companies**

Infrastructural property of public water supply systems and public sewage systems was operated by water companies and other entities, which provided information to elaborator of the Report on Water Management of the Slovak Republic in 2011. All entities were included into the overview of indicators.

The profits from sales of their own products and services in respective water companies increased by 11,327 thous. € (to 441,281 thous. €) compared to 2010. Economic result after taxation represented an increase to 7,431 thous. €.

The costs of water companies amounted to 439,540 thous. € which is a decrease by 12,678 thous. € compared to 2010.

Water companies in 2011 produced 289,873 thous. m<sup>3</sup> of water in their own facilities. Revenue drinking water represented 197,440 thous. m<sup>3</sup> out of this volume.

Overview on claims and obligations is given in the Table 10.1.

[thous. €]

Table 10.1

Indicator	Year	WC+ other entities	SWME	WMC	WM total
Claims after maturity date	2010	22,501	14,915	3,158	40,574
	2011	24,054	23,685	3,321	51,060
	Index 2011/2010	1.07	1.59	1.05	1.26
Obligations after maturity date	2010	15,098	1,860	278	17,236
	2011	14,764	2,023	15	16,802
	Index 2011/2010	0.98	1.09	0.05	0.97



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 10.2.

[thous. €]

Table 10.2

Indicator	Year	WC+ other entities	SWME	WMC	WM total
Revenues	2010	429,954	133,347	111,076	674,377
	2011	441,281	100,495	97,944	639,720
	Index 2011/2010	1.03	0.75	0.88	0.95
Expenditures	2010	452,218	135,451	107,762	695,431
	2011	439,540	112,144	93,942	645,626
	Index 2011/2010	0.97	0.83	0.87	0.93
Net income after taxation	2010	-19,159*	-2,104	3,314	-17,949*
	2011	7,431	-18,551	- 5,290	-16,409
	2011 - 2010	26,590	- 16,447	- 8,604	1,540

\* Central Slovakia Water Company merged with its shareholder "Prvá Vodárenská" and they amortized the goodwill which generated by this merger had unfavourable economic loss (- 23,315.7 thous. €) in 2010.

### 10.1 Effect of Economic Tools

#### Drinking and Waste Water Prices

In 2011 the prices for drinking water production, distribution and supply by public water supply system increased on average by only 1 % compared to 2010. These prices without VAT were in the range from 0.6879 €/m<sup>3</sup> in Trnava Water Company to 1.2415 €/m<sup>3</sup> in East Slovakia Water Company in 2011.

In 2011 the prices for collection and treatment of waste water by public sewerage system increased by 4.5 % compared to 2010.

In 2011 the prices for waste water collection and treatment by public sewerage system were in the range from 0.7685 €/m<sup>3</sup> (West Slovakia Water Company) to 0.9625 €/m<sup>3</sup> in Central Slovakia Water Company.

In 2011 the prices for production and supply of drinking water by public water supply system and prices for treatment and collection of waste water by public sewerage system together increased on average by 2.8 % compared to 2010. Maximal water charges for municipal sewerage network were in the range from 1.5492 €/m<sup>3</sup> to 2.0741 €/m<sup>3</sup> without VAT.

Drinking water

Table 10.1.1

	Unit	2007	2008	2009	2010	2011
Eligible costs	thous. €	182,168	186,261	183,118	185,889	185,291
Drinking water supply	thous. m <sup>3</sup>	216,516	220,861	206,694	201,998	197,440
Average eligible costs	€/m <sup>3</sup>	0.84	0.84	0.89	0.92	0.94
Average price (without VAT)	€/m <sup>3</sup>	0.81	0.83	0.89	0.93	0.96

## Waste water

Table 10.1.2

	Unit	2007	2008	2009	2010	2011
Eligible costs	thous. €	136,161	140,754	160,780	169,879	170,928
Volume of waste water	thous. m <sup>3</sup>	208,991	207,006	201,384	202,600	200,360
Average eligible costs	€/m <sup>3</sup>	0.65	0.68	0.80	0.84	0.85
Average price (without VAT)	€/m <sup>3</sup>	0.68	0.73	0.79	0.84	0.86

Figure 10.1.1

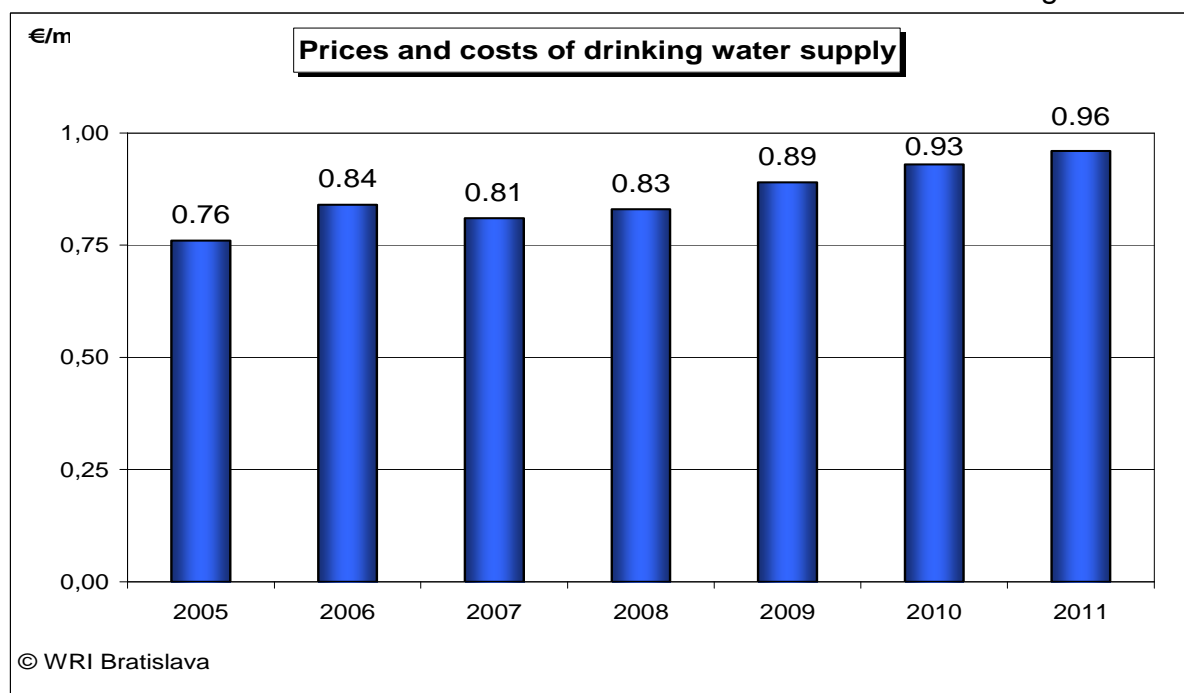
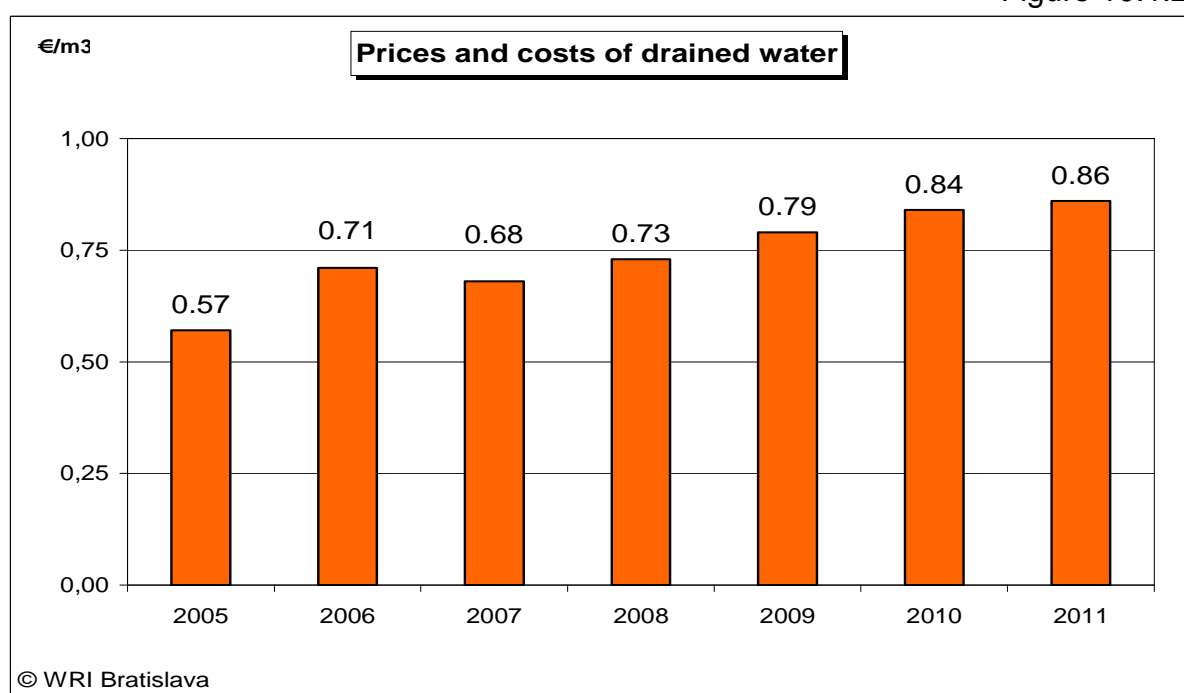


Figure 10.1.2



## Taxes

In 2011 a decrease was recorded in real estate tax and legal entity income tax compared to previous year. Value added tax and road tax were increased.

The range of tax burden by individual taxes can be seen in the following table 10.1.3.

[thous. €]

Table 10.1.3

Taxes	2007	2008	2009	2010	2011	Index 2011/2010
Value Added Tax	20,774	19,792	19,483	20,478	22,618	1.10
Real Estate Tax	1,369	1,474	1,288	1,019	1,005	0.99
of which: land tax	767	855	720	434	440	1.01
construction tax	602	599	568	585	561	0.96
Road Tax	1,018	959	996	971	1,019	1.05
Legal Entity Income Tax	21,801	21,237	16,621	21,883	17,558	0.80

## Loans

Compared to 2010 bank loans and aids increased by the amount of 24,619 thous. €. Long-term bank loans are 142,363 thous. € and compared to 2010 they increased by 10,896 thous. €. Current bank loans are 41,246 thous. €. Compared to 2010 they increased by 13,722 thous. €.

[thous. €]

Table 10.1.4

	2007	2008	2009	2010	2011	Index 2011/2010
Bank loans and aids	104,957	119,548	143,125	158,992	183,611	1.15
of which: long-term bank loans	69,030	95,521	112,077	131,467	142,363	1.27
current bank loans	40,190	24,028	29,683	27,524	41,246	1.39

## 10.2 Labour Force, Salaries

Annual average number of registered employees calculated in water management state enterprises and water companies was 11,829 to 31 December 2011.

The overview of number of employees and emolument indicators in water management (WM) state enterprises and water companies is indicated in the table 10.2.1.

Table 10.2.1

Indicator	2007	2008	2009	2010	2011	Difference 2011- 2010	Index 2011/ 2010
Water companies employees total	8,638	8,233	8,163	8,069	7,990	- 79	0.99
SWME employees	3,922	3,708	3,663	3,644	3,609	- 35	0.99
Other state enterprises employees (WMC)	264	213	194	219	230	11	1,05

Indicator	2007	2008	2009	2010	2011	Difference 2011- 2010	Index 2011/ 2010
Employees total	12,824	12,154	12,020	11,932	11,829	- 103	0.99
Average salary (SWME, WMC, WC) total (€)	721	778	797	830	890	60	1.07
Average salary in WC (€)	689	723	754	772	858	86	1.11
Labour productivity of revenues (thous. €/head)	49	55	53	57	54	- 3	0.95

### 10.3 Financing of Investment Constructions in Water Management Sector

In 2011 the **Slovak Water Management Enterprise, Banská Bystrica** spent 18.181 mil. € which is 79.16 % of planned funds. The volume of investment construction increased by 5.69 % compared to the year 2010.

Flood protection investments were in the amount of 13,066,000 € i. e. 72 % out of the total volume of investments made in 2011. These were mainly prevention measures against floods in line with the Flood Protection Programme of the Slovak Republic by 2010.

In 2011 the investment construction was financed according to the following structure of financial resources:

Financial sources for investment construction total	18.181 mil. €	100.00 %
- own resources	9.198 mil. €	50.59 %
- co-financing of SB to EU funds	1.321 mil. €	7.27 %
- EU financial resources	7.662 mil. €	42.14 %
- other resources	0 €	0 %

In 2011 the **Water Management Construction** carried out investments using the total amount of 24.683 mil. € consisting mainly of its own financial resources.

In 2011 the money was invested mainly in Gabčíkovo and Žilina Hydraulic Structures in the following amounts:

SVD G - N	21.769 mil. €
VD Žilina	0.762 mil. €
Structures not finished yet	0.188 mil. €
Other	1.964 mil. €
<b>Total</b>	<b>24.683 mil. €</b>

The most important works were performed at the following places: Sered' – Hlohovec water structure, Tichý Potok water reservoir, Mošoň II small hydropower plant and Čunovo II hydropower plant.

In 2011 the **Water Companies** used their own resources for investments in the amount of 105.522 mil. €.

Constructions of water supply and sewage system were financed from the EU funds in the amount of 75.167 mil. €. Investment activities in the amount of 13.402 mil. € were co-financed from the state budget.

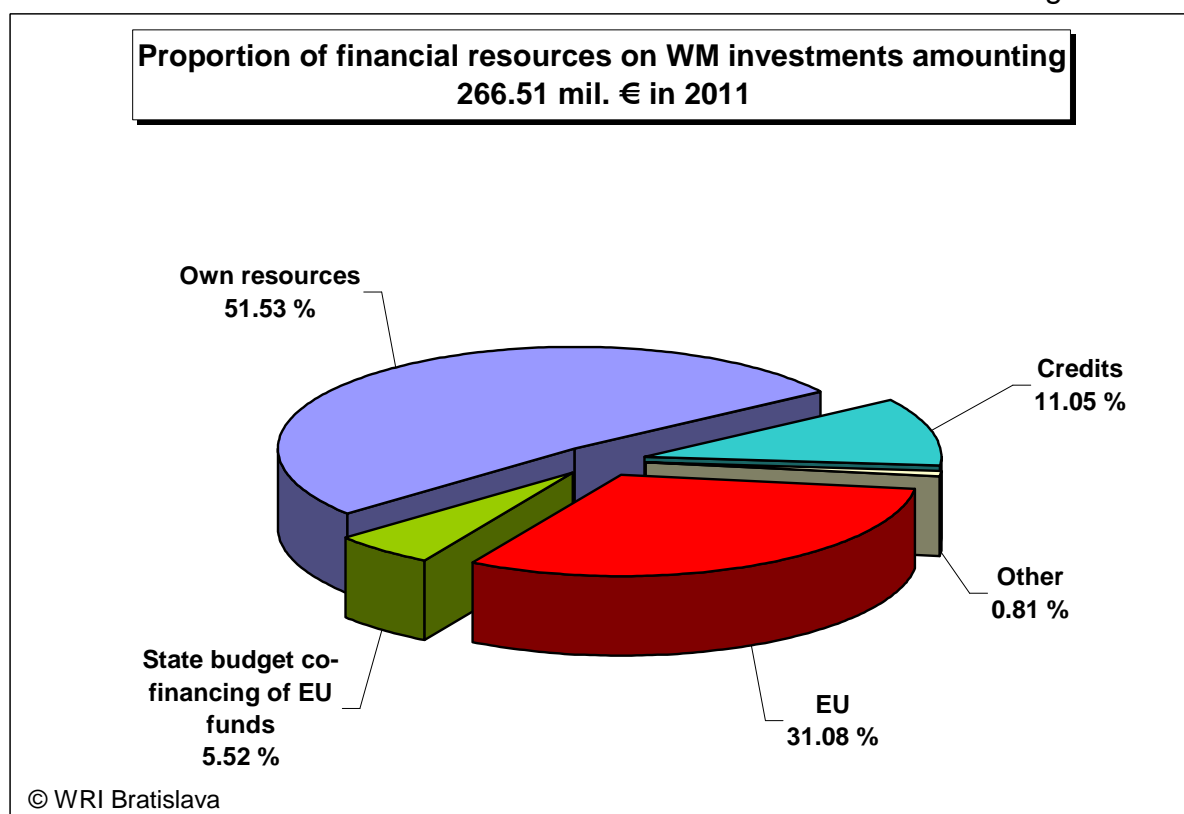
An overview of investment construction financial resources in the years 2010 and 2011 is indicated in the table 10.3.1 and figure 10.3.1.

(in millions €)

Table 10.3.1

Financial resources	SWME		WC and other entities		WMC		Total WM	
	2010	2011	2010	2011	2010	2011	2010	2011
State Budget (SB)	-	-	-	-	-	-	-	-
Own Resources	11.44	9.20	139.25	105.52	12.38	22.62	126.14	137.34
EU funds	4.99	7.66	112.81	75.17	0.02	-	36.03	82.83
Co-financing of SB to EU funds	0.78	1.32	27.72	13.40	0.02	-	8.65	14.72
Loans	-	-	30.63	29.46	-	-	35.59	29.46
Others	-	-	0.12	0.10	0.38	2.06	0.40	2.16
<b>TOTAL</b>	<b>17.21</b>	<b>18.18</b>	<b>310.53</b>	<b>223.65</b>	<b>12.80</b>	<b>24.68</b>	<b>206.81</b>	<b>266.51</b>

Figure 10.3.1



## 11 Research, Education, Environmental Training, Publicity and Promotion

### 11.1 Research

Following scientific – technical projects of international, national and local importance were solved within the scientific research activity at the **WRI Bratislava** in 2011:

Restoration of the Morava River – MoRe; HESTIA; Protection of the Central European Tundra Vole; WANDA; selection of new isolators of microorganisms from polluted environment containing genes of catabolic and detoxification trajectories and their testing for potential usage in biotechnologies; preparation and development of environmental technologies in flood protection of Little Carpathian area – case study Modra; WATLIFE; water monitoring and assessment; exchange of articles among water managers V4; support of the implementation process related to the EU Directive on Flood Risk Management and Assessment in Georgia; diagnostic sensors at the level of nanotechnology and micro-technology; specific tasks according to the rules of NORMAN Association; drinking water supply safety; usage of new filtration materials in water treatment; integrated solution of information flow related to water monitoring and assessment according to the Water Framework Directive; development of supporting system related to reduction of environmental pollution in the Bosna River.

Within the activities resulting from the valid legislation, the Water Research Institute dealt with 65 tasks in 2011.

In September 2011 the WRI was charged by the Ministry of Environment of the Slovak Republic with coordinating the implementation of EU strategy for the Danube region.

In 2011 the National Water Reference Laboratory for Slovakia received 8 798 samples for analysis and performed totally 161,353 analyses out of which as many as 120,917 were accredited and as many as 40,436 were not accredited.

In the Calibration Laboratory of Water Meters, which is the authorised metrological workplace, the amount of 14 water meters of overflowed amount of cold water and 26 heat meters were verified and 8 flow meters and 18 current meters were calibrated in 2011.

In 2011 the **SWME, state enterprise, Banská Štiavnica** dealt with the following tasks:

- Many tasks were related to the preparation of flood risk maps and flood hazard maps. In 2011 there were also tasks resulting from the implementation of other related EU legislation, national, European and international standardization. The enterprise was involved in the investment and development projects; territorial development of settlements and regions. The following studies were solved: Study of Measures in the Váh Old River Bed Focused on Increasing Fishing and Recreational Potential, Preparation of Electronic Navigation Map ENC, Project Related to the Marking of the Navigation Channel on the Danube, International GIS Consolidation of the Danube Navigation Waterway – GIS Forum, RIS SR – River Information Service, Study of the Small Danube Recreational Usage, Programme of Public Works and Flood Protection Programme of the Slovak

Republic, Improvement of Flood Protection Management and Flood Protection Planning in the Hornád River Basin in the Territory of the Slovak Republic.

- Implementation of correction and mitigation measures to reach good water status included the Study of Reducing Water Continuity Interruption for Fish Migration in three localities – Papradnianka, Petrovička and Štiavnik water courses.
- In 2011 the international cooperation included mainly the following projects: NEWADA; DANUBE FLOOD RISK; CEFROME; MORE; WACO; Creation of PLUSK information system for common Slovak-Polish transboundary rivers resulting from the WFD and the Directive on Flood Risk Management and Assessment; Checking the flood protection potential through distance research in the Slaná river basin; Integration of principles and procedures of ecology management into landscape and water management at the East Slovakia Lowland (Laborec – Uh region); TICAD – Sustainable development of the Tisa river basin.

In 2011 the **SHMI Bratislava** dealt with 4 contract tasks related to water:

- Ecosystems,
- Pollution Reduction Programme,
- Interaction of Ground and Surface water,
- National Climate Programme

and 4 projects:

- Climate – Water (Project of the 7 Framework Programme EU),
- Identification of hydrological regime changes of rivers in the Danube river basin,
- H-SAF,
- Consequences of climate changes and possible adaptation measures in individual sectors in Slovakia.

### **11.2 Education and Environmental Training**

Within education activities the **WRI Bratislava** traditionally organizes courses and workshops for people working in water management. In 2011 these were the following:

- Training Course on Ground and Waste Water Sampling
- Workshop for Radio-chemical Laboratory Workers
- Methods related to determination of selected specific substances. Possibilities of reaching required quantification limits
- Training on Hydrobiology
- Training Course on Microbiology
- Course for Water Managers II. level
- Training Course of Surface Water Sampling

In 2011 the WRI organized and co-organized the following scientific and professional conferences:

- Flood Risk and River Basin Management
- Reconstructions of Sewerage Systems and Waste Water Treatment Plants 2011
- Sediments of Water Courses and Reservoirs
- XVIII. Consulting Days for Water Management Radiological Laboratory Workers
- Modernization and Optimization of Water Treatment Plants

- 
- Drinking Water Supply System and Waste Water Collection in Municipalities
  - Conference of Water Managers in Industry
  - Development of WDF Compliant Method for Analysis of Biological Quality Elements. Phytobenthos & Macrophytes
  - Workshop Safety of Drinking Water Supply System

In 2011 the WRI was visited by many partners from abroad (China, Iraq, Great Britain, Czech Republic, Austria and Hungary) for the purpose of exchanging scientific-research knowledge and negotiating the mutual cooperation.

Key event of the year was the Ceremonial Meeting and the Expert Conference on the occasion of the 60th anniversary of the WRI establishment which were held on 14 November.

On the occasion of the World Water Day with the motto „Water for Cities“, the national conference was organized in Bratislava within the competence of the WRI. As many as 152 delegates from the whole of Slovakia participated in this conference.

In 2011 the education and environmental training 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,
- publication of own journals (e. g. „Voice of the Váh River“ and „Voice of the River Basin“),
- organizing expert conferences and workshops.

Activities of the **SHMI Bratislava** in 2011 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

**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 – CEED).

Target group is represented by schools (kindergartens, primary and secondary schools), coordinators and professional environmental education workers, employees of the state administration related to environmental protection and general public.



In 2011 the SEA organized:

- *national competitions* – ProEnviro, EnvirOtázniky, Hypericum, Green World;
- *school programmes* – Ecology Footprint, Hiking with NATURA, Campaign Eyes Peeled, BEAGLE;
- *workshops and conferences* – ENVIROFILM 2011, Fair of Environmental Education Programmes – ŠIŠKA 2011, Programme of Continual Education - Ecology Footprint, Conference IT – in environmental education

### **11.3 Promotion**

In 2011 the **WRI Bratislava** published 3 scientific monographs, 11 books and 7 scientific works in foreign prestigious expert journals. Comprehensive publication activity can be found at: [http://www.vuvh.sk/index.php/sk\\_SK/kniznica/kniznica-publikacna-cinnost](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.

**SWME, Banská Štiavnica** within its editorial and promotion activities

- publishes its own expert materials, e.g. water status assessment reports, reports on special-purpose fish management, reports on technical-security supervision, reports on implemented projects, annual reports, periodicals - „Voice of the Váh River“ (in 2011 – 20 years) and „Voice of the River Basin“, promotion and information materials, etc.,
- cooperates with expert water management periodicals, e.g. Water Management Journal, Enviromagazine, Water Management Magazine, etc.,
- actively supports presentation activities of its employees at conferences and workshops,
- promotes the work of the SWME by the activities organized within the work with the public.

**SHMI, Bratislava** publishes its own:

- expert periodicals: year books, reports, bulletins and assessments,
- information materials: overview of publication activities of employees of the Slovak Hydro-meteorological Institute,
- promotion and information materials and proceedings from the conferences organized within the institute

It cooperates with other expert periodicals (Water Management Magazine, Water Management Journal, Meteorological News, Enviromagazine, Acta Hydrologica Slovaca, and Environment). It is represented in editorial boards of national and international journals.

Publication activity of the institute employees in 2011 consisted of approximately 90 scientific articles, conference and workshop contributions, bulletin boards, reports and yearbooks.

Also in 2011 the promotion and editorial activities were in the **SEA Banská Bystrica** focused on:

- preparation of education and information publications for schools and the public,
- services of environmental library,
- publication of ENVIROMAGAZINE – national periodical supporting the environmental protection ([www.enviromagazin.sk](http://www.enviromagazin.sk)).

## **12 Conclusion**

Water management is a large interest area and has strategic importance in sustainable development. Water is a strategic resource and probably its price will be increased not only due to demographic growth, but also due to increasing demands for its consumption. Key theme of the World Water Day in 2011 was Water for Cities. The main reasons for its choice were growing claims for water management infrastructure development and water quality resources in sufficient amount corresponding with increasing population in cities.

Capacity of drinking water resources has been decreased also in Slovakia due to climate changes accompanied by warming, changing of drought periods and storm rainfalls and due to deterioration of water quality caused by anthropogenic water pollution.

Therefore the main objectives of water management are:

- provision of sufficient amount of water resources,
- provision of drinking water supply through public drinking water supply system including collection and treatment of waste water by public sewerage systems. Key document for waste water treatment is the Directive 91/271/EEC according to which the Slovak Republic is obliged to fulfil the commitments towards the EU.

Further task of the water management is the implementation of the Water Framework Directive and taking the measures to reach „good status“ of water by 2015, 2021 and 2027. Respective tool for this is also ground and surface water monitoring.

Flood protection is focused on protection of human health, lives and property in line with the valid legislation of the Slovak Republic and related EU directives.

## LIST OF ABBREVIATIONS

AEWIS	Autonomous Early Warning and Information System
BE	Branch Enterprise
DE RA	Department of Environment of Regional Authority
DE DA	Department of Environment of District Authority
EEC	Economic justified costs
ES	European Standards
EU	European Union
GDP	Gross Domestic Product
HEP	Hydro-ecological Plan
HYCO	Hydro-consult, s.e., Bratislava
LA	Local Authorities
MA SR	Ministry of Agriculture of the SR
ME SR	Ministry of Environment of the SR
MUSES	Local landscape system of ecological stability
NGO	Non-governmental organizations
ORNI	Office for Regulation in Network Industries
OTN	Sectoral Technical Standards
$Q_a$	Long term Average rate of flow
$Q_{min}$	Minimal monitored rate of flow
$Q_{100}$	Water volume reached or exceeded once in 100 years
$Q_{365d}$	Flow exceeded approximately during 365 days in a year
RIS	River Information Services
RUSES	Regional landscape system of ecological stability
SB	State Budget
SHMI	Slovak Hydrometeorological Institute
SEI	Slovak Environmental Inspection
STN	Slovak Technical Standard
SWME	State Water Management Enterprise, s.e. Banská Štiavnica
TC	Technical Committees
VAT	Value Added Tax
WFD	Water Framework Directive
WMC	Water Management Company
WMP	Water Management Plan
WRI	Water Research Institute Bratislava
WC	Water Company
WP	Work Packages
WSW	Water and Sewage Works
WWTP	Waste Water Treatment Plant