

MINISTRY OF ENVIRONMENT OF THE SLOVAK REPUBLIC

Elaborated by: Water Research Institute Bratislava

# **Report**

on Water Management  
in the Slovak Republic in 2007

Bratislava 2008



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# **1 ROLE OF WATER MANAGEMENT**

Water management sector deals with the major issues in the field of flood protection, drinking and service water supply of population, industry and agriculture as well as protection of surface water and ground water against pollution. Water management activities are related the administration of rivers, hydraulic structures, water supply systems, sewerage systems, and waste water treatment plants. Furthermore, it participates in creation and protection of environment. Accession of the Slovak Republic to the European Union means adoption of new obligations and implementation of new legislation in all fields of social and economic life. Meeting the requirements under the EU Directives depends on several factors where some of them such as insufficient funding, incomplete databases and inadequate monitoring of water quality and quantity have adverse effect.

In 2007 the Directive of the European Parliament and of the Council on the assessment and management of flood risks (2007/60/EC of October 23, 2007) was adopted by the Ministry of Environment of the Slovak Republic.

Meeting the requirements under the implementation programmes also depends on quality of proposed river basin management plans and programmes of measures in accordance with WFD. Therefore, it is important to create conditions in order to eliminate all problems recognized in this field.

## **2 ORGANIZATION, MANAGEMENT, MACROECONOMICS AND PROPERTY STRUCTURE**

### **2.1 Organization and Management**

The water management is legally regulated under the Act No. 139/2003 Coll. amending the Act No. 575/2001 Coll. on Organization of Activities of the Government and Central State Authorities as amended in later regulations and the Act No. 312/2001 Coll. on State Services and on amendment to some acts in wording of later regulations.

The Ministry of Environment of the Slovak Republic is a central body of the state administration responsible for environment and environmental protection, including:

water management

protection of water quality and quantity and its reasonable use under the Act No. 364/2004 Coll. on Waters and on amendment to the National Council Act no. 372/1990 Coll. on offences as amended in later regulations (Water Act), the Act No. 442/2002 Coll. on public water supply and public sewerage and on amendments to the Act No. 276/2001 Coll. on regulation of network industries as amended in later regulations

flood protection

fishery except aquaculture and sea fishing

The Section of Water and Energy Resources is an organizational body of the Ministry of Environment. It comprises the following departments:

- Department of State Administration in the Section of Water and Fishery

- Department of Water Policy and Energy Resources
- Department of River Basin Management and Flood Protection.

The Ministry of Environment is the founder of the following:

- three state enterprises:
  - Slovak Water Management Enterprise, š. p., Banská Štiavnica (SVP, š. p.),
  - Hydroconsult, š. p., Bratislava (HYCO, š. p.),
  - Water Management Construction, š. p., Bratislava (VV, š. p.),
- two government-subsidized organizations:
  - Water Research Institute Bratislava (VÚVH),
  - Slovak Hydrometeorological Institute (SHMÚ),
- execution of state administration by Slovak Environmental Inspection, Regional Environmental Authorities and District Environmental Authorities in the field of water, public water supply and public sewerage, and fisheries.

### ***Slovak Water Management Enterprise, state enterprise, Banská Štiavnica (SWME)***

The Slovak Water Management Enterprise is a public enterprise established in 1997 based on property of former river basin state enterprises. Its major activities are focused mainly on administration of rivers and hydraulic structures as well as quality and quantity of surface water and groundwater resources. Certain activities are related to flood protection and creation of navigation conditions.

### ***Hydroconsult, state enterprise, Bratislava***

Hydroconsult (HYCO) is a design-engineering and advisory organization providing design, engineering, consulting and advisory services related to hydraulic structures.

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

It is an investment-engineering organization performing investment-engineering activities and providing technical assistance to investors in investment construction. It performs design services and technical-safety supervision according to special regulations.

### ***Water Research Institute, Bratislava***

It is the only organization in Slovakia conducting complex water management research and other related activities resulting from the needs of the Slovak water management.

The main priorities of the WRI research and development activities result from its multifunctional position regarding creation and protection of environment, public health protection as well as social aspects of water which is essential, irreplaceable, natural and renewable resource used in production processes.

### ***Slovak Hydrometeorological Institute***

Slovak Hydrometeorological Institute (SHMI) is an expert organization with a national scope providing hydrological and meteorological services as well as other hydrological and meteorological activities including timely, comprehensive operative and regime information concerning water quality and quantity and air quality. It conducts comprehensive operational, research – development and international activities in the field of monitoring and assessment

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of surface water and groundwater including Hydrological Information and Forecast Services. SHMI also manages the Water Sub-Monitoring System Centre.

#### *Other organizations*

#### **Specialized State Authorities**

The scope of activities of the environmental state authorities is regulated under the Act No. 525/2003 Coll. on environmental state authorities and on amendments to certain acts.

The scope of the state water authorities responsible for water protection and water management is established pursuant to the Water Act. The state water authorities include the Ministry of Environment of the Slovak Republic, 8 regional environmental offices, 46 local environmental offices, Slovak Environmental Inspection and municipalities.

The state authorities responsible for public water supply and public sewerage are regulated under the Act No. 442/2004 Coll. on public water supply and public sewerage and on amendments to the Act No. 276/2002 Coll. on regulation of network industries. The state authorities responsible for fishery are regulated under the Act No. 139/2004 Coll. on fishery as amended in later legal regulations. The state authorities responsible for flood protection are regulated under the Act No. 666/2004 Coll. on flood protection.

The state authorities in individual sections of the state administration are mainly aimed at decision-making, control and supervisory activities in compliance with applicable legislation.

The assessment of the activity of regional environmental offices and their subordinate district environmental offices is included in the 2007 Annual Reports of regional environmental offices.

#### **Slovak Environmental Inspection, Bratislava**

##### *Department of Water Protection Inspection*

The scope and aim of the Water Protection Inspection control activities are defined under the Act No. 364/2004 Coll. on waters (Water Act) in effect as of July 1, 2004. In addition to control activity it also approves emergency plans, identifies causes of accidental water deterioration and manages activities dealing with its elimination, and manages the operation of the International Warning Centre in Slovakia. The Slovak Environmental Inspection includes four regional environmental inspectorates.

#### **Slovak Environmental Agency, Banská Bystrica**

Slovak Environmental Agency is an expert organization of the Ministry of Environment with a national scope aimed at environmental protection and development of environmental sciences. In the field of waters it coordinates reporting activities related to implementation of relevant EU legal regulations in the Slovak Republic. The Agency implements the projects in the field of restoration and re-naturalization of water courses. Moreover, it prepares expert opinions on proposed activities and strategic documents that are subject to the assessment of pressures and impacts on environment.

***State Geological Institute of Dionýz Štúr Bratislava***

The State Geological Institute of Dionýz Štúr as a scientific-research institute of the Ministry of Environment is a separate government-subsidized organization conducting geological research and survey of the Slovak territory. The water issues are dealt with especially in the Department of groundwater and geothermal energy.

***Special-Interest Associations and Organizations******Association of Employers in Water Management in Slovakia***

The Association of Employers in Water Management in Slovakia is a voluntary organization associating legal entities and natural persons employing the people in water management sector. It was established on December 9, 1991 with the primary objective to be a partner of the labour union in collective negotiations. It is a branch organization presenting activities and particularities of water management to general public.

Detailed information about the association is available on the following website: <http://www.svp.sk/hron/media/zzvh/ZZVH-ram.htm>

***Slovak Fishery Union, Žilina Council***

The Slovak Fishery Union, Žilina Council enforces execution of fishery laws under the provision of Article 4 of the Act No. 139/2002 Coll. on fishery as amended in later regulations.

***Association of Water Companies***

Association of water companies was established in 2004. In compliance with the Memorandum on Cooperation with the Ministry of Environment of the Slovak Republic it makes an effort to achieve a coordinated process of providing required level of operation of public water supply and sewerage system as well as to create the conditions for development of these activities in the territory of the Slovak Republic under the applicable legislation of the Ministry of Environment of the Slovak Republic as a central body of the state administration in the field of public water supply and sewerage systems.

Activities and responsibilities of legal entities and natural persons in establishing and operating the public water supply and public sewerage systems are defined pursuant to the Act No. 442/2002 Coll. The entities acting according to the requirements of this Act are as follows:

- water companies
- other entities providing drinking water supply and wastewater collection through public water supply and sewerage systems

Infrastructure property of municipalities is managed by water companies. Municipalities are owners of infrastructure property.

In 2007 there was 14 major water companies in Slovakia:

- 1 – Bratislava Water Company, joint-stock company, Bratislava
- 2 – Trnava Water Company, joint-stock company, Piešťany
- 3 – West Slovakia Water Company, joint-stock company, Nitra



- 4 – Trenčín Water Company, joint-stock company, Trenčín
- 5 – Trenčín Sewage and Water Works, joint-stock company, Trenčín
- 6 – North Slovakia Sewage and Water Works, joint-stock company, Žilina
- 7 – Orava Water Company, joint-stock company, Dolný Kubín
- 8 – Liptov Water Company, joint-stock company, Liptovský Mikuláš
- 9 – Turiec Water Company, joint –stock company, Martin
- 10 – Váh Water Company, joint-stock company, Považská Bystrica
- 11 – Ružomberok Water Company, joint-stock company, Ružomberok
- 12 – Central Slovakia Water Company, joint-stock company, Bratislava
- 13 – East Slovakia Water Company, joint-stock company, Bratislava
- 14 – Podtatranská Water Company, joint-stock company, Poprad

Other entities providing drinking water supply and wastewater collection:

- 1 – Water and Technical Services, Ltd. Hlohovec
- 2 – Komárno Water and Sewage Works, joint-stock company
- 3 – Mondi Business Paper SCP, joint-stock company, Ružomberok
- 4 – Aquaspiš, Ltd., Spišská Nová Ves
- 5 – PreVaK, Ltd., Bratislava

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

In 2007 the revenues of water management amounted to 18.850 billion SKK that represents an decrease by 1.324 billion SKK compared to 2006.

Table no. 2.2.1

Indicator	unit	Year							
		2004		2005		2006		2007	
			index 2004/2003		index 2005/2004		index 2006/2005		index 2007/2006
GDP	billion SKK	1,325.5	110.8	1,439.8	108.6	1,636.3	113.6	1,851.8	113.7
thereof: water management	billion SKK	15.65	101.5	17.85	114.1	20.17	113.0	18.85	93.5
Average number of employees in Slovakia	number in thous.	2,170.4	107.2	2,075	95.6	2,301.4	110.9	2,357.4	102.4
thereof: water management	number	13,629	96.3	13,247	97.2	13,114	98.9	12,824	97.8
Average monthly salary	SKK	15,825	110.2	17,274	109.2	18,761	108.6	20,146	107.4
thereof: water management	SKK	16,689	109.9	18,404	110.3	20,291	110.2	21,731	107.1

Source: Statistic Office SR, Statistic Report on Basic Development Trends in the Slovak Economy in 2004, 2005, 2006, 2007

SWME Banská Štiavnica shared 15.6 % of the total revenues, i.e. 2.934 billion SKK. The revenues of water companies shared 63.0 % in amount of 11.883 billion SKK, i.e. majority of the total revenues. Other water management enterprises generated revenues in amount of 4.033 billion SKK which shares 21.4 % of the total revenues in water management.

In 2007 the number of employees in water management sector was reduced by 290. The average salary increased by 1,440 SKK compared to 2006.

## 2.3 Relation to the State Budget

### *Capital Transfers (SWME, state enterprise)*

Funds in amount of 50.0 mil. SKK were allocated to the SWME, state enterprise. These funds were intended for flood protection measures.

Allocated funds were spent for the following investment activities:

- |   |               |
|---|---------------|
| – Reconstruction of Lakšársky Brook dikes   | 5.0 mil. SKK  |
| – Višňové – training of Rosinka   | 7.3 mil. SKK  |
| – Komjatná – training of Komjatná Brook   | 13.3 mil. SKK |
| – Kolpašská Gauging Station, putting protection objects into operation, providing the stability of dam body | 3.4 mil. SKK  |
| – Môťová Gauging Station, increasing the safety and providing stability of dam body                         | 6.6 mil. SKK  |
| – Dubovica – Dubovický Brook 2nd stage  | 3.0 mil. SKK  |
| – Hromoš – river training of Hromovec   | 6.4 mil. SKK  |
| – Žilina – Trnové, river training of Trnovka  | 5.0 mil. SKK  |

### *Current Transfers (SWME, state enterprise)*

The Slovak Water Management Enterprise received grants in amount of 111.453 mil. SKK and were allocated as follows: 50.953 mil. SKK for elimination of disaster consequences, 50.0 mil. SKK for repairs and maintenance within the flood protection measures and 10.5 mil. SKK for water quality and quantity monitoring.

### *Capital Transfers for Government-Subsidized Organizations*

In 2007 the total capital transfers spent by government-subsidized organizations were amounted to 5.8 mil. SKK (WRI).

### *Current Transfers for Government-Subsidized Organizations*

The total amount of current transfers approved for government-subsidized organizations in sum of 754.639 SKK was adjusted through the budget measures to the amount of 793.951 mil. SKK in 2007.

In 2007 the total current transfers for government-subsidized organizations were amounted to 182.918 mil. SKK (SHMI 77.621 mil. SKK + WRI 105.297 mil. SKK).

In 2007 water management organizations governed directly by the Ministry of Environment spent funds from the state budget in the total amount of 350.171 mil.SKK:

capital transfers SWME	50.000 mil. SKK
capital transfers WRI	5.800 mil. SKK
current expenses SWME	111.453 mil. SKK
<u>current expenses WRI+SHMI</u>	<u>182.918 mil. SKK</u>
Total	50.171 mil. SKK

## 2.4 Property Relations

### *Watercourses*

Based on more precise digital processing of the river inventory by using qualitatively more precise data in a digital output of the water management maps at M 1:50,000 scale the total length of rivers in Slovakia is 61,147 km. Pursuant to the Water Act, the Slovak Water Management Enterprise has a crucial position in administration of the watercourses in Slovakia.

The administration of small water courses is provided through the state organisations of forest management, namely, Forests of the Slovak Republic Banská Bystrica, Forest-Agricultural Property Ulič, Military Forests and Properties of the Slovak Republic, Pliešovce and the State Forests of TANAP. One percent of the total length of Slovak water courses is administrated by other entities while seven percent of water courses have no administrator.

SWME manages the river system with a total length of 38,217 km including major water courses with a length of 11.850km. The rest are small rivers. Rivers in a length of 8,202.5 km are trained. The length of protection dikes is 3,135.2 km.

Development Overview – Water Courses and Hydraulic Structures

Table no. 2.4.1

Indicator	Unit	Year			
		2004	2005	2006	2007
Length of watercourses	km	38,015	38,183	38,211*	38,217**
thereof: trained watercourses	km	8,115	8,125	8,199	8,202.5
Major water management rivers and water supply watercourses	km	11,422	11,850	11,850	11,850
Length of protection dikes	km	3,074* <sup>1</sup>	3,127* <sup>1</sup>	3,135* <sup>1</sup>	3,135.2
Length of artificial channels and feeders	km	42	42	42	67* <sup>2</sup>
Weirs	no.	210	210	216	217
Number of navigation locks	no.	12	12	12	15* <sup>3</sup>
Pumping stations	no.	70	71	72	72
Water reservoirs (total)	no.	286	278	278	278
thereof: water supply reservoirs	no.	8	8	8	8
Total capacity of water reservoirs	mil. m <sup>3</sup>	1,919* <sup>4</sup>	1,908* <sup>4</sup>	1,908* <sup>4</sup>	1,908* <sup>4</sup>
Dry reservoirs -polders	no.	4	14	20	20
Historical hydraulic structures	no.	23	23	23	23

Source: SWME, public enterprise, Banská Štiavnica – Annual report on administration and operation of watercourses and hydraulic structures, Economic Yearbook

\* the total length of watercourses includes minor watercourses of the 3rd stage of delimitation process (delimited as of April 30, 2006)

\*\* in 2007 three small rivers with a total length of 5.648 km were delimited

\*1 change – increase in the length of protection dikes has been caused mostly by applying more precise data (digital data and revised data)

\*2 increase due to 25 artificial channels and feeders (Bratislava Branch) that were not included in previous year

\*3 increase by 2 navigation locks in Gabčíkovo in administration of SWME and 1 navigation lock in Čunovo

\*4 change in number of reservoirs is due to the transfer of reservoir administration to a new administrator - Hydromeliorations Bratislava

## Water Supply and Sewerage Systems

Development Overview – systems in administration of water companies, local authorities and other entities:

Table no. 2.4.2

Indicator	Unit	Year					
		2005	2006	2007			
				WC	LA	Other*	Total
Length of water supply system (without service pipes)	km	25,719	26,357	24,413	2,222	534	26,899
Length of service pipes	km	5,809	5,925	5,216	712	178	6,105
Number of service pipes	piece	755,908	777,795	700,075	73,892	18,885	792,852
Length of sewage system (without service pipes)	km	7,690	8,016	7,018	1,324	164	8,506
Length of service pipes	km	1,996	2,117	1,748	420	35	2,203
Number of sewerage service pipes	piece	254,556	275,207	234,467	50,783	6,207	291,457
Number of WWTP	number	468	499	266	238	7	511

\* Other entities: KOMVaK Komárno, Water and Technical Services Hlohovec, SCP Ružomberok, Prevak Stará Turá, HBP Prievidza (Source: WRI)

## 3 LEGISLATION IN THE WATER MANAGEMENT

### 3.1 Legislation

In 2007 the legislative process was focused on two issues:

1. new EU water legislation adopted by the European Parliament and the Council, which shall be transposed to national legislation of the Slovak Republic .
2. new Act on land use planning and building regulations (Building Act) which empowers the Ministry of Environment to issue a legally binding regulation „ Specifications of Technical Requirements on Water Construction“. The Act will come into force in 2009. In the preparation phase, basic documents were developed for intersectoral discussion between the Ministry of Construction and Regional Development of the Slovak Republic as a proponent and the Ministry of Environment of the Slovak Republic as an body authorized to develop this legally binding regulation.

### 3.2 Standardization

The WRI Department of Standardization and Informatics for Water Management of the Water Research Institute and SHMI Hydrological Standardization Centre deal with the

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technical standardization in water management sector and cooperation with international and European standardization organizations.

Standardization for water management sector of the Slovak Republic is conducted in the following technical committees (TC):

- TC 1 Water Supply and Sewerage Systems
- TC 26 Pipes, fittings and plastic valves
- TC 27 Water quality and protection
- TC 64 Hydrology and Meteorology
- TC 72 Environmental management

The list of Slovak Technical Standards and technical standards of the Ministry of Environment SR for water management sector 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. Slovakia is a member of the International Organization for Standardization (ISO) and the European Committee for Standardization (CEN). It is obliged to comment on all draft standards and working papers.

The WRI Department of Standardization and Informatics for Water Management is authorized by the Slovak Institute for Technical Standardization to cooperate with the international standardization committees:

- ISO/TC 147 Water quality
- ISO/TC 113 Measurement of discharges in open river channels
- ISO/TC 224 Services concerning the drinking water supply and sewerage systems – quality criteria of services and operation indicators

and European standardization committees:

- CEN/TC 163 Sanitation facilities
- CEN/TC 164 Water supply
- CEN/TC 165 Wastewater technology
- CEN/TC 230 Water analysis
- CEN/TC 308 Sludge

International cooperation in European Standardization Committee CEN/TC 318 Hydrometry is provided by the representative of the SHMI Hydrological Standardization Centre.

## **4 WATER FRAMEWORK DIRECTIVE IMPLEMENTATION**

### **4.1 WFD Implementation Strategy in Terms of EC Reporting Obligations**

In 2007 WFD implementation process ran in compliance with updated and approved *2007 Strategy for WFD Implementation* and in accordance with the *Time Schedule of*

*Activities for Development of River Basin Management Plans.* The implementation process was aimed mainly at the following core activities:

- Implementation of the programmes for monitoring of surface and ground water quality and quantity as well as monitoring of protected areas; the Slovak Republic should have to submit the Summary Report on Monitoring Programmes (WFD, Article 8) to the European Commission by March 22, 2007. The Report was submitted on May 29, 2007 due to delayed deadline of approval of the Water Quality and Quantity Monitoring Programme in Slovakia for 2007. The results of assessment regarding achievement of WFD objectives in accordance with Article 8 have not been provided yet.

Due to a lack of funding, water quality and quantity monitoring was carried out in a reduced extent of monitored sampling sites and parameters. Since the frequency of analyses and number of samplings were reduced, statistical reliability is not guaranteed in evaluation of water quality and quantity monitoring results and in preparation of classification schemes needed for water quality and quantity assessment. This may lead to major uncertainties in the process.

- Elaboration of the Methodology for derivation of reference conditions and classification schemes applied to assessment of surface water ecological status in cooperation of the Ministry of Environment subordinate organizations (WRI, SHMI, SEA) with the Zoology Institute and Hydrology Institute of the Slovak Academy of Sciences. The document contain not only a description of methodology but also derived classification schemes for all quality elements, i.e. aquatic flora (phytoplankton, macrophytes and phytobenthos), benthic invertebrates, fish, hydromorphology and physical-chemical quality elements for all types of flowing surface water bodies. Since particular quality elements should be harmonized with each other, the harmonization process started in 2007 and its completion is expected in 2008. It is extremely challenging and complicated process revealing new aspects, interconnections and relationships needed to be taken into consideration in the harmonization process. The above-mentioned methodology is available on the website: <http://www.vuvh.sk/rsv/?page=download>.
- Estimation of background heavy metal concentrations in surface water began in 2007 and it is expected to be finished in May 2008. It is also very demanding and complicated scientific procedure. The results will be directly reflected in the limit values of environmental quality standards for relevant substances in Slovakia and will enter the process of harmonization through the chemical quality elements.
- Elaboration of the Methodology for evaluation and assessment of groundwater bodies quantity in Quaternary sediments and pre-Quaternary rocks based on data from 2006.
- Identification of problematic water management localities regarding poor quantitative status of groundwater bodies, i.e. risk of failing to achieve good quantitative status by 2015 based on data from 2006.
- Elaboration of the Methodology for assessment of groundwater bodies chemical status including its application throughout Slovakia, identification of problematic water management localities (quality) and draft programme of measures (in 2007, groundwater quality monitoring was supplemented with monitoring of relevant substances and specific

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organic substances selected under the Pollution Reduction Programme. This activity was funded by the Environmental Fund of the Ministry of Environment SR).

- Development of the Preliminary Overview of Identified Major Water Management Problems based on the outputs of implementation of the Article 5 WFD and other materials. Identification of major water management problems is a significant step in the planning process which is followed by a proposal of measures within the Programme of Measures. The above-mentioned document is intended to be a part of the river basin management plans. Currently it is available for comments on the following website: <http://www.vuvh.sk/rsv>. The document will be updated based on applied comments.

In protection against adverse effects of waters concerning flood risk no problems have been identified in the previous stage of activities. The activities will result from the transposition of new *Directive of the European Parliament and of the Council No. 2007/60/EC of October 23, 2007 on the assessment and management of flood risks* to the Slovak legislation and its following implementation. The problems assessed under this Directive will be included in the second planning cycle. Similarly, the issues on drought risks will be dealt with in the following planning cycle.

- Continuation in testing the water bodies – “candidates“ for heavily modified water bodies (HMWB) and artificial water bodies (AWB) as well as preparation of restoration measures proposals for rivers of Slovakia. For the needs of the final HMWB designation a database of migration barriers on medium and large rivers has been developed in cooperation of the State Nature Protection Agency with ichthyologists.
- Compensation of delay in works within the economic analysis that should have been completed by the end 2004. It was related mainly to assessment of the current level of water management services cost effectiveness. This task included water management services (drinking water production and distribution; wastewater treatment and collection) performed only by water companies. Currently it is not possible to include also all municipalities and other entities providing the same type of services due to absence of the central register of data important for calculation of cost effectiveness. Moreover, an assessment of the current level of cost effectiveness of water management services related to utilization of water courses and provided by SWME, Banská Štiavnica was carried out (hydropower potential, water for power production and surface water intakes).

Other activities were aimed at fields in which economic analysis is very important. *The Cost Effectiveness Assessment Methodology* was developed within the relevant activities since the WFD requires to include only sufficiently effective and cost-effective measures in the programmes of measures. Furthermore, the measures should take into account the “polluter pays” principle. In 2007, information on particular types of costs (unit costs) necessary for remedial measures were collected for that purpose.

- Preparation of documents related to positions of the representatives of Slovakia participating in discussions on the proposal of the Directive on the assessment and management of flood risks in legislative process of the second reading (the Directive entered into force on October 23, 2007) and the Directive of the European Parliament and of the Council on environmental quality standards in water policy and o amendments

to the Directives 82/176/EEC, 83/153/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and 2000/60/EC which was discussed in the first reading.

In performing these activities several problems have arisen mainly due to a lack of funding. It led to limitation of the number of experts participating in this difficult and complicated process.

Despite the above-mentioned facts, work on preparation of river basin management plans was done in compliance with the requirements of the European Commission. However, there can be expected several uncertainties in the RBMP preparation process.

In addition to activities at the national level, the actions at international level were also taken within the International Commission for the Protection of the Danube River. A River Basin Management Plan for international river basin of the Tisza River was developed under the *Memorandum of Understanding "Towards a River Basin Management Plan for the Tisza river supporting sustainable development of the region"* signed by the Ministry of Environment of the Slovak Republic and environmental departments of Hungary, Romania, Ukraine, Serbia and Monte Negro (December 13, 2004, Vienna).

In 2007 the first stage of the WFD implementation was completed by submitting the Report "Analysis of the Tisza River Basin – 2007" which was approved by relevant water directors (written approval by February 2008). Other activities related to a River Basin Management Plan for the Tisza River will be done simultaneously with a River Basin Management Plan for the Danube River and national river basin management plans.

## **4.2 Implementation of Other Relevant EU Water Directives**

In addition to WFD implementation under the Government Decree No. 262 of October 10, 2001 as well as the Act No. 575/2001 Coll. on the organization of the Government activities and organization of the central state authorities, the implementation of other 25 EU directives and regulations including the reporting to the European Commission is also in the competence of the Ministry of Environment. The Directive 2006/7/EC concerning the management of bathing water quality and repealing Directive 76/160/ECC and the Directive of the European Council 98/83/EC on the quality of water intended for human consumption are in the competence of the Ministry of Health of the Slovak Republic.

In 2007, the new Directive of the European Parliament and of the Council No. 2007/60/EC of October 23, 2007 was included in the competence of the Ministry of Environment. The Directive entered into force on November 26, 2007.

There was an effort to perform activities in order to meet the requirements of the implementation programmes for particular directives. However, it was not possible in all cases. Execution of the Implementation programmes depends on several factors and some of them are very adverse: lack of funding, missing databases, insufficient level of water quality and quantity monitoring, etc. Considering this fact, the Directive 91/676/EC on the protection of waters against pollution caused by nitrates from agricultural sources and the Directive 91/271/ECC concerning urban wastewater treatment were the most important and the most problematic among all.



Meeting the requirements of the implementation programmes for relevant EU directives/regulations has also an effect on the quality of prepared river basin management plans and programmes of measures under the WFD. So it is very important to create conditions in order to eliminate all limitations as soon as possible.

Following the above-mentioned facts, the development of new purpose-made nitrates monitoring network started in 2007 (in accordance with the protected areas monitoring programme). In every municipal cadastre situated in vulnerable area at least one monitoring object will be installed for the purpose of nitrates evaluation. This requires to build 702 new monitoring objects in Slovakia. Such project started in 2007. Field works, samplings and laboratory analyses of nitrogen substances in groundwater are currently being done. Monitoring performed through the extended monitoring network will deliver more comprehensive and reliable results related to a content of nitrates in groundwater. Such results will facilitate the reassessment of work programmes and identification of vulnerable areas. Currently it is not possible to reassess these issues since there is only 10 percent of important information available.

In 2007, the National Programme of the Slovak Republic was modified for the purpose of the Directive of the European Council 91/271/ECC on urban wastewater treatment as amended by the Directive 98/15/EC and the Regulation of the European Parliament and of the Council 1882/2003/EC. Updated version of the National Programme of the Slovak Republic was submitted to the European Commission in April 2007. UWWTD 2007 Questionnaire for the 2005 reference period was completed and sent via e-mail in November 2007. The above-mentioned documents are available on the following website: <http://www.sazp.sk>.

“Information provided by the Slovak Republic for 2006 within the information exchange under the Council Decision 77/795/ECC” is also one of the directives reported to the EU authorities.

### 4.3 Directives Implementation Projects Funded by EU

In 2007, the projects under the Measure 2.1 in amount of 1,322.185 million SKK were funded by the structural funds. Co-financing by the state budget funds amounted to 286.731 million SKK.

Detailed budget breakdown is shown in the following table:

[in million SKK]

		ERDF	State budget	Total
Drinking water	Water companies,	289.888	72.932	362.820
	municipalities	79.907	28.358	108.265
	(total)	369.795	101.290	471.085

		ERDF	State budget	Total
Sewerage and WWTPs	Water companies,	328.928	91,782	420.710
	Municipalities	201.532	68,308	269.840
	(total)	530.460	160,090	690.550
Flood protection measures	SWME	135.199	25.351	160.550
Total		1,035.454	286.731	1,322.185

In 2007, 18 projects were funded from the ISPA Fund in amount of 188.012 mil. € (EU funds: 105.590 mil. €; state budget co-financing: 45.988 mil. €).

The Cohesion Fund allocated 1,027.709 mil. SKK for 7 projects in 2007.

## 5 INTERNATIONAL COOPERATION IN WATER MANAGEMENT

In 2007, international cooperation continued under the following intergovernmental agreements, international treaty and international conventions:

### *Intergovernmental agreements and International Treaty*

*Agreement* between Czechoslovak Socialistic Republic and Hungary on regulation of transboundary water management

*Agreement* between Slovakia and Ukraine on management of transboundary waters.

*Agreement* between Slovakia and Poland on management of transboundary waters.

*Agreement* between Slovakia and Czech Republic on cooperation in the field of transboundary waters.

*Treaty* between Czechoslovak Socialistic Republic and Austria on regulation of transboundary water management.

The following documents are in the process of preparation or ratification, respectively:

*Agreement* between Slovakia and Austria on cooperation in management of transboundary waters.

*Agreement* between Slovakia and Hungary on cooperation in common river basins and transboundary waters

*.Convention on Protection and Use of Transboundary Rivers and International Lakes UN Economic Commission for Europe (Helsinki Convention)*. The objective of the Convention is at protection and use of transboundary rivers and international lakes, strengthening national and international measures for prevention, control and reduction of adverse effects on transboundary waters including hazardous substances in aquatic environment, reduction of water eutrophication, etc. Several working groups are established within the Convention. Slovak representatives is are members of some of these groups. The most active working groups are WG for monitoring and assessment a part of which is the International Water Assessment Centre (IWAC). At the present time, the IWAC secretariat is located at the Slovak Hydrometeorological Institute. In 2007, the first assessment report on transboundary waters in the UN ECE region was developed under the Helsinki Convention. SHMI experts

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actively participated in preparation of the report which was presented in the Ministerial Conference "Environment for Europe" held in Belgrade.

*Convention on Cooperation in Protection and Sustainable Use of the Danube River.* The Convention is aimed at sustainable development and balanced water management including conservation, improvement and rational use of surface and ground water resources in the Danube River Basin. It is supposed that it will lead to reduction of pollution of the Black Sea coming from the pollution sources located in the river basin.

The International Commission for the Protection of the Danube River (ICPDR) is established under the *Convention on Cooperation in Protection and Sustainable Use of the Danube River*. The Ministry of Environment of the Slovak Republic is a member of this Commission.

*Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention).* The Convention is aimed at reasonable use of wetlands and support of international cooperation in providing the wetlands functions. International cooperation under the Ramsar Convention and the Framework Convention on the Protection and Sustainable Development of the Carpathians is developing within the Carpathian Wetlands Initiative.

The following committees were established under the particular 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.

Specific measures and tasks (short-term, medium-term, long-term) were approved at the regular meetings of the Transboundary Water Commission. The measures were included in the Commission Meeting Protocols. Conclusions of the discussions of individual working and expert groups served as a basis for the Commission Meetings. The meetings of working groups are organized twice a year.

Communication is done via working and expert groups as well as representatives of the individual governments.

### ***International Projects***

The most important projects in 2007 were as follows:

- Water Management Balance of the Morava River with respect to the Concept of Sustainable Use of the Morava River Basin – 1st up to 4th stage;
- Water Management Balance of the Ipeľ River – Concept of Utilization of the Ipeľ River – 6th stage
- "Morava" Bilateral Project – joint management of water management and hydro-ecological measures (Slovakia – Austria)

- Initial Study of the Project – Improving the Danube River Navigability (Hungary – Slovakia)
- NORMAN – Network of Reference Laboratories and Partner Organizations for Monitoring and Bio-Monitoring of Pollutants Posing Risk to Environment;
- BALANCE – Integrated management of selected river basin under EU WFD;
- SOCOPSE – development of control system in Europe – it is related to support of WFD implementation process by using the directives and supporting tools for decision making in management of priority pollutants;
- Development of the Joint Landscape and Water Management Concept and assessment of conditions for its implementation and planning of individual elements of the concept in Medzibodrožie – INTERREG III A;
- DINAMICS – the project is aimed at development of biological nanosensors capable to detect pathogenic microorganisms in aquatic environment;
- DANewBE Data (Digitally Advanced New Cross-Border Exchange of Data) which is a part of INTERREG III B Project;
- UNDP – Integration of principles and practices of ecological management into the landscape and water management in the Laborec-Uh Region (East Slovakia Lowland)
- Improvement of flood management and flood protection plans for the Hornád River Basin in the territory of Slovakia;
- Twinning project SK05/IB/EN-01 “Determination of EQS for water, and building capacity for regional and district environmental offices in implementation of water control and monitoring
- MOSES – Improvement of Flood Protection System;
- Envirogeoportal is funded by EF within the Intereg Prohgramme III A). The objective of the project is to develop the central internet portal for public with access to relevant spatial data (Geographic information System) of parties involved in the project (Slovak Environmental Agency, SHMI, WRI) in cooperation with the Hungarian partner;
- FLOODMED co-financed by EU within the INTERREG CADSES IIIB Initiative;
- HYDROCARE co-financed by EU within the INTERREG CADSES IIIB Initiative;
- HSAF – satellite application for hydrology funded by EUMETSAT;
- Education and training in water management sector using virtual educational environment (Leonardo da Vinci). The objective of the project is to develop the online educational system for water management concerning mainly flood protection and landscape retention capacity.

## **6 DESCRIPTION OF NATURAL CONDITIONS IN THE FIELD OF WATER AND WATER MANAGEMENT**

### **6.1 Natural Conditions**

The Slovak Republic is situated in the Central Europe. It borders on Austria, Czech Republic, Poland, Ukraine and Hungary.

The most of the territory forms a part of the West Carpathians Mountain System and only the outmost northeast part belongs to the East Carpathians, which is a part of the Carpathian

Ecoregion. Lowlands cover almost one fourth of the territory - Vienna basin from the north, Panonian Basin from the southwest and Great Danube Basin from the south-east. All these form a part of the Hungarian Lowland.

Maximum vertical dissection - energy of the relief expressed as difference between maximum and minimum altitude is given by 2,655 meter above sea level (Gerlachovský štít - mountain peak) - 94 meters above sea level (Bodrog - state border) = 2,561 meters.

### **Climatic Conditions**

The total precipitation in the Slovak territory for 2007 is 858 mm which represents 113 percent compared to average conditions. The year 2007 is considered as a humid year. Monthly rainfall totals for 2007 are shown in table no. 6.1.1.

Average rainfall in Slovakia for 2007

Table no. 6.1.1

Month	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Year
mm	101	58	71	6	82	92	58	94	133	57	66	40	858
% of average	220	138	151	11	108	107	64	116	211	93	106	75	113
Excess (+) Deficit (-)	+55	+16	+24	-49	+6	+6	-32	+13	+70	-4	+4	-13	+96
Description of precipitation period	EW	VW	EW	ED	R	R	VD	W	EW	R	R	VD	W

Notice: ED – extremely dry, VD- very dry, D – dry, R- regular, , W - wet, VW – very wet, EW – extremely wet  
Source: SHMI

Rainfall totals for 2007 in individual river basin districts of Slovakia are shown in table 6.1.2. Following the precipitation period characteristics, the Poprad, Dunajec and Hornád river basins can be considered as wet. Most of other sub-basins were considered as regular regarding rainfall totals for 2007.

Average rainfall totals per river basin in Slovakia for 2007

Table no. 6.1.2

River Basin District	Sub-Basin	Area [km <sup>2</sup> ]	Average Rainfall [mm]	% of average	Precipitation Period Characteristics
Danube	Morava*	2,282	728	107	R
	Danube*	1,138	650	104	R
	Váh	14,268	967	115	W
	Nitra	4,501	769	111	W
	Hron	5,465	869	110	R
	Ipeľ**	3,649	659	96	R
	Slaná	3,217	791	100	R
	Bodrog*	7,272	834	118	W
	Bodva	858	745	102	R
Hornád	4,414	842	124	VW	
Dunajec and Poprad	Dunajec and Poprad	1,950	1,068	127	VW
Slovakia		49,014	854	112	W

\*only Slovak part of river basin

### **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 Čirč it passes over the Slovak territory) along with natural conditions predetermines situation of water management in our country. Water from 96 % of the Slovak territory flows through the Danube and Tisza into the Black Sea, while the remaining 4 % flows through the Vistula River tributaries into the Baltic Sea. The streams rising in Slovakia 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 the karst plains up to 3.4 km.km<sup>-2</sup> in paleogennic rocks of the flysch mountains. An average density of the river system is characterized by the value of 1.1 km.km<sup>-2</sup>.

#### Water Resources in 2007

In 2007 the average annual runoff from the Slovak territory was 189 mm, which is 72 % of the long-term average. The runoff in individual river basins was in the range from 27 mm (Danube sub-basins) to 4,256 mm (Poprad and Dunajec river basins). The lowest runoff was recorded in the Bodva River Basin (28 %) while the highest runoff was in the Dunajec and Poprad river basins (123 %). Values of annual runoff for each river basin are shown in table 6.1.3. The water balance data for 2007 are shown in table no. 6.1.4.

Average annual runoff for each river basin of Slovakia in 2007

Table no. 6.1.3

River basin district	Sub-basin	Area of river basin [km <sup>2</sup> ]	Annual runoff [mm]	% of normal
Danube	Morava*	2,282	65	55
	Dunaj*	1,138	27	75
	Váh	14,268	309	87
	Nitra	4,501	113	72
	Hron	5,465	199	69
	Ipel' *	3,649	45	33
	Slaná	3,217	98	52
	Bodrog*	7,272	198	84
	Bodva	858	60	28
	Hornád	4,414	143	63
Dunajec and Poprad	Dunajec and Poprad	1,950	456	123
Slovakia		49,014	189	72

\* Slovak part of river basin

Total water balance of water resources in Slovakia

Table no. 6.1.4

Balance	Volume [mil. m <sup>3</sup> ]
	2007
<i>Hydrological balance:</i>	
Rainfall	39,460.000
Annual inflow to Slovakia	63,519.000
Annual runoff	72,593.000
Annual runoff from the Slovak territory	9,264.000
<i>Water management balance:</i>	
Total intakes (Slovakia)	480.313
Vapour from water reservoirs	62.070
Discharge into surface water	628.342
Effect of water reservoirs (WR)	31.700

Balance	Volume [mil. m <sup>3</sup> ]
	2007
	accumulation
Total water supply in WR as of January 1 of the following year	797.700
% of storage capacity in accumulation water reservoirs	69.000
Water use rate (%)	5.180

### *Assessment of Groundwater Regime in the Hydrological Year 2007*

In 2007 the highest values of groundwater levels and well capacities were measured in the period from January to March. In the Danube River Basin and Hornád River Basin the effect of above-average rainfall totals in autumn led to increase in groundwater level with maximum annual values measured in October. In the regions situated at higher altitude, maximum well capacity influenced by storm rainfalls was recorded during the summer season in July and August, respectively. However, most of maximum well capacity values were recorded in March. Minimum groundwater levels and well capacities were observed during winter in November and December or in some cases in September and October.

Recently, the long-term maximum water levels and maximum well capacities are more frequently exceeded or, on the contrary, well capacities and water levels are often below the minimum. This may be a result of relatively short monitoring series as well as extreme weather events (droughts, floods and storm rainfalls).

### **Surface Water Quality**

The Slovak Hydro-Meteorological Institute conducts an assessment of surface water quality within the national river quality monitoring based on the results of water analyses (basic physical-chemical parameters, biological parameters, micro-biological parameters, organic and inorganic micro-pollutants) carried out in SWME laboratories (physical-chemical water analyses) and WRI laboratories (biological analyses, analyses of specific organic substances and all analyses of samples from transboundary waters on the Danube River and its tributaries).

The results are processed under the Regulation of the Slovak Government No. 296/2005 Coll. determining the requirements on surface water quality, surface water quality objectives, and limit values for wastewater and special water pollution parameters. In a given year the previous 24-month period is assessed.

Pursuant to the Decree No. 221/2005, water quality monitoring was divided into the following categories: basic monitoring, operational monitoring and monitoring of protected areas. Water quality was monitored in compliance with the 2007 Water Quality Monitoring Programme. The monitoring should have been done at 310 sampling sites. A part of sampling sites was monitored for several purposes to minimize costs. Basic monitoring network includes 218 sampling sites where 35 of them were monitored within the verification of water bodies description process, 61 within the monitoring of reference conditions, 75 within the description of water course types and 9 sampling sites is subject to the Decision 77/95/EEC.

In 2007, the monitoring frequency for each parameter varied in a range from 1 to 24 times. Parameters with lower frequency of monitoring include biological parameters, heavy metals and specific organic pollutants. Priority substances are monitored 12 times a year.

Today, the approach to assessment of surface water quality is changing under the WFD requirements. Recently, surface water quality was assessed under the Slovak Technical Standard No. 75 7221 - Water Quality. Surface Water Quality Classification. This standard was cancelled on March 3 2007.

In this transition period, the parameters shown in the table 6.1.5. are categorized under the Regulation of the Slovak Government No. 296/2005 determining the requirements on surface water quality and quality objectives for surface water and limit values of wastewater and special water pollution parameters.

The requirements under the Regulation No. 296/2005 have been fully met in some physical – chemical parameters: TOC, calcium, sulphates, magnesium; for micropollutants: tensides, cyanides, copper, nickel, chrome and some specific organic substances.

The limit values for aluminium and selenium were exceeded in most cases(100% exceeded). AOX, chloroform and trichloroethylene were also among the frequently exceeded parameters. Concerning microbiological parameters, the limit values for faecal streptococci, thermotolerant coliform bacteria and coliform bacteria were frequently exceeded. Tetrachloromethane was not evaluated since the determination limit value is higher than the limit under the Regulation 296/2005. Cis 1,2 – dichloroethene was evaluated only in case when it met the requirements under the Regulation 296/2005 – values measured were below the determination limit, which is higher by 0.1 than the threshold limit under the Regulation 296/2005. Parameter did not met the requirements of the Regulation where the values exceeded the determination limit.

Evaluation of Monitored Surface Water Quality Parameters  
under the Regulation 296/2005 for 2006 - 2007

Table no. 6.1.5

Parameter	Unit	Total number of monitored sampling sites	Number of monitored sampling sites under the requirements of the Regulation 296/2005	% meeting the requirements of the Regulation 296/2005
Dissolved Oxygen	mg/l	123	118	96
COD Mn	mg/l	42	40	95
COD Cr	mg/l	114	90	79
Total Organic Carbon	mg/l	22	22	100
BOD with nitrification inhibition	mg/l	98	90	92
Free Ammonia	mg/l	47	47	100
Water Reaction		123	114	93
Water Temperature	°C	123	118	96
Dissolved Solids	Mg/l	68	64	94
Total Iron	mg/l	37	32	86
Total Manganese	mg/l	37	33	89
Ammonium Nitrogen	mg/l	121	106	88



Parameter	Unit	Total number of monitored sampling sites	Number of monitored sampling sites under the requirements of the Regulation 296/2005	% meeting the requirements of the Regulation 296/2005
Nitrite Nitrogen	mg/l	121	44	36
Nitrate Nitrogen	mg/l	121	114	94
Organic Nitrogen	mg/l	57	54	95
Total Phosphorus	mg/l	89	76	85
Total Nitrogen	mg/l	123	118	96
Dissolved solids - ignited	mg/l	52	47	90
Chlorides	mg/l	109	105	96
Sulphates	mg/l	109	109	100
Calcium	mg/l	104	104	100
Magnesium	mg/l	104	104	100
Fluorides	mg/l	1	1	100
Phenols - volatile	mg/l	71	68	96
Anion Tensides	mg/l	41	41	100
Non-polar extractable substances - UV	mg/l	74	53	72
Total Cyanides	mg/l	16	16	100
Active chlorine	mg/l	32	17	53
Mercury	µg/l	26	22	85
Cadmium	µg/l	20	20	100
Lead	µg/l	20	19	95
Arsenic	µg/l	17	16	94
Copper	µg/l	25	25	100
Total chrome	µg/l	16	16	100
Nickel	µg/l	16	16	100
Zinc	µg/l	19	13	68
Selenium	µg/l	1	1	100
Aluminium	µg/l	11		0
Saprobic Index of Bioseston		57	48	84
Coliform Bacteria	KTJ/ml	76	26	34
Thermotolerant Coliform Bacteria	KTJ/ml	70	17	24
Faecal Streptococci	KTJ/ml	52	9	17
Chlorophyll	µg/l	51	43	84
Saprobic index of microflora growth		1	1	100
Producers in 1 ml(aut.org.)	number/1ml	32	25	78
Abundance of phytoplankton	number/1ml	11	8	73
Total volume alpha activity	mBq/l	26	25	96
Total volume beta activity	mBq/l	29	27	93
Radium 226	mBq/l	3	3	100
Tritium	Bq/l	13	13	100
Absorbed organic halogens	µg/l	30	3	10
Pentachlorophenol	µg/l	14	14	100

Parameter	Unit	Total number of monitored sampling sites	Number of monitored sampling sites under the requirements of the Regulation 296/2005	% meeting the requirements of the Regulation 296/2005
Benzene	µg/l	47	47	100
Toluene	µg/l	32	32	100
Chlorobenzene	µg/l	1	1	100
1,3-Dichlorobenzene	µg/l	4	4	100
1,4-Dichlorobenzene	µg/l	4	4	100
1,2-Dichlorobenzene	µg/l	4	4	100
Sum Xylene	µg/l	32	32	100
Chloroform	µg/l	44		0
1,2-Dichloroethane	µg/l	41	38	93
Tetrachloromethane	µg/l	36	not evaluated	
1,1,2-Trichloroethylene	µg/l	36		0
1,1,2,2-Tetrachloroethylene	µg/l	29	29	100
Cis 1,2 - dichloroethene	µg/l	29	21	72
Benzo(a)pyrene	µg/l	57	57	100
Fluoranthene	µg/l	57	54	95
Naphthalene	µg/l	57	57	100
Hexachlorobenzene	µg/l	52	52	100
Lindane	µg/l	54	54	100
1,2,4-trichlorobenzene	µg/l	46	45	98

## 6.2 River Basin Districts

Water resources of Slovakia are divided into the hydrological and administrative units – river basins, river basin districts and water bodies following the WFD requirements.

### *Hydrological Division of River Basin Districts*

Water resources of Slovakia are divided into two international river basins: Danube River Basin (96 % of the Slovak territory) and Vistula River Basin (4 % of the Slovak territory). Two river basin districts are designated within the international river basins:

Danube International River Basin (Black Sea drainage area) - *Danube River Basin District* comprises the following: Danube sub-basin, Morava sub-basin, Váh sub-basin, Hron sub-basin, Ipeľ sub-basin, Slaná sub-basin, Bodrog sub-basin, Hornád sub-basin and Bodva sub-basin;

Vistula International River Basin (Baltic Sea drainage area) – *Dunajec and Poprad River Basin District* (Dunajec and Poprad sub-basin).

Compared to 2006 there is a change in the number of defined river basin districts. Original number of six river basin districts was changed to two since according to EC comments there are only two river basin districts in the European context. This change will be transposed to relevant provisions of the Water Act.

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### *Hydrogeological Division of River Basin Districts*

Relevant hydrogeological zones are assigned to each river basin district under the Article 11, Water Act. Hydrogeological zones are defined as areas with similar hydrogeological conditions, type of aquifer and groundwater cycle. Hydrogeological zones (141 in Slovakia) are an important element for assessment of groundwater bodies quantity in accordance with the WFD requirements. The list of hydrogeological zones will be included in the Regulation of the Ministry of Environment SR No. 224/2005 Coll. specifying the details on identification of river basin districts, environmental objectives and water planning.

### *River Basin District Authority*

River basin district is a basic unit of river basin administration. River basin districts are managed by the Slovak Water Management Enterprise, Banská Štiavnica as an administrator of important rivers. The Ministry of Environment SR and regional environmental offices are designated as competent authorities for each river basin district.

### *Water Bodies*

There are 1,742 bodies of flowing surface water and 23 bodies of standing surface water identified within the river basin district bodies (their list including maps is available on <http://www.vuvh.sk/rsv>). Concerning groundwater, there are 101 groundwater bodies identified in Slovakia including 16 bodies in Quaternary sediments, 59 bodies in pre-Quaternary sediments and 26 geothermal water bodies – structures.

Identification of water bodies is continuous and repetitive process. Identified water bodies can be specified by December 22, 2008, i.e. before issuing the river basin management plan. When the river basin management plan is in force no modifications can be done to identified water bodies. Further specifications of water bodies can be done only within the preparation of updated version of the following river basin management plan

## **6.3 Protected Areas**

In 2004, the Register of Protected Areas was prepared in compliance with the WFD requirements. It is updated annually. The Register includes protected areas with surface and ground water as well as areas with established conservation of natural habitats of plant and animal species directly dependent on water. Specifically, it comprises two groups of protected areas:

protected areas under the Water Act;

protected areas under the Act on nature and landscape protection

Detailed description of protected areas are included in the 2005 Report on Water Management in Slovakia. The Register of Protected Areas is available on the website: <http://www.vuvh.sk>.

Table no. 6.3.1

Protected Areas	Number	
	2006	2007
Protection zones of water supply resources	1,138	1,138
Protected water management areas	10	10
Large protected areas, thereof:	23	23
- National parks	9	9
- Protected landscape areas	14	14
Small protected areas , thereof:	1,002	1,012
- directly dependent on water	312	312
Wetlands of international importance, thereof:	22	22
- Ramsar localities – approved	14	14
- Ramsar localities – proposed	4	4
Wetlands of national importance	72	72
Protected bird areas, thereof	38	38
- for water birds protection	15	15
- established under the Regulation of the Ministry of Environment	5	5
Area of European importance	382	382
Areas with bathing waters	38	38
Protected fishing areas	29	29

In 2007 WRI continued in updating of the water supply resources protection zones database.

## 7 WATER USE

### 7.1 Water Use in Water Bodies

#### 7.1.1 Surface Water

##### *Service Water Supply*

Charged surface water supply from surface resources in Slovakia has been experiencing downward trend since 1990. In 2007 decrease in water supply by 56,396 thousand m<sup>3</sup> to volume of 299,475 thousand m<sup>3</sup> was recorded, i.e. by 15.8 % compared to 2006. It was 2,534 thousand m<sup>3</sup> more than stated in the approved change of water abstraction plan. The most significant drop in water supply was in SWME - Branch Enterprise Košice where supplies have decreased by 54,433 thousand m<sup>3</sup> (38.3 %). Branch Enterprise Piešťany recorded decrease in water supply by 12,204 thousand m<sup>3</sup>. Branch Enterprise Bratislava recorded slight increase by 7,884 thousand m<sup>3</sup> and Branch Enterprise Banská Bystrica recorded the increase by 2,357 thousand m<sup>3</sup>. Water supply for public water supply systems

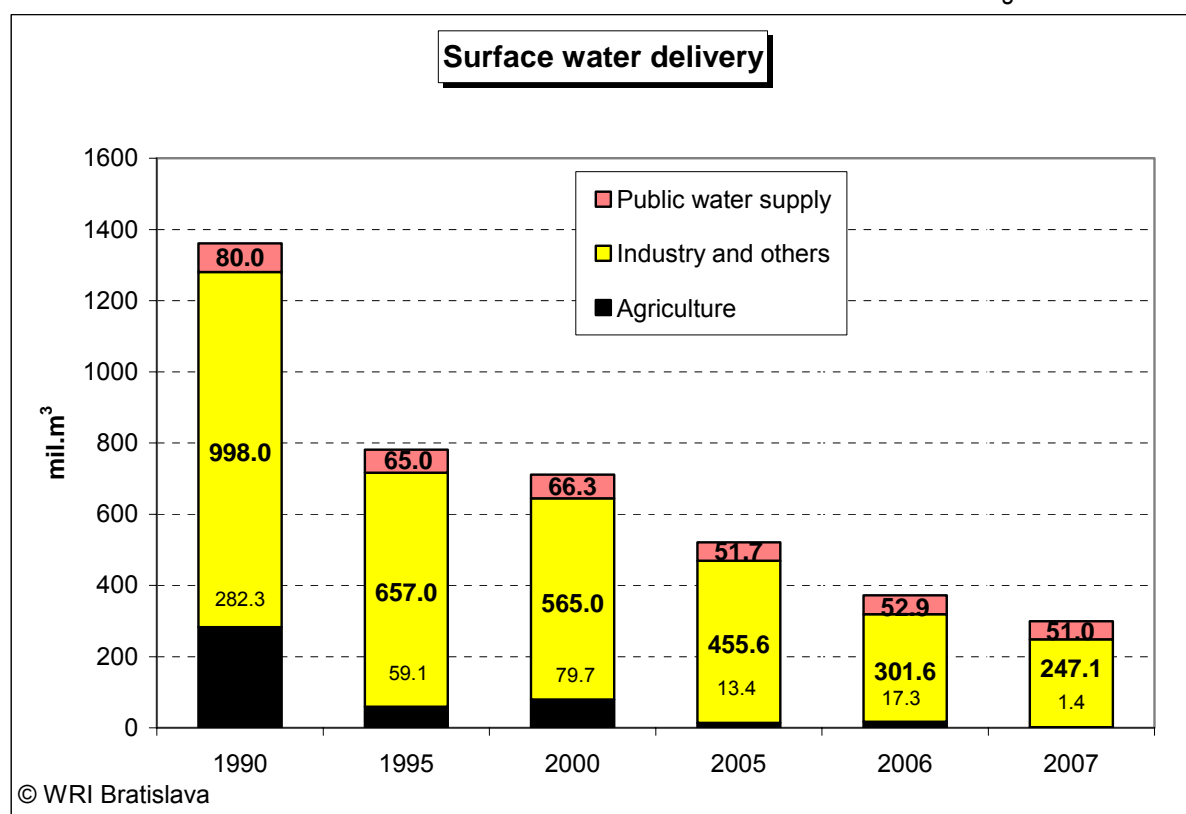
decreased by 1,876 thousand m<sup>3</sup> compared to 2006. Significant decrease by 55,534 thousand m<sup>3</sup> (by 18.4 %) was recorded in surface water supply for industry and other consumers. The main reason for decreasing the surface water supply in 2007 is decrease of surface water supply of the Vojany Power Plant (decrease by 50,451 thousand m<sup>3</sup>), Slovak Electric Works, EBO, Jaslovské Bohunice (due to cut-off of the first block of nuclear power plant V1), Matador, Púchov.

Surface Water Supply (charged) [thousand m<sup>3</sup>]

Table no. 7.1.1.1

	Branch Bratislava	Branch Piešťany	Branch Banská Bystrica	Branch Košice	SWE Total
Surface water supply (total):	65,033	95,122	51,605	87,715	299,475
thereof: public water supply	0	10,860	13,112	27,036	51,008
industry and others	65,033	2,911	37,476	60,679	247,099
agriculture	0	1,351	17	0	1,368

Figure no. 7.1.1.1



### Hydropower Potential

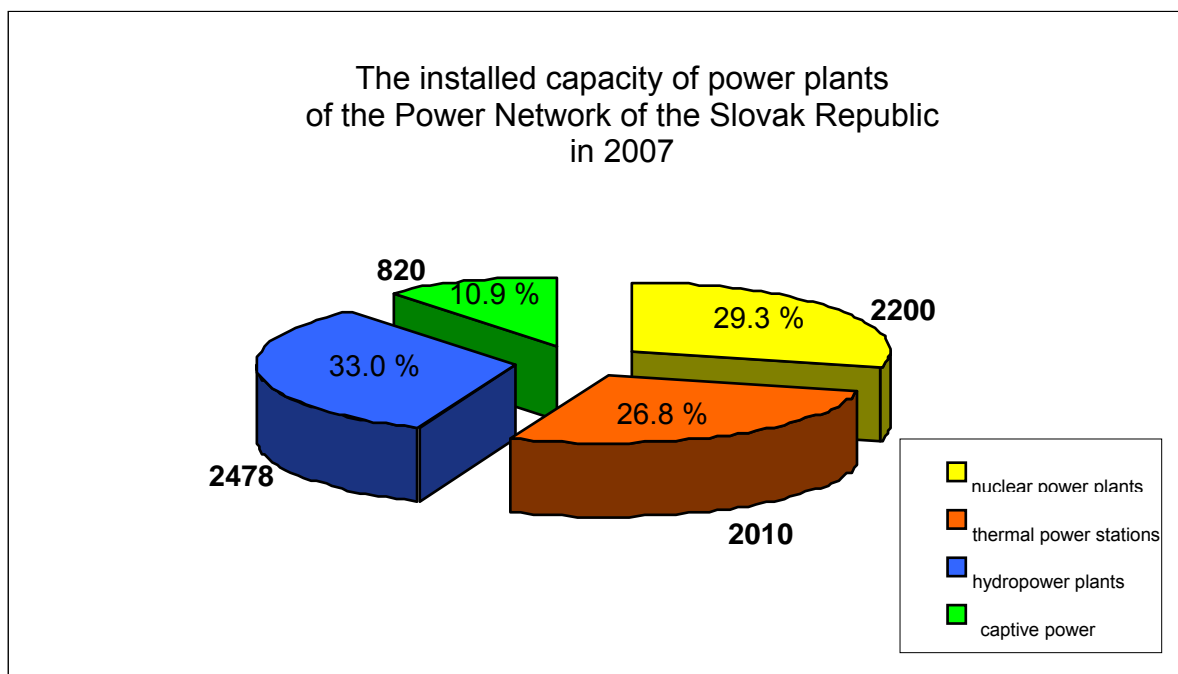
According to the data of the Slovak Electricity Supply System for the year 2007 the Slovak Republic did not cover the consumption of electric energy from domestic sources. The country consumed totally 29,632 GWh, domestic production was 27,907 GWh.

Due to cut-off of the first block of nuclear power plant in V1 in Jaslovské Bohunice at the end of the year 2006 the Power Network of the Slovak Republic was the importing system in

2007. Decrease of electricity production within the Power Network of the Slovak Republic represented 10.6% in comparison with the year 2006. Electricity import covered 5.8 % of the annual consumption of the Power Network of the Slovak Republic. Annual consumption in 2007 remained at the same level as in 2006.

The installed capacity of power plants of the Power Network of the Slovak Republic in 2007 was 7508 GWh (figure no. 7.1.1.2.). Proportion of production in nuclear power plants represented 51.8%, in thermal power stations 18.3%, in hydropower plants 15.1% and in captive power stations 9.0%. Production in hydropower plants was influenced by hydrological conditions and reached the value 4485 GWh which is approximately the same number as in the year 2006 (4447 GW). Gabčíkovo Waterworks produced 2131,542 GWh.

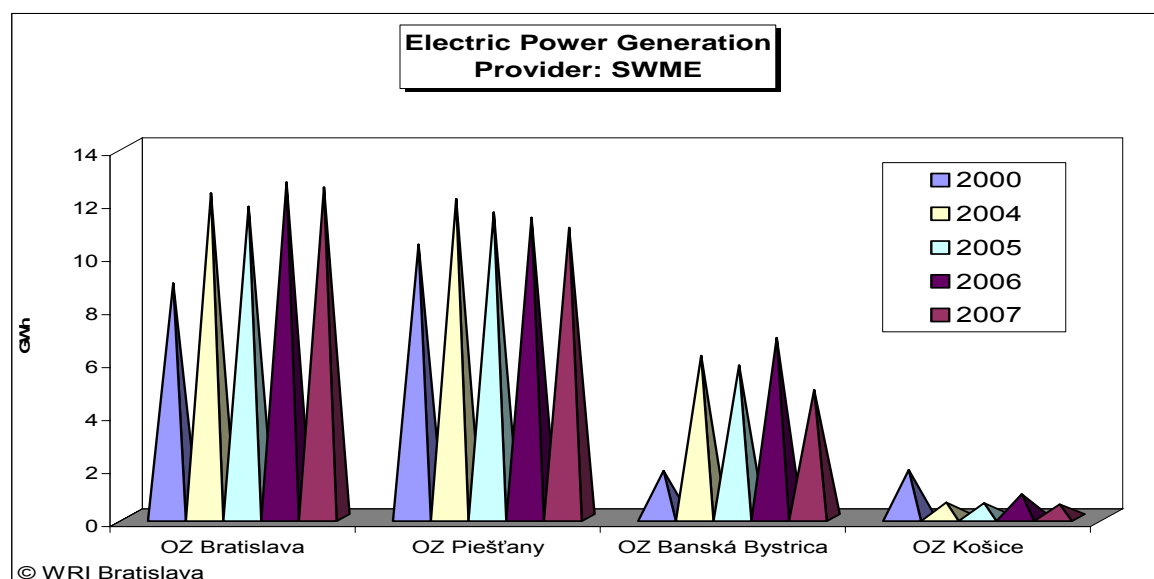
Figure no. 7.1.1.2



Today, there is 200 small-scale hydropower plants connected to the electricity supply system with the total installed capacity of 69,075.6 kW (as of December 31, 2007), out of which 32 small-scale plants with installed capacity of 6,655 kW are managed by SWME, Banská Štiavnica.

In 2007, individual organizational units of the Slovak Water Management Enterprise directly managing small-scale hydropower plants generated 28.755 GWh. This is decrease by 9,25 % compared to 2006 which represents decrease in the total production by 2.93 GWh.

Figure no. 7.1.1.3



### Legislation

- Act no. 107/2007 Coll. of February 2, 2007 amending the Act no. 276/2001 Coll. on Regulation in Network Industries and Amendment of Some Acts in wording of later provisions
- Regulation of the Slovak Government no. 317/2007 Coll. determining the rules for electricity market
- Revenue of the Office for Regulation of Network Industries no. 2/2007 of August 27, 2007 determining the range and structure of eligible costs, amount of adequate profit and materials for proposal of prices in electricity industry and amending the Revenue of the Office for Regulation of Network Industries no. 1/2007 of June 27, 2007 determining the range of price regulation in network industries

### Irrigation Systems

Irrigation systems are constructed on an agricultural land covering 321 thousand ha (buying price 6,105 thousand SKK). They include 441 irrigation networks and 487 pumping stations. In 2007 functioning systems covered the area of 226 thousand ha out of the total area.

Within the system of adjustments of water regime on agricultural soil there are built also drainage systems of 450 thousand ha as a part of hydromelioration facilities.

Hydromelioration Bratislava, state enterprise has been the operator of main melioration machinery of irrigation and drainage since July 7, 2003.

The Ministry of Agriculture decided about the change of present mode of operation and use of irrigation systems in a way that from 2007 the irrigation systems will be rented out to agro-entrepreneurs, associations of agro-entrepreneurs or in case of no interest of before mentioned subjects they can be offered to present operators as well.

In 2007 the total amount of rented irrigation areas was 226,188 ha.

According to individual regions most of irrigation areas were rented out in the area of the Danube Lowland (districts Bratislava, Galanta, Dunajská Streda, Šaľa, Komárno and Nové Zámky) covering the territory of 131,719 ha, in the area of Trnava Plain covering the territory of 39,620 ha, in the area of the Hron River and the Ipel' River covering the territory of 23 491 ha, in the area of Záhorie covering the territory of 14,035 ha and irrigation area in the East Slovakia Lowland covering the territory of 17,323 ha.

From the viewpoint of utility of rented state irrigation systems it is possible to assume that till the end of September 2007 these systems completely provided 23,477,500 m<sup>3</sup> of irrigation water. In particular regions the following amounts of irrigation water were provided:

– Danube Lowland Region	13,775,125 m <sup>3</sup>
– Trnava Plain Region	4,248,986 m <sup>3</sup>
– Hron River and Ipel' River Region	2,890,381 m <sup>3</sup>
– Záhorie Region	2,472,580 m <sup>3</sup>
– East Slovakia Lowland Region	90,428 m <sup>3</sup>

Allocated financial means for preservation of operation capability of hydro-melioration facilities were assured by the contract in the amount of 25.7 million SKK and were fully given the Hydromelioration state enterprise.

These financial means were used for the purpose of maintenance and repair of hydro-melioration property of the state. Financial means for investment purposes were not granted.

### *Waterways*

Slovak Water Management Enterprise is the river authority and operator of waterways. In 2007 the maintenance of waterways and their operation was the following:

Slovak Water Management Enterprise – Branch Enterprise Bratislava operates monitored waterways Danube, Morava and Váh and not monitored waterways – Small Danube, Danube branch system and the old Danube riverbed which are used for the purpose of sports and recreation.

On the Danube as the monitored international waterway being subject to the regime AGN and observing the recommendations of the Danube Committee for necessary parameters of waterway there were the following issues:

- *water management activity in the process of regulation of water course and waterway* in line with the cooperation, regulations and requirements of water management authorities and organizations of Austria and Hungary through the Transboundary Waters Committee,
- *navigation* which must be performed by the Slovak Republic pursuant to international conventions and current legislation in close cooperation with State Navigation Authority Bratislava and navigation authorities of Austria and Hungary.

As far as 6.00 river kilometre *the Morava River* is a monitored international waterway belonging to the category with necessary parameters of the Danube River. Then up to the border with the Czech Republic it is a perspective monitored waterway currently intended for



sport and recreation purposes. Navigation marks are kept pursuant to the “Regulations of Navigation Safety” valid on the international waterways.

*The Váh River* is national monitored waterway of the international importance operated by the Slovak Water Management Enterprise – Branch Enterprise Bratislava from the Danube mouth to the Small Danube mouth into the Váh River in Kolárovo. The section was demarcated pursuant to the valid “Navigation Regulation” issued by the State Navigation Authority Bratislava. In 2007 river training works were performed.

Other not monitored waterways serve mainly the purpose of sport and recreation.

In the conditions of the Slovak Water Management Enterprise – Branch Enterprise Košice the navigation with combustion engine is currently allowed on the following water reservoirs:

- Zemplínska Šírava Water Reservoir
- Part of Ružin Water Reservoir
- Bodrog River in 0.000 – 15.000 river kilometre

Pursuant to valid generally binding Regulation of the Regional Office in Košice no. 1/2003 of 3 September 2003 the administrator of related water reservoirs provides the demarcation and maintenance of waterways in line with the provisions of valid legislative standards.

#### *Special-Purpose Fish Management*

Special-Purpose Fish Management within the Slovak Water Management Enterprise Banská Štiavnica was provided in the following 8 water reservoirs: Turček Reservoir, Nová Bystrica Reservoir (Piešťany Branch), Hriňová Reservoir, Klenovec Reservoir, Málinec Reservoir, Rozgrund Reservoir (Banská Bystrica Branch), Rozgrund Reservoir, Starina Reservoir (Košice Branch). Bratislava Branch has no water reservoir in the surroundings.

In 2007 there were fish management measures taken in water supply reservoirs necessary for proper fulfilment of the tasks related to the special-purpose fish management. The main objective of these measures was the improvement of water quality and they were focused on the following:

- creation of favourable qualitative and quantitative composition of fish planting
- rational fish planting management which means to plant suitable fish species and remove unwanted fish species using regulation method
- function of fish as biological indicator of emergency water pollution
- monitoring and regular checking of fish health condition with the focus on water quality
- regulation and optimization of biomass through bio manipulation effect of fish planting

#### **7.1.2 Groundwater**

Groundwater, as one of important natural resources, represents invaluable, easily available and the most appropriate drinking water resource from quantitative, qualitative and economic viewpoints. Sufficient amount, better quality, low treatment costs and potentially low risk of contamination make groundwater a dominant resource of drinking water.

Assessment of relations between potential available groundwater quantity and used groundwater quantity is carried out through the annual water management balance developed by SHMI.

Basic evaluation unit of groundwater balance is a hydrogeological region with its subsequent classification into sub-regions. According to valid hydrogeological regionalization (1995) the territory of Slovakia was divided into 141 hydrogeological regions.

#### *Groundwater Resources*

The most significant amounts of ground water are registered in Bratislava and Trnava Region. On the other hand the lowest amount of ground water is registered in the area of Prešov and Nitra Region.

Based on water management balance data, natural resources of Slovakia are amounted to  $146.7 \text{ m}^3 \cdot \text{s}^{-1}$ . Groundwater resources represent amount of  $76,830 \text{ l} \cdot \text{s}^{-1}$ , i.e. more than 52 % of natural resources. The Committee for Available Groundwater Quantity Classification approved  $45,149 \text{ l} \cdot \text{s}^{-1}$ , representing 58.8 % of available groundwater amount and 30.8 % of natural groundwater resources.

The total available groundwater amount represents the sum of available resources approved by the Committee for Available Groundwater Quantity Classification and supplies not approved by the Committee which are determined based on volumes documented from hydro-geological researches and surveys.

Total available groundwater resources as of December 31, 2007:

–	approved:	$45,149 \text{ l} \cdot \text{s}^{-1}$
–	<u>not approved:</u>	<u><math>31,681 \text{ l} \cdot \text{s}^{-1}</math></u>
	total:	$76,830 \text{ l} \cdot \text{s}^{-1}$

Compared to the previous year there was recorded an increase in available groundwater resources by  $82 \text{ l} \cdot \text{s}^{-1}$  (0.11 %) in 2007. According to documented available groundwater resources it can be stated that current and also expected water demand is well assured.

#### *Groundwater Use*

Groundwater is preferentially intended for drinking water supply under the Water Act Groundwater abstraction has been following the downward trends in Slovakia since 1990. In 2007 used groundwater resources amounted to  $11,366 \text{ l} \cdot \text{s}^{-1}$  that represents a decrease by  $299.2 \text{ l} \cdot \text{s}^{-1}$  (2.6 %) compared to 2006. Data on groundwater abstraction are included in the SHMI Water Abstraction Register. The data are provided by the consumers based on responsibilities resulting from the Water Act and Decree of the Ministry of Environment No. 221/2005 Coll. that replaced older Decree No. 556/2005 Coll.

In 2007 the SHMI Water Abstraction Register listed 5468 resources of Slovakia. Review of groundwater abstraction in Slovakia in 2006 and 2007 according to their purpose of use are listed in table no. 7.1.2.2.

Table no. 7.1.2.2

Purpose of use	Water abstraction [l.s <sup>-1</sup> ]		Difference	
	2006	2007	[l.s <sup>-1</sup> ]	[%]
Public water supply	8,836.1	8,441.6	-394.5	-4.5
Food industry	295.6	383.9	88.3	29.9
Other industries	852.3	891.3	39.0	4.6
Agriculture – animal production	275.8	267.8	-8.0	-2.9
Agriculture – plant production	95.0	146.3	51.3	54.0
Social needs	340.2	333.4	-6.8	-2.0
Other	970.2	901.7	-68.5	-7.1
Total	11,665.2	11,366.0	-299.2	-2.6

Source: SHMI Bratislava

In the assessment of ground water use in Slovakia according to the purpose it can be stated that there was the decrease of water consumption in public drinking water supply of the inhabitants in animal production, social needs and other use. On the contrary, abstractions increased globally in industry and plant production.

From the viewpoint of water management use the ratio of usable amounts and abstractions varies in individual hydrogeological regions.

#### *Groundwater Quality*

Monitoring of ground water quality is represented by the systematic monitoring and assessment of ground water quality condition according to the requirements of the Ministry of Environment of the Slovak Republic as it is stated in the Water Act and in line with the requirements of the Decree of the Ministry of Environment of the Slovak Republic no. 221/2005 Coll. determining the details about location and assessment of surface and ground water, monitoring, water register and water balance. In terms of this legislation the Ministry of Environment of the Slovak Republic provides locating and assessing the condition of ground water through the Slovak Hydro-meteorological Institute. Systematic ground water quality monitoring within the national monitoring programme has been provided by the Slovak Hydro-meteorological Institute since 1982.

Monitoring programmes experienced the changes in 2006 which resulted from the requirements of related legislation of the European Union, particularly the Water Framework Directive. In line with the strategy for the implementation of the Water Framework Directive in the Slovak Republic the Programme of Water Condition Monitoring for 2007 was prepared. This document included the requirements to collect all the information on water condition necessary to be reported to the European Commission in required quality.

By the year 2006 the monitoring objects were distributed into 26 important water management areas (alluvial sediments, mezozoic and neovolcanic structures). Afterwards in line with the requirements of WFD the territory of the Slovak Republic was not divided into important water management areas anymore for the purpose of monitoring. Since 2007 this

division has been made on the basis of bordering the ground water bodies. Monitoring of ground water chemical condition was divided into:

- basic monitoring
- operational monitoring

Within the *basic monitoring* all ground water bodies were covered by at least one abstraction site. In 2007 the ground water quality was monitored in 130 objects of basic monitoring. These objects are either a part of state monitoring network of the Slovak Hydro-meteorological Institute or the springs not affected by point pollution sources. Ground water samples were taken once in the autumn for selected group of parameters (with the exception of boundary monitoring object 200290 Holíč where the samples were taken 3 times).

*Operational monitoring* was done in all ground water bodies assessed as risk because of reaching not good chemical condition. Monitoring network was enlarged by adding 34 piezometric wells in the territory of Žitný ostrov where the levels 1 – 3 are monitored, what is 84 levels altogether. The region of Žitný ostrov represents a separate part of the SHMI monitoring network because it plays an important role in the whole process of monitoring of water quality changes in Slovakia since this region is the most significant drinking water resource in our territory. In the region of Žitný ostrov the samples were taken 4 times a year for basic monitoring and twice a year for additional monitoring in spring and autumn periods (extreme groundwater levels). To meet the requirements of the Directive no. 91/676/EHS related to water protection against pollution caused by nitrates from agricultural sources, the pollution caused by nitrogenous substances was monitored in 116 objects in vulnerable territories in Slovakia within operational monitoring in 2007. Next in 2007 within operational monitoring 218 objects were monitored because there is an assumption of potential infiltration of pollution into ground water from potential pollution source or related group. The frequency of sampling was twice a year in 155 quaternary objects, four times a year in 32 pre-quaternary karst objects and once a year in 31 pre-quaternary objects.

The results of laboratory analyses were assessed under the Regulation of the Slovak Government No.354/2006 Coll. on Drinking Water Requirements and Drinking Water Quality Control. The assessment is performed using comparison of measured and limit values of all analysed indicators. The results will be published in the annual report “Groundwater Quality in Slovakia for 2007” and biennial report “Žitný ostrov Groundwater Quality for 2007 - 2008”.

In the objects of *basic monitoring* the limit values of concentrations in Slovakia, except for the “Žitný ostrov” region, were defined under the Regulation of the Slovak Government No.354/2006 Coll. Recommended value of the percentage of water saturation by oxygen specified in the terrain was reached in 54 % of samples. Values pH were in the interval of limit values with the exception of 4 samples, conductivity exceeded the indicating value specified by the Government Regulation 3 times out of the total number of 132 specifications. Within the basic monitoring objects of ground water there are the issues of unfavourable oxidation-reduction conditions becoming essential which is being pointed out by the most frequently exceeded acceptable concentrations of the total Fe (31 times), Mn (31 times) and  $\text{NH}_4^+$  (8 times). Besides these parameters there was sporadic exceeding in case of  $\text{Cl}^-$ ,  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ . Increased concentrations of the following trace elements were recorded: Al (25

times), As (4 times), Pb (2 twice) a Sb (once). Pollution caused by specific organic substances has only local impact; majority of specific organic substances was specified under the detection limit. Limit values in this group were exceeded only in the structure 344990 BA-Ružinov (inclusion into basic monitoring will be reconsidered following the results).

In the objects of *operational monitoring*, except for the territory of Žitný ostrov, the values of acceptable concentration (highest acceptable concentration) were also defined by the Regulation of the Slovak Government no. 354/2006 Coll. Ground water contains relatively small amount of oxygen which is confirmed also by the fact that the recommended percentage of oxygen saturation in water was reached only in 26 % of samples. The values of conductivity measured in the field exceeded the indicating value specified by the Government Regulation 55 times out of the total number of 467 specifications; pH with the exception of 20 samples was in the interval of limit values. Mn and total Fe are the most frequently exceeded parameters which mean that unfavourable situation of oxidation-reduction conditions is ongoing. Besides these parameters the exceeded limit values of Cl<sup>-</sup> and SO<sub>4</sub><sup>2-</sup> indicate the impact of anthropogenic pollution on ground water quality. Land use pattern (agricultural areas) is reflected into increased contents of oxidized and reduced forms of nitrogen in ground water. Ammonium ions NH<sub>4</sub><sup>+</sup> (70 times) and NO<sub>3</sub><sup>-</sup> (47 times) participated mostly in that exceeding. In the objects of operational monitoring the acceptable value specified by the Regulation was exceeded by 5 trace elements (Al, As, Sb, Ni and Hg) in 2007. Increased contents of Al (49 times) and As (26 times) were mostly recorded. The presence of specific organic substances in ground water is the indicator of human activity impact. Wider scale of specific organic substances was recorded. Exceeding the limit values was most frequently recorded in parameters from the group of polyaromatic hydrocarbons (phenanthren, fluoranthene, benz[a]pyrene, pyrene) and group of volatile aromatic hydrocarbons (1,3 – dichlorobenzene, 1,4 – dichlorobenzene, 1,2 – dichlorobenzene). Sporadically the limit values in the group of pesticides and volatile aliphatic hydrocarbons were exceeded.

The purpose of the monitoring programme indicates that monitoring objects of the basic monitoring are situated in the areas not affected by human activity, therefore ground water show better quality in comparison with the objects of operational monitoring designed to catch the impact of significant sources of ground water pollution.

Ground water includes also ground water declared as ***natural healing water resources*** or ***natural mineral water resources*** as well as ***mining water*** under the special provisions.

Basic terms are described in the following:

- Act No. 538/2005 Coll. on natural healing waters, natural spas and natural mineral waters
- Act No. 214/2002 Coll. on protection and use of natural resources (Mining Act)

*Natural healing water resources and natural mineral waters* are managed by the Ministry of Health - Spas and Mineral Springs Inspectorate.

The basic register of mineral springs lists more than 1600 mineral springs. A specific group of natural mineral waters includes natural healing waters used for balneal-therapeutic

purposes, especially in the health care facilities and natural spas. Important natural healing waters are bottled pursuant to the Act no. 583/2005 Coll. Their protection requires establishing the protection zones where the activities with potential negative effect are restricted or prohibited.

*Mining water* is water that fills mining space (shafts). Mining space has features of tough drains of overlaying and surrounding rock mass and they may bring about changes in original natural conditions of groundwater cycle. Considerable part of groundwater is diverted through them on surface – water flowing out from shafts and pumped at need of mining works.

The largest volumes of mining water are located in the Banská Štiavnica Ore Field (440 l.s<sup>-1</sup>), South Slovakia Basin (125 l.s<sup>-1</sup>), Nováky Basin (70 l.s<sup>-1</sup>) and Handlová Coal Basin (94 l.s<sup>-1</sup>). The Kremnica Ore Field District and „Spišsko-Gemerské Rudohorie“ Region are also among areas of significant mining water resources.

**Geothermal water** is groundwater serving as a medium for accumulation, transport and exploitation of heat from rock environment. It is bound to the Triassic dolomites, limestones and pudding-stones or neogene andesites and their pyroplastics. These rocks as aquifers of geothermal water are situated in depth from 200 to 5,000 metres. The temperature of geothermal water is ranged from 15 to 240 °C.

Today, there are 26 geothermal regions (structures) that at the same time represent geothermal water bodies pursuant to WFD. Thermal-power potential of geothermal water in all prospective regions is 5,538 MW. Geothermal waters were verified by using wells in 22 localities. There are 116 geothermal wells (5 negative) in Slovakia. Their total capacity is 1,690 l.s<sup>-1</sup> and water temperature moves from 18 to 129 °C. The total heat capacity of these wells is 314.3 MWt.

Natural healing water resources, natural mineral water resources, mining water and geothermal water are described in detail in the Report on Water Management in the Slovak Republic in 2006.

## 7.2 Drinking Water Supply

The total number of inhabitants supplied with drinking water from public water supply network increased in 2007 compared to the previous year only by 330 inhabitants to 4,653.7 thousand inhabitants that is 86.16 % out of the total number of population of the Slovak Republic. This decrease was caused in some factories by wrong reporting of inhabitants supplied with drinking water last year. Moreover, high prices of drinking water make inhabitants disconnect themselves from public water supply system and build their own drinking water sources; however, the quality of such water mostly does not meet hygienic requirements. The largest proportion of supplied population is in the Bratislava Region and higher proportion than the total average is also in Trenčín, Žilina and Trnava Region. The public water supply network development in Banská Bystrica, Košice and Prešov regions falls behind the total average. Much more differentiated condition concerning drinking water supply occurs in particular districts where the proportion of supplied inhabitants is moving up

from approximately 60 % (Vranov nad Topľou, Sabinov, Bytča, Košice – environs) up to the saturation level (Bratislava, Prievidza, Martin, Banská Bystrica, Partizánske, etc.).

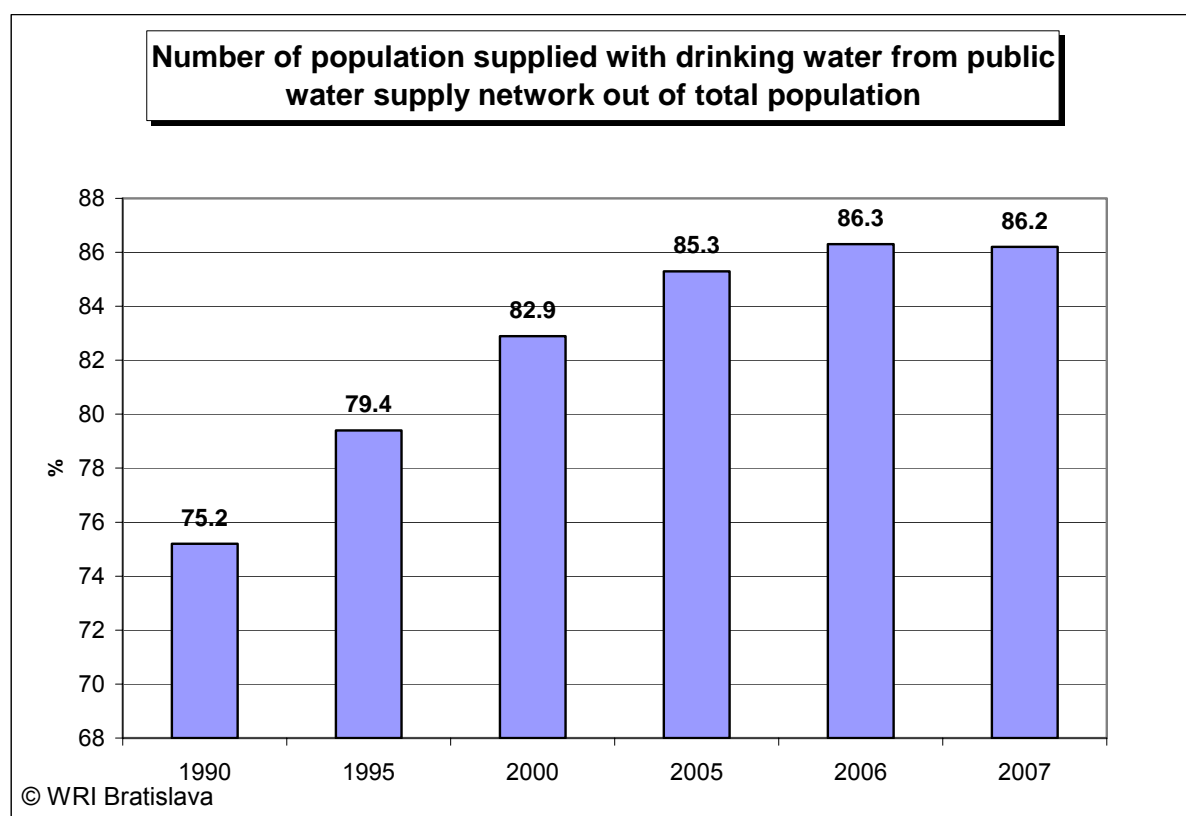
Development of the total number of inhabitants and the number of inhabitants supplied with drinking water [in thousand]

Table no. 7.2.1

	1995	2000	2004	2005	2006	2007
Total number of inhabitants	5,363.7	5,400.6	5,384.8	5,386.7	5,390.4	5,401.0
Supplied with drinking water from public water supply network	4,256.8	4,479.2	4,569.1	4,594.1	4,653.4	4,653.7
Proportion [%]	79.4	82.9	84.9	85.3	86.3	86.2

Source: Water Research Institute

Figure no. 7.2.1



Drinking water supply and development of water supply network in administration of water companies, local authorities and other subjects

Table no. 7.2.2

No	Indicator	Unit	Year				
			2005	2006	2007	Expectation	
						2008	2009
1	Number of inhabitants supplied from water supply network	thousand	4,594.1	4,653.4	4,653.7	4,699.0	4,710.4
2	Capacity of water resources	l.s <sup>-1</sup>	33,848.0	33,545.7	32,736.0	32,940.0	32,875.0
3	Length of water supply networks	km	25,719.0	26,356.9	26,898.7	27,062.3	27,303.0
4	Capacity of ground water resources	l.s <sup>-1</sup>	27,921.0	27,713.0	26,904.7	27,132.0	27,564.0

No	Indicator	Unit	Year				
			2005	2006	2007	Expectation	
						2008	2009
5	Water produced in water management facilities	mil. m <sup>3</sup>	338.0	334.3	321.6	318.0	319.6
	Of which: water produced from ground water	mil. m <sup>3</sup>	287.6	280.6	271.0	270.0	272.0
6	Water intended for use	mil. m <sup>3</sup>	343.1	339.2	326.3	322.2	323.8
7	Water invoiced in total	mil. m <sup>3</sup>	232.0	225.0	224.8	223.1	224.6
	Included: for households	mil. m <sup>3</sup>	159.1	152.1	153.0	150.1	151.0
8	Water not invoiced	mil. m <sup>3</sup>	111.1	114.2	101.5	99.1	99.2
	Of which: Water loss in pipes	mil. m <sup>3</sup>	93.2	94.2	87.6	86.0	86.3
9	Specific water consumption (of water invoiced in the households)	l.inhab. <sup>-1</sup> .day <sup>-1</sup>	94.9	89.5	89.9	87.5	87.8

Source: Water Research Institute

In the facilities of water companies, local authorities and other subjects there was produced 321.6 mil. m<sup>3</sup> of drinking water in 2007 which means the decrease by 12.7 mil. m<sup>3</sup> compared to 2006. The table no. 7.2.2 indicates that the decrease of invoiced water was more moderate – in 2007 it decreased by 0.2 mil. m<sup>3</sup>, even the amount of water invoiced for households increased by 0.9 mil. m<sup>3</sup>. Amount of invoiced water represented 68.8 % out of the total amount of water intended for supply.

Specific drinking water consumption increased to the number of 89.9 inhab.<sup>-1</sup>.day<sup>-1</sup> in 2007. It is alarming situation mostly because the high costs for drinking water lead to construction of own sources of drinking water with the quality far behind the hygienic standards.

The volume of not invoiced water decreased to 101.5 mil. m<sup>3</sup> which is 31.2 % of water intended for supply. Water loss in pipes (27.7 % of water intended for use) covers more than 86.6 % of this number. The measures for reduction of water loss in pipes to acceptable level corresponding with European trends should be adopted and implemented.

Construction of public water supply network led to an increase in number of technical facilities and structures. Compared to 2006 the total length of water supply systems in Slovakia (water companies, local authorities and other subjects) increased by 541.8 km up to the total length 26,898.7 km. (Data on water supply and water supply network development are listed in the table no. 7.2.2.)



Figure no. 7.2.2

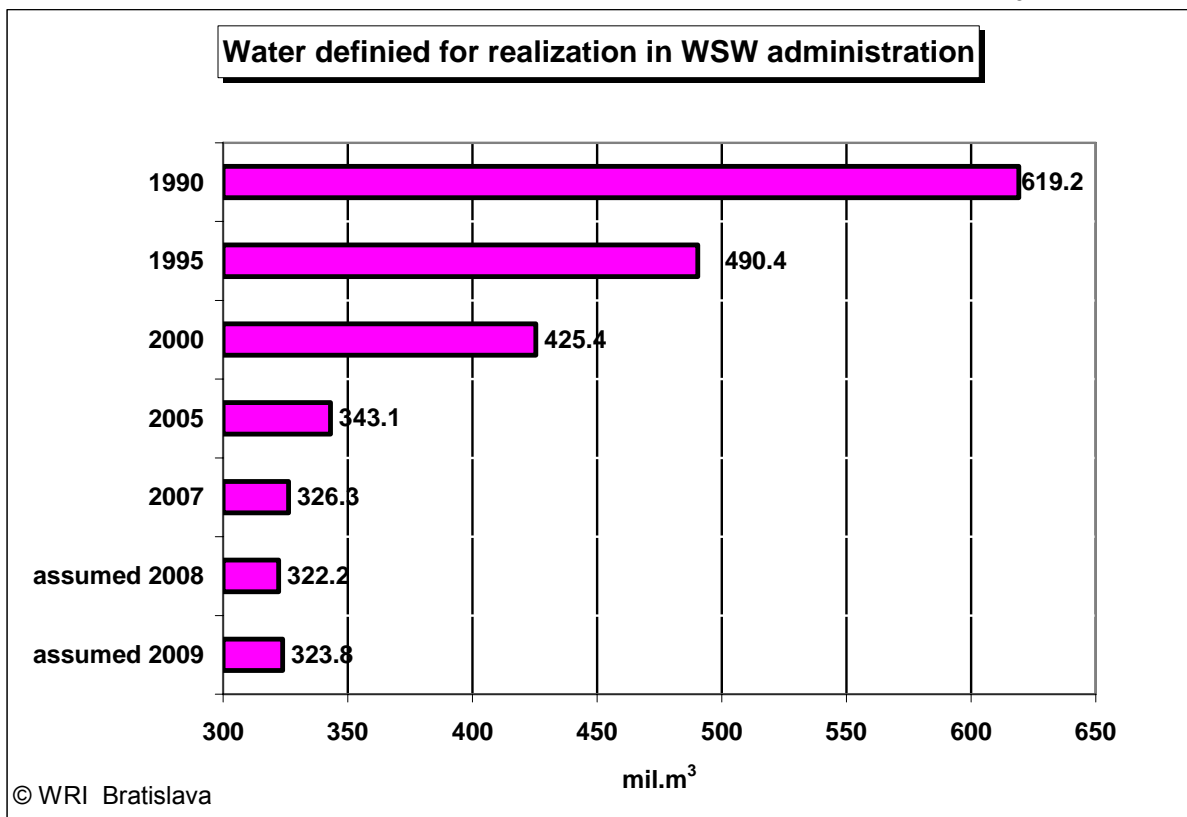
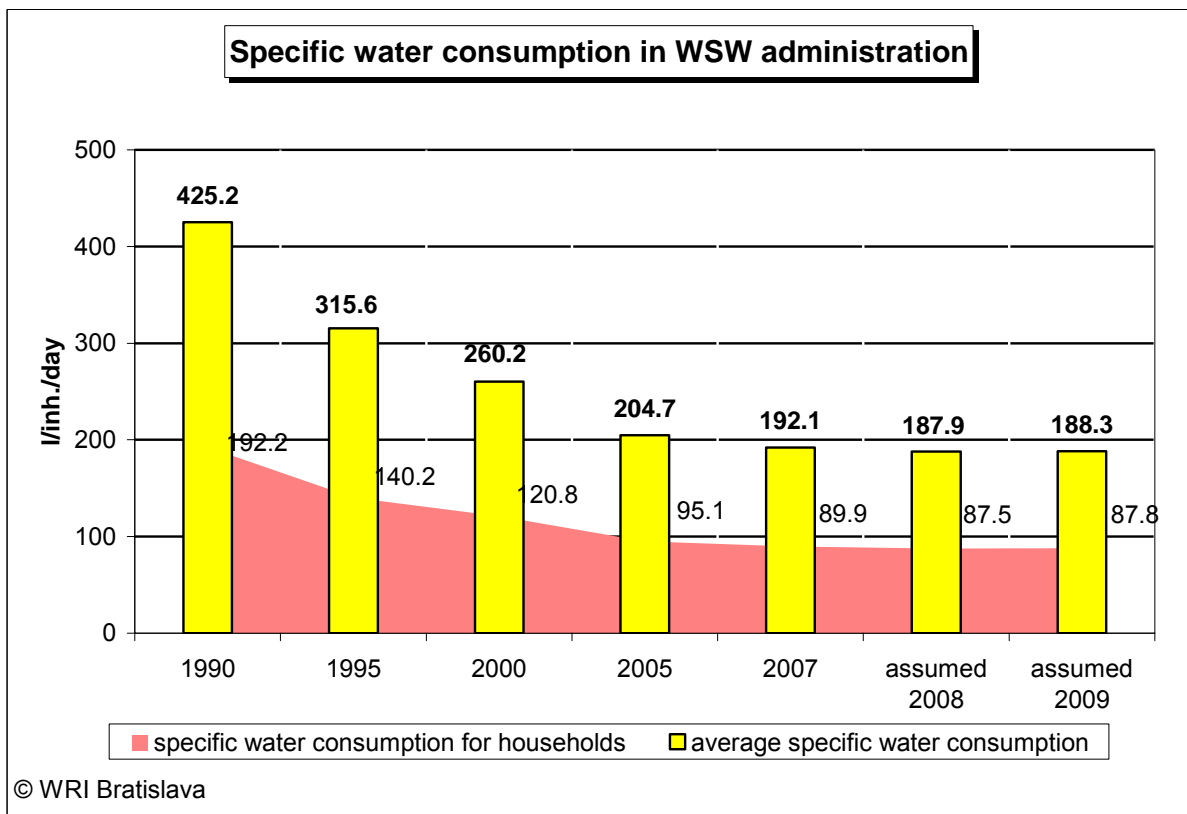


Figure no. 7.2.3



### 7.3 Wastewater Collection and Treatment

Development of public sewerage system falls behind the development of public water supply network in the Slovak Republic. In 2007 the number of residents connected to public sewerage system increased by 39.1 thousand to the total number of 3,147.0 thousand inhabitants representing 58.3 % out of the total number of population. Unfavourable situation is in particular regions and districts. Trnava, Žilina and Nitra regions are below the nationwide average value. At the district level the worst situation is in the districts of Komárno, Námestovo, Čadca and Košice-environs where the proportion of inhabitants living in houses connected to public sewerage system is lower than 30 %.

Development of public sewerage system and volume of discharged wastewater through public sewerage system administrated by state companies of water and sewage works is listed in the table no. 7.3.1 and figure no. 7.3.1.

In 2007 there was recorded the decrease of the amount of discharged wastewater (water collected invoiced). Decrease originated in Mondi SCP company where the SČOV Ružomberok Slovak Steam-gas Company was the operator in 2005 (100 % daughter company of the SCP company) and there was the invoicing of the own waters of Mondi SCP company. On January 1, 2006 SPS company was cancelled and Mondi SCP became also the operator of SČOV (as succession company). For that reason real incomes were not shown and waters were not invoiced.

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

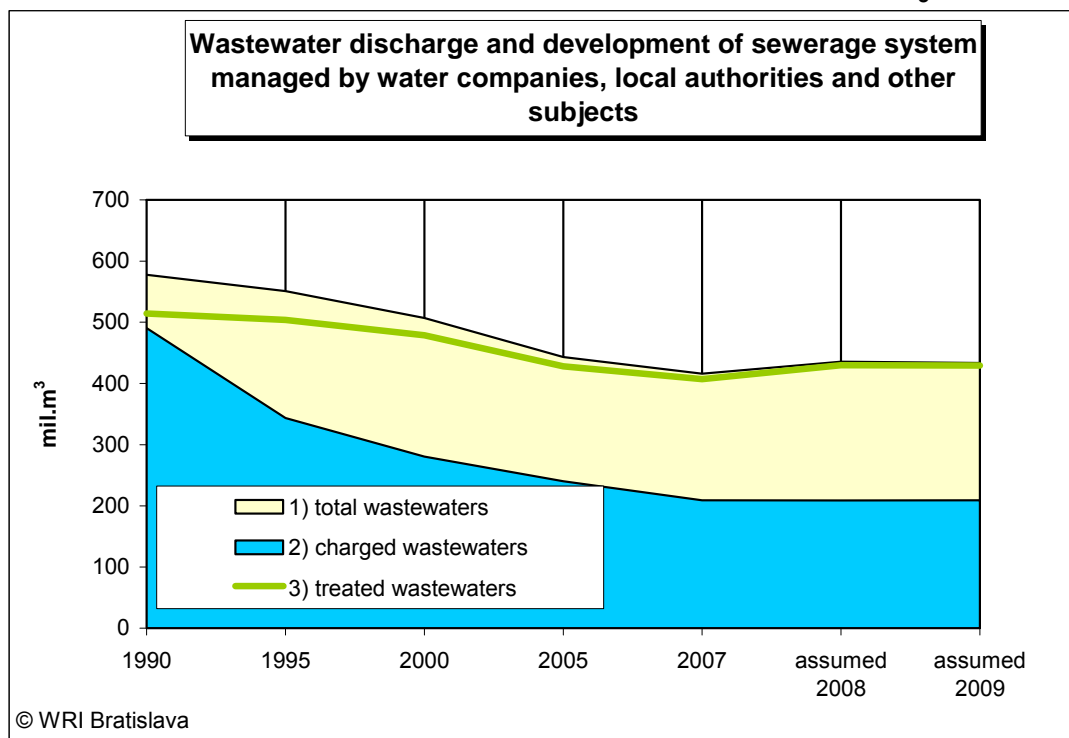
Table no. 7.3.1.

No	Indicator	Measure	Year				
			2005	2006	2007	Expectation	
						2008	2009
1	Number of inhabitants connected to public sewerage system	thousand	3,075.5	3,100.5	3,147.0	3,158.1	3,176.6
	Of that: in houses connected to sewerage system with WWTP	thousand	2,971.4	3,031.1	3,060.8	3,064.3	3,074.3
2	Length of sewerage networks	km	7,690.0	8,016.1	8,496.5	8,650.0	8,900.0
3	Water discharged to watercourses altogether	mil.m <sup>3</sup>	443.3	452.6	416.1	435.6	433.5
	Of that: treated wastewater	mil.m <sup>3</sup>	428.2	439.4	407.8	429.9	429.4
4	Volume of discharged wastewater	mil.m <sup>3</sup>	240.6	212.2	209.0	208.7	209.0
	Of that: sewerage water	mil.m <sup>3</sup>	122.9	128.4	115.9	117.5	118.3
	industrial and other wastewater	mil.m <sup>3</sup>	117.7	83.8	93.1	91.2	90.7

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

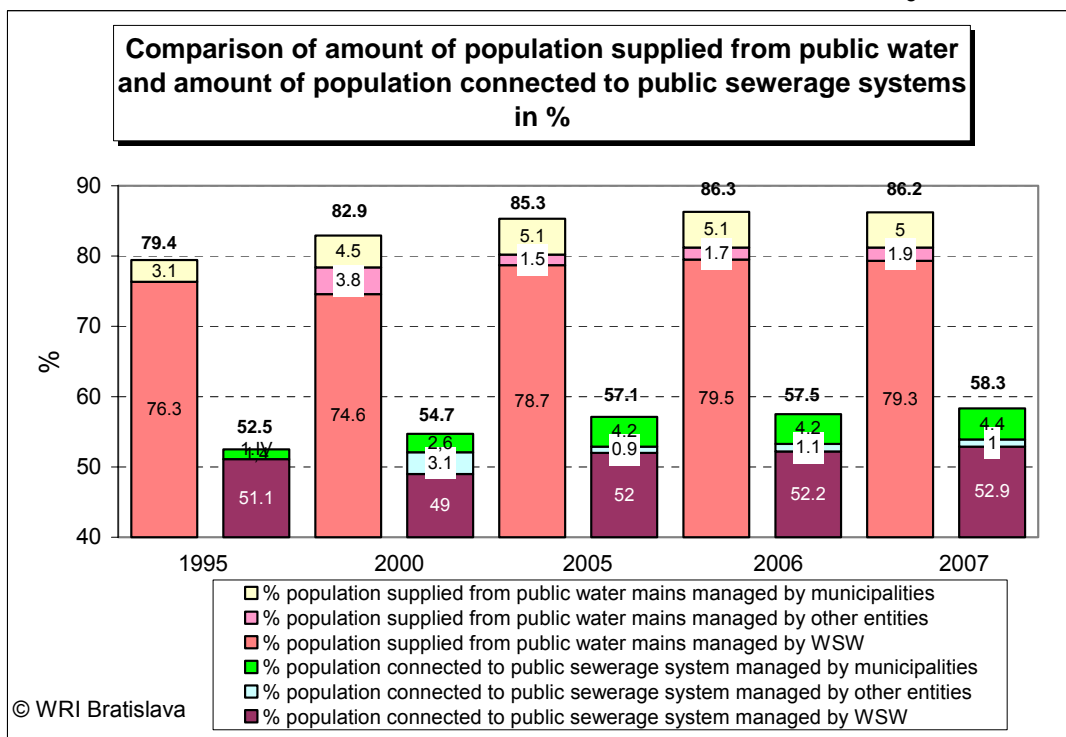
Source: Water Research Institute

Figure no. 7.3.1



Existing trend leads to significant differences in development of water supply systems and sewerage system that have an effect on environment and in connection with the requirements of the EU directives they increase investments for their implementation into practice in the Slovak Republic (figure no. 7.3.2).

Figure no. 7.3.2



## 7.4 Sewage Sludge Disposal and Production

Qualitative sewage sludge production as well as the issue of its contamination has been permanently monitored in the Water Research Institute in Bratislava since 1998.

In 2007 sludge production covered 55,305 tons of dry mass. Out of this quantity 42,315 tons (76.5 %) were used in agriculture, 9,400 tons (17.0 %) were temporarily stored and 3,590 tons (6.5 %) were put at landfills. In 2007 no sewage sludge was directly applied directly. 37,220 tons of sludge dry mass were used for production of compost and 5,095 tons of sludge for soil processes.

The overview of sewage sludge generation for WWTP and sludge disposal methods in the period from 2001 to 2007 is shown in the table no. 7.4.1. Data concerning the quantity of sludge applied to soil include also the sludge added to soil in a form of compost and sludge used in soil processes.

Table no. 7.4.1

Year	Sludge production (dry mass) t/r	of which					
		application into soil		temporarily Stored		put on disposal site	
		t/r	%	t/r	%	t/r	%
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

In the connection with the increasing requirements for waste water treatment – implementation of the Council Directive 91/271 EEC on Urban Waste Water Treatment, it is necessary to reckon with the increase of sludge production by approximately 20 – 40 %. Strategic approach of meeting the conceptual objectives based on provision of corresponding collection and treatment of waste water in the agglomerations over 10 000 p.e. and in the agglomerations from 2,000 to 10,000 p.e. is currently determined by the requirements of the Directive 91/271/EEC with the deadlines being the part of the Water Act – December 31, 2010 or 2015. Since it is mostly increase of sludge from small WWTP, without significant contribution of industrial waste waters, we can also expect sludge contamination equivalent to requirements limiting the process of its application into soil.

## 7.5 Additional Benefits of Water Management

### *River Basin and River Restoration*

In 2007 there were local restoration measures within the Danube River Basin for the purpose of restoration of biotopes of European importance – namely European mudminnow.

Within the project LIFE Nature “Restoration of Wetlands in the Záhorie Lowland” the project focused on restoration of wetland ecosystems in the Záhorie Lowland is being implemented in the Ramasar Locality of Rudavy Alluvium.

Restoration of water regime was implemented in the wetland biotopes in the localities of Bahno and Kotlina.

Authority of Biele Karpaty Protected Landscape Area cooperated with Pruské Village on the project proposal of restoration of “Pri Rybníku” Wetland.

Authority of Veľká Fatra National Park cooperated with the Institute DAPHNE of applied ecology and other professional institutions in the preparation of restoration measures in Kláštorné lúky National Nature Reserve.

### *Wetlands*

Within the activities of the Slovak Ramsar Committee - wetlands restoration – the Action Plan 2003 – 2007 was assessed and the “Current Programme of Wetland Restoration in Slovakia 2008 – 2014 and the Action Plan 2008 – 2011 to the Current Programme of Wetland Restoration in Slovakia” were approved by the Slovak Government on October 3, 2007 (Resolution of the Slovak Government No. 848/2007).

On February 1 and 2, 2007 the meeting of the Slovak-Hungarian working group for nature conservation was organized as well as the common meeting with the Hungarian Ramsar Committee with the registration of Ramsar Localities in the Ipeľ Valley as transboundary Slovak-Hungarian Ramsar Locality Poiplie with the objective of harmonization of their management.

State Nature Protection Office coordinates the Carpathian Initiation for Wetlands for 7 Carpathian countries based on the Memorandum on Cooperation between the Secretariats of the Carpathian Convention and Ramsar Convention of 2006. Within this cooperation the preparation and approval of the documents for upcoming conferences and meetings of the parties of both conventions were done in 2007.

Within trilateral cooperation Slovak Republic – Czech Republic – Austria the meetings of Trilateral Ramsar Platform were organized and in November 2007 the certificate presentation ceremony took place in Devín regarding the Transboundary Wetlands in the meeting point of the rivers Morava, Dyje and Danube – Transboundary Ramsar Locality.

In the cooperation with the International Commission for the Protection of the Danube River (ICPDR) the projects implemented also in Slovakia were assessed and creation of the System of Protected Areas on the Danube River was agreed within the final workshop on wetlands of the Danube River Regional Project (in Tulcea – Romania in April 2007).

In 2007 the project LIFE Nature “Protection and Management of Floodplain Forest of the Danube River” was finished.

Within the project LIFE Nature “Restoration of Wetlands in the Záhorie Lowland” the proposals of text part of the protection project for two territories of European importance

(Orlovské vršky, Mešterova lúka) were elaborated and restoration programmes for four territories of European importance (Vanišovce, Zelenka, Bahno, Jasenácke) were prepared.

Within the project LIFE Nature “Conservation of Senné and Medzibodrožie Protected Bird Areas” the following issues were elaborated:

- draft of the conservation programme of Medzibodrožie Protected Bird Area
- technological projects for construction of 3 hydraulic gates for Senné Protected Bird Area
- technological project for repairing the weir, outlet and inlet structure in Senné Protected Bird Area.

In Senné Protected Bird Area there was land purchase and repairing the part of the weir.

Within the project of UNDP/GEF (United Nations Development Programme/Global Environmental Fund) called “Conservation, Restoration and Reasonable Use of Bogs in the Slovak Republic” there is preparation of restoration programme regarding the territories of European importance Belianske lúky, Kláštorne lúky National Nature Reserve and Abrod as well as their management is performed.

Drafts of restoration programmes or materials for restoration programmes regarding all Ramsar Localities in Slovakia were being continuously finished and updated.

Management measures were adopted in 130 small-area protected areas, in zones of protected areas or localities Natura 2000 and in gene pool localities, many of which are wetlands.

Research of fauna and flora of selected biotopes and species connected to wetland systems was conducted in all organizational units of State Nature Protection Office.

Within the Partial Monitoring System (PMS) Biota there is regular monitoring of some wetland species of plants and animals.

In Senné and Medzibodrožie Protected Bird Areas there is monitoring of restoration and development of biotopes and bird population.

In Prievidza District there are 2 regionally important wetlands monitored.

Some workplaces of State Nature Protection Office developed wetland mapping.

Regional Centre of Nature Protection Prešov of State Nature Protection Office elaborated the assessment of valuable wetlands in Prešov cadastral area.

Mapping the barriers on rivers in cooperation with the Water Research Institute and Slovak Water Management Enterprise, Banská Štiavnica resulted into preparation of the database of migration barriers and their update.

Within the possibilities and range of financial means of State Nature Protection Office budget the invasive species of plants were removed in protected areas, Ramsar Localities and outside protected areas.

On the Váh River the project of construction of fish passage at Jamborov Sill in Ružomberok was elaborated in connection with upcoming construction of small water power plant.

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On the Poprad River deepening the river bed in Svit cadastral area was made for the purpose of creating the fish wintering.

Some activities are performed also by municipalities and civil associations.

#### *Restoration of Natural Water Regimes*

Within the cooperation with DAPHNE in the project called Conservation, Restoration and Reasonable Use of Bogs in the Slovak Republic the preparation of the care programme regarding Kláštorňé lúky National Nature Reserve was made in 2007 within which restoration of natural water regime was defined.

Within the project LIFE Nature “Restoration of Wetlands in the Záhorie Lowland” practical measures regarding wetland biotopes restoration were adopted in selected localities.

Within the project LIFE “Conservation of Senné and Medzibodrožie Protected Bird Areas” measures regarding improvement of water regime of this territory were taken.

Within the project LIFE Nature “Conservation of Biotopes Diversity in Slovenský Raj National Park” the activities for improving water regime of bog biotopes were included.

Administrative measures for flood simulation were taken in the part of Dunajské luh Protected Landscape Area negatively affected by the construction of Danube Waterworks where due to the Danube impoundment and the absence of natural flooding there was disturbance of natural processes.

## **8 MONITORING AND INFORMATION SYSTEM**

### ***Monitoring System***

Monitoring of ground and surface water is done in a complex way in the river basins and sub-basins and it is specified under the Decree No. 221/2005 of the Ministry of Environment of the Slovak Republic determining the details on detection and assessment of ground and surface water condition, its monitoring, water source inventory and water balance.

The Slovak Hydro-meteorological Institute is responsible for the framework project named Partial Monitoring System – Water and it is charged with coordination of the project via hydrological services and implementation of monitoring programmes in accordance with the above-mentioned decree.

In 2007 the Partial Monitoring System - Water consisted of the following monitoring sub-systems:

1. Quantitative indicators of surface waters
2. Quantitative indicators of ground waters
3. Surface water quality
4. Ground water quality
5. Thermal and mineral waters
6. Irrigation waters
7. Recreational waters

Subsystems 1 to 4 are provided by the Ministry of Environment of the Slovak Republic through the Slovak Hydro-meteorological Institute. Providing the function of the subsystems 5. Thermal and mineral waters and 7. Recreational waters are in charge of the Ministry of Health. Providing the function of the subsystem 6. Irrigation waters is within the competence of the Ministry of Agriculture.

### **Activities related to Partial Monitoring System – Water for 2007**

#### *Surface Water Quantity Parameters*

In 2007 monitoring of surface water amount was done in 417 gauging stations of basic monitoring network. 7 gauging stations out of the abovementioned stations are located in the territory of neighbouring state. Besides abovementioned stations there were 2 functional stations where water discharge was monitored.

In 2007 two more gauging stations were constructed where only a part of the year 2007 was monitored and hydrometrics necessary for making the rating curves was performed.

In 2007 all gauging stations were equipped with automatic measuring devices based on pressure scanning. It means that the network of stations is 100 % automatic what fulfils the quality objectives of the Slovak Hydro-meteorological Institute.

In 2007 15 reconstructions of gauging stations were performed.

In gauging stations totally 326 automatic devices (MARS4i and MARS5i) were operating. In some important stations 2 devices were operating for the reason of quality collection and storage of hydrological data, mainly in forecast and warning profiles.

In 2007 in monitoring network of surface water amount there were 2 497 direct measurements (hydrometerings) done, necessary for creation and updating the measuring curves. It was 6 hydrometerings on average on one gauging station enumerating the discharge which is a slight increase compared to preceding years.

According to bilateral agreements with the neighbouring countries 279 joint measurements with hydrological services of Austria, Hungary, Poland, Czech Republic and Ukraine were carried out in 2007. Verification of data, time orders and measuring curves was done. Representatives of the Slovak Hydro-meteorological Institute participated in the meetings of working groups of Transboundary Water Committees (TWC). International rivers are measured five to nine times a year based on bilateral agreements with neighbouring countries and approved plans.

Basic monitoring element in suspended load monitoring is water turbidity or the content of suspended load in surface flow.

Outputs of processing include annual tables of water levels, discharges and water temperatures containing average daily, monthly and extreme values.

#### *Groundwater Quantity Parameters*

The total number of objects within the groundwater monitoring network was 1,500 in 2007. The network is divided as follows:



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- *Monitoring network of wells.* Total number of monitored wells is 362 (429 springs). Some wells have more springs which are monitored separately. Temperature and yield was measured everywhere.
  - *Monitoring network of groundwater levels* – 1,138 objects

Total number of stations for continual measurement of ground water quantity parameters was on the level of 580 objects at the end of 2007.

Basic interval of monitoring is once a week in Wednesday. Measuring interval of automated devices is 1 hour. Average daily value is calculated based on measurements carried out during 1 day.

Monitoring in all objects of groundwater quantity monitoring network was provided by local observers. Systematic and conceptual development of automated monitoring process using equipment for groundwater level measurement still continues.

In 2007 development of technological line for archiving the hourly records in the central SHMI database continued. Works in 2007 were focused on verification of hourly data for the years 2004 – 2006. Hourly data bank of ground water quantity monitoring is currently independent data register in hydrological information system of HIS SHMI.

#### *Surface Water Quality Parameters*

In 2007 surface water quality was monitored within the approved Programme of Water Condition Monitoring for 2007 taking into account 310 sampling sites. For the reason of costs minimization a part of sampling sites was monitored for several purposes. Basic monitoring network consisted of 218 sampling sites.

Basic monitoring is primarily based on existing sampling sites of surface water quality state monitoring network administrated by SHMI.

Within the Project UIBF 2004/016-764.08.03 the monitoring of water bodies in the Slovak Republic in 2007 was done. 12 water reservoirs were monitored in a way that all types within the Slovak Republic were covered.

The results of analyses from particular laboratories were collected at SHMI. Afterwards, the results were stored in the MAGIC information system and processed for the need of check, preparation of yearbook, preparation of water balance and other purposes.

#### *Groundwater Quality Parameters*

Groundwater quality monitoring programmes are in the process of changes that result from the WFD requirements and EU legislation. In line with the strategy for WFD implementation in the Slovak Republic the Programme of Water Condition Monitoring for 2008 was elaborated with included requirements for collecting all information on water condition which will have to be reported to the European Commission in required quality.

Within the basic monitoring 131 objects were analyzed. Within the operational monitoring 834 samplings and measurements in situ were made in 413 objects. Out of that number 248 ground water samples were taken in the territory of Žitný ostrov (with the frequency 2 - 4 times) and 116 samples of nitrogenous substances were taken in vulnerable

territories in Slovakia. Two localities were monitored for the purpose of Czech-Slovak transboundary monitoring. Analyses were done by accredited geoanalytical laboratories of the State Geological Institute of Dionýz Štúr in Spišská Nová Ves. In 2007 monitoring in 158 quaternary objects (sampling frequency – 2 times) and in 33 objects localized in karst (sampling frequency – 4 times) was extended for the purpose of fulfilling the requirements of Water Condition Monitoring Programme, optimal variant.

Collected information are used for assessing the chemical condition in groundwater bodies in Slovakia, for describing the trends of ground water quality development as materials for research and expertises and water management authorities use this information in decision making process.

Compared to the year 2006 the frequency of ground water sampling was higher as well as the group of monitored parameters was enlarged mainly by specific organic substances – some pesticides and relevant substances defined for Slovakia according to the Programme of Pollution Reduction.

#### *Thermal and Mineral Water*

In 2006 the definitive operation of monitoring system of natural healing and natural mineral resources in Slovakia was launched. Following the Act No. 538/2005 Coll. there is the requirement for modification of certain parts of monitoring system. Draft of software modification was made for the period 2006 - 2008.

Monitoring in Slovakia includes 39 localities out of which 36 localities provide data transfer to a central database of the Ministry of Health of the Slovak Republic through the local information system (Baldovce, Bardejov, Bojnice, Brusno, Budiš, Cígelka, Čerín, Čilistov, Číž, Dudince, Korytnica I, Korytnica II, Kováčová, Kláštor pod Znievom, Lipovce, Lúčky, Lúka, Martin, Maštinec, Mníchova Lehota, Nimnica, Nová Ľubovňa, Piešťany I, Piešťany II, Rajecké Teplice, Santovka, Sklené Teplice, Slatina, Sliach, Smrdáky, Sulín, Tornaľa, Trenčianske Mitice, Trenčianske Teplice, Turčianske Teplice, Vyšné Ružbachy). In the aggregate, there are 156 objects included in monitoring system - 101 approved and 55 other observation resources.

Monitoring of selected parameters using automatic measuring equipment was provided in 17 localities on 25 resources in 2007.

In remaining 20 localities parameters are measured manually or partially manually in intervals according to valid decision.

#### *Irrigation water*

In 2007 irrigation water quality was monitored in the whole territory of Slovakia in 80 sampling sites. Totally 559 samples were registered. Laboratories of the Soil Science and Conservation Research Institute in Bratislava performed sampling and chemical analyses.

In individual sampling sites irrigation water quality was monitored once a month from April to October.

Besides these parameters the irrigation water quality monitoring included the contents of atrazine and simazine as priority substances pursuant to the Water Act.

The measured results show that irrigation water meets under the requirements of the standard STN 75 7143 the quality categories as follows:

Category 1	35 sampling sites (43.8 %)
Category 2	40 sampling sites (35.0 %)
Category 3	5 sampling sites (6.2 %)

Irrigation water quality decrease was caused by increased pH values, higher content of dissolved substances, calcium and microbiological pollution. Most often cause for irrigation water quality decrease was again microbiological contamination, mainly by coliform bacteria, faecal coliform bacteria, enterococcus and chemical contamination, mainly by higher content of calcium and high pH values.

In 2007 there was no irrigation water pollution caused by heavy metals, NEL, PCB and limit concentration of atrazine, simazine, cadmium, lead, mercury and nickel in irrigation water was not exceeded in monitored localities.

#### *Recreational waters*

We distinguish two main types of recreational water in our conditions – natural recreational localities, mainly sand pits, gravel pits, lakes, delimited parts of water courses and diked water reservoirs having besides other purpose also recreational utilization. The second type is represented by artificial swimming pools filled with thermal and non-thermal water (usually water from public water supply system). Until September 1, 2007 the requirements on water quality and responsibilities of swimming pools providers were defined under the Act No. 126/2006 Coll. on public health care and the Regulation of the Government of the Slovak Republic No. 252/2006 Coll. on specifications concerning the operation of bathing facilities and on specifications concerning the requirements on quality of bathing water and its monitoring. Since September 1, 2007 these issues have been included in the Act no. 355/2007 on support, development and protection of public health and amendment of some acts.

#### *Natural bathing waters*

Overall monitoring included 73 natural localities in 2007, namely gravel pits, sand pits and diked water reservoirs having also recreational utilization besides other purpose. Only 26 localities were available for organized recreation (in 2006 it was 32 localities). Remaining localities hosted so-called unorganized recreation or only nearby beaches were available and there was no request for making water resource available. At the beginning or during the season regular bathing water quality monitoring was done in 31 such localities visited by bigger number of people or being of European importance. Informative bathing water quality monitoring was carried out in water resources used by small number of visitors. Localities with water not suitable for swimming for a longer time been monitored in the past but currently used only for fishing purposes (Šahy Health Area) or localities with small visit rate (Veľké Kozmálovce in Nitra Region) were not monitored this year.

Since 2004 the Slovak Republic has been annually monitoring and assessing the water quality in most frequently used natural localities at European level and preparing and submitting the Report of the Slovak Republic on bathing water quality to the European Commission. In 2007 this assessment included 38 localities which were proclaimed to be suitable for bathing by the Regional Environmental Office through generally binding provisions.

During the season 544 water samples were taken in natural swimming pools and 8393 analyses of physical-chemical, microbiological and biological indicators of water quality were done. Threshold value of parameters determined by valid legislation was exceeded in 298 samples and 408 indicators. The most frequent cause of insufficient water quality were mainly insufficient values of chlorophyll and total phosphorus, changes in colour, transparency and shift of saprobic index and content of algae exceeding the limit. The trend of 2006 in decreasing the occurrence of cyanobacteria in bathing water continued and it was considerably lower than in the previous years.

#### *Artificial bathing waters (swimming pools)*

There are 179 bathing facilities with 492 swimming pools in Slovakia (180 thermal and 312 regular swimming pools). In the 2007 bathing season 157 bathing facilities with 444 swimming pools were in operation (number of bathing facilities didn't change and number of swimming pools increased by 33). Out of 2,223 samples in total 31,997 physical-chemical, microbiological and biological parameters were analyzed. Threshold values were exceeded in 1,940 cases, while the highest percentage of samples with exceeding the threshold value was in the pH indicator. Regarding other indicators the threshold value was exceeded in the following indicators: smell, turbidity, water temperature, CHSK<sub>Mn</sub>, bound and free chlorine ammonium ions, amoebas cultivable at the temperature 36 °C and 44 °C, *Pseudomonas aeruginosa*, *Saphylococcus aureus*, enterococcus. In connection with physical-chemical properties of thermal water used for filling the thermal swimming pools there is exceeding the threshold values in the following indicators: pH, CHSK<sub>Mn</sub>, ammonium ions, and colour – which is caused by natural composition of thermal water.

Quality of localities with the organized recreation was mostly suitable during the season and it was monitored in line with the legislation requirements.

#### **Information system**

In 2007 in connection with the requirements of the Integrated Landscape Management and the project Environmental Infrastructure for Spatial Information (<http://isu.enviroportal.sk>) the activities aimed at development of infrastructure of space data of the Ministry of Environment of the Slovak Republic were performed as defined by the Directive INSPIRE 2007/2/EC (<http://inspire.jrc.it/home.html>). Practical part of activities was performed by the Team of Central Geographic System of the Ministry of Environment (<http://isu.enviroportal.sk/index.php/item/cgs>) that consists of the representatives of individual organisations of the Ministry of Environment.

Implementation of this task as the main pillar in the process of spatial information infrastructure building is smoothly connected to the process of creation of this infrastructure

at the national level. Practical outcomes of his process involve also the project GeoNet.sk (<http://geonet.sk>).

## **9 RISK FACTORS OF WATER MANAGEMENT, CAUSES AND CONSEQUENCES**

### **9.1 Floods**

Report of Floods in the Slovak Republic in 2007 was prepared and submitted to the SR Government discussion in March 2008. Floods in the period May – December 2006 which were not included in this report were discussed by the SR Government on May 23, 2007.

After heavy rainfalls the 3<sup>rd</sup> flood stage was announced on Ublianka, Bánov Brook, Jablovský Brook, Uh and Cirocha in January 2007. In February 2007 heavy rainfalls caused water level increase in water courses in the territory of western Ukraine leading to water level increase in the Latorica and Bodrog Rivers. Similar situation was in March 2007 when the 2<sup>nd</sup> flood stage was announced again on the Latorica River (in Veľké Kapušany). In May 2007 there was 3<sup>rd</sup> flood stage announced in the villages of Lučatín and Hriadel'.

In summer 2007 there were floods mostly as a result of heavy rainfalls during a very short period – so called storm rainfall. Rainfall caused increased surface runoff, river bank overflowing and flooding rural and urban areas.

In June there was 3<sup>rd</sup> flood stage announced on the rivers Kutina, Korňanka, Nižný Brook, Jedľovský Brook, Kikajka, Branovský Brook, Harčarka and Majerský Brook.

In August and September there was 3<sup>rd</sup> flood stage announced on local rivers in the villages Jelšová, Diviaky nad Nitricou, Matiašovce, water courses in cadastre area of Spišská Nová Ves, Biela Brook, Miskrindel Brook, Zimný Brook, Polhoranka and Kysuca with tributary rivers in the districts of Žilina and Kysucké Nové Mesto; Radoľa, Vadičovský Brook, Povínsky Brook.

Extremely heavy rainfalls in the first half of September 2007 caused water level increase in the Danube River. Water level of the Morava River considerably increased also in the territory of Slovakia.

The northern part of Slovakia was most affected by the floods in 2007. In Žilina Region 33 municipalities (2,103 inhabitants) were affected by floods and in Prešov Region 19 municipalities were affected.

#### *Flood Consequences in 2007*

In 2007 the total flood costs and damages (table 9.1.1. and figure 9.1.1.) were amounted to 125.106 million SKK out of which the costs for rescue operations were 9.137 million SKK and the costs for flood protection operations counted 6.392 million SKK.

Damage to property was amounted to 74.912 million SKK including damage to property of residents in amount of 6.792 million SKK, property of municipalities in amount of 54.9 million SKK and property of higher territorial units in amount of 13.220 million SKK.

Damage to flood protection measures was amounted to 34.665 million SKK.

During the floods in 2007 there were affected totally 60 municipalities where 693 houses were flooded (cellars, basements). The following objects were flooded: 28 administration buildings, schools and medical facilities; 9 factories, storehouses and operation premises; 116 water resources; 149.05 ha agricultural land; 4.1 ha forest land and 181.191 ha urban areas. Floods damaged 707 m of water supply system; 1.530 km of sewerage system; 230.3 km of river embankments and 5.0 m of dikes. Floods affected 2,277 residents out of which 37 had to be evacuated.

Financial consequences of floods in 2002 – 2007

Table no. 9.1.1

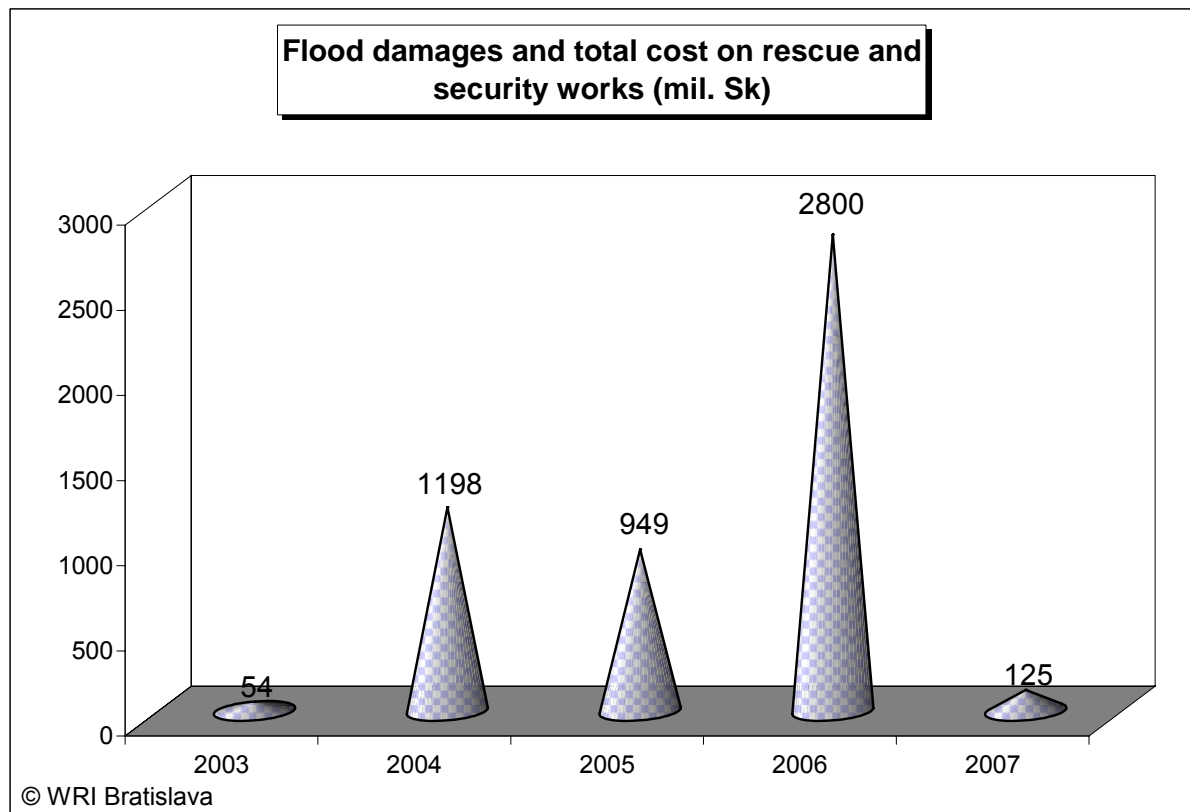
Floods - year	Number of municipalities affected by floods	Flooded areas in hectares	Flood damages in million SKK	Costs in million SKK		Total costs and damages in million SKK
				Rescue operations	Protection operations	
2002	156	8,678.0	1,525.7	58.1	50.1	1,639.90*
2003	41	744.0	43.9	5.7	4.2	53.79
2004	350	13,717.0	1,057.4	37.2	103.4	1,198.04
2005	237	9,236.8	800.5	67.8	80.6	948.92
2006	512	30,729.7	2,425.9	180.4	193.4	2,799.64
2007	60	339.5	109.6	9,137.0	6.4	125.11

Source: Reports on floods in Slovakia in 2001, 2002, 2003, 2004, 2005, 2006, 2007 (Ministry of Soil Management of the Slovak Republic, Ministry of Environment of the Slovak Republic)

\* amount of 6.0 million SKK – costs for mosquito insecticide is included

The total flood damages and costs for rescue operations and protection measures in 2002 – 2007 are shown in the Figure 9.1.1.

Figure no. 9.1.1



### **9.1.1 Flood Protection Programmes**

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

The Report on financial consequences caused by floods and the proposed system of flood protection measures – “*the Flood Protection Programme in the Slovak Republic by 2010*” (further referred to as “Flood Protection Programme”) was adopted by the government of the Slovak Republic as the Resolution 31/2000 of January 19, 2000. The total costs for flood protection measures amounted to 17.766 billion SKK including 14.596 billion SKK for the Slovak Water Management Enterprise (further referred to as “SWME”).

The government of the Slovak Republic took into consideration measures within the mentioned *Flood Protection Programme* and set priorities for flood protection in Bratislava, the capital city of the Slovak Republic by adopting the Resolution 25/2006 as of January 15, 2003. The financial resources required for the *Flood Protection Programme* have been adjusted to 20.766 billion SKK including 18.415 billion SKK for the SWME.

#### *Flood Protection Measures*

In 2007 the works within the *Flood Protection Programme* amounted to 393.541 million SKK, including 134.355 SKK from the EU funds and 191.409 million SKK from the state budget.

#### POVAPSYS Project

The activities of the POVAPSYS project were focused on:

- testing and implementation of developed systems and technologies in pilot projects in compliance with the framework programme,
- preparation of supporting documents with the aim to request contribution from the EU funds within the financial period 2007 – 2013.

The results and outputs will be:

- monthly evaluation reports on quality of measured data with a proposal to solve inconsistencies and shortcomings,
- radio-local and numerical products for POVAPSYS operation,
- calibrated and tested models for selected forecasted profile.

### **9.1.2 Action Programme of Sustainable Flood Protection in the Danube Basin**

#### *Implementation of the ICPDR Action Programme of Sustainable Flood Protection*

The International Committee for the Protection of the Danube River (ICPDR) adopted the Action Programme of Sustainable Flood Protection in the Danube River Basin (further referred to as the *Action Programme*) on the 7<sup>th</sup> Conference of Ministers of the Member States responsible for Water Management, which was held in Vienna on December 14, 2004. Implementation of *the Action Programme* in the Danube river basin is one of the topics at the agenda of Expert Working Group (further referred to as “EG”) “Flood Protection” within ICPDR, in which Slovakia was represented by the Ministry of Environment of the

Slovak Republic, Slovak Water Management Enterprise, Slovak Hydro-meteorological Institute and Water Research Institute.

The POVAPSYS project objectives are in compliance with the *Action programme*.

The objective of the *Action Programme* from the view of the Danube river basin is to:

- reach progress in the area of flood forecasting and alarm systems,
- support preparation and coordination of action plans on the level of the Danube river basin,
- create forums for expert information exchange in flood protection and evaluation of flood risk,
- elaborate recommendations for joint approach in evaluation of threatened territories and flood risks.

A completion of the study comparing differences between the *Action Programme* and Directive of the European Parliament and Council of the European Union on Assessment and Management of Flood Risks (further referred to as *the Directive*), which came into force in November 2007, was done by the EG. The objective of the *Action Programme* and *Directive* is very similar, but the main difference is in the implementation deadlines, which are stricter in the *Action Programme*. During the meetings organised by the EG, the member states of ICPDR stated that implementation of the *Action Programme* was lagging behind. Concerning this an evaluation report was elaborated and submitted to the represented member states within the ICPDR on the 10<sup>th</sup> regular meeting in December 2007. Following the conclusions, the EG will further proceed in 2008.

In September 2007 a workshop with the Slovak participation was organised on the topic of mapping flood hazards and risks and joint presentation of the representatives from the Slovak Republic in the EG Flood protection ICPDR. In regard to minimal requirements of mapping flood risk in the Danube river basin a joint vision plan was elaborated and approved in cooperation with the initiative EXCIMAP EU.

Among other activities of the EG, preparation works on the project FLOODRISK commenced. The aim of the project is to elaborate flood risk maps for the main course of the river Danube from its spring in Germany up to the mouth into the Black Sea and its biggest tributaries in the reach of backwater. Should the financing of the project be approved, this activity will correspond with the aims of the *Action Programme*.

In 2006 a working group (further referred to as "WG") "Water quantity – Floods and Draughts" created on basis of updated implementation strategy of the WFD on the national level, took charge of methodical solutions and implementation issues concerning the *Action Programme* and *Directive*. The WG transformed into WG "Floods". A process of transposition of *Directive* into legislative system of the Slovak Republic has commenced.

After some amendments a pilot project was approved to evaluate flood hazard and risk in Myjava river basin. The project financing is foreseen for the year 2008. The aims and project structure are in line with the requirements of the *Action Programme* and *Directive*.



In implementation of the *Action Programme*, improvement of cooperation has been required in providing required supporting data from competent representatives of the Slovak Water Management Enterprise and other governmental or public institutions.

### **9.1.3 Directive of the European Parliament and of the Council 2007/60/EC on the Assessment and Management of Flood Risks**

The Directive 2007/60/EC of the European Parliament and the Council on the Assessment and Management of Flood Risks as of October 23, 2007 was published on November 6, 2007 in the Official Journal of the EU under the number L 288/27 in Volume 50 and came into force on November 26, 2007.

The objective of the Directive is to establish a legal framework for assessment and management of flood risks with the aim to reduce adverse effects of floods on human health, environment, cultural heritage and economic activities.

The *Directive* includes following chapters:

- Chapter I - General provisions
- Chapter II - Preliminary flood risk assessment
- Chapter III - Flood hazard maps and flood risk maps
- Chapter IV - Flood risk management plans
- Chapter V - Coordination with directive 2000/60/ec, Public Information and consultation
- Chapter VI - Implementing measures and amendments
- Chapter VII - Transitional measures
- Chapter VIII - Reviews, reports and final provisions

## **9.2 Quality Control in Water Protection and Solutions to Emergency Water Quality Deterioration**

Audit by the Water Protection Inspection (WPI) on behalf of Environmental Inspectorates, which falls under the Water Act, was focused primarily on checking release of and treatment of hazardous substances, waste water discharge and special (mining and geothermal) water discharge, operation and effectiveness of WWTP, solutions to emergency water quality deterioration, approving accident emergency plans, solving claims, petitions and incentives.

Audit of enterprises and companies of A and B category was coordinated according to 163/2002 Coll. on chemical substances and chemical preparations and in total 1,637 checks were carried out. Violation of the law was reported in 361 cases (22 %). An overview of number of checks carried out in the years 2005 - 2007, when a violation of the law was reported, is indicated in the table 9.2.1.

Table no. 9.2.1

Water Protection Inspection	Act 364/2004 Coll.		Act 261/2002 Coll.		Act 163/2001 Coll.		Total	
	Number of checks	Law violation	Number of checks	Law violation	Number of checks	Law violation	Number of checks	Law violation
	Number							
2005	1,467	332	43	4	4	0	1,514	336

Water Protection Inspection	Act 364/2004 Coll.		Act 261/2002 Coll.		Act 163/2001 Coll.		Total	
	Number of checks	Law violation	Number of checks	Law violation	Number of checks	Law violation	Number of checks	Law violation
	Number							
2006	1,713	436	43	4	32	3	1,788	443
2007	1,567	356	59	5	11	0	1,637	361

### *Emergency Water Quality Deterioration*

The Slovak Environmental Inspection reported 157 cases of emergency water quality deterioration, including surface water pollution in 97 cases and ground water pollution and threats in 60 cases. An overview of these cases is shown in the following table.

Overview of reported cases in the years 2005-2007

Table no. 9.2.2

Year	Emergency water quality deterioration						
	Number of reported cases	surface water			Groundwater		
		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

The most frequent cause (32) of emergency water deterioration was human factor and unsatisfactory technical conditions of facilities, where hazardous substances had been used. In many cases this was caused during and by transport of these substances (50).

Secondly, it was caused mainly by oil products, in 76 cases (48.4 %), wastewater in 24 cases (15.3 %) and agricultural fertilizers in 12 cases (7.6 %). Pollutant was not identified in 24 cases (14.0 %).

Operation of the Communication Unit of the Basic International Warning Centre PIAC 4 Slovakia was activated 5 times within the System of Early Warning in the Danube River Basin.

Based on public requests concerning environmental pollution, planned control operations and regular checks have been done. Detailed information concerning quality control and its evaluation is indicated in the annual reports of respective regional environmental authorities.

## **10 ECONOMIC ANALYSIS OF WATER USE AND REVISION IN WATER MANAGEMENT**

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

A negative economic result - a loss was reported in the amount of 979.080 million SKK for the accounting period in 2007.

Profits of the SWME amounted to the total amount of 2,934.091 million SKK, which represents 104 % of the annual plan performance. However, compared to 2006 profits have been decreased by 527.195 million SKK, including profit from selling goods, production,

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provision and usage of hydraulic power potential, water for energy production and other entrepreneurial activities.

The costs amounted to the total amount of 3,913.171 million SKK, which has been an increase by 478.643 million SKK compared to 2006.

The abstractions of surface water by respective consumers were as much as 299.475 million m<sup>3</sup> which compared to the preceding year has been a decrease by 56.396 million m<sup>3</sup>.

The year 2007 was extremely demanding as the SWME did not succeed in dealing with the planned tasks. This resulted mainly from insufficient financial resources provided by the state budget to cover costs of public works and drop-out of water for energy production, almost in the amount of 150 million SKK, which caused lower electricity production in hydraulic power plants.

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

The company reached a positive economic result – a profit in the amount of 400.920 million SKK, which has been an increase by 674.334 million SKK compared to the same period of preceding year.

The total amount of profits amounted to 4,007.727 million SKK, which represents 112.93% of the annual plan performance. Compared to 2006 the profits have been increased by 168.643 million SKK, which represents an increase by 4.39 %, while the profits from economic activities have been increased by 1,173.354 million SKK and the profits from financial activities have been decreased by 1,004.711 million SKK.

The profit of their own products has been increased by 913.013 million SKK, which represents 53.94 %.

The costs in the amount of 3,606.807 million SKK represent 100.8 % of performance compared to the adopted plan for 2007. The total costs have been increased by 842.977 million SKK, which is 30.5 %. The largest share of the total costs resulted from the operation of hydraulic power plants in Gabčíkovo and Žilina, which represents 65.82 %.

Financial management of the company can be characterised as firm. The company was able to provide finances from its own resources to cover all its needs in due date.

#### ***Hydroconsult, state enterprise, Bratislava***

The total profit of Hydroconsult amounted to 25.518 million SKK. Compared to the previous year the profit has been increased by 10.933 million SKK. This resulted mainly from the increase of own performance as well as of purchased and sold subdeliveries including of unfinished production.

The number of orders was mostly contracts signed in 2007 - priority orders "Flood protection of Bratislava" and "water supply and implementation of treated sewage system in the micro-region Hornad - Slanec", marketing activities, preparation of projects for small hydraulic power plants, water management solutions for facilities in the motorway

programme etc. The prevalent number of contracted orders was acquired in the competitions outside of public procurement.

The total indebtedness compared to 2006 has been moderately decreased.

### **Water Joint Stock Companies**

Fourteen (14) water companies and other subjects were operators responsible for the infrastructural property of public water supply and sewerage system and providing detailed information to the elaborator of the Water Management Report in the Slovak Republic. All the subjects have been included in the overview of indicators.

The profits from the sales of the own products and services in respective water companies have been decreased by 7.5 % compared to 2006. The financial result after taxation has represented a decrease by 42.2 %.

The costs have been increased by 7.0 %. Depreciation has been increased by 180 million SKK. There has been a considerable increase by 2,073 million SKK in tangible and non-tangible investments, including their own resources by 524 million SKK.

The produced water in their own facilities has been in the amount of 313,534 thousand m<sup>3</sup>, including invoiced drinking water, which represents 69.1 % i.e. 216,516 thousand m<sup>3</sup>. The difference between produced and invoiced water is 30.9 % which means that there has been a significant loss of drinking water.

An overview of net income of the respective groups of state enterprises, water companies and other subjects providing drinking water supply and waste water collection is shown in the table 10.1.

Table no. 10.1.

Indicator	Year	Water companies	SWME	Other companies	Total water management
Revenues	2006	12,846	3,461	3,867	20,174
	2007	11,883	2,934	4,033	18,850
	Index 2007/2006	0.93	0.85	1.04	0.93
Expenditures	2006	12,520	3,434	2,805	18,759
	2007	11,645	3,913	3,631	19,190
	Index 2007/2006	0.93	1.14	1.29	1.02
Net income after taxation	2006	509	27	1,062	1,598
	2007	294	-979	402	-283
	Index 2007/2006	0.58	-36.26	0.38	-0.18

## 10.1 Effect of Economic Tools

### *Drinking and Waste Water Pricing*

Prices for drinking water production, distribution and supply, and prices for waste water collection and treatment for 2007 were determined by the Office for Regulation of Network Industries of the Slovak Republic – the Revenue No. 1/2006 following by the Revenue No. 3/2006 as of June 30, 2006.

For the year 2007 fixed prices were valid for drinking water production, distribution and supply as well as waste water collection and treatment; maximal prices for controlled subjects, which planned production and drinking water supply or planned waste water collection was lower than 100 thousand m<sup>3</sup>.

Maximum amount of respective profit was derived from the planned amount of corporeal property annual depreciation and benefit limitation index which was in the amount of 0.2 for drinking water and 0.3 for waste water.

#### Drinking water

Table no.10.1.1

	Unit of measure	2003	2004	2005	2006	2007
Economic justified costs (EJC)	mil. SKK	4,287	4,874	4,876	5,393	5,488
Drinking water supply	thous. m <sup>3</sup>	254,393	233,675	223,064	216,569	216,516
Average EJC	SKK.m <sup>-3</sup>	16.85	20.86	21.86	24.91	25.35
Average price (without VAT)	SKK.m <sup>-3</sup>	17.18	17.72	22.88	25.18*	24.58
Price for the households (without VAT)	SKK.m <sup>-3</sup>	13.79	18.45	21.96	25.41*	25.09
Average price for others (without VAT)	SKK.m <sup>-3</sup>	24.07	25.41	24.81	24.88*	23.12

\* Price calculation resulted from the fact that the water invoiced for other consumers includes also water supply for municipal water companies. Price for drinking water supply through the public water supply system is lower for municipal water companies than the price for other consumers.

#### Waste water

Table no. 10.1.2

	Unit of measure	2003	2004	2005	2006	2007
Economic justified costs (EJC)	mil. SKK	2,808	3,271	3,536	5,394	4,102
Volume of wastewater	thous. m <sup>3</sup>	227,165	216,920	240,619	205,751	208,991
Average EJC	SKK.m <sup>-3</sup>	12.36	15.08	14.70	18.66	19.63
Average price (without VAT)	SKK.m <sup>-3</sup>	13.71	16.03	17.04	21.39	20.61
Price for the households (without VAT)	SKK.m <sup>-3</sup>	8.87	11.42	15.75	20.87	20.50
Average price for others (without VAT)	SKK.m <sup>-3</sup>	20.43	22.61	18.39	22.18	20.84

Figure no. 10.1.1

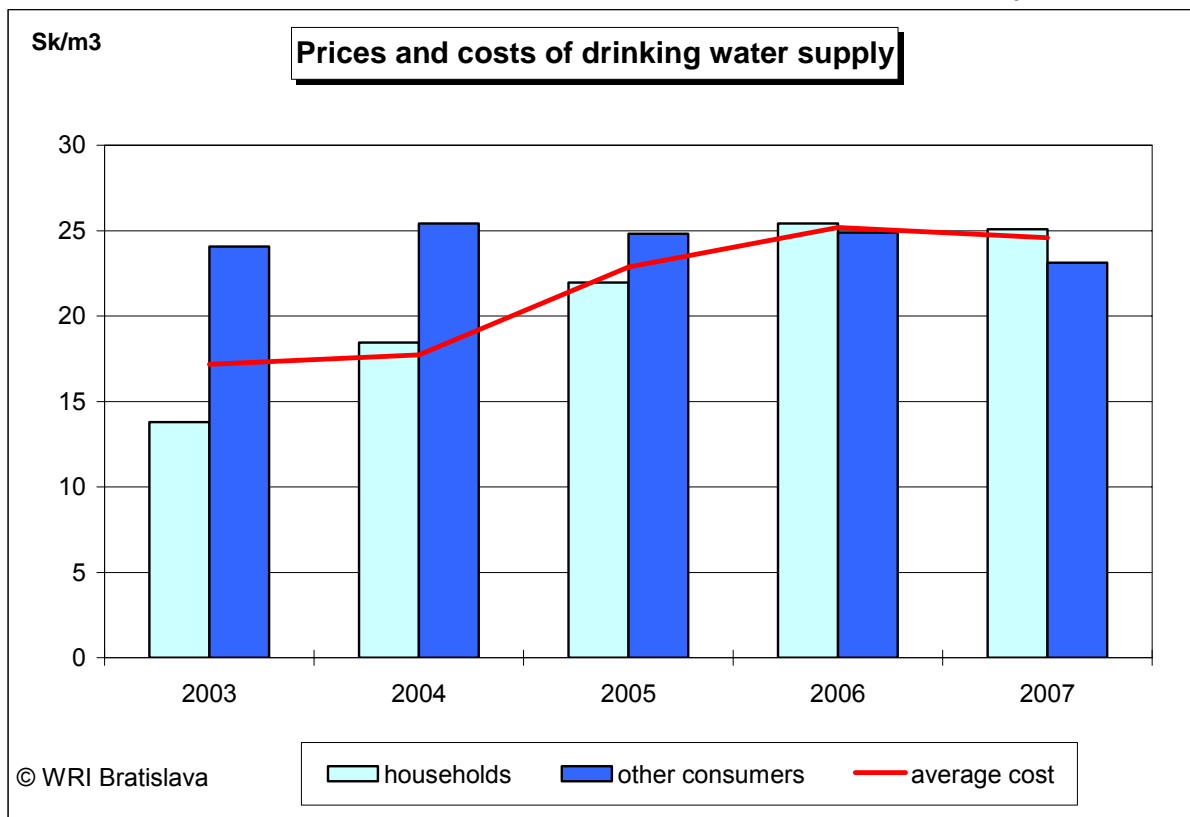
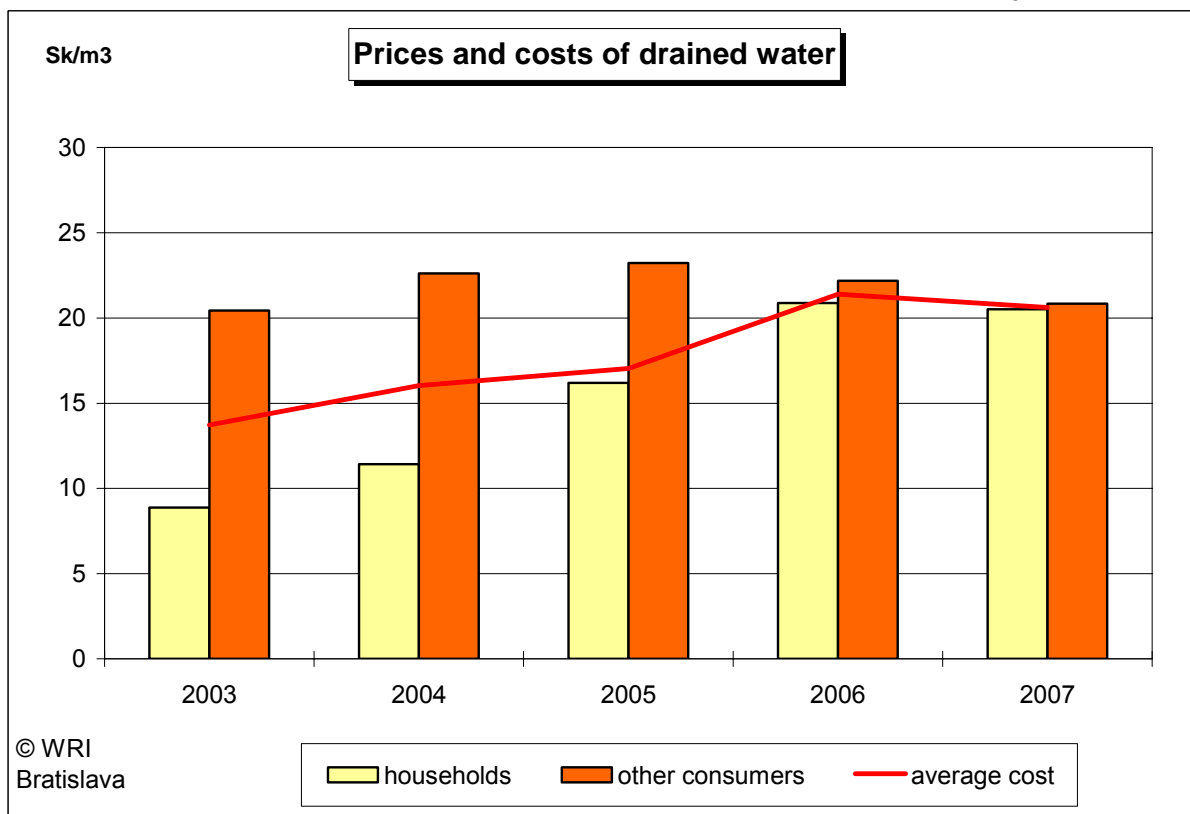


Figure no. 10.1.2



### **Payments for provision of water management services related to usage of surface water**

The Office for Regulation of Network Industries of the Slovak Republic (ORNI) has been determining the payments for usage surface water since 2005 in line with the governmental Regulation SR No. 755/2004 Coll.. According to the Revenue No. 5/2006 the details on procedures have been adjusted when regulating prices in water management activities related to the Report on Water Courses and Report on River Basins for the year 2007.

After carrying out an audit, the ORNI decided that the SWME in Banská Štiavnica shall set maximum prices for water abstraction and usage as follows:

- for surface water abstraction in the amount of 2.27 SKK.m<sup>-3</sup>,
- for usage of the hydro-energetic potential of water courses on water constructions administrated by a water course administrator when the installed output is higher than 100 kW in the amount of to 427 SKK/MWh,
- for purposes of energy production at water constructions owned by the user of hydro-energetic potential of the water course when the installed output is higher than 10 MW in the amount of 0.0031 SKK/m<sup>3</sup>.

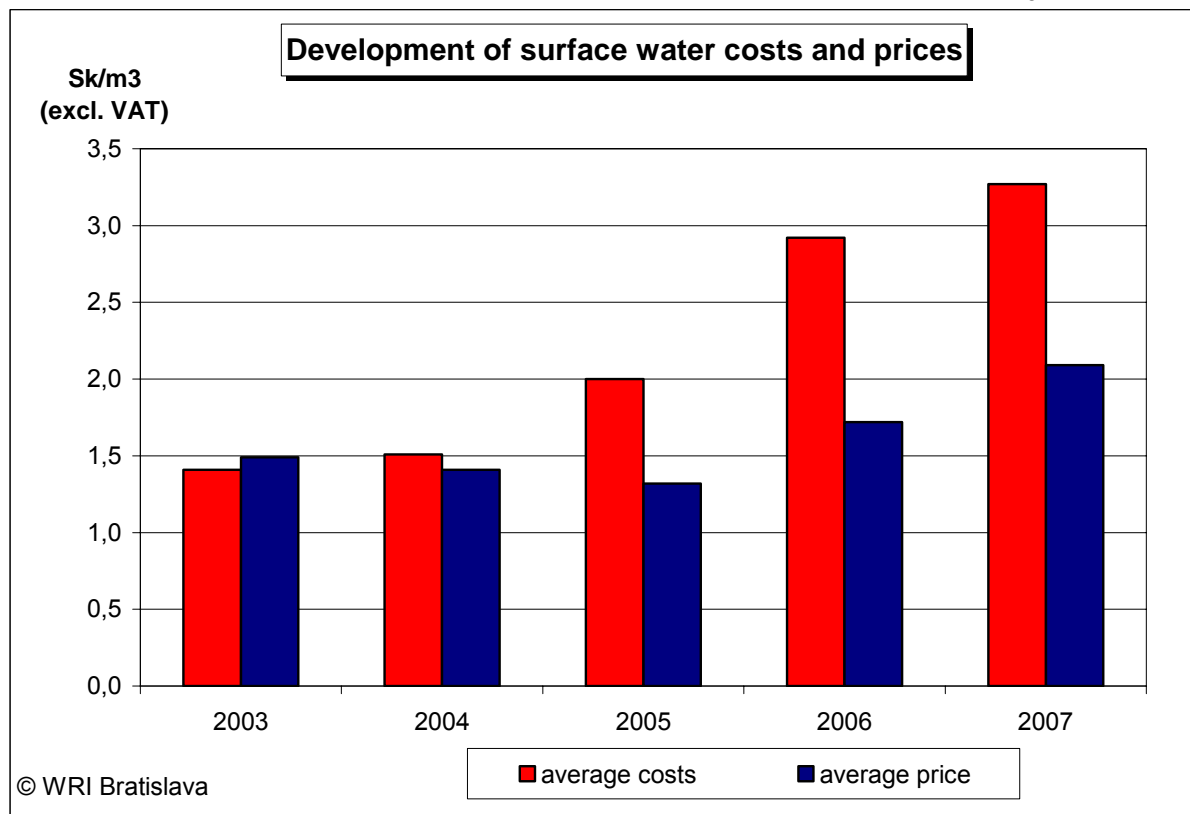
In 2007 respective consumers abstracted totally 299,475 thousand m<sup>3</sup> of surface water. This represents profit in the amount of 624.690 million SKK. Compared to the previous year there has been a decrease in the charged surface water abstractions, however, the profit has been increased by 13,343 thousand SKK. Price and cost development for surface water abstractions for the years 2003 – 2007 is shown in the following table 10.1.3 and the average values are seen in the figure 10.1.3.

Price Development for Surface Water out of Revenues (without VAT) in the years 2002 – 2007 for the Slovak Water Management Enterprise, Banská Štiavnica

Table no. 10.1.3

	Unit of measure	2003	2004	2005	2006	2007
Average costs	SKK.m <sup>-3</sup>	1.41	1.51	2.00	2.92	3.27
Average price	SKK.m <sup>-3</sup>	1.49	1.41	1.32	1.72	2.09

Figure no.10.1.3



### Taxes

In the assessed period, construction tax has been increased compared to the previous year as well as road tax has slightly been increased. Value added tax and estate tax have been decreased.

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

[thous. SKK]

Table no. 10.1.4

Taxes	2003	2004	2005	2006	2007	Index 2007/2006
VAT (Value Added Tax)	249,726	291,370	1,168,971	933,546	625,838	67.03
Real Estate Tax	13,697	17,225	47,930	41,667	41,249	98.99
Of which: Land Tax	2,242	3,503	24,923	24,223	23,119	95.44
Construction Tax	11,451	14,131	13,844	16,744	18,131	108.28
Road Tax	26,242	25,100	27,568	28,513	30,659	107.53
Legal Entity Income Tax	128,587	162,507	119,337	119,117	656,764	551.36

### Loans

The Water Management Construction, state enterprise, contributed to the largest degree to a decrease of bank loans in 2007, by settling all payments of the foreign loan in 2006 and in consequence in 2007 did not record any debts against any banks.

In 2007 a loan was provided in the amount of 45 million SKK for the project Flood Protection in Bratislava. In 2005 a short-term bank loan was provided for the project Floods



in the amount of 100 million SKK. Another drawing in the amount of 60 million SKK was done in 2007, and accordingly the closing balance was 160 million SKK.

[in thousands SKK]

Table no. 10.1.5

Loans	2003	2004	2005	2006	2007	Index 2007/2006
Bank loans and aids	8,591,408	8,006,287	9,236,752	3,336,404	3,161,943	94.77
of which: long-term bank loans	8,198,078	7,540,767	8,635,023	2,354,211	2,079,587	88.33
current bank loans	393,330	465,520	601,729	982,193	1,210,772	123.27

## 10.2 Labour Force, Salary

Average annual registered number of employees by December 31<sup>st</sup>, 2007 in state water management enterprises and water joint stock companies was 12,824. Compared to the preceding year this number represents a decrease by 290 employees. The number of employees decreased mainly in water companies (98 employees) and the Slovak Water Management Enterprise (175 employees).

In 2007 the labour costs incurred by the Slovak Water Management Enterprise were amounted to 1,091 mil. SKK, which is higher by 48 million SKK compared to 2006.

The average salary in water management has been increased by 7.1 % and in water companies by 6.2 %. Labour productivity from profits in water management has been decreased by 4 %.

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 no. 10.2.1

Indicator	2003	2004	2005	2006	2007	Difference 2007-2006	Index 2007/2006
Water companies employees total	9,291	9,179	8,833	8,736	8,638	-98	0.99
SWME employees total	4,432	4,149	4,129	4,097	3,922	-175	0.96
Other enterprises employees (WMC+HYCO)	314	301	285	281	264	-17	0.94
WM employees total	14,167	13,635	13,247	13,114	12,824	290	0.98
Average salary in WM total (SKK)	14,317	16,689	18,404	20,291	21,731	1,440	1.07
Average salary in WC total (SKK)	13,456	16,005	17,858	19,546	20,756	1 210	1.06
Labour productivity of revenues in WM (thous. SKK/head)	1,197	1,155	1,347	1,538	1,470	-68	0.96

### 10.3 Financing of Investment Constructions in Water Management

Capital transfers for investment constructions in the amount of 50.0 million SKK were provided to the state **Slovak Water Management Enterprise** in the field of Water management. These resources were assigned for 8 investment activities.

A significant share in the amount of 511.7 million SKK represented own financial resources.

The investment activities financed by the resources from the EU funds were in the total amount of 28.2 million SKK. To co-finance the projects the amount of 5.3 million SKK was provided from the state budget.

The total volume of investments in construction represented 594.0 million SKK.

The amounts for respective branches were the following:

Branch Bratislava	333.793 million Sk
Branch Piešťany	134.348 million Sk
Branch Banská Bystrica	54.149 million Sk
Branch Košice	64.741 million Sk
<u>Directorate</u>	<u>7.004 million Sk</u>
Total SWME	594.035 million Sk

**The Water Management Construction** carried out investments from their own resources in the amount of 392.5 million SKK and continued mainly in constructions of the Gabčíkovo - Nagymaros hydropower plant and dam system and Žilina hydro-engineering structure according to the approved company plan for 2007. The safety of water works as well as their operational ability is still the priority. Number of buildings under construction is taken into consideration, but also some preparation works in development projects, particularly preparation of constructions of the Tichý Potok water reservoir and water works in Slatinka and Sered'-Hlohovec.

**Water companies** used for investments their own resources in the amount of 3,719.266 mil. Sk.

Constructions of water pipes and sewage system were financed by the EU funds in the amount of 2,904.629 mil. SKK, while the amount of 764.024 SKK was provided by the state budget to co-finance these investments.

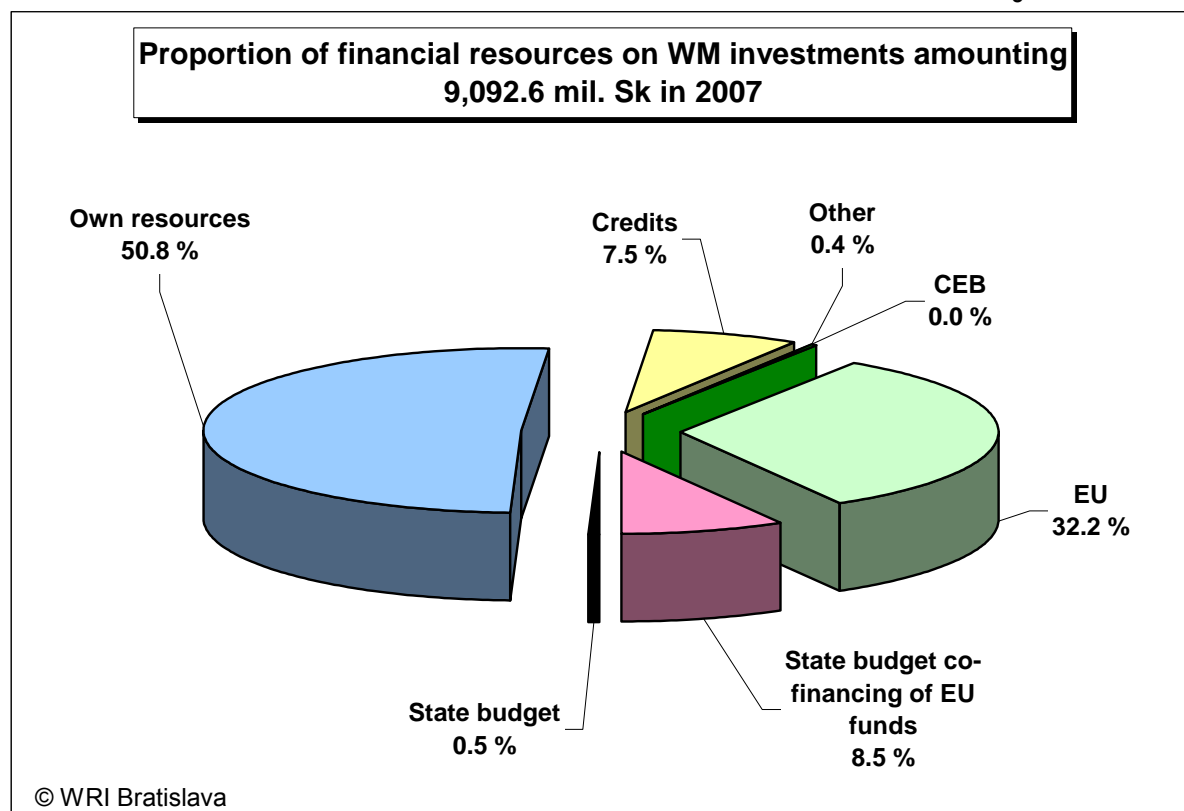
An overview of investment construction financial resources in the years 2006 and 2007 is indicated in the table 10.3.1 and figure 10.3.1.

Table no. 10.3.1

Financial resources	Slovak Water Management Enterprise		Water companies and others		Water Management Construction		Total Water Management	
	2006	2007	2006	2007	2006	2007	2006	2007
State budget (SB)	-	50,0	-	-	0,5	-	0,5	50,0
Own sources	379.7	511.7	4,504.8	3,719.3	4,920.7	392.5	9,805.2	4,623.5
Council of Europe Development Bank	-	-	-	-	-	-	-	-
EU funds	72.3	27.3	1,471.0	2,904.6	-	-	1,543.3	2,931.9
Co-financing of SB to EU funds	9.5	5.0	625.1	764.0	-	-	634.6	769.0
Credits	-	-	490.6	677.7	-	-	490.6	677.7
Others	-	-	181.1	40.5	-	-	181.1	40.5
<b>TOTAL</b>	<b>641.5</b>	<b>594.0</b>	<b>7,272.6</b>	<b>8,106.1</b>	<b>4,921.2</b>	<b>392.5</b>	<b>12,655.3</b>	<b>9,092.6</b>

\* Water Management Construction obtained financial resources for paying the fiduciary credit through the Fond of National Property.

Figure no. 10.3.1



## **11 OVERVIEW OF RIVER BASIN MANAGEMENT PROGRAMMES AND PLANS**

### ***River Basin Management Plans***

River basin management plans are a basic tool to achieve the goals of water planning in line with the requirements of the Water Framework Directive (WFD). The deadline of their production and approval for the first planned cycle is December 31<sup>st</sup>, 2009. The preparation process of river basin management plans is coordinated from the European Commission which besides coordination and audit focuses on evaluation of summary reports submitted by the respective Member States in compliance with requirements of the WFD.

The river basin management plans are processed on two levels with different solution particularities. The most detailed are the sub-basin plans, on which national plans are based

- Management Plan in the Danube River Basin and
- Management Plan in the Vistula River Basin

These documents are the basis for strategies on international and national level.

Modifications were made in number of river basin management plans, as there are only two river basin areas in the Slovak Republic from the European viewpoint. The Water Plan of the Slovak Republic, which is going to have less detailed solutions, will be a supporting document for international river basin plans (Danube and its sub-basin Tisa and Visla). The binding part of the relevant river-basin management plans are programmes of measures, by which set aims should be achieved, particularly good water quality by the year 2015. The mentioned changes including relevant executive regulations will be incorporated into the prepared amendment of the Water Act, which legislatively regulates water planning process on national level.

These documents form part of water plans and integrated river basin management. Flood protection management plans shall also be included. Their implementation is required by the *Directive of the European Parliament and Council 2007/60/EC on the Assessment and Management of Flood Risks* by 22 December 2015. The first plans have been prepared and processed.

## **12 RESEARCH, EDUCATION, ENVIRONMENTAL TRAINING, PUBLICITY AND PROMOTION**

### **12.1 Research**

The following tasks were the centre of scientific research:

- *Domestic and International Scientific-Technical Projects:*
  - SZIGETKÖZ – Programme LIFE – “Danube Island” – Implementation of new processes for sustainable water management in the Hungarian-Slovak territory
  - Zemplin Water way - INTERREG III.A
  - EnviroGeoPortal – INTERREG III.A
  - NORMAN project – Network of reference laboratories and partner organisations for monitoring and bio-monitoring pollutants threatening environment

- 
- SOCOPSE project (Source Control of Priority Pollutants in Europe) – Creation of control system in Europe
  - Water management balance in the boundary water course Morava with the view to the Framework Programme of Sustainable Use of River Basin Morava – III. Phase
  - Bilateral project Morava – Joint Slovak and Austrian management of water/ hydro ecological measures
  - Water management balance in the boundary water course Ipeľ with the view to the framework of Ipeľ river use – VI. Phase
  - Introductory project study – Enhancing the Danube navigability (Hungary - Slovakia)
  - BALANCE project – Integrated management of selected river basin based on the EU – WFD
  - INTERREG III. - Elaboration of joint framework programme of land and water management, consideration of implementation and suggesting relevant project elements of the framework in Medzibodrožie
  - DINAMICS project – Nanotechnologies and nanosciences, knowledge-based multifunctional materials and new production processes and devices and devices
  - *Tasks over the framework of common transfer:*
    - Water management model of water works system in Gabčíkovo-Čunovo,
    - Review and risk assessment of pesticides in soil and water
    - Building of observation networks objects for territories according to the Council Directive 91/676/EC concerning the protection of waters against pollution caused by nitrates from agricultural sources
    - DETOX – Expert review of the size of ground water pollution after fires in Bratislava and Rimavská Sobota
    - Incidence Study of building tunnel and its impacts on the groundwater flow by connecting the railway corridor TEN-T (Trans European Transport Network) to the airport and railway network in Bratislava
    - Tackling issue of alleviation sediments in water reservoirs and their use
  - *International Cooperation based on international agreements:*
    - Danube Committee,
    - Committee of boundary waters
  - *Methodical procedures*
    - Elaboration of methods for ecological conditions assessment for phytobentos according to the WFD
    - Elaboration of supporting document including methodological environmental procedures to evaluate interaction of highly modified water bodies and environment in relation to the integrated river basin management
    - Plan implementation for security of drinking water supply in the Slovak conditions
    - Assessment of activities
    - Implementation of the WFD
    - Standardisation
  - *Framework and legislation documents*
    - Update of the Water Management Framework according to river sub-basin of the Slovak Republic,
    - Processing of supporting documents for the Act No. 666/2004 Coll. on Flood Protection in accordance with the Directive 2007/60 of the European Parliament and Council on the Assessment and Management of Flood Risks,

- Processing of supporting documents for the draft Decree of the Ministry of Environment “Technical Requirements on Water Constructions”.
- The national programme of the Slovak Republic for execution of the Council Directive 91/271/EC on Urban Waste Water Treatment as amended by the Council Directive 98/15/EC and the Regulation of the European Parliament and Council 1882/2003/EC.
- *Certification and accreditation*  
The following laboratories have been accredited and authorised:
  - National Water Reference Laboratory for Slovakia
  - Laboratory for Calibration of Current Meters in line with the Standard STN EN ISO/IEC 17025:2005.

The task of the WRI is also to administer database systems concerning water management in the SR.

Besides projects based on contracts and the Plan of Main Activities, the WRI was dealing with 72 tasks for corporations, enterprises, public administration within the Slovak Republic in the total amount of 14,957 thousand SKK, of which 64 have been finished and 10 of them have been dealt by the end of the following year.

There were totally 21 tasks or signed contracts with foreign customers in the amount of 4,171 thousand SKK.

Water management maps with the scale 1:50,000 were delivered to legal entities and natural persons. The financial resources acquired in the amount of 72 thousand SKK have been used for updates and prints of new water management maps.

Activities of the **Slovak Water Management Enterprise** within the research mainly included:

- Water management plan of Hron river basin – III. Cycle
- Water management plan of Dunajec and Poprad river basin – III. Cycle
- Tasks resulting from the activities of respective working groups according to the Working Plan for WFD Implementation in the SR in accordance with the governmental Resolution of the SR No. 46 as of 21 January 2004 concerning the strategy for WFD implementation (2000/60/EC), which is the updated Strategy for WFD Implementation in the SR for the year 2007 and the following years.
- Tasks resulting from implementation of respective EU legislation, national, European and international standardization, views and statements concerning investment and development projects, territorial documentation of settlements and regions development
- Water Management Balance for 2006 - Basic data concerning water consumers
- Supporting documents for Annual Reports on water management investment constructions and operation in Slovakia for the year 2006 as well as for Water Management Journal 2006

Water management development tasks and studies were focused on water protection including water ecosystems and water depending directly on land ecosystems, enhancing water conditions and environment for sustainable, economic and efficient water use, reducing negative effects of floods and draughts, providing erosion protection measures, measures to increase retention ability of river basin and territorial protection of natural water

accumulation, measures to provide ecological territorial stability, all functions of water courses and water constructions, but also on processing economic analyses and application payments to water consumers.

An important internal development task has been the annual update of the *Examination of Water Courses in Towns and Municipal Residential Areas of the Slovak Republic from the Flood Protection Aspect* based on analysis of natural conditions and socio-technical structure of assessed residential areas and its water courses, by which flood protection measures to be performed have been determined.

Implementing Medium-term Development and Investment Programmes as the *Development and Investment Programme, Public Works Priorities Programme, Flood Protection Programme* as well as short term, annual investment programmes result from the long-term framework programmes which are included in water plans and other water management documents.

The foreign cooperation activities were focused on activities resulting from the measures of respective committees for transboundary waters and governmental delegates for the issues of cooperation at transboundary water courses.

The most important international projects implemented by the SWME in 2007 were:

- DANewBE Data – Digitally advanced New Cross- Border Exchange of data
- Enhancement of flood management and flood protection planning of Hornád basin on the territory of Slovakia
- Cooperation in the water management and environment concerning international agreements on boundary waters
- Elaboration of joint framework of land and water management, review possibilities to carry out respective project elements of the framework in Medzibodrožie
- Ecologic management practices and principles of integration into land and water management in the region Laborec-Uh (in the East-Slovak plain)
- Project initiative INTERREG III B CADSES Programme Neighbouring MOSES – Innovating flood protection system

Besides the mentioned projects SWME participated in the pilot project programme Leonardo da Vinci: Education in water management in virtual training environment.

Research and development activities of the **Slovak Hydrometeorological Institute Bratislava** were focused on the applied research, which was financed by other resources than the state budget. In total investments into research and development provided from the state budget were 1.8 %, from their own resources 1.2 % and from other resources 2.3 % of the current expenditures.

Tasks of SHMI covered primarily from transfer and gains:

- Ground water Resources assessment in Slovakia
- Implementation of the Water Framework Directive

Research projects covered mainly from other than budget resources:

- Twinning project SK05/IB/EN-01 “Establishment of Quality Standards (EQS) for water and Strengthening of Regional and District Environmental Offices for Implementation of Water Control and Monitoring”
- Satellite applications for hydrology – calibration and validation of products, rainfall intensity from polar satellites with use of radio local network of SHMI for August 2006 - September 2007
- Hydro-geological draught and its impact on used amounts of groundwater
- Within the FLOODMED and HYDROCARE projects, which are co-financed by EU within the INTERREG CADSES IIIB initiative, automatic pluviometers and automatic hydrological stations with pluviometers were installed.
- Project Forecasting of impact changes on land use on water courses quantity and quality for a need of integrated water management planning, topic T1: “Creation of database” has been finished.
- The project REBECA, carried out between 2003 and 2006, has been closed from the financial viewpoint.

## **12.2 Education and Environmental Training**

The Ministry of Environment of the Slovak Republic as a governmental body for environment protection within its activities in line with its valid statute supports environmental education and training.

In 2007 within the methodical and instructional activities the Water Research Institute experts prepared the following trainings for the employees of the Slovak Water Management Enterprise, water companies in Slovakia and others:

- Course for Water Managers – 1st level
- Course for Water Managers – 2nd level
- Training Course on Sampling
- Water Measurement Course
- Training Course on Microbiology
- Training Course on Hydro-biology
- Training Course on Radiology

The WRI organised or co-organised the following conferences and workshops:

- How to tackle water scarcity
- Sediments in water courses and water reservoirs
- Geothermal water, its use and disposal
- Conference for water managers in industry
- Water Framework Directive – industry, agriculture, municipalities, public
- TAIEX to the Directive on Urban Waste Water Treatment (91/271/EEC)



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In the consultancy the WRI experts prepared the answers to the questions given by public concerning water management issues published on the website of the Institute ([www.vuvh.sk/faq/](http://www.vuvh.sk/faq/)).

Our experts in radiology participated in the XIV. "Consultancy Days for Water Management Radiology Laboratorian Technicians" in September 2007 in Srní, the Czech Republic.

The **Slovak Water Management Enterprise** supported public environmental education by organising the following activities:

- The World Water Day and Free Entrance Day,
- Expert presentations on radio and TV,
- Press conferences for media,
- Publication activities by employees,
- Opponent's statements (University theses, dissertation theses, scientific and technical tasks, etc.).
- Publication of periodicals (Journal published by SWME, Branch Piešťany "Hlas Váhu - Voice of river Váh")

The Slovak Hydrometeorological Institute created an educational system for their employees by organising educational programmes and trainings.

Based on this The School of Continuous Education near SHMI was founded. The school has its own statute, school order and organises special workshops, assigned for their employees, accredited by the Ministry of Education of the Slovak Republic.

In 2007 fourteen employees of the SHMI were on post-gradual studies, one of them graduated successfully.

Education is financed by their own resources as well as from projects acquired within the competition call of the European Social Fund, where SHMI had won a project for education of employees.

The library of the SHMI is another source to acquire knowledge.

One of the units of the Slovak Environmental Agency is the Centre of Environmental Education and Promotion (CEEP). The environmental education is provided by two CEEP departments in Banská Bystrica: Department of Environmental Education providing public with education on environmental protection.

In May 2007 Department of Environmental Education transformed into the Centre of Programming of Environmental Projects and Environmental Education and obligatory education of state and municipal employees on national level became also one of the activities.

Environmental Education on regional level was provided by the centres of environmental education operating within the territory of the Slovak Republic: Modra, Harmónia, Nitra-Dropie, Banská Štiavnica, Žilina, Teplý Vrch, Spišská Sobota, Prešov, Regetovka, Košice.

The following activities were carried out in the area of environmental education:

- Green School
- Programmes for significant days on environment – environmental calendar
- Coordination, institutional and professional support of geo-parks in Slovakia
- Services of environmental library
- Practical environmental education:

- *At national level*

Some environmental programmes were developed as international or Slovak projects for schools, teachers, pupils, students and generally public” Hypericum, ŠÍŠKA, “Children to Nature” competition, Living Nature – BISEL -BioIndicator at Secondary Education Level, Ecopacks, ProEnviro, Enviro-issues.

- *At regional level carried out by the Centre of Environmental Education within the Slovak Environmental Agency*

Employees of the State environmental protection of the Slovak Republic participated in the international course “Ecohydrological approaches to reasonable use, restoration, management and protection of wetlands”, which was organised in June 2007 in Třebon by the Czech National Committee for UNESCO Programme: “Man and Biosphere” in cooperation with other institutions of the Ministry of Environment of the Czech Republic.

A workshop “*Legal and Financial Tools of Environmental Protection in Slovakia*” organised in November 2007 in Bratislava was focused on wetlands protection.

### **12.3 Publicity and Promotion**

The results of ***Water Research Institute’s*** activities are published in national and international scientific specialised periodicals. The scientific knowledge is also disseminated in form of presentations on domestic and international conferences and workshops or published in collection of abstracts as contributions and posters from these events, e.g. the conference “Sediments of water courses and water reservoirs”, “Geothermal waters, their use and disposal” and “Conference for water managers in industry”.

The part of publication and editorial activity was also: the Report on Water Management in the Slovak Republic, Lists of the Slovak Technical Standards and Branch Technical Standards, Hydro-biological Course Proceedings, Reconstruction of Sewerage Systems and Waste Water Treatment Plants, etc.

The *Water Management Journal* as the only comprehensive water management journal in Slovakia has been prepared and edited in the WRI and published by the Association of the Employers in Water Management in Slovakia.

The publication activities are going to focus more on Internet, the WRI website and direct publishing into prestigious expert journals.

***The Slovak Water Management Enterprise*** within editorial and advertising activities:

- cooperates with expert journals, e.g. Water Management Journal, Enviro-magazine, Water Management Magazine, etc.,
- publishes their own expert materials, e.g. water quality year books, reports on fishing economy, reports on implemented projects e.g Elimination of consequences and precautionary measures of floods in Slovakia, annual company reports, periodic press “Hlas Váhu – The voice of river Váh” and “Hlas Povodia – The voice of River Basin”) and other advertising materials and information,
- promotes presentation activities of its employees at expert conferences and workshops.

In 2007 SWME participated in the following events:

- Danube GIS Forum (Zagreb, Croatia) – “Hydraulics Information to Skippers”, by M. Bačík.
- Danube GIS Forum, First meeting of WP4 (Vienna, Austria) - “Water Level Information (Introduction to Discussion)” by M. Bačík.
- FLOODMED project Workshop – INTERREG IIB CADSES in Bojnice.
- “Mathematical Hydrodynamics model of the river Myjava in HEC-RAS 4.0 Beta: Demonstration of input data, define of boundary conditions, run estimation demonstration of results” by M. Bačík and “Structural Measures and Polders in the Flood Protection Systems” by M. Bačík and P. Virág.
- Preparation of presentation “Water Construction Môťová, effective use of reservoir for drinking water supply” for conference in Zvolen organised in occasion of 50th anniversary of Water construction Môťová put into operation.
- 10th Conference “Ice and temperature regime of water courses and reservoirs” with international participation organised in Banská Bystrica.

***The Slovak Hydrometeorological Institute***

- publishes regularly its own specialised periodicals, year book, news bulletin and assessments, information,
- cooperates with other specialised periodicals and is represented in editorial councils of domestic and foreign specialised magazines,
- supports publication activities of its employees and informs public in all media (TV, press, radio, internet),
- is represented in the Scientific Council as an advisable body to the Institute’s management,
- supports advertising and promotion of its activities by cooperating with primary and secondary schools, Universities, the Slovak Scientific Academy and other research institutes,
- maintains tradition of the Free Entrance Day, contact with public and media,
- organises professional events as workshops, conferences for young hydrologists, water managers, methodical meetings, competitions and particularly a workshop in occasion of the World Water Day, meetings dealing with project solutions, events within the Week of Science in Slovakia and the Danube Day,
- provides standardisation activities including processing of national standards and harmonising them with foreign hydrological standards,

- is a member of the Association of Employers in Water Management,
- is represented in the Slovak Committee for Hydrology,
- cooperates with the Slovak Water Management Enterprise and the Association of Hydrologists in Slovakia.

**The Slovak Environmental Agency** published six editions and two special editions of Enviromagazin, Report on conditions of environment of the Slovak Republic, topical documents concerning educational activities.

The Environmental Education Department prepared part of publication for practical education, published educational documents and information for the project NATURA 2000. This started in August 2007 and contributes to increase of information on significance NATURA 2000 effective protection of respective territories and enhancing of environmental awareness of public.

The Duration of the project is expected 14 months. In 2007 a conference took place, educational activities and promotion materials were prepared. Training activities of professionals and public are planned for 2008.

Promotion activities were also organised by the association ECOMOVE International. The aim was the joint organisation of International Festivals of Environmental Films and presentation of the Envirofilm festival ([www.envirofilm.sk](http://www.envirofilm.sk)) and environmental education in the Slovak Republic.

The members of the Association are festivals:

- Ekofilm, the Czech Republic,
- Okomedia, Germany,
- Green Vision, Russia,
- Earth Vision, Japan,
- International festival of environmental films, Poland,
- International films on natural parks in Sondria, Italy.

## **13 CONCLUSION**

The Strategic aims of the Slovak Republic in water management and development, which are harmonised with the European requirements in this field, are focused on:

- Sufficient amount and quality of drinking water for population and all consumers.
- Sufficient amount and quality of water supply for industry, agriculture, power industry and other purposes as well as services with time provision.
- Purifying and Treatment of all used and polluted water before recycling to water environment.
- Achieving high degree of environmental protection in intentions of sustainable development.
- Achieving appropriate conditions of flood protection in the territories with human settlements, industry, transport infrastructure and intense agricultural production.
- Achieving appropriate conditions of water resources and equipments to avoid damages resulted from draughts.

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The current state of public water supply system is not sufficient. The total number of inhabitants supplied by public water supply system has increased in comparison to the previous year by 330 inhabitants to 4,653.7 thousand, which is 86.2 % of the total number of inhabitants.

According to the “Development Plan of Public Water Supply System and Public Sewage System for the Territory of the Slovak Republic” it is required to provide approximately 53.728 billion SKK for constructions to much worse conditions are in development of public sewage system and waste water treatment systems. The number of inhabitants living in houses connected to public sewage system increased by 39.1 thousand inhabitants to 3,147.0 thousand inhabitants, which is 58.3 % of the total number of inhabitants.

In reference to unfavourable conditions of urban waste water treatment and abstraction it is required to create system of public sewerage system and waste water treatment. The most affected regions will get priority. This approach is in line with the obligations, which the Slovak Republic committed to meet within the negotiations on accession to the EU. They are also part of the National Programme of the Slovak Republic for carrying out the Urban Waste Water Treatment Directive of the Council 91/271/EEC amended by the Directive 98/15/EEC and the Regulation of the European Parliament and Council 1882/2003/EC. The approximate costs of these constructions by the year 2015 are estimated to 52.942 billion SKK (2006 price indication).

In the period 2007-2013, within the operational programme Environment 691.72 million € (approx. 20.838 billion SKK) are assigned for the area of urban waste water, while within the “Programme of flood protection in the territory of the Slovak Republic” flood protection measures are considered with the total amount of 120 million € (almost 4 billion SKK) funded from the EU resources.

Flood protection measures are considered as important for priority constructions. Financially the most complex constructions are made in the regional capital city, but also other towns of the Slovak Republic where a large flood risk persists and possible damages would be very high. It is obvious that besides EU resources, financial means from the state budget and own resources from the water course administrator shall be taken into consideration.

## 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
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

## **Report on Water Management in the Slovak Republic in 2007**

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