# Annual Report 2014

**T. G. Masaryk Water Research Institute, public research institution**

**Prague 2015**

## Index

# Introduction

In 2014, we commemorated the 95th anniversary of the founding of the T. G. Masaryk Water Research Institute, public research institution (Institute). The 2014 year was like previous years characterized by a high level of uncertainty and changes that directly or indirectly affected the Institute. Most of these changes, both inside and outside the Institute, can be characterized as a positive change. The positive changes have a stabilizing character in terms of the further development of water management in the Czech Republic.

Changes occurred at the positions: the Minister of the Environment, all the deputy ministers of the Environment and director of the Water Protection Department of the Ministry of the Environment. The appointment of a new or renewed, Supervisory Board followed these changes. I was appointed director of the Institute for a new five-year period with effect from 1st January 2014. The year 2014 was a turning point in terms of long-term embedding of the Institute in research and development and support of the state administration in water management. Multi-year institutional crisis can now be considered closed.

Many changes occurred in the Institute in 2014. Test laboratories for components of the environment and water technology of the Institute received a valid Certificate of good laboratory practice no. 445 issued by ASLAB (Centre for Assessing Proficiency of Laboratories) according to CSN EN ISO / IEC 17025:2005. The test laboratories also received a Certificate of accreditation issued by Czech Accreditation Institute (CAI): Test laboratory N. 1492 accredited by CAI according to CSN EN ISO / IEC 17025: 2005. Staffing of the Institute is stabilized from the long-term perspective in terms of capacities and in terms of new activities pertaining to the scope of actions of the Institute.

The Institute participated in projects that were supported by the "Environment" Operational Programme in 2014. A new multi-year contract in support of the state administration has been signed with the Ministry of the Environment. The other projects were supported by State Environmental Fund and by other funds: Technology Agency of the Czech Republic, Grant Agency of the Czech Republic, Ministry of the Interior, Ministry of Agriculture, and Ministry of Culture. The Institute also participated in the international projects financed by the European Union, e.g. the collaboration with Saxony partners in frame of the project financed by Goal 3. We succeeded in participation in many commercial contracts and projects (e.g. projects concerning the second cycle of River basin plans). These projects are only one financial source for possible co-financing of research projects. The project Strategy of the Protection against the Negative Impacts of Floods and Erosion Phenomena by the Semi-natural Measures in the Czech Republic started. The Institute participated at many scientific workshops and conferences.

Second informal meeting of experts in water resource management took place in cooperation with Heineken, SWECO Hydroprojekt and VRV in the Institute on 29th May 2014 on the occasion of the 95th anniversary of the founding of the Institute. The experts from different organizations had the opportunity to discuss current issues in an informal atmosphere. We commemorated the anniversary of the Institute within the National Dialogue on Water and other events.

In conclusion, I would like to thank all, who participated in 2014 (just as their predecessors during the 95-year history of the Institute) in maintaining the fact that Water Research Institute, public research institution, performs the function of the national and international research centre in the field of water and waste.

Mgr. Mark Rieder
the director of the public research institution

# 2 Information on Institute Bodies Members and Activities

## 2.1 Institute bodies and their members

a) Director: Mgr. Mark Rieder (appointed as a director since 1st January 2014)

b) The Council of the TGM Water Research Institute, p.r.i.:

Ing. Petr Tušil, Ph.D., MBA (TGM WRI, p.r.i., Ostrava Branch ) – chairman,
RNDr. Dana Baudišová, Ph.D. (TGM WRI, p.r.i., Prague) – deputy chairman,
Ing. Eduard Hanslík, CSc. (TGM WRI, p.r.i., Prague),
Ing. Anna Hrabánková (TGM WRI, p.r.i., Prague),
Ing. Jaroslav Beneš (River Board Povodí Vltavy, state enterprise, Prague),
Ing. Rut Bízková (President of the Technology Agency of CR, Prague),
Mgr. Vít Kodeš (Czech Hydrometeorological Institute, Prague).

Secretary of the Council of TGM WRI, p.r.i., is Ing. Michal Vaculík.

c) Supervisory Board

Ing. Jiří Červenka (Ministry of the Environment of CR, Director of the Department of internal audit and financial inspection) – chairman (until 31th October 2014),
Ing. Jan Landa (Ministry of the Environment of CR, 1st Deputy Minister of the Environment – Director of the Office of the Ministry) – chairman (since 1st November 2014),
prof. Ing. Jiří Wanner, DrSc. (Institute of Chemical Technology, Prague, professor) – deputy chairman,
Ing. Milan Blažek (Ministry of the Environment of CR, Director of the Department of Budget, until 1st December 2014),
doc. RNDr. Jakub Hruška, CSc. (Czech Geological Survey, research scientist),
Mgr. Jakub Čurda (Ministry of the Agriculture of CR, Head of the Water Management policy Department),
Ing. Roman Dvořák (TGM WRI, p.r.i., the head of the Centre for Assessing Proficiency of Laboratories – ASLAB).

Secretary of the Council of TGM WRI, p.r.i., is Ing. Jan Rykl from TGM WRI, p.r.i.

## 2.2 The Report on activity of the Council of the TGM Water Research Institute, p.r.i., in 2014

The members of the Council of the TGM Water Research Institute, public research institution (TGM WRI Council), have not changed in 2014.

Six meetings of the TGM WRI Council took place in 2014. The most important conclusions of these meetings were as follows:

- TGM WRI Council approved the adjustment of the organizational protocol of TGM WRI, p.r.i.
- TGM WRI Council discussed and approved the 2013 Annual Report in accordance with section 18, article (2), letter e) of Act No. 341/2005 Coll., about public research institutions, as amended.
- TGM WRI Council approved proposed budget of the institute for the 2014 period in accordance with section 18, article (2), letter e) of Act No. 341/2005 Coll., about public research

institutions, as amended. The budget was created as a balanced. The investment plan was also approved.

- Mgr. Mark Rieder was appointed the director of the Institute by the Minister of the Environment Mgr. Tomáš Jan Podivínský with effect from 1st January 2014.
- During 2014, the TGM WRI Council was briefed on the progress of work on the preparation and processing of medium-term strategy of the Institute for the period 2015–2020.
- Proceedings are made from every meeting. After ten days of approval procedure by members of the TGM WRI Council the proceedings are at disposal to all employees in the internal information database of the Institute.

The third year of activity of the newly elected TGM WRI Council was relatively administratively calm according to its rights and duties which were given to the Council by Act No. 341/2005 Coll., about public research institutions, as amended, in comparison with previous years. The main reason was the appointment of Mgr. Mark Rieder the director of the Institute with effect from 1st January 2014.

TGM WRI Council fulfilled all its duties in 2014. The duties are defined by the above mentioned act. TGM WRI Council also dealt with current status and development of selected economical parameters of the 2014 at each meeting.

## 2.3 The Report on activity of the Supervisory Board of the TGM Water Research Institute, p.r.i., in 2014

In 2014, changes have occurred in membership of the Supervisory Board: Ing. Jiří Červenka was recalled on 1st November 2014 and 1st Deputy Minister of the Environment Ing. Jan Landa was appointed the chairman. Ing. Milan Blažek resigned from the Supervisory Board with effecte from 1st December 2014.

In 2014, two meetings of the Supervisory Board took place on 20th May and 21st November. Director of TGM WRI, p.r.i., Mgr. Mark Rieder participated in all meetings.

The Supervisory Board, after discussion, considered:

- the Draft of 2013 Annual report and recommended its approval by the Council of TGM WRI, p.r.i.,
- results of economic activities of TGM WRI, p.r.i., in 2013 that are described in 2013 Annual Report with no objection.
- the Draft of the budget of TGM WRI, p.r.i., for 2014.

The Report on activity of the Supervisory Board of the TGM Water Research Institute, p.r.i., in 2013 was processed and transferred to be included in 2013 Annual Report.

The Supervisory Board presented the Report about its seventh year of activity (from 1st June 2013 to 31st May 2014) to the founder and to Mgr. Mark Rieder within the meaning of paragraph 19 article (1), letter l) of Act No. 341/2005 Coll., as amended.

The Supervisory Board also dealt with current issues of TGM WRI, p.r.i., activities, e.g. the project Strategy of the Protection against the Negative Impacts of Floods and Erosion Phenomena by the Semi-natural Measures in the Czech Republic, economic issues in 2014, the preparation of the budget for 2015 and events organized in connection with the 95th anniversary of the Institute.

# 3 Profile of the Institute

TGM WRI was included to the Register of public research institutions, administered by the Ministry of Education, Youth and Sports, on 1 January 2007.

The activities of the Institute are based on the founding deed of the public research institutions given by Provision No. 12/06 of the Ministry of the Environment from 12 December 2006, as amended by Provision No. 2/11 of the Ministry of the Environment on publication of the full wording of the founding deed from 31 May 2011.

Authorities of the Institute according to Article 16 of Act No. 341/2005 Coll., as amended, are as follows:

■ The Director is an official representative competent to make decisions within the framework of the public research institution, with the exception of issues in competence of the Council of the Institute, the Supervisory Board or the founder of the Institute;

■ Council of the T. G. Masaryk Water Research Institute, public research institution;

■ Supervisory Board of the T. G. Masaryk Water Research Institute, public research institution.

The main mission of the Institute is:

- the research of the status, use and changes of water ecosystems and their linkages with landscape and related environmental risks; waste and packaging management,
- professional support of the water protection; prevention of flood risks and waste and packaging management based on the above mentioned research.

Activities of TGM WRI are categorized into main activity and additionally activity according to the founding deed.

The main activity includes

■ hydrological, hydrogeological and hydraulic research ■ research of water resources, protection of water and protection of river basins ■ research in water chemistry, toxicology and radiology ■ research in water biology and microbiology ■ research of processes caused by water pollution and elimination of pollution ■ research of the status of water and water bodies and protection of aquatic ecosystems ■ research of methods for identification and evaluation of water status ■ research of ecological relations of water in a landscape ■ research of monitoring methods, field measurements and sampling techniques including technical instruments ■ research of methods in analytical chemistry including technical instruments ■ research of methods for information processing, development and use of databases including geographical information systems ■ economic research in relation to water and its use as a component of the environment ■ research in remediation of river systems and aquatic remediation of damaged landscape ■ research for selection of water biotopes suitable for renewal or remediation and management of databases of relevant sites ■ research for protection against harmful impacts of water ■ research in water management planning, water balance and use of water ■ research in waste management, composition and quality of waste, including dangerous waste and its impact on aquatic environment ■ research of risks of landfills and contaminated sites for the water environment ■ research of management of packaging and packaging waste ■ research, development, application and evaluation of technological methods for waste management including assessment of waste production and waste management ■ development of research infrastructure.

Within its additional activity the Institute ensures

■ expert opinions, positions, assessments and analyses in the area of the main activity ■ observations, field measurements, sample analyses, chemical analyses in the area of the main activity ■ international cooperation, activities in a framework of relevant thematic strategies in the area of the main activity ■ cooperation with universities, institutes of the Academy of Sciences and other research institutions in the area of the main activity ■ publishing and dissemination of information in the area of the main activity ■ proposing of parameters of good ecological status of water ■ proposing of programmes for reduction of pollution of surface water by dangerous harmful substances and priority dangerous substances ■ assessment of sensitive and vulnerable zones, as well as surface water suitable for life and reproduction of native fish species and other aquatic fauna, protected areas of natural accumulation of water and bathing surface water ■ proposing and monitoring of areas of natural accumulation of water in the area of the main activity ■ proposing protection measures for water resources ■ maintaining registry of watercourses and water reservoirs, protection zones of water supply reservoirs and water supply groundwater resources ■ maintaining thematic water management cartography ■ assessment and evaluation of surface water and groundwater regime in relation to status of use of water resources ■ determination of minimum residual flows and minimum groundwater levels ■ expert support to preparation of district river basin management plans ■ operation of reference laboratories for all components of the environment ■ proficiency testing of hydroanalytical laboratories for chemical, biological, microbiological, toxicological and radiochemical analytical methods and organizing intercalibration laboratory testing in the area of the environment ■ methodological guidance for hydroanalytical laboratories and unification of their practices ■ expert support to prevention of major accidents involving chemical substances and preparations ■ participation in operating the permanent and emergency component of the national radiation monitoring network ■ development and operation of the evaluation system of status and potentials of water bodies and reference conditions of water bodies ■ establishment and operation of monitoring network for observation of surface water and groundwater except their quality ■ strategic and organizational provisions of activities for evaluation and assessment of status of surface water and groundwater ■ maintaining and updating registries of water of public administration information system ■ assessment of technologies and evaluation of operation of technological installations for water treatment and wastewater treatment ■ evaluation of effectiveness of remediation measures of river systems ■ expert support to the international cooperation of CR within the framework of bilateral and multilateral agreements and conventions in the area of water protection ■ preparation of background documents necessary for meeting the obligations towards the European Union and documents included in reports on implementation of directives in the area of water protection and waste management according to the requirements of the European Community ■ evaluation of waste management methods for individual waste types ■ operating the waste management information systems and maintaining registry of production and management of waste and packaging ■ evaluation of analytical methods and quality of waste, evaluation of efficiency of waste treatment technologies including dangerous waste ■ carrying out the function of the National inspection authority for good laboratory practice ■ expert support to updating and evaluation of waste management plans ■ provision of information on the status of the environment in the area of waste management ■ carrying out the function of the expert institution for professional and registering activities■ operating the calibration center for hydraulic measurements ■ carrying out the function of the center for evaluation of competency for calibration of measuring instruments for water discharge in conditions of free water level ■ operation of a Testing laboratory for water management equipment.

Apart from the above listed functions, the Institute carries out also other activities according to Provision No. 12/06 of the Ministry of the Environment in compliance with the relevant Trade Certificates.

# 4 The Activity of TGM Water Research Institute, p.r.i., in 2014

Research activities of the Institute take place primarily as a part of the main activities of the Institute, with significant contribution of supplementary and other activities as specified in the Founding Deed of the Institute.

The research activity of the Institute encompasses mainly the issues of research of the status, usage and changes of water ecosystems and their relations in landscape and connected environmental hazards, protection of the hydrosphere, flood prevention and waste and packaging management. Other important projects include a research of water quality, aquatic environments, use of water, and development of comprehensive proposals aimed at improvement of water quality and functioning of aquatic ecosystems. The overview of the most important projects is presented in the following description of activities of individual research branches.

**Branch of Hydraulics, Hydrology and Hydrogeology** was oriented in 2014 similarly as in the previous years (besides basic areas delimited by scientific disciplines in its name) on issues of environment protection. The branch focused mainly on the contract Review of Groundwater Resources in the Czech Republic: Hydrological Part (Activities 2, 3, 4) and Geological support for the Hydrogeological Research (Area 3).

The Department of hydrology deals with issues of climate change impact on water regime and water resources in the Czech Republic. The department focused on mitigation of climate change impacts in the frame of several projects. In 2014, three important research projects were successfully finished: Proposal of a System for Managing Emergency Situations Associated with Drought and Water Scarcity in the Czech Republic (Ministry of Interior), Sustainable Use of Water Resources under Condition of Climate Change (the Technology Agency of CR, TA CR) and The Support of Long-term Planning in Water Management Sector in Context of Climate Changes (TA CR). Other important project is supported by TA CR and will be finished in 2015 (Ensuring the Quality of Drinking Water Supplied to Small Municipalities from Local Sources). The project Compensation of Negative Climate Change Impacts on Water Supply and Ecosystems Using the Localities for Potential Accumulation of Surface Water (TA CR) started in 2014.

The Department of hydraulics focused on project Review of Groundwater Resources in the Czech Republic and The Study on the Possibilities of Enhanced Retention Effects of the Nechranice Reservoir. The project Development of a Tool and Methodology for Continuous Measurements of Snow Water Equivalent in the Field (TA CR) was successfully finished. The project was focused on the development of a field measurement device, its comprehensive testing in various types of terrain and vegetation cover conditions and creating a methodology of installation and handling the device to measure the snow water equivalent. The Technology Agency then ordered the new project: Increasing the Safety and Reliability of Culverts with Regards to the Transfer of Flood Flows. The department also participates in the project financed by the Grant Agency of the Czech Republic (Headwaters Retention Potential with Respect to Hydrological Extremes) and in the project financed by COST programmes (Uncertainties in Water Footprint and New Way of Work with the Predictions of Climate Models).

The Department of groundwater protection processed the sub-basin district plans in the Czech Republic with focus on the part “groundwater”. Geological Activity for the Hydrogeological Survey in Area 3 continued in 2014. The project Assessing Water Quality Improvement Options Concerning Nutrient and Pharmaceutical Contaminants in Rural Watersheds (Aquarius) started in the end of 2014. The project is financed by Norway Grants.

The Department of hydrogeology and contaminated sites dealt with i.e. border groundwaters. The research is going on in cooperation with Poland and Saxony respectively. The cooperation with

Saxony is mainly in the frame of the GRACE project which is supported by EU funds. The GRACE project is focused mainly on the issues of groundwater quantity in two selected transboundary areas.

The Czech Calibration Station for Current Meters (accredited laboratory) provided the calibration of current meters and other measuring instruments including atypical ones.

**The Reference Laboratory for the Environment Components and Waste** of TGM WRI, p.r.i., is one of the two units of Test laboratories for components of the environment and water technology of TGM WRI, p.r.i. The Test laboratories received a valid Certificate of good laboratory practice no. 445 issued by ASLAB (Centre for Assessing Proficiency of Laboratories) according to CSN EN ISO / IEC 17025:2005. The Test laboratories received also a Certificate of accreditation issued by Czech Accreditation Institute (CAI): Test laboratory N. 1492 accredited by CAI according to CSN EN ISO / IEC 17025: 2005.

Reference Laboratory for the Environment Components and Waste of TGM WRI, p.r.i., consists of four departments, which are able to provide a variety of common and special analyzes in various types of matrices.

The Department of hydrochemistry focused mainly on the project Determination of the Amount of Illicit Drugs and Their Metabolites in Municipal Wastewater – New Tool for Obtaining of Complementary Data on Illicit Drug Consumption in the Czech Republic (Dragon). The department continued in the project New Drugs – Market Analysis, Epidemiology of Use and Identification of Preventive and Harm Minimization Strategies. The project is focused on so-called new synthetic drugs. New methods for determining residues of selected pesticides in hop were introduced and accredited. The department provided the analyses of samples for the other units of the Institute and also for external costumers.

The Department of microbiology continued in projects supported by TA CR: Optimization of Method for Detection of Assimilable Organic Carbon by Optic Detection, Water Recreation – Bathing in Bathing sites and Other Freshwater Bodies in collaboration with the Branch of Water Protection and Informatics.

The Department of hydrobiology participated in the project focused on the project Research on Intensification of Outdoor and Small Wastewater Treatment Plants by Non-capital Funds (TA CR) and the project The Development of Cyanobacteria during the Bathing Season 2014 (costumer: Statutory city of Jablonec nad Nisou).

The Department of radioecology dealt with the studies focused on occurrence and behavior of natural and synthetic radionuclides below a source of pollution.

Reference radiological laboratory performs the activities of the permanent component of the national Radiological Monitoring Network in the normal and emergency radiological situation in cooperation with the River Boards, state enterprises; the activities are based on a contract between Ministry of the Environment and the State Office for Nuclear Safety.

The traditional activity of the **Branch of Water Protection and Informatics** is annual preparation of Summary water balance assessment of the main river basins of CR according to the Decree of Ministry of Agriculture No. 431/2001 Coll., which provided the results of the analysis of the use of water resources and the water use requirements in terms of quantity and quality in spatial units that are not covered by the water management balances by the River Boards, state enterprises. Another activity was the preparation of documents for the Ministry of the Environment to the Report on Water Management in the Czech Republic. The two projects supported by the OMEGA TA CR programme continued: Introduction of New Market-based Tools to Increase the Efficiency of the Surface Water Allocation (IREAS–TGM WRI) and Regulation of Public Services in Water Management with Emphasis on Drinking Water Supply and Sewerage Sector (Czech University of Life Sciences, CULS–TGM WRI).

The project Jointly Used Groundwater on the Czech-Saxony Border (GRACE) was completed in 2014. The project has been supported by European Regional Development Fund via Goal 3 Program for support of cross-border activities between the Czech Republic and the Free State of Saxony. The Branch participated in the projects for the government administration concerning the collaboration in International Commission for the Protection of the Elbe River and collaboration with Germany on transboundary waters in Saxony section of country borders.

The Department of GIS and cartography carried out following projects: Water Recreation – Bathing in Bathing Sites and Other Freshwater Bodies (TA CR), Support of the Reporting: International Commission for the Protection of the Elbe River (ICPER), International Commission for the Protection of the Danube River (ICPDR) and International Commission for the Protection of the Odra River against Pollution (ICPO), Bathing Waters Reporting: Update of the List of Identified Bathing Waters (Ministry of the Environment of the Czech Republic), Updating of Water Resource Protection Zones, Accuracy Classification for Existing Delimitation of Flood Plain Areas in the Czech Republic, and Implementation of the Results in the Flood Plain Areas Delimitation Methodology. The department also operated data storage and provided operative technical support of users while working with the GIS platform.

The HEIS department focused on support of research projects of the Institute including the support of public administration concerning informatics. The support is mainly via development and operation of the Hydroecological Information System (HEIS VÚV). The department staff participated in the project Emissions and Their Impact on Water Environment, in support of the state administration (the operation and publishing of data of selected databases of ISVS-VODA information system) and preparation of reporting for EC according to the Water Framework Directive.

In 2014, **Branch of Water Technology** focused mainly on several projects obtained in tenders (Technology Agency of CR, Ministry of Interior of CR). The branch also focused on the commercial projects for manufacturers of waste water treatment plants.

The project A Safety Assessment of the Emergency Infrastructure Components – Drinking Water was successfully finished in December 2014 in accordance with the set timetable. The project was coordinated by the Cityplan, s r.o., company and supported by the Ministry of Interior.

In the project Alternative Sources of Water in Municipalities during the State of Emergency – Exploitation of Original Local Sources and Springs field and laboratory activities of case studies in selected municipalities (Decin, Brno, Plzen and Praha) were finished. The certified methodology was prepared and monograph on these issues was given to the press. The handbook for representatives of local authorities (mayors) was prepared by the project. The project was extended to 2015 because of the suspension of the project during 2014.

The research project for the Technology Agency of CR, which focused on testing options for efficient non-investment intensification of small and rural waste water treatment plants by using bioactive preparations, was finished in December 2014. The methodologies (main output of the project) were sent for certification to the Ministry of the Environment.

The project focused on the solution of extraordinary effective waste water treatment using combination of technological elements (TA CR) continued in 2014. The retention experiment started in 2014. The aim is to describe the influence of the accumulation of waste water to the total cleaning efficiency. The monitoring of influence of final treatment pools on overall effectivity of the treatment also continued. Three biological final treatment pools were put into operation at three pilot localities. The waste water is treated in domestic water treatment plants at these localities. The pool experiments continued in the Institute. Many modifications and sizes of reservoirs and their effect on the overall cleaning efficiency were tested.

Assessment and consolatory activity verifying the suitability of technologies and sampling and analysis of water and sludge were main activities carried out by the Branch for private entities.

In 2014, the Testing Laboratory for Water Technology and Environment Components (formerly Testing Laboratory for Water Technology) continued working in similar extent as in previous years. The Laboratory is accredited according to the standard CSN EN ISO/IEC 17 025 by the Czech Accreditation Institute under the number 1492. The reference Laboratory for the Environment Components and Waste and Testing Laboratory for Water Technology and Environment Components were merged into one organizational unit with effect from 1st July 2014. The merged laboratory was assessed by ASLAB and reaccredited by the Czech Accreditation Institute.

The Testing Laboratory of Water Equipment (a part of the Testing Laboratory) carried out tests of the effectiveness of small wastewater treatment plants for the purposes of their certification in 2014. The testing was carried out according to the procedure laid down in the CSN EN 12566-3+A2 standard. Other tests of water management facilities were carried out. Some wastewater treatment plants were tested by the procedures reflecting the client requirements. In 2014, the tests of light liquid separators were carried out (procedure laid down in standard CSN EN 858-1, chap. 8.3.3 + change A1). The grease trap testing was carried out according to the procedure laid down in the CSN EN 1825-1 standard, chap. 8.5.

In 2014, the **Brno Branch** focused on a broad spectrum of issues with special reference to the floods issues. The researchers carried out the expert support of flood risk mitigation. Specifically, they provided expert support in collaboration with the Faculty of Civil Engineering of the Brno University of Technology concerning the reduction of flood risks to the Ministry of the Environment. The project Flood education and research centre was successfully completed. The project was supported by the Ministry of Education, Youth and Sports. The Department of water management participated in the preparation of documents for updating the Decree of the Ministry of the Environment No. 263/2002 Coll., on the method and scope of drafting and determining the flood plain areas. The project Strategy for Protection against Negative Impacts of Floods and Erosion Phenomena by Nature-friendly Measures in the Czech Republic was launched in mid-2014. The project has been financed by The Operational Programme "Environment".

The project Identification of Significant Areas with Cultural and Historical Values Threatened by Natural and Anthropogenic Stresses is supported by the Ministry of Culture. The project objective is to evaluate the size of threat for selected categories of historical objects (Cultural Heritage Objects and UNESCO objects). The project is carried out in collaboration with the National Heritage Institute and experts from other organizations (Transport Research Centre in Brno, Czech Geological Survey, and Mendel University in Brno). In 2014, the manuscripts of scientific papers have been prepared and draft of methodology and preliminary results were presented at the conference "CheriScape – Cultural Heritage in Landscape" (Amersfoort, the Netherlands).

The objective of the project Inundated Cultural and Natural Heritage of Southern Moravia is to evaluate the historical, social, cultural and ecological continuity of the areas which were totally changed by river engineering. The project deals with the most important localities of river engineering in Southern Moravia – Nové Mlýny water reservoirs system, Vranov and Brno water reservoirs – and is supported by the Ministry of Culture.

Other important research is focused on issues related to waste water treatment including development of new technologies and optimization of technologies that are already used.

In 2014, the collaboration with several companies operating in the Czech Republic and abroad successfully continued. The branch also collaborated with water management and chemical institutes of the Brno University of Technology.

The project Assessment of Agricultural Land in the Areas of Former Fishpond Systems with the Aim of Supporting Sustainable Management of Water and Soil Resources in the Czech Republic is carried out in cooperation with public universities. It is focused on the review of historical development of occurrence of fishponds in CR and the potential of their renovation. The browser-based presentation of the project results is available to the public since 2014. A certified map of

historical and former fishponds in the territory of the Czech Republic since 2014 (http://heis.vuv.cz/projekty/historickerybniky/default.asp) is the main result.

The staff of the branch also ensured the tasks arising from the activities of the committees focused on cooperation in transboundary waters with the Slovak Republic and Austria. Simultaneously, they ensured the expert support to the participation of the Czech Republic in the International Commission for the Protection of the Danube River.

In 2014, the commercial activities were focused on consulting in the field of using the artificial wetlands and extensive water treatment technologies, the operation of such type of waste water treatment plants and impacts of discharged water on water quality in recipients. The clients were local authorities, NGOs, design companies and general public.

Cooperation with universities in Brno continued in education of students and lecturers. The cooperation followed up completed projects and was also carried out in running research projects. The research results were presented at many events in the Czech Republic and abroad for members of scientific community and for the state administration and local authorities.

The branch also participates in the project Drying out of Streams during Climate Change: Prediction of Risk and Biological Indication of Drought Periods as a New Methods for Water Resources and Landscape Management (TA CR). The objective of the project is to create a map of the watercourses complete dry-out vulnerability based on model of abiotic data and to develop the retrospective method of the complete dry-out events identification. The method is based on taxonomic and functional analysis of macrozoobenthos.

Following the completed project Methodology of Assessment of Biological Component Benthic Invertebrates for Big Unfordable Rivers, the methodical procedure on sampling and assessment of benthic Invertebrates biological component was submitted to certification. The methodical procedure respects the requirements of Directive 2000/60/EC. The branch participated also in other projects.

The expert activity of the **Ostrava Branch** is focused mainly on participation in all available public tenders in the field of science and research. Thanks to that, a wide range of projects is carried out according to the requirements of contracting authorities (Technology Agency of the Czech Republic, Grant Agency of the Czech Republic, the Ministry of the Interior, the Ministry of Agriculture and Ministry of Education, Youth and Sports).

The branch carries out the tasks for the state administration; specifically the tasks on water management issues and waste management according to the requirements of the founder (Ministry of the Environment).

The NAVARO project (Development of Tools for Early Warning and Response in the Area of the Protection of Surface Waters) was completed in 2014. The main output of the project is the certified methodology.

Since 2014, the Ostrava Branch participates in the project Discover the Secrets of Science. The aim of the project is to popularize natural sciences and to transmit the results of science, technology and new technologies into practice.

The project Documentation, Passportization, Archiving and Conversion Proposals of Chimney Water Reservoirs as Endangered Group of Industrial Heritage Sites in the Czech Republic continued in 2014. Locations of existing and non-existing smoke stacks with reservoirs in the Czech Republic were determined. For the nine constructions, a complete structural and historical survey on the spot was carried out. Furthermore, photographic documentation of these objects and update construction documentation was created. The beta version of a specialized map of smoke stacks with water tanks was created and presentation of the achievements for professional and general public took place.

The employees of the branch participated also in following projects of the Institute: Development of Technologies for the Road and Other Paved Areas Storm Water Runoff Cleaning, Determination of the Amount of Illicit Drugs and Their Metabolites in Municipal Wastewater – New Tool for Obtaining of Complementary Data on Illicit Drug Consumption in the Czech Republic, Phosphorus in Catchments, Cost-appropriateness Evaluation of Ensuring a Good Status of Water (TA CR OMEGA) etc.

**The Centre for Waste Management** finished the project Possibilities of Using Information and Resources of Waste Management Data as Tool for Identification and Solution of Unauthorized Waste Management in 2014. The certified methodology for Solution of Unauthorized Waste Management has been created. The aim of the project was to show possibilities of using information and resources of waste management data as tool for identification and solution of unauthorized waste management. The project was successfully completed, including the final inspection by contracting authority.

The project The Analysis of Material Flows of Waste Electrical Equipment and Possibilities of Increase of their Recycling and Reuse was also completed in 2014. The project was supported by the BETA programme of TA CR. The project objective was a detailed analysis of material flows of waste electrical equipments using the monitoring of current collection and processing of electric and electronic equipments.

The methodological instruction for calculation of the mass of the production of waste electrical and electronic equipment in the Czech Republic has been created. It contains xls file for the calculation. Utilization of the calculation described in the methodological instruction (and used for these purposes in other EU member states) simplifies the verification of the origin of electrical products.

Simultaneously, the supporting document for the update of registration of electric waste in Decree No. 352/2005 Coll. has been prepared.

The branch also prepared (as every year) the project proposals for participation in public tenders. New expert knowledge has been received at expert waste forums. The results obtained by research have been confronted with works by other experts. The representatives of the Centre for Waste Management were working in important professional organizations, e.g. Council for Waste Management or Technical Working Group for Waste Processing.

**The Branch of Applied Ecology** launched a project focused on protection of *Margaritifera margaritifera* in the catchment of the Vltava River. The project is carried out in frame of the long-term collaboration with the Šumava National Park. The branch is responsible for mapping of occurrence of the species, bioindicative tests in situ and ex situ, monitoring of water quality and evaluation of the influence of the number of visitors on the species.

The mapping of the bivalves (e.g. *Unio Crassus*) and wetland molluscs (e.g. *Vertigo angustior*) of European importance continued in 2014. The branch also participated in the research project focused on the final treatment of waste water (methods and biology parts). The project results are useable mainly in protected areas.

The project Erosion Washout: Increased Possibility of Danger for Population and Water Quality in Connection with Expected Climate Change is carried out in collaboration with the Czech Technical University in Prague (started in 2012, supported by Ministry of the Interior). The project focuses on the modeling of critical points in the area of the Czech Republic, where the municipalities, critical infrastructure and water and terrestrial ecosystems are threatened by soil erosion and sediment transport. The sites threatened by erosion under current conditions were modeled. The data for modeling with considering the influence of climate changes have been prepared.

The projects supported by TA CR continued in 2014. Methodology for evaluation of the influence of the pollution sources on the eutrophication in water reservoirs was completed and submitted for certification.

The next project is focused on the technical parameters of wooden structures and anti-erosive measures in streams. Different types of proposed wooden structures were tested on the physical model of a river channel. Their stability and impact on changes of channel during the different flow regimes were monitored.

The Analysis and Solutions of the Environmental Risks of Operation of Small Hydropower Plants in Connection with Water Organisms project was completed by proposal of a solution that would minimize the risks associated with the operation of small hydropower plants. The proposal is a part of a published methodology.

The project supported by the OMEGA programme of TA CR focused on evaluation of benefits connected with improving the ecological and chemical status of water bodies and on using of these benefits while proposing exemptions from the requirements of the Water Framework Directive. Next project supported by OMEGA TA CR is focused on evaluation of future water needs regarding the expected socio-economic changes.

Extensive survey on wastewater handling has been carried out for River Board Povodí Vltavy, s.e., in the catchment of the lower Sázava. The evaluated data were processed in form of GIS layers and detailed text reports.

The study on improvement of water quality in the Vranov – Frainer Thaya/Vranovská Dyje has been carried out in collaboration with Pöyry Environment. The two main tributaries in the Vranov Reservoir have been monitored by using automatic samplers. The survey of important point sources in the catchment has been prepared. The input data for calibration of the simulation model of the catchment have been processed.

**ASLAB – Centre for Assessing Proficiency of Laboratories** is a part of TGM WRI, p.r.i. ASLAB is authorized in accordance with the mandate of Ministry of the Environment to carry out the state delegated powers:

- Organization of intralaboratory proficiency testing in the field of environmental laboratory analyses,
- Assessment of professional competence of hydro-analytic laboratories in the area of environmental research and protection in accordance with the quality management system CSN EN ISO//IEC 17025 and
- Acting as a National Inspection Authority on good laboratory practice in the area of chemical substances and chemical preparations in accordance with the Act No. 350/2011 Coll. and Regulation No. 219/2004 Coll., as amended.

Significant proportion of ASLAB activities falls to proficiency testing (PT) that forms the fundamental level of external supervision over hydro-analytic laboratories. In 2014, 290 laboratories from CR and Slovakia participated in the testing. ASLAB organized 7 PT projects in chemistry and radiology in 2014. 252 laboratories participated. Three projects in biology were organized and 38 laboratories participated.

ASLAB continues to new and prepared legislation with new testing methods or reference to such methods and creates the methodologies of proficiency testing in these new areas with aim to implement them in programmes of ASLAB. ASLAB prepares the laboratories for the changes that follow from the new or updated legislation.

ASLAB granted Certificate on Good Laboratory Practice to 12 newly assessed laboratories in 2014. 51 such certificates were in force by 31st December 2014. In the area of good laboratory practice, ASLAB checked by 31st December six testing devices.

ASLAB activities include also cooperation in developing of new regulations of the Ministry of the Environment, technical standards and documents concerning the assessment of laboratories. The objective is support of the state administration, evaluation of data created by ASLAB activities and to transmit data created elsewhere in the activities of ASLAB. ASLAB produces technical reports on all its activities. The reports are stored in the archive of ASLAB.

In the context of its activities the T. G. Masaryk Water Research Institute, p.r.i., also participates in public tenders and seeks opportunities to apply the expertise of its divisions. TGM WRI participated in the public competitions from one provider with a total of 46 of the proposed projects in the framework of the announced tenders and programmes realized according to Act No. 130/2002 Coll. The Institute succeeded with 16 projects (34.8% success).

In 2014, 74 business opportunities were found on the internet. The opportunities were proposals of commercial contracts based on different calls and public procurements. Nine proposals have been prepared after consultation and three contracts have been obtained. Other possibilities of obtaining the projects from direct offer besides these found by the specialized department were discussed by research managers.

TGM WRI, p.r.i., was awarded the certificate of conformity of quality management system with the requirements of CSN EN ISO9001:2009 in the subject area covered by the activities provided for in the founding deed in 2011. That is very important for winning projects. Implementation of quality management system improved effective management which is reflected in increased effectiveness of investing of means and sources and improvement of customer services. A significant contribution to improving the process management has customer communication and the targeted feedback. The feedback is a source of information that allows bettering of meeting needs of customer. In 2014 all internal regulations regarding quality systems were reviewed (marked Q). Eleven internal regulations were updated and presented to the new edition (there are 39 internal regulations in total). The "Quality Policy" (Q / V / S004), which continues to define the overall intentions and direction of development in terms of quality, will be amended in 2015.

Evaluation of results of research projects and research and development projects and other projects and contracts for 2014 is based mainly on eligible research results in the RIV (Czech Registry of information on research outputs) database, but also other important outputs of expert activities.

## 4.1 Main Activities

### 4.1.1 Publications in Journals

In 2014, the employees of the Institute were authors or coauthors of 41 contributions in scientific journals. The absolute majority of the other contributions were published in peer reviewed journals. Six contributions were published in journals with IF (e.g. Biologia, Journal of Hydrology and Hydromechanics, Hydrological Processes etc).

### 4.1.2 Monographs

The monographs published in TGM Water Research Institute in 2014: Kult, A.: History of Legal Relations to Waters in the Area of the Czech Republic I – until 1253; Mattas, D.: Computation of discharge in open channels; Pavelková, R. et al.: Small water reservoirs (ponds) in the Czech Republic: comparison of the present situation with the state in the 2nd half of the 19th century; Czech-German two-volume publication Grundwasserressourcen im tschechisch-sächsischen Grenzgebiet I. Gebiet Hřensko–Křinice/Kirnitzsch and II. Gebiet Petrovice–Lückendorf–Jonsdorf–Oybin. The employees of the Institute participated in another two publications and in processing of chapters in two monographs published e.g. by the Imperial College Press London publishing house.

### 4.1.3 Results with legal protection and technically implemented results

In 2014, many technically implemented research results have been created in the Institute. A patent was granted to the *Device and method for the physical treatment of waste*. The invention relates to a device and procedure for the physical treatment of materials, particularly of waste in solid form, by physical factors of degradation of materials.

Furthermore, the three utility models were registered. *Kit for collecting sediment from dried-up bottom* – this technical solution is focused on sampling of sediments, primarily from dried-up bottom, exposed banks of streams or pools, beds of gravel etc.; *Semi-automatic sampler of percolation* – sampler allows setting and sampling of water mainly from the pilot plant and experimental artificial wetlands, settling and retention tanks or filtration devices; *Hanging device for sampling of surface runoff* – the sampling device allows to sample passively the sufficient amount of surface runoff depending on the current precipitation development, the device can be used similarly to collect samples from retention reservoirs.

The prototype of a *Tool for measurement of snow water equivalent with a floating frame and an integrated device for measuring the percolation* is based on measuring the weight of snow with floating inner frame and an integrated device for measuring the percolation. The device allows obtaining continual observation data even in case of occurrence of adverse properties of snow layers. It is very easy to operate.

Two functional samples were created: *AOC turbidimeter* – the device for determination of assimilable organic carbon (AOC) in water supply systems using optical detection and *Model of innovative storm water settling tank* – the model of such tank was designed and created using mathematical modeling. The model is usable for testing of effectivity of mechanical pretreatment of runoff water and detention of oil products.

The pilot plant *The mechanical pretreatment of surface runoff* allows testing the mechanical pretreatment of real runoff from paved surfaces and roof constructions; equipment was placed in Brno branch with a connection to the real runoff from the roofs.

### 4.1.4 International cooperation in research

The project Jointly Used Groundwater on the Czech-Saxony Border (GRACE) ended in 2014. The objective of the GRACE project was the protection of water sources and identification of causations of dropping of groundwater levels in two cross-border areas: Hřensko–Křinice/Kirnitzsch and Petrovice–Lückendorf–Jonsdorf–Oybin. Common strategies of protection of groundwater in the two areas are the outputs of the project. The project was supported by the European Regional Development Fund via Objective 3 Programme for support of cross-border activities between CR and the Free State of Saxony.

Critical Source Areas of Phosphorus in Watersheds as the Decisive Factor of Transport – this is a project of American-Czech cooperation. The project objective is research of leaching of phosphorus from agricultural land and/or diffuse pollution leaching from small municipalities and buildings with insufficient removal of sewage.

Other international activities were e.g. cooperation with the German Federal Institute of Hydrology (BfG) in Koblenz at homogenization of flow time series for selected sites on the Elbe River, organization of the International popularization workshop – Water and water resources management with participation of Slovak and Polish experts and collaboration with the University in Koblenz-Landau on organizing a course focused on the biology of springs.

### 4.1.5 Presentation at international meetings of experts

The employees of the Institute participated in the international experience exchange. They participated in organization of international conference MinWat 2014, Mineral Waters Genesis, Exploitation, Protection and Valorization (Karlovy Vary) Hydrological Precipitation Evaporation Runoff Droughts (Prague).

They participated in 24 international conferences and had 51 oral presentations, conference proceedings or posters. The most important conferences were e.g. 7th Global Friend-water Conference Hydrology in a Changing World: Environmental and Human Dimensions (Montpellier, France), 15th Biennial Conference ERB 2014 (Coimbra, Portugal), 17th Radio-chemical Conference (Mariánské Lázně, Czech Republic), Conference The International Association for Sediment Water Science – IASWS (Grahamstown, South Africa), EMAN – Environmental and Sustainability Management Accounting Network Conference (Rotterdam, the Netherlands), IWA 7th Young Water Professional Conference (Taipei, Thai-wan), 1th Specialist Conference on Municipal Water Management and Sanitation in Developing Countries (Bang Kong, Thailand), European Geosciences Union General Assembly 2014 (Wien, Austria) etc.

### 4.1.6 Important national meetings of experts

In 2014 employees of TGM WRI, p.r.i., organized or participated in preparation of 30 conferences, seminars and workshops. Examples are: National dialogue on Water (the Institute was the main organizer), XIV Hydrogeological congress, Conference on factory trunks, Seminar for the employees of the Regional Authority of the Vysočina Region on the issues of designing, permitting and construction of wells, XXI consultation days for water radiological laboratory workers, 14 seminars in centers of regions on the topic of flood hazard and flood risk maps, Sediments from watercourses and reservoirs seminar, organization of a workshop Emissions and their impact on the aquatic environment, two runs of the course Sampling for Water Management and Inspection Laboratories etc.

The employees of TGM WRI, p.r.i., had 63 presentations (oral and posters) at 29 national conferences and seminars: National Dialogue on Water, Adolf Patera Workshop 2014, Drinking Water 2014, Radionuclides and ionizing radiation in water management, XXXII Mikulov Symposium on the topic Water in the History of Moravia, River Landscape 2014, Cultural monuments and floods, RECYCLING 2014, Biodiversity 2014 etc.

## 4.2 Additional and other activities

### 4.2.1 Methods and results reflected in standards and legislation

The Institute staff was also significantly involved in the preparation of guidelines, legislation and standardization in 2014.

Regarding legal directives and methodological documents the Institute staff participated e.g. in preparation of the document of the European Commission Technical Report on Aquatic Effect-Based Monitoring Tools. They prepared the supporting document for the amendment of Decree no. 352/2005 for the registration of waste electrical and electronic devices (Decree no. 200/2014 Coll.) and for the update Government Regulation no. 61/2003 Coll., as amended, on the indicators of radioactive substances. They prepared 25 methodologies mainly for the Ministry of Agriculture and the Ministry of the Environment (e.g. Methodology of delimitation of vulnerable zones according to water eutrophication, Methodology for determination of hydrological drought indices and their threshold values, Methodology for establishing reference conditions for individual components of biological quality, Methodology of revision of delimitation of running surface water bodies, Methodology of procedure of an emergency status declaration on watercourses, Methodology for solutions of unauthorized waste management and Determination of assimilable

organic carbon in water supply systems). Another five methodologies are still undergoing certification.

The staff of the Institute participated in the preparation of the standard CSN 75 0176 The Nomenclature of Water Microbiology and the standard CSN 75 7613 Water Quality–Determination of total volume activity Beta using the fast method. They evaluated in total 24 standards in the frame of cooperation with technical standards committee 104.

### 4.2.2 Consulting and expert activity including support for the state administration

Consulting and expert activity is an important form of the direct application of research results. In 2014, e.g. the assessment of the deterioration of water quality in a swimming pool was carried out. The functionality of domestic water treatment plants was assessed and the causes of fish poisoning were determined. Consulting services were permanently provided in various areas for local authorities, non-governmental organizations, and specialized laboratories and also for the public. Example of such activity is the consulting in the area of using of artificial wetlands and extensive technologies of the water treatment etc.

The support of the state administration was focused on tasks especially for Ministry of the Environment: the operation and publishing of data of selected databases of information system ISVS-VODA and review of water resource protection zones. The staff of the Institute was involved in reporting for the EU, the European Environmental Agency, and also in preparation of statements and orders for the need of the state administration and local authorities etc. RNDr. Hrdinka has become a secretary of the interdepartmental commission Water-drought, which aims to find solutions to the problems of the occurrence and impact of a prolonged drought in the Czech Republic.

The employees of the Institute are significantly active in international commissions – International Commission for the Protection of the Elbe River, Standing Committee for Saxony of the Czech-German Commission for Transboundary Waters, International Commission for the Protection of the Odra River against Pollution, Commission for Transboundary Waters with Poland, International Commission for the Protection of the Danube River and the Czech-Austrian working group Dyje. The staff of the Institute is involved in many expert groups within these commissions and also in preparation of the documents for their meetings. The employees of the Institute are also involved in the final assessment of the projects and their proposals (e.g. for TA CR).

### 4.2.3 Other activities

An important part of the activity of the Institute includes also collaboration with universities. The staff of the Institute presented a series of lectures at e.g. Faculty of Environmental Sciences of the Czech University of Life Sciences, Faculty of Natural Sciences of the Charles University, Faculty of Natural Sciences of the Masaryk University, VSB-Technical University of Ostrava and Faculty of Natural Sciences of the Ostrava University. The employees of the Institute provide consultations and are supervisors of dissertations and diploma theses (Faculty of Natural Sciences of the Charles University, the Czech University of Life Sciences, the Masaryk University, and the Mendel University in Brno etc.). Students can participate in excursions organized by the staff of the institute and they can participate in practical training in the Institute. The employees of the Institute also act as members of the state examination commissions at the Charles University, the Czech University of Life Sciences and the Czech Technical University. Ing. Drbal is a member of the Scientific Board of the Faculty of Civil Engineering of the Brno University of Technology.

Excursions for primary school pupils and secondary school students took place at the Ostrava Branch. Four professional trainings for teachers of primary and secondary schools of the Moravian-Silesian Region were organized at the Ostrava Branch.

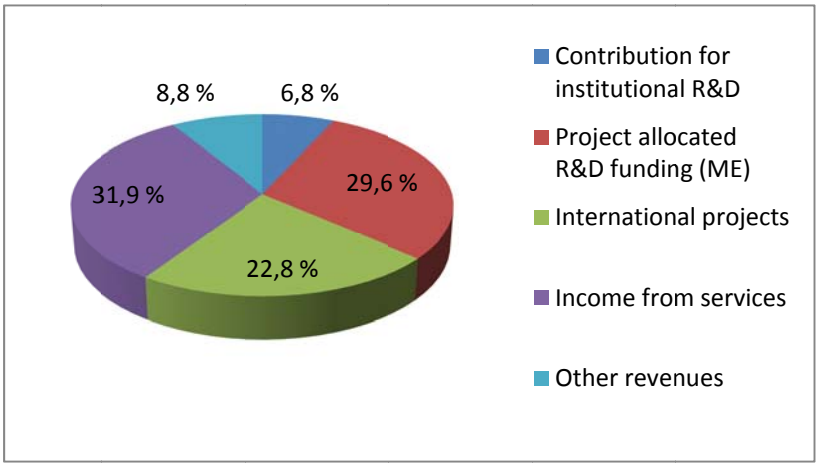
The staff is also active in national and international professional organizations and scientific associations – Czech National Committee for Hydrology, Czech Meteorological Society, Czech Hydrogeologists' Association, International Association of Hydrogeologists (IAH), nitrate committee EC etc.

### 4.3 Economic issues

Significant changes occurred in 2014 in the economic sphere. The major change of approach to our organization by the founder – the Ministry of the Environment can be considered as particularly positive. Some projects were unblocked and consequently the revenue grew and some debatable items from the past years were solved. Due to this fact it was possible at the end of the year to deal with problems in the cash flow, pay all costs and make a small profit. Cost-saving measures were in force throughout the year (especially in the area of purchases and services) and this had a positive effect on the economy.

Co-financing of the contracts remains a recurring problem because the Institute mainly deals with the main activity, namely research, and it is non-profit. There is insufficient space for commercial activity from which the co-financing could be paid. In the future, it is imperative to address this issue and to find a solution for this situation which is unsustainable in long-term and it has a significant impact on the resources for reproduction of the property. The impact of VAT has a recurring negative effect on the economy of the Institute.

The budget of CZK 164 814 thousand for 2014, was created balanced in accordance with Act No. 341/2005 Coll. on public research institutions. Total revenues amounted in 2014 to CZK 183 320 thousand and costs reached CZK 183 218 thousand. Consequently, the total outcome of the Institute's activities was represented by the end-of-year result of 102 thousand CZK in surplus. The proposal to transfer the whole positive outcome in 2014 in reserve fund was submitted to the relevant bodies of the Institute.




R&D – Research and Development; ME – Ministry of the Environment

Fig. 1. Revenue structure

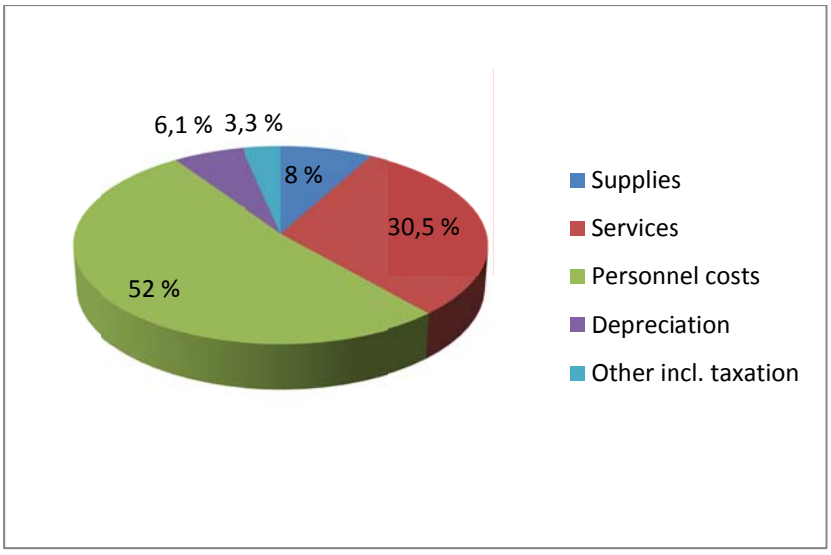



Fig. 2. Cost structure

# 5 Other requested Information

## 5.1 Information on measures for elimination of imperfections of management and their fulfillment

No measures to elimination of imperfections of management were assigned.

## 5.2 Information on things that come to pass after the balance sheet day and are important for fulfillment of the purpose of the institution

No things important for fulfillment of the purpose of the institution came to pass after the balance sheet day.

## 5.3 Activities in the field of environmental protection

Regarding the fact that the type of activity of the Institute is closely connected with topical environmental issues, its operation is focused primarily on this sector: mainly on research of aquatic ecosystems and their relations in landscape and connected environmental hazards and on issues of waste and packaging management.

The Institute lays stress primarily on care of the environment and permanently sustainable development. This care includes the effort of energy saving. The waste is separated to full extent, vegetation is cared about and other relevant activities take place.

## 5.4 Activities related to employment relationships

In 2014, there were no major organizational changes, which would result in staff cuts. In 2013, the organizational changes took place to increase the effectivity of the Institute. The changes lead to the lowering of number of employees. The number of 208.25 employees worked in TGM WRI, p.r.i., in 2014 (average registration recounted number). The research and expert employees constituted 86% and operational employees constituted 14% of total employees number.

Table 1. Employees structure according to age and sex – physical state by 31 December 2014

| Age | men | women | total | % |
|---|---|---|---|---|
| **up to 20 years** | 0 | 0 | 0 | 0 |
| **21–30 years** | 22 | 15 | 37 | 15.42 |
| **31–40 years** | 31 | 24 | 55 | 22.92 |
| **41–50 years** | 24 | 27 | 51 | 21.25 |
| **51–60 years** | 18 | 41 | 59 | 24.58 |
| **61 years and more** | 29 | 9 | 38 | 15.83 |
| **total** | **124** | **116** | **240** | **100** |

The average age is 46.53 years, the men average age is 45.86 and women average age is 47.31 years.

Table 2. Employees structure according to achieved education and sex – physical state by 31 December 2014

| Education level | men | women | total | % |
|---|---|---|---|---|
| **basic school** | 0 | 3 | 3 | 1.25 |
| **apprenticeship** | 6 | 3 | 9 | 3.75 |
| **secondary technical** | 0 | 1 | 1 | 0.42 |
| **completed secondary general** | 1 | 1 | 2 | 0.83 |
| **completed secondary technical** | 20 | 36 | 56 | 23.33 |
| **follow up courses** | 0 | 1 | 1 | 0.42 |
| **bachelor** | 4 | 3 | 7 | 2.92 |
| **master** | 70 | 58 | 128 | 53.33 |
| **doctoral** | 23 | 10 | 33 | 13.75 |
| **total** | **124** | **116** | **240** | **100** |

Table 3**.** Employees structure according to the length of employment and sex – physical state by 31 December 2014

| Duration | men | woman | total | % |
|---|---|---|---|---|
| **up to 5 years** | 41 | 30 | 71 | 29.58 |
| **6–10 years** | 28 | 24 | 52 | 21.67 |
| **11–15 years** | 25 | 24 | 49 | 20.42 |
| **16–20 years** | 17 | 16 | 33 | 13.75 |
| **over 20 years** | 13 | 22 | 35 | 14.58 |
| **total** | **124** | **116** | **240** | **100** |

Four jobs aimed at university graduates were supported through the Labor Office, regional offices for the City of Prague in the frame of the project Professional practice for young people under 30 years of age. The project was funded by the European Social Fund and the state budget of the Czech Republic.

## 5.5 Organizational units abroad

T. G. Masaryk Water research Institute, p.r.i., has no organizational units abroad. It is a delegate of CR in the Global Water Partnership – Central and Eastern Europe organization since 2009.

## 5.6 Supposed development of the organization in 2015

It can be expected that also the 2015 year will be economically very challenging mainly from the point of view of winning contracts of all kinds. It is a consequence of cost-saving measures implemented by the government of CR in the frame of the economic reform and slower national economic take-off. TGM WRI, p.r.i., will naturally focus its activity on tasks following from its fundamental mission i.e. mainly on:

- research of aquatic ecosystems and their relations in landscape and connected environmental hazards and on issues of waste and packaging management,

- expert support for the state administration in the field of hydrosphere and waste and packaging management, based on performed research.

The activity of the Institute is focused not only on continuing research projects, grants, commercial projects, but mainly on winning of other projects in the frame of all relevant calls and competitions. The attention is focused on the projects financed from resources of EU and also national funders supporting the research and development in sector of water and waste. It's necessary to focus with exceptional intensity on commercial contracts: the only source of financial funds for already absolutely generally requested co-financing in grants.

# 6 List of projects in 2014

| Title | Project manager | Client |
|---|---|---|
| **Branch of Hydraulics, Hydrology and Hydrogeology** | | |
| Critical source areas of phosphorus in watersheds as the decisive factor of transport – a trial of the expression of the dependence on the source areas of runoff and the way of land management | Ing. Š. Blažková, DrSc. | Ministry of Education, Youth and Sports |
| Uncertainties in Water Footprint and new way of work with the predictions of climate models | Ing. Š. Blažková, DrSc. | Ministry of Education, Youth and Sports |
| Proposal of a system for managing emergency situations associated with drought and water scarcity in the Czech Republic | Ing. R. Vlnas | Ministry of the Interior |
| Sustainable use of water resources under condition of climate change | Ing. A. Vizina | Technology Agency of the CR |
| Development of a tool and methodology for continuous measurements of snow water equivalent in the field | Ing. A. Kulasová | Technology Agency of the CR |
| Support of long-term planning in water management sector in context of climate changes | Ing. M. Hanel, Ph.D. | Technology Agency of the CR |
| Ensuring the quality of drinking water supplied to small municipalities from local sources | RNDr. J. V. Datel, Ph.D. | Technology Agency of the CR |
| Increasing the safety and reliability of culverts with regards to the transfer of flood flows | Ing. P. Balvín | Technology Agency of the CR |
| Compensation of negative climate change impacts on water supply and ecosystems using the localities for potential accumulation of surface water | Ing. M. Hanel, Ph.D. | Technology Agency of the CR |
| Processing of methodologies concerning the minimum residual flows | Ing. P. Balvín | Ministry of the Environment |
| Reporting of Nitrate Directive (91/676/EEC) and vulnerable areas | Ing. A. Hrabánková | Ministry of the Environment |
| Evaluation of the chemical and quantitative state of groundwater bodies for the 2nd cycle of River basin plans in the Czech Republic | RNDr. H. Prchalová | Ministry of the Environment |
| The identification and evaluation of state of the areas delimitated according to the Article 7 of the Water Framework Directive | Ing. A. Hrabánková | State Environmental Fund |

| | | |
|---|---|---|
| The methodology of evaluation of the effectiveness of the action programme (detailed monitoring) | Ing. A. Hrabánková | Ministry of Agriculture |
| Hazard assessment of dangerous landslides and glacial lake outburst floods, Cordillera Blanca, Peru | Ing. P. Bouška, Ph.D. | Institute of Rock Structure and Mechanics AS CR – Grant Agency of the CR |
| Headwaters retention potential with respect to hydrological extremes: the verification of hypothesizes on outflow formation by model MIPs in comparison with the other models | Ing. Š. Blažková, DrSc. | Charles University – Grant Agency of the CR |
| Assessing water quality improvement options concerning nutrient and pharmaceutical contaminants in rural watersheds | doc. RNDr. Z. Hrkal, CSc. | Norway Grants – Ministry of Education, Youth and Sports – CULS |
| The determination of flow capacity of the weir of the small hydroelectric plant Ružbašská Miľava | Ing. O. Motl | RFB, s.r.o., Košice |
| The influence of the water reservoirs on 2013 flood | Ing. P. Balvín | BFG Koblenz |
| Review of groundwater resources in the Czech Republic: Hydrology documentation for Activities 2, 4 and 6 | Ing. L. Kašpárek, CSc. | ČGS |
| Operation of the Czech Calibration Station for Current Meters | Ing. L. Ramešová | Joint contract |
| Sub-basin district plans of Upper Vltava, Berounka and other Danube tributaries – part groundwater | RNDr. H. Prchalová | Sweco Hydroprojekt, a. s. |
| Review of Groundwater Resources in the Czech Republic – geological support for the hydrogeological research of Area 3 | doc. RNDr. Z. Hrkal, CSc. | AQUATEST, a. s. |
| The Partial River Basin Management Plan of the Upper and Middle Elbe and Partial River Basin Management Plan of the Lusatian Neisse and other Oder tributaries – groundwater | RNDr. H. Prchalová | AgPOL, s.r.o. |
| The study on the possibilities of enhanced retention effects of the Nechranice Reservoir | Ing. P. Balvín | Ohře River Board, state enterprise |
| The Partial River Basin Management Plan of the Morava and tributaries of the Váh, The Partial River Basin Management Plan of the Thaya | RNDr. H. Prchalová | Pöyry Environment, a. s. |
| The processing of Partial River Basin Management Plan of the Upper Oder | RNDr. H. Prchalová | Pöyry Environment, a. s. |
| Hydraulic research of the relief shaft of the Airport Praha-Ruzyně | Ing. O. Motl | D-PLUS |

| | | |
|---|---|---|
| Review of monitoring for location of new nuclear source at Dukovany nuclear power plant | doc. RNDr. Z. Hrkal, CSc. | Nuclear Research Institute Řež |
| Processing of supporting documents and drafts of national River basin plans of the Elbe, Oder and Danube – part groundwater | RNDr. H. Prchalová | VRV, a.s. |
| **Reference Laboratory of Environment Components and Wastes** | | |
| New drugs – market analysis, epidemiology of use and identification of preventive and harm minimisation strategies | Ing. M. Kvíčalová | Charles University – Ministry of Agriculture |
| Alternative sources of water in municipalities during the state of emergency – exploitation of origina llocal sources and springs | Ing. E. Mlejnská | Ministry of the Interior |
| Investigation of the impact of the Temelín Nuclear Power Plant accident on contamination of the Vltava and Elbe rivers up to boundary profile Elbe at Hřensko | Ing. E. Hanslík, CSc. | Ministry of the Interior |
| Determination of the amount of illicit drugs and their metabolites in municipal wastewater – new tool for obtaining of complementary data on illicit drug consumption in the Czech Republic | Ing. V. Očenášková | Ministry of the Interior |
| Optimization of the method for detection of assimilable organic carbon by optic detection | RNDr. D. Baudišová, Ph.D. | Technology Agency of the CR, ALFA |
| Research of optimization possibilities of operation and of effectiveness increase of wastewater treatment from small municipalities using non-conventional technologies | Ing. E. Mlejnská | Technology Agency of the CR, ALFA |
| Processing of supporting documents for the reporting in accordance with Article 15 of Council Directive No 91/271/EEC | Ing. E. Mlejnská | Ministry of the Environment |
| Support to activities of the permanent and emergency component of nationwide Radiation Monitoring Network | Ing. E. Hanslík, CSc. | Ministry of the Environment and SONS |
| Lyofilization of frozen fish samples | Ing. V. Očenášková | ICPDR Austria |
| Monitoring and assessment of surface water and groundwater quality and its changes in relation to the impact of the Temelín Nuclear Power Plant construction and operation on its vicinity | Ing. E. Hanslík, CSc. | Czech Power Works |
| Revision of the Czech standard CSN 750176-1 – Water quality – Terminology of water microbiology | RNDr. D. Baudišová, Ph.D. | Sweco Hydroprojekt. |
| Determination of pesticides in hop crops, cones and pellets | Ing. V. Očenášková | PP servis |
| Content of radioactive substances in the Orlík Reservoir and its tributaries after commissioning of the Temelín Nuclear Power Plant – period 2014 | Ing. E. Hanslík, CSc. | Vltava River Board, state enterprise |

| | | |
|---|---|---|
| The evaluation of the results of inspection measurements of the changes in gamma radiation dose rate and the content of radioactive compounds in the vicinity of the buildings included in remediation programme of the Nuclear Research Institute in Řež –2014 | M. Novák | Nuclear Research Institute Řež |
| The research of detection and determination methods of radioactive contamination | Ing. E. Hanslík, CSc. | National Radiation Protection Institute |
| **Branch of Water Protection and Informatics** | | |
| Accuracy classification for existing delimitation of flood plain areas in the Czech Republic, and implementation of the results in delimitation methodology | Ing. H. Nováková, Ph.D. | Ministry of the Interior |
| Development of methodological, planning and monitoring measures for solving of the fragmentation of the river continuity in the Czech Republic | Mgr. A. Zbořil | VRV, a.s. – Technology Agency of the CR ALFA |
| Water recreation – bathing in bathing sites and other freshwater bodies | Ing. T. Fojtík | NIPH – Technology Agency of the CR OMEGA |
| Introduction of new market-based tools to increase the efficiency of the surface water allocation | Ing. L. Petružela | IREAS – Technology Agency of the CR OMEGA |
| Regulation of public services in water management with emphasis on drinking water supply and sewerage sector | Ing. L. Petružela | ČZU – Technology Agency of the CR OMEGA |
| Updating of water resource protection zones | Ing. V. Levitus | Ministry of the Environment |
| Bathing waters reporting: update of the List of identified bathing waters | Ing. T. Fojtík | Ministry of the Environment |
| The support of the representation of the Czech Republic in activities of the International Commission for the Protection of the Elbe River (ICPER) | Ing. M. Kalinová | Ministry of the Environment |
| The support of the participation of the Czech Republic in activities of Permanent Committee Saxony and Permanent Committee Bavaria of the Czech-German Commission for Cross-Border Water | Ing. M. Kalinová | Ministry of the Environment |
| Creation and maintenance of data sources, support of data and map outputs of the reporting: ICPER, ICPDR and ICPO | Ing. T. Fojtík | Ministry of the Environment |
| Report on Water Management in the Czech Republic – comprehensive preparation of documents in the field by the Ministry of Environment | Ing. A. Kult | Ministry of the Environment |

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| Creation of a report for the European Commission on changes in general and water management characteristics of basins | Ing. P. Vyskoč | Ministry of the Environment |
| Reporting of emissions into the aquatic environment | Ing. P. Vyskoč | Ministry of the Environment |
| Water balance, audit and evaluation in the field of water quantity and quality | Ing. J. Dlabal | Ministry of the Environment |
| Emissions and their impact on water environment | Ing. P. Vyskoč | National Agency for Agricultural Research |
| Jointly used groundwater on the Czech-Saxony border (GRACE) | Ing. M. Kalinová | SAB Dresden |
| Water issues in Moldova – solid waste | Mgr. M. Rieder | Hydroprojekt, a.s. |
| The projection of water use sites for drawing up of a water balance | Ing. J. Dlabal | Vltava River Board, state enterprise |
| **Branch of Water Technology** | | |
| A safety assessment of the emergency infrastructure components – drinking water | Ing. V. Šťastný | CityPlan – Ministry of the Interior |
| Research on the intensification of rural and small wastewater treatment plants by non-capital means | Ing. V. Šťastný | Technology Agency of the CR |
| Final treatment pools used with low intensity | Ing. F. Wanner | Technology Agency of the CR |
| Activity of the Testing laboratory for water management facilities in 2014 | Ing. V. Jelínková | Joint contract |
| Accredited sampling and analysis of samples of wastewater from wastewater treatment plants | Ing. M. Beránková | Nuclear Research Institute Řež |
| Sampling courses | RNDr. J. Fuksa, CSc. | Joint contract |
| **Brno Branch of the Institute** | | |
| Drying out of streams during climate change: Prediction of risk and biological indication of drought periods as new methods for water resources and landscape management | RNDr. P. Pařil, Ph.D. | Technology Agency of the CR |
| The anaerobic separator of suspended solids and nutrients | Ing. M. Rozkošný, Ph.D. | ASIO – Technology Agency of the CR |

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| Development of technologies for road and other paved areas stormwater runoff cleaning | Ing. M. Rozkošný, Ph.D. | DEKONTA – Technology Agency of the CR |
| Analysis and evaluation of socio-economic impact on the development of society in areas protected for surface water accumulation | Ing. M. Forejtníková | Technology Agency of the CR OMEGA |
| Technical tools to identify pollution | Ing. S. Juráň | Technology Agency of the CR OMEGA |
| Identification of significant areas with cultural and historical values threatened by natural and anthropogenic stresses | Ing. M. Forejtníková | Ministry of Culture |
| Inundated cultural and natural heritage of Southern Moravia | RNDr. H. Mlejnková, Ph.D. | Ministry of Culture |
| The expert support for the evaluation and mitigation of flood risks | Ing. Karel Drbal, Ph.D. | Ministry of the Environment |
| Expert support of the Czech Republic's participation in the International Commission for the Danube River Protection | Ing. S. Juráň | Ministry of the Environment |
| Cooperation with the Slovak Republic on transboundary waters | Ing. S. Juráň | Ministry of the Environment |
| Cooperation with Austria on transboundary waters | RNDr. H. Mlejnková, Ph.D. | Ministry of the Environment |
| The expert support for the mitigation of flood risks | Mgr. P. Štěpánková, Ph.D. | Ministry of the Environment |
| Strategy for protection against negative impacts of floods and erosion phenomena by nature-friendly measures in the Czech Republic | Mgr. M. Rieder | State Environmental Fund |
| Flood Education and Research Centre | Mgr. P. Štěpánková, Ph.D. | Masaryk University Brno |
| Assessment of agricultural land in the areas of former fishpond systems with the aim of supporting sustainable management of water and soil resources in the Czech Republic | Ing. M. Rozkošný, Ph.D. | National Agency for Agricultural Research |
| Monitoring of the impact of Dukovany Nuclear Power Plant on quality of water in the Jihlava River | RNDr. H. Mlejnková, Ph.D. | Czech Power Works |
| **Ostrava Branch of the Institute** | | |
| NAVARO – The development of early warning and rapid reaction tools in the area of surface water protection | RNDr. P. Soldán, Ph.D. | Technology Agency of the CR |
| Documentation, passportization, archiving and conversion proposals of chimney reservoirs as an endangered group of industrial heritage sites in the Czech Republic | Ing. R. Kořínek, Ph.D. | Ministry of Culture |

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| Expert support to legislative regulations within the water management | Ing. P. Tušil, Ph.D., MBA | Ministry of the Environment |
| Support to the participation of the Czech Republic in the activities of the International Commission for the Protection of the Odra River against Pollution | Ing. L. Trdlica | Ministry of the Environment |
| Cooperation in transboundary waters with Poland | Ing. L. Trdlica | Ministry of the Environment |
| A comprehensive data base of actual emissions into the aquatic environment in the Czech Republic | Ing. A. Kristová | Ministry of the Environment |
| Discover the secrets of science | Ing. R. Kořínek, Ph.D. | Business School Ostrava plc. |
| **Centre for Waste Management** | | |
| Possibilities of using information and resources of waste management data as a tool for identification and solution for unauthorized waste management | Ing. V. Hudáková | Ministry of the Interior |
| The analysis of material flows of waste electrical equipment and possibilities of increase of their recycling and reuse | Ing. V. Hudáková | Technology Agency of the CR BETA |
| **Branch of Applied Ecology** | | |
| Erosion washout: increased possibility of danger for population and water quality in connection with expected climate change | Mgr. P. Rosendorf | Ministry of the Interior |
| The development of the system for automated monitoring of influence of water management structures on the environment using the technology of passive integrators TROVAN | Mgr. L. Závorka | Technology Agency of the CR ALFA |
| Optimization of large wood structures for stream restoration and semi-natural stream regulation | Mgr. P. Kožený | Technology Agency of the CR ALFA |
| The methods of optimization of the proposed measures in watersheds of reservoirs leading to effective decrease of their eutrophication | Mgr. P. Rosendorf | Technology Agency of the CR ALFA |
| Software tools for evaluating the hydromorphology of aquatic ecosystems and proposed measures in relation to biological components | Mgr. P. Kožený | Šindlar – Technology Agency of the CR ALFA |
| Effects of socio-economic changes in society on water consumption | Ing. L. Ansorge | Technology Agency of the CR OMEGA |
| Cost-appropriateness evaluation of ensuring a good status of water | Ing. L. Ansorge | UJEP – Technology Agency of the CR OMEGA |
| The analysis and solutions of the environmental risks of operation of small hydropower plants in connection with water organisms | Ing. J. Musil, Ph.D. | Technology Agency of the CR BETA |

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| Reporting on fish waters: update of delimitation | Ing. V. Kladivová | Ministry of the Environment |
| Intercalibration for evaluation of biological components | Mgr. L. Opatřilová | Ministry of the Environment |
| The methodology for evaluation of ecological potential of heavily modified and artificial water bodies – category river | Mgr. L. Opatřilová | State Environmental Fund |
| The Evaluation of technical reports of pilot projects of Operational Programme Fishing | Ing. J. Musil, Ph.D. | Ministry of Agriculture |
| Evaluation of projects of applicants for grants from Operational Programme Fishing 2007–2013 | Ing. J. Musil, Ph.D. | Ministry of Agriculture |
| Monitoring of catadromous migration of the European eel (*Anguilla anguilla*) | Ing. J. Musil, Ph.D. | Ministry of Agriculture |
| Monitoring and nationwide mapping the species of European importance as a basis for finalizing the draft of Natura 2000 network in the Czech Republic | Ing. V. Kladivová | Nature Conservation Agency of the Czech Republic |
| Bioindication tests of the effectivity of management measures in catchments with occurrence of *Margaritifera margaritifera* | Mgr. O. Simon | Gammarus, s.r.o. |
| Processing of selected chapters of the Sub-basin Plan for Ohre (Eger), lower Labe (Elbe) and other tributaries of the Labe (period 2015–2021) | Ing. L. Ansorge | Ohře River Board, state enterprise |
| Coexistence of man and freshwater pearl mussel in the Vlatava flood plain | Mgr. O. Simon | VRV a.s. |
| Study of a clearing of the Dyje (Thaya) River between Vranov and Znojmo | Ing. Jiří Musil, Ph.D. | VRV a.s. |
| Supervision of the application of aluminium salts to Mšeno reservoir in order to limit the development of cyanobacteria during the bathing season 2014 | Mgr. D. Fiala | Statutory city of Jablonec nad Nisou |
| The study on improvement of water quality in the Vranov – Frainer Thaya/Vranovská Dyje | Mgr. D. Fiala | Pöyry Environment, a.s. |
| Technical reports containing the summary of the results of water management studies for the new nuclear facility EDU5 | Mgr. P. Rosendorf | Nuclear Research Institute Řež |
| The study of pollution sources in Sázava river basin from the confluence with the Želivka river to the mouth into the Vltava River | Mgr. P. Rosendorf | Vltava River Board, s.e. |
| Evaluation of impacts of waves caused by navigation on coastal habitats | Mgr. L. Opatřilová | Directorate of Waterways |
| Analysis of muscle of fish, including their catch from the river Elbe and sandpits Mlékojedy | Ing. J. Musil, Ph.D. | Spolana, a.s. |
| **ASLAB Centre for Assessing Proficiency of Laboratories** | | |
| Good laboratory practice | Ing. P. Finger | Ministry of the Environment |
| ASLAB Accreditation | Ing. R. Dvořák | Joint contract |
| Courses– Good Laboratory Practice | Ing. P. Finger | Joint contract |

| Branch of the economic, operation and technical activity | | |
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| Global Water Partnership – Central and Eastern Europe | K. Havlák | SHMI |

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