Annual Report 2015

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

Prague 2016

Index

Introduction

The 2015 year was like previous years characterized by 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. These changes can be considered as a stabilizer for the further development of water management in the Czech Republic.

From a hydrological point of view, 2015 was a dry year and the activities of the Institute were directed to the solution of the problems of drought. A series of meetings of the interdepartmental commission Water-Drought took place. The output of the commission activity is a supporting document for Government Resolution No. 620/2015. The resolution defines many tasks and activities that will be fulfilled by the Institute in the field of combating drought in 2016–2018. It is good that future major heading of the Institute is based on a government document and that the point of view is not only hydrological or hydrogeological, but significantly broader: the impact of drought on water quality, water resources management, the impact of drought on aquatic ecosystems etc., i.e. the main activities of the Institute.

Many changes took place in 2015 in the Institute. I hope that these changes will be the basis for a new communication between research and economic branches, for the removal of barriers and the separation of the worlds of scientists and economists. Another major change is the abolition of the Centre for Waste Management as an individual unit of the Institute. It was merged with the Department of Water Technology into the new Department of Water Technology and Waste from 1st January 2016. Long-time TGM WRI editor Mgr. Smrťák retired in 2015 and therefore personnel changes took place in editorial office. The change in editorial activity was to get back to the model that VTEI journal would be published and distributed by the T. G. Masaryk Water Research Institute, p.r.i., individually to general professional public free of charge, with new modern attractive appearance without advertisements. Water Management Technical and Economical Information Journal – VTEI Journal has been published since 1959 and is currently listed in the list of reviewed non-impact journals. It was published individually until 1998. Then, it was published together with the Water Management Journal based on contract on cooperation. In follow-up to this decision, editorial board of the VTEI Journal, scientific board of the VTEI Journal and editorial board of the TGM WRI, p.r.i., were newly established and appointed. From the long-term perspective, stabilization of the staffing of the Institute continued regarding capacity and the emerging activities in the areas of the Institute operation.

Third informal meeting of experts in water resource management took place in cooperation with Heineken, SWECO Hydroprojekt and VRV in the Institute on 29th May 2015. The experts from different organizations had the opportunity to discuss current issues in an informal atmosphere. Open day was newly organized in cooperation with the Ministry of the Environment and many conferences and seminars were organized by the Institute.

The Institute participated in projects that were supported by Operational Programme Environment in 2015. The expert support for the Ministry of the Environment took place based on a frame contract. The projects financed by the State Environmental Fund and other providers were carried out. The other providers were: Technological Agency of the Czech Republic, Grant Agency of the Czech Republic, Ministry of the Interior, Ministry of Agriculture, Ministry of Culture. The international project supported by EU took place. The projects that had significant impact on economy of the Institute was the project Strategy of the Protection against the Negative Impacts of Floods and Erosion Phenomena by the Semi-natural measures in the Czech Republic financed by Operational Programme Environment and many projects financed by the Norway Grants. The project Strategy was successfully completed in 2015. Many projects co-financed by the Norway Grants started in 2015. However, the financial issues are significant: e.g. issues of cofinancing,

pre-financing from own sources, the extent of eligibility of costs (overheads and costs of the coordination and management of projects) etc.

We succeeded in participating in many commercial contracts and projects that are the only source of possible co-financing of research projects.

In conclusion, I would like to thank all, who participated in that the T. G. Masaryk Water Research Institute ended in black numbers in 2015 despite the aforementioned problems with co-financing and pre-financing. Therefore, I would like to thank all our employees for their work leading to fulfilment of the Institute´s strategy.

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 (Povodí Vltavy River Board, state enterprise, Prague),
Ing. Rut Bízková (President of the Technology Agency of CR, Prague),
Mgr. Vít Kodeš (CHMI, Prague).

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

c) Supervisory Board

Members of the Supervisory Board until 1st January 2015:

Ing. Jan Landa (Ministry of the Environment of CR) – chairman,
prof. Ing. Jiří Wanner, DrSc. (Institute of Chemical Technology, Prague, professor) – deputy chairman,
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 Centre for Assessing Proficiency of Laboratories–ASLAB).
In early 2015, Ing. Vladimír Sassmann (Ministry of the Environment of CR) and Ing. Berenika Peštová, Ph.D. (Ministry of the Environment of CR) were appointed to the Supervisory Board.
RNDr. Jakub Čurda was dismissed in May 2015 and Mgr. Ladislav Faigl (Ministry of the Agriculture of CR) was appointed to the Supervisory Board.

Secretary of the Council of TGM WRI, p.r.i., was 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 2015

The members of the Council of the TGM Water Research Institute, public research institution (TGM WRI Council) have not changed in 2015.

Three meetings of the TGM WRI Council took place in 2015. The most important conclusions of these meetings were as follows:

- TGM WRI Council discussed and approved the 2014 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 2015 period in accordance with section 18, article (2), letter c) of Act No. 341/2005 Coll., about public research institutions, as amended. The budget was created as balanced. Investment plan was also approved.

- During 2015, the TGM WRI Council discussed the information (provided by the director) on the progress of work on the preparation and processing of medium-term strategy of the Institute for the period 2015–2020.

- TGM WRI Council approved the adjustment of the organizational protocol of TGM WRI, p.r.i., in 2015 in accordance with section 18 article (2) letter d) and section 20 article (1) letter c) of Act No. 341/2005 Coll., about public research institutions, as amended.

- The 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 internal information database of the Institute.

The fourth 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. TGM WRI Council fulfilled all its duties in 2015. 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 2015 at each meeting.

2.3 The Report on activity of the Supervisory Board of the TGM Water Research Institute, p.r.i., in 2015

In 2015, three meetings of the Supervisory Board took place on 6th March, on 25th May and on 1st October. Director of TGM WRI, p.r.i., Mgr. Mark Rieder participated in all meetings.

The Supervisory Board, after discussion, considered:

- the draft of 2014 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 2014 that are described in 2014 Annual Report with no objection,
- the draft of the budget of TGM WRI, p.r.i., for 2015.

The Report on activity of the Supervisory Board of the TGM Water Research Institute, p.r.i., in 2014 was processed and transferred to be included in 2014 Annual Report.

The Supervisory Board presented the Report about its eighth year of activity (from 1st June 2014 to 31st May 2015) to the founder and 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 2015, problems of financing public research institutions and alienation (sale) of buildings and land in cadastre Soběšovice, which are owned by TGM WRI, p.r.i.

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 1st 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 12th 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 31st 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 proper 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 2015

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 is focused on issues of environment protection besides basic areas delimited by scientific disciplines in its name) on issues of environment protection.

The Department of hydrology focused on standard hydrological research and issues of climate change impact on water regime water resources and whole hydrosphere. The topics of the projects dealing with the climate change impacts are e.g.: erosion wash-out and precipitation extremes, drying out of streams during climate change and localities for potential accumulation of surface water. In the area of water management planning, the activities were connected to General Plan of water management in the CR and Strategy to adapt to climate change. Further, the data were processed for preparation the construction of several water structures (Pěčín, Mělčany, etc.). The two research projects focused on water supply for small communities from local sources and water supply in the Karlovy Vary region dealt carried out the evaluation of water resources for water supply. In 2015, the department finished the hydrology part of the Review of Groundwater Resources in the Czech Republic for Czech Geological Survey. The project started in 2011. The hydrology and hydrogeology survey was carried out for CEZ at two nuclear power plants: Temelín and Dukovany.

In the Department of hydraulics, the project Increasing the Safety and Reliability of Culverts with Regards to the Transfer of Flood Flows continued in 2015. The international projects continued: Homogenization of Time Series (in collaboration with Federal Institute of Hydrology in Koblenz, CHMI and Aqualogic) and the COST project. Regarding the physical hydraulic modeling, the comprehensive research started. The objective of the research is the adjustment of the water duct Děčín (collaboration with the Czech Technical University in Prague, Faculty of Civil Engineering).

The most important task of Department of hydrogeology was to finish the calculation of usable groundwater resources in area III of the project Review of Groundwater Resources in the Czech Republic. The staff of the department dealt with the monitoring of groundwater in vicinity of the new nuclear facility at the Dukovany Nuclear Power Plant. Regarding the international projects the department staff focused on two projects co-financed by the Norway Grants : Protection of our Most Vulnerable Biotopes – Wetlands and Steppes and Assessing Water Quality Improvement Options Concerning Nutrient and Pharmaceutical Contaminants in Rural Watersheds (Aquarius). In early 2015, the project GRACE majority-financed by EU funds ended. The project was focused on water quantity problems in two selected border regions.

In the first half of 2015, the activities of Czech Calibration Station for Current Meters (CCSCM) were focused on renewal of its accreditation. The station is currently accredited by the Czech Accreditation Institute as fulfilling the requirements established by CSN EN ISO/IEC 17025:2005 on General requirements for the competence of testing and calibration laboratories. The station is accredited to 17th July 2020. The number (identifier) of the calibration laboratory is the 2278. Scope of the granted accreditation is as follows: calibration of hydrometric propellers (cupped and propeller types) carried out in accordance with ISO 2537:2007 *Hydrometry – Rotating-element current-meters* and other gauging instruments (electromagnetic and ultrasonic), which can be calibrated in accordance with ISO 3455:2007 *Hydrometry – Calibration of current-meters in straight open tanks*. Measured variables are the flow velocity derived from the number of pulses of the rotational component of the propeller (with varied increase of k) and flow velocity v derived directly from velocity indicated by gauge. The range of the calibration rate is 0.02–7.00 m/s, the nominal calibration temperature is in the range 1–26 °C. The calibration of hydrometric propellers and other hydrometric devices is a permanent activity included in the statutory activities of the Institute. The main customers of the station were different Povodí (River Boards), s.e., Czech Hydrometeorological Institute, Nature Conservation Agency of the Czech Republic and many private companies engaged in the flow measurements in open channels.

Reference Laboratory for the Environment Components and Waste of TGM WRI, p.r.i., is one of the two units of the Test laboratory for components of the environment and water technology of TGM WRI, p.r.i. The Test laboratory 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 laboratory 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 on 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 (financed by the Ministry of Interior). The project was completed in 2015. The project New Drugs – Market Analysis, Epidemiology of Use and Identification of Preventive and Harm Minimization Strategies was completed also in 2015. The residues of selected pesticides were determined in hop. The new methods for determining residues of selected pollutants in sediments, suspensions and sedimentable suspensions were implemented. The department provided the analyses of samples for the other units of the Institute and also for external costumers.

The Department of microbiology participated in project supported by Technology Agency of the Czech Republic (TA CR) in cooperation with Branch of Water Protection and Informatics: New Methodical Approach to the Control and Evaluation of Bathing Waters and Optimization of Method for Detection of Assimilable Organic Carbon by Optic Detection. The 2015 year was the last year of the project. The department provided the analyses of samples for the other units of the Institute and also for external costumers. Sample analyses on assimilable organic carbon in waters from different water treatment plants formed a significant part.

The Department of hydrobiology participated in the projects financed by Norway Grants in collaboration with the Branch 280 and the Branch 210: Monitoring of Long-term Changes in Biological Diversity of Running Waters during Climate Change and the project Protection of our Most Vulnerable Biotopes – Wetlands and Steppes. The department carried out the monitoring and evaluation of changes of hydrobiological and hydrochemical characteristics of water in the pond Útěchovický rybník in frame of the theme Seminatural approaches in municipal wastewater

treatment (innovation Voucher 77) in cooperation with ARC, Ltd. The department was responsible for the monitoring and evaluation of the biological status of two creeks: Únětický potok and Kopaninský potok for Prague Airport. The evaluation was based on analyses of phytobenthos, macrozoobenthos and sediments. The department provided the analyses of samples for the other units of the Institute and also for external costumers.

The Department of radioecology dealt with the studies focused on occurrence and behavior of natural and synthetic radionuclides bellow a source of pollution, at uninfluenced monitoring sites in water samples, samples of sediments, in atmospheric precipitation and water treatment plants. The department prepares data for evaluation of the impact of new nuclear facilities on hydrosphere. The department performs the activities of the permanent component of the national Radiological Monitoring Network in the normal and emergency radiological situation in cooperation with River Boards, state enterprises (Povodí, state enterprise); the activities are based on a contract between Ministry of the Environment and the State Office for Nuclear Safety.

The traditional activity of **Branch of Water Protection and Informatics** is the support of the projects in the Institute regarding informatics. The support is provided by the development and operation of TGM WRI Hydroecological Information System (HEIS VUV). The other branch activity is the management of DIBAVOD including the activities connected to using of geographic information systems. Other activity was 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.

The branch carried out the support for the state administration (the management of the selected registers ISVS-VODA, preparation of the EC reporting according to Water Framework Directive and support of the reporting in international commissions ICPER, ICPDR and ICPO). The staff of the Branch participated in following projects via data support and development of software for calculation and publishing: Monitoring of NATURA 2000 Sites as a Tool for Effective Management and Conservation of Autochthonous Crayfish, Effects of Socio-economic Changes in Society on Water Consumption, *Drying out of Streams during Climate Cha*nge: Prediction of Risk and Biological Indication of Drought Periods as New Methods for Water Resources and Landscape Management, the Methods of Optimization of the Proposed Measures in Watersheds of Reservoirs Leading to Effective Decrease of Their Eutrophication, Erosion Washout: Increased Possibility of Danger for Population and Water Quality in Connection with Expected Climate Change and Procedures for Compilation and Verification of Water Footprint according to International Standards.

Another activity was the preparation of documents for the Ministry of the Environment to the Report on Water Management in the Czech Republic and Bathing Waters Reporting – update of delimitation and update of water resource protection zones.

The following projects are financed by TA CR from programme OMEGA: Introduction of New Market-based Tools to Increase the Efficiency of the Surface Water Allocation (IREAS – TGM WRI), Regulation of Public Services in Water Management with Emphasis on Drinking Water Supply and Sewerage Sector (CULS – TGM WRI), Procedures for Compilation and Verification of Water Footprint according to International Standards, Water Recreation – Bathing in Bathing Sites and Other Freshwater Bodies. The other projects continued: Accuracy Classification of Current Floodplain Definition in the Czech Republic and Involve Results into Floodplain Definition Methodology and Preparation of a Strategy to Mitigate the Effects of Fragmentation of River Networks in the Czech Republic.

The project Jointly Used Groundwater on the Czech-Saxony Border (GRACE) was completed in 2015. The project was supported by European Regional Development Fund via Program Goal 3 for support of cross-border activities between the Czech Republic and the Free State of Saxony.

In 2015, **Branch of Water Technology** focused mainly on the commercial projects for manufacturers of waste water treatment plants and on research project financed by TA CR. The branch staff participated in many other research projects that were in competence of other units of the Institute (financed by Norway grants).

The project Final Treatment Pools Used with Low Intensity was completed in 2015. The project was financed by TA CR. The retention experiment of the accumulation of waste water was finished and evaluated on the overall treatment efficiency in 2015 at the locality in Zbytniny. The monitoring of the effect of final treatment plants on the overall treatment efficiency was finished. The monitoring of the biological final treatment ponds in Mysletice, Malovice and Mikulůvka was finished in the project last year. The waste water is pretreated in waste water treatment plant (WWTP) at these localities. At the Mysletice locality, the retention experiment with accumulation of waste water was carried out. The pool experiments continued in TGM WRI. Many modifications and sizes of tanks and their effect on the overall treatment efficiency were tested. The two overload experiments were carried out. The aim was to determine the impact of a possible leak of the sludge from the domestic WWTP on the treatment efficiency. Output of the project is the utility model and the prototype. The prototype has been included in the production and product range of the cooperating company.

Four expert opinions on water supply and sewerage were processed for state administration in 2015. Three expert opinions were for the court and one for the Czech Environmental Inspectorate. Many other expert activities were carried out: e.g. detailed sampling of operation of several municipal WWTPs for research purposes, the selection of appropriate reconstruction of industrial WWTP, the proposal of measures to reduce foaming of waste water discharged from industrial plant, laboratory verification of biodegradability of waste water from industrial production, evaluation of the suitability of the reconstruction design of facility in water treatment plant and evaluation of causes of excessive precipitation of iron in the water for bathing.

For support of state administration, the data on local sources of waste water pollution were processed and verified. The collected data are used to inform the European Union about the status of urban waste water treatment from agglomerations above 2000 PE according to Articles 15 and 17 of Directive No. 91/271/EEC on urban waste water treatment.

Comments were processed on draft legislation of government regulation and Water Act.

In 2015, the Testing Laboratory for Water Technology and Environment Components of TGM WRI continued working in similar extent as in previous years. The Laboratory is accredited according to the standard CSN EN ISO/IEC 17025 by Czech Accreditation Institute under the number of 1492. 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 2015. The testing was carried out according to the procedure laid down in standard CSN EN 12566-3+A2. Some wastewater treatment plants were tested by the procedures reflecting the client requirements.

The issues of waste are transfered in the Branch of Water Technology with effect from 1st January 2016. The new name of the branch will be the Branch of Water Technology and Waste.

In 2015, **Brno Branch** started several new research projects. A module for monitoring long-term changes in diversity of significant components of the biota of surface running waters (phytobenthos, macrophytes, macrozoobenthos, fish) in conditions of climate change is developed in the project Monitoring of Long-term Changes in Biological Diversity of Running Waters during Climate change: Design, Realization, and Implementation in the ARROW Public Information system. The project is financed by EES funds. The project objective is to create a web portal that will allow to display and to evaluate the change in occurrence or quantity of selected organisms in relation to environment variables including those related to climate change. Other project financed by EES funds is a multidisciplinary project focused on elimination of climate change negative impacts

(drought, local torrential rains) in the Southern Moravia region. This region can be considered as the most vulnerable to drought in the Czech Republic based on the evaluation of existing climate data and climate scenarios.

In April 2015, two projects financed by the Ministry of Agriculture (programme KUS) were initiated. The broad research team dealt with the project New approaches to optimization of integrated protection systems in the context of their economic sustainability: Brno University of Technology – Faculty of Civil Engineering, Povodí Moravy, s.e., the town of Fulnek and Vrchovina Agricultural Cooperative. TGM WRI is the project leader. The project System of Water Management Infrastructure Monitoring and Maintenance is carried out in cooperation with the firm VARS, a.s. (project leader) and Brno university of technology (Faculty of civil engineering).

The project Identification of Significant Areas with Cultural and Historical Values Threatened by Natural and Anthropogenic Stresses continued in 2015. The project 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) from natural and anthropogenic influences (floods, erosion, landslides, industrial activity and transport infrastructure. The project was carried out in collaboration with National Heritage Institute and experts from other organizations (CDV, Czech Geological Survey, and Mendel University in Brno).

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 other project objective is to compare the state of society, culture, landscapes, watercourses, still water bodies and their using, biotopes and other components that constitute the cultural and natural heritage of Southern Moravia before and after the flooding of large areas during construction of water reservoirs. The project is supported by the Ministry of Culture. The project deals with following localities of river engineering in Southern Moravia: the water reservoirs system of Nové Mlýny, the Vranov water reservoir and the Brno water reservoir.

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 2015, the projects focused on the development of technologies for treatment of storm water from roads and other paved areas. The documentation to all functional samples and pilot plants was prepared, the certificates for utility models were obtained and materials were prepared for the promotion and sale. These activities were carried out by cooperating firms.

The project Strategy for Protection against Negative Impacts of Floods and Erosion Phenomena by Nature-friendly Measures in the Czech Republic was completed in 2015. The project was financed by the Operational Programme "Environment". The project objectives were proposals of the systems of nature-friendly flood and erosion control in basins with the most urgently needed solutions to these issues. The project results are available on the map portal to target groups of users (http://vodavkrajine.cz). The systems of flood protection were supplemented by elements of local protection and effective measures to protect the soil against erosion in order to adapt to the potential impacts of climate change. Documentation was created to complement existing planning agendas in rural areas especially for sub-basin plans, projects of landscaping modifications, territorial systems of ecological stability, and regional plans of forest development and registration of agricultural land use.

The project 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 provided very interesting outputs: the map of vulnerability of watercourses to drying based on abiotic data and retrospective method of bioindication reflecting in macrozoobenthos community the previous episodes of dry-out based on taxonomic and functional assemblages of

macrozoobenthos. Outputs allow to identify the areas with highest risk and to direct properly effective protective measures. The project was supported by the Technology Agency of CR (TA CR).

In 2015, two projects focused on water management in landscape were completed: the project of 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 and two projects supported by TA CR Programme OMEGA focused on new tools for evaluation of water pollution and issues associated with activities in the territories designated for use as a water reservoir in the Czech Republic.

Regarding the support of state administration, the branch staff participated in preparation of data for update of Ministry of Environment Decree No. 263/2002 Coll., on the method and extent of processing the design and determination of floodplains. Simultaneously, the staff of the branch also ensured the tasks arising from the activities of the committees focused on cooperation in transboundary waters with Slovak Republic and Austria. In the framework of the Czech-Slovak Commission for border waters, activities were carried out in a group for the protection of the waters (the evaluation of the results of monitoring of surface waters on the border watercourses and activities to prevent the exceptional deterioration of water quality. The branch participated in the International Commission for the Protection of the Danube River. The activities were focused on requirements for processing the data needed by key expert groups (P&M, MA, Nutrients).

Examples of commercial activities in 2015 are: using the artificial wetlands and extensive water treatment technologies (root wastewater treatment plants, earth filters, stabilization ponds for treatment and final treatment of waste water), the operation of such type of waste water treatment plants and evaluation of impacts of discharged water on water quality in recipients. The clients were local authorities, NGOs, design companies and general public. The hydrochemistry laboratory of the Brno Branch processed analyses of wastewater, surface water and groundwater (samples from WWTPs in small municipalities, surface water samples from systems of fishponds and water samples from technologies to remove the pollution from surface washout from roads. In addition, several types of analyses of solid matrices were carried out.

Similarly, the staff of the Department of hydrobiology in Brno Branch perform broad spectrum of microbiological and hydrobiological analyses in samples of different types of water and selected types of solid matrices to determine the water quality, evaluation of ecological status using biological components (phytobenthos, macrozoobenthos, macrophytes, the extent of water eutrophisation (the content of chlorophyll-a and phaeopigments, determination of trophic potential) and microscopic determination of current status of water environment. The department is equipped for basic molecular biological techniques as polymerase chain reaction (PCR) and fluorescence in situ hybridization (FISH).

The expert activity of the **Ostrava Branch** is focused mainly on monitoring and evaluation of the physico-chemical and biological characteristics of processes in hydrosphere to ensure its protection. The branch activity is also focused on participation in public tenders on water protection, on status and changes of water ecosystems and on other activities. Thanks to that, a wide range of project is carried out according the requirements of contracting authorities (Technological 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).

In 2015, two research projects, the Ostrava Branch was responsible for, were completed: the project Discover the Secrets of Science and the project Documentation, Passportization, Archiving and Conversion Proposals of Chimney Reservoirs as an Endangered Group of Industrial Heritage Sites in the Czech Republic.

The staff of the branch participated in research projects supervised by other units of the Institute that were completed in 2015: 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 and the project Cost-appropriateness Evaluation of Ensuring a Good Status of Water (TA CR OMEGA). The branch participates also in the project Monitoring of NATURA 2000 Sites as a Tool for Effective Management and Conservation of Autochthonous Crayfish. In the long term, the activities are carried out for support of state administration in water management and in waste management according to needs of the founder Ministry of Environment.

The core activities of the **Centre for Waste Management** were the actions for Ministry of the Environment (preparation of supporting documents for decision making and creation of legislative provisions). Specifically, the issues of metals were dealt with. The objective was to prevent the illegal waste management and buying illegally obtained objects. The material was the basis for the amendment of Decree No. 383/2001 Coll., on details of the management of waste. The decree entered into force in 2015. Other activities were focused on mapping the area of the landfill of waste. Especially, the focus was on using the waste as a technology material for protection of landfills and on types of waste landfill of which have to be gradually reduced and prohibited according to EU directives. All projects were completed successfully, including the final inspection by the contracting authority.

The comments were processed on the legislative proposals of the Decree No. 382/2001 Coll., on the conditions of application of the adapted sludge on agricultural land, the framework positions on draft directives of the European Commission from so called package to the circulation management and the law on waste.

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 worked in important professional organizations, e.g. Council for Waste Management or Technical Working Group for waste processing.

Branch of Applied Ecology completed the project called Erosion Washout: Increased Possibility of Danger for Population and Water Quality in Connection with Expected Climate Change in 2015. The project was carried out in collaboration with the Czech Technical University in Prague and supported by Ministry of the Interior. The project was focused on modeling the critical points where there is a threat to settlements, critical infrastructure and aquatic and terrestrial ecosystems by the influence of the soil erosion and sediment transport. The final version of the Methodology for determining the area potentially threatened by the impacts of heavy rainfall associated with soil erosion, taking into account expected climate changes was prepared. The interactive software tool for presentation of the research results was completed.

Several projects supported by TA CR were completed in 2015. Projects focused on impacts of socio-economic changes on water use and on cost-appropriateness evaluation of ensuring a good status of water were completed by processing the certified methodologies and by software for modeling of impacts of socio-economic changes on water use.

Four utility models and proposal of methodology were created in the project that dealt with the application of wooden structures for the revitalization of watercourses and seminatural modifications.

In the project focused on eutrophication of water reservoirs, the software was completed. The software allows evaluate the eutrophication potential of phosphorus sources and simulate the effects of proposed measures on status of water at monitored sites.

Other project supported by TA CR was focused on economic and management issues ("water footprint") and biological topics (the relationship between the watercourse ecological status and hydromorphological parameters).

The project focused on protection of *Margaritifera margaritifera* in the catchment of the Vltava River was completed in 2015. The project was carried out in cooperation with the National Park Šumava. The branch is responsible for mapping of occurrence of the species, bioindicative tests in situ and ex situ, monitoring of water quality and the evaluation of the influence of the number of visitors on the species. The project focused on mapping of molluscs of European importance (e.g. *Unio crassus, Vertigo angustior*) was completed in 2015.

Three projects financed from the EES funds started in 2015. First project is dedicated to monitoring and research on populations of threatened species of crayfish. The activities of the project were focused on the research in the field. Many informative events for professionals and the public were organized. Mutual visits of cooperating experts from the Czech Republic and Norway took place. Second project deals with chemical monitoring and biomonitoring of the Horní Malše River focused on fresh water pearl mussel demands. The project will provide important supporting document for implementation of a part of the Rescue program for *Margaritifera margaritifera* in Czechia. Last project deals with fragmentation of river network that restricts two-way migration of fish. The project is focused on finding suitable pilot projects for removing migration barriers in territories with priority of nature protection in national and international scale.

The extensive survey on wastewater management including wastewater sampling for determination of phosphorus in more than 250 parts of municipalities in the catchments of watercourses Lomnice, Skalice and Loděnice was carried out for the River Board Povodí Vltavy, s.e. The evaluated data were processed into the geographical layers and detailed text reports.

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 intra-laboratory 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., Code, 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 2015, 283 laboratories from CR and Slovakia participated in testing. ASLAB organized 6 PT projects in chemistry and radiology in 2015, in which 230 laboratories participated. Three projects in biology were organized and 53 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 the Certificate on Good Laboratory Practice to 16 newly assessed laboratories in 2015; 51 such certificates were in force by 31st December 2015. In the area of good laboratory practice, ASLAB checked by 31st December 2015 eight 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 the 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.

Support for the state administration and projects within the competence of the Ministry of the Environment were an important component of the additional and other activity of the Institute in 2015 (26 projects in 2015). The Ministry of the Environment is responsible for many obligations arising from national and European legislation. Expert support for fulfillment of the obligations is involved in many current partial projects. Most attention is focused on technical support in the implementation and reporting of selected EU directives and international cooperation in the field of water, on data and expert support to the Ministry of the Environment as a central water office, planning and monitoring of water.

In 2015, the support for the state administration consisted of these topics:

- expert support of international cooperation in the field of water protection;
- management and operation of registers and summary of information in the field of water management;
- expert support of reporting for the EU and support of implementation of European legislation in the field of water protection;
- information and expert support in the area of water protection beyond the previous topics.

International cooperation took place in international commissions for water protection and on transboundary water. Following activities took place:

- support of participation of the CR in activities of the International Commission for the Protection of the Elbe River (ICPER),
- support of participation of the CR in activities of the International Commission for the Protection of the Danube River (ICPDR),
- support of participation of the CR in activities of the International Commission for the Protection against Pollution of the Odra River (ICPO),
- expert support of expert groups set up by the European Commission,
- support of participation of the CR of the Standing Committee for Saxony and the Standing Committee for Bavaria of the Czech-German Commission for Transboundary Waters,
- cooperation on border waters with Slovakia,
- cooperation on border waters with Austria,
- cooperation on border waters with Poland.

The operation and publishing of data of selected databases of information system ISVS and summary information on water management: this topic is focused on creation of the selected expert supporting documents for needs of the Ministry of the Environment. It is necessary to collect and processed these supporting documents with regard to the requirements of section 108 of the Act No. 254/2001 Coll., on waters, as amended (the Water Act). These are in particular the documents that are necessary to ensure the role of the Ministry of the Environment as a central water office.

Expert support of the reporting for EU and support of implementation of European legislation in the field of water protection included collection and processing of documents relevant to the CR due to the implementation of the provisions of the relevant EU directives and their amendments, including a proposal for the transposition into national legislation in 2015. That are mainly the following directives: 2000/60/EC (the Water Framework Directive), 2006/7/EC (bathing water),

2006/44/EC (surface water requiring protection or improvement to support fish life), 2006/11/EC (dangerous substances), 2007/60/EC (floods), 91/271/EEC (urban wastewater treatment), 91/676/EEC (protection of waters against pollution caused by nitrates from agricultural sources), 2008/105/EC (environmental quality standards), 2009/90/EC (technical specifications for chemical analysis and monitoring of water status).

Data and expert support in the area of water protection beyond the previous topics was related to: processing of data and expert documents of determination of emission limits application; processing of risks of ecological harm assessment; methodological and technical support to the planning process in water management and a system for monitoring and evaluation of water status in the CR under the relevant provisions of Water Act; ensuring expert supporting documents for Ministry of the Environment that must be collected and processed with regard to the requirements of the Directive 2007/60/EC on the assessment and management of flood risks in the area of flood damages and the cost of the implementation of relevant measures to minimize the damages; participation of representatives of the CR in working groups of the European Commission for intercalibration of the methods and procedures of evaluation of biological components of ecological status.

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 6 providers with a total of 65 of the proposed projects in the framework of the announced tenders and programmes realized according to the Act No. 130/2002 Coll. The Institute succeeded with 7 projects (10.8 % success). The results of the 14 projects will be announced in August 2016.

In 2015, 73 business opportunities were found on the Internet. The opportunities were proposals of commercial contracts based on different calls and public procurements. Ten proposals have been prepared after consultation and six contracts have been obtained. Other possibilities of obtaining the projects from direct offer, besides these found by a specialized department were discussed by research managers.

4.1 Main Activities

4.1.1 Publications in Journals

In 2015, the employees of the Institute were authors or coauthors of 34 contributions in scientific journals. The absolute majority of the journals were peer reviewed. Three contributions were published in journals with IF (Limnologica, Journal of Radioanalytical and Nuclear Chemistry and Water, Air, and Soil Pollution).

4.1.2 Monographs

TGM Water Research Institute published in 2015 the following monographs and important certified methodologies: Fuksa, J.K. et al.: Water Springs of the City of Prague, Situation in 2011–2013; Hanslík, E. et al.: Study of Selected Radiological, Biological and Physico-chemical Indicators Behaviour in Hydrosphere in Vicinity of the Temelín Nuclear Power Plant; Datel J. V. et al.: Specifics of Comprehensive Management of Small-Sized Water Resources; Ansorge, L. et al.: Water needs scenarios for the 2030–2050 period, Energy and water supply sector (case study); Slavíková, L. et al.: Methodology for the Application of Cost Disproportionality Exemptions When Reaching Good Status of Water Bodies; Ansorge, L. et al.: Methodology for Determining Water Demand Based on Indicators of the Driving Forces of Water Demand; Mlejnská, E. et al.: Operation and Treatment Efficiency Optimization of Wastewater from Small Municipalities Using Extensive Wastewater Treatment Technologies; Rosendorf, P. et al.: Methodology for assessment of pollution sources influence on water reservoirs eutrophication; Pavelková, R. et al.: Former ponds in the Czech Republic: case studies of potential utilization of areas; Forejtníková, M. et al.: Heritage and its Vulnerability to Natural and Anthropogenic Stresses, Telč, 1.–2. 6. 2015 (CD).

The employees of the Institute participated in the other five publications and in processing of chapters in two monographs published e.g. by publishing house Springer-Verlag.
The employees of the Department of hydrology were members of author team of the important monograph Drought in the Czech Lands: Past, Present and Future.

4.1.3 Results with legal protection and technically implemented results

In 2015, many technically implemented research results have been created in the Institute. The three utility models were registered: *Surface Runoff Sampling Device (*project Development of Technologies for Road and Other Paved Areas Stormwater Runoff Cleaning*);* technical solution of *Partition to Divide Tanks for Further Treatment of Waste Waters* allows to divide the tank for further treatment of wastewater to an anaerobic and an aerobic part*; Filter Formed by Floating Vegetation Island with Submerged Elements* is intended for elimination of trash discharge from the water level surface of water reservoirs to recipients and *Wooden Obstacle Designed for Embedding into Watercourses* mimicking uprooted tree is designed for such cases where stream restoration and semi-natural stream regulation is preferred.

A prototype is *Combination of Biological Household Treatment Plants with Low-loaded Biological Polishing Ponds.*

Five functional samples useable in the frame of extensive technologies of wastewater treatment were created: *Filtering Materials Washer with Biological-enzymatic Preparations, Final Purification Filter with Specific Filling* for the final purification of stabilization ponds and root filters*, Floating Mixing Island with Autonomous Energy Source* for enhancement of conditions for water treatment processes in biological tanks*,* and *Pulse Control Outlet Gate* and *Distribution Shaft – Turbiny-over Device.*

In 2015, following pilot plants were developed: *Distribution Pipeline with Separated Sedimentation Zone* for the filter inflow water distribution, Bioreactor for Biological-enzymatic Preparations Culturing for support wastewater treatment processes, *Filter for Secondary Pollution of the Biological Tanks Reduction* and the *Three-stage of Technology for Runoff Water Treatment* is developed for interception and treatment of storm water runoff.

4.1.4 International cooperation in research

Examples of international projects are: IHA UNESCO: FRIEND (Flow Regime from International and Network Data), AQUARIUS – Assessing Water Quality Improvement Options Concerning Nutrient and Pharmaceutical Contaminants in Rural Watersheds (Norway Grants), Protection of our Most Vulnerable Biotopes – Wetlands and Steppes (Norway Grants), Science Management of Intermittent Rivers and Ephemeral Streams (EU), Monitoring of NATURA 2000 Sites as a Tool for Effective Management and Conservation of Autochthonous Crayfish.

Other examples of international cooperation are collaboration with Koblenz-Landau University concerning the fauna in groundwater and collaboration with Federal Institute of Hydrology in Koblenz on homogenization of time series for selected gauges on the Elbe River.

4.1.5 Presentation at international meetings of experts

The employees of the Institute participated in international experience exchange. They participated in organization of the 2nd International Interdisciplinary Conference on Land Use and Water Quality: Agricultural Production and the Environment (Vienna, Austria). They prepared the meeting of expert group Nutrients in the CR for the group working in the frame of International Commission for the Protection of the Danube River (Nový Světlov castle at Bojkovice).

They participated in 22 international conferences and had 32 oral presentations, conference proceedings or posters. The most important conferences were e.g. 42nd IAH Congress (Rome, Italy), 2nd International Conference Hydro-meteorological Risks and Climate Change (Cholula, Puebla, Mexico), Testing the Waters – 2nd International Conference on Wastewater-based Drug Epidemiology (Ascona, Spain), Sustainability Accounting for Innovation Management (San Sebastian, Spain), 9th Symposium for European Freshwater Sciences (Geneva, Switzerland), 27th International Congress for Conservation Biology (Montpellier, France), CheriScape – Cultural Heritage in Landscape (Madrid, Spain) etc.

4.1.6 Important national meetings of experts

In 2015, employees of TGM WRI, p.r.i., organized or participated in preparation of more than 20 conferences, seminars and workshops. Examples are: National dialogue on Water (the Institute participated in organization), expert seminar with the company GEOtest, a. s., for potential users of the results of the project Ensuring the Quality of Drinking Water Supplied to Small Municipalities from Local Sources, conference Radiology Methods in Hydrology 15, XXIInd consultation days for water radiological laboratory workers, opening seminar of the project Monitoring of Long-term Changes in Biological Diversity of Running Waters during Climate Change: Design, Realization, and Implementation in the ARROW Public Information System, conference Ponds – Our Heritage and Wealth for the Future, workshop New Using of Smokestacks with Water Tanks, conference Discover the Secrets of Science, popularizing lecture in collaboration with the Science Café on the topic Model of Future Water Needs, lecture events with the theme of the occurrence of crayfish and their protection for professionals and general public, Practical training for workers of microbiological laboratories, the course Sampling for Water Management and Inspection Laboratories etc.

The employees of TGM WRI had 51 presentations (oral and posters) at 24 national conferences and seminars: National Dialogue on Water, A. Patera Workshop – Extreme Hydrological Events in Catchments, Operation of Water Pipelines and Sewerage Systems, Radiology Methods in Hydrology 15,

Water 2015, the Conference of the Czech Limnological Society and of the Slovak Limnological Society etc.

4.2 Additional and other activity

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 2015. They created Support materials for *Government Order No. 401/2015 Coll.* concerning radioactive contamination of the hydrosphere. Other examples follow:

Government Regulation no. 61/2003 Coll. as *Government Regulation no. 401/2015 Coll.* was amended. Commission implementing decisions for selected industrial sectors into the Annex no. 1, Tab. 2 were implemented. Completely new design of Annex no. 3 (allowable values of pollution and environmental quality standards for surface water and biota) was prepared.

The structure of planning study LASW contains instructions that absolute bar items should include the task of planning study in the event that part of the area is localities suitable for surface water storage (LASW).

The Proposal of a System for Managing Emergency Situations Associated with Drought and Water Scarcity in the Czech Republic was processed. The Institute staff prepared 25 methodologies mainly for the Ministry of Environment and the Ministry of Agriculture. Examples are: *The Methodology for Bound Determination of Hydrological Drought Indices*, *The Methodology for Compiling a Hierarchy of Measures for Each Phase of Drought Risk, Methodology for Assessment of Pollution Sources Influence on Water Reservoirs Eutrophication*, *The Methodology for Application of Wastewater Epidemiology for Determination Illicit Drug Consumption in the Czech Republic, Methodology for Comprehensive Management of Small Water Resources to Ensure Optimal Quality of Drinking Water in Normal and Emergency Situations* etc.

The Institute staff also participated in preparation of ČSN 757714 *Water quality – Biological analysis – Determination of benthos.* They evaluated in total 21 standards in the frame of cooperation with Technical Standards Committee.

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 2015, the expert opinions were prepared e.g. for Directorate of Waterways and for The Olomouc Railway Infrastructure Administration. Road construction was assessed according to the requirements of the EU framework directive on water policy. The expert opinion on the impact of the supplements installed in domestic wastewater treatment plants was prepared etc.

The other clients of consulting are local authorities, NGOs, specialized laboratories and general public. Example of consulting activity is in using the artificial wetlands and extensive water treatment technologies etc.

The support of the state administration was focused on the activity of the interdepartmental commission Water-Drought and Proposal of a System for Managing Emergency Situations Associated with Drought and Water Scarcity was prepared. The supporting documents for Proposal of Conceptual Solution of Price Regulation in Water Supply were prepared for Government Office. The operation and publishing of data of selected databases of information system ISVS-VODA is an example of the support for the Ministry of the Environment.

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 state administration and local authorities.

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 against Pollution of the Odra River, Commission for Transboundary Waters with Poland, International Commission for the Protection of the Danube River 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 is also collaboration with universities. The staff of the Institute presented a series of lectures at e.g. the Faculty of Environmental Sciences of the Czech University of Life Sciences, the Faculty of Natural Sciences of the Charles University, the Faculty of Natural Sciences of the Masaryk University, the VSB-Technical University of Ostrava, the Faculty of Natural Sciences of the Ostrava University and the Brno University of Technology. The employees of the Institute provide consultations and are supervisors of dissertation and diploma theses (Faculty of Natural Sciences of Charles University, Czech University of Life Sciences 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.

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, interdepartmental commission Water-Drought, International Association of Hydrogeologists IAH, Nitrate committee EC etc.

4.3 Economic issues

For 2015, the same applies as has already been said about 2014. The positive is the fact that despite the considerable difficulties with the implementation of the budget, it was kept as balanced with little economic results. 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. The overall economy was influenced by the project Strategy of the Protection against the Negative Impacts of Floods and Erosion Phenomena by the Semi-natural Measures in the Czech Republic. The reasons were: the high cofinancing ratio and the fact that the overhead costs associated with the project were not recognized.

To ensure the smooth progress of the project, it was necessary to use a considerable amount of income from commercial activities. We could not generate a profit again. Consequently, it was not possible to fill the reproduction fund. Another negative fact is that, for projects that are financed after the monitored period, there is a considerable delay in funding by providers. Therefore, the cash-flow of the Institute is disrupted and the only way to resolve such situation is to use a loan. Certainly, it brings additional costs because of interest.

A very positive can be considered the cooperation with the founder mainly at support of the state administration. However, this cannot be said for some other providers. Misinterpretations had happened, consequently the sources were reduced for implementation of a project. The probable reasons were the misunderstanding of reality and efforts to strengthen the requirements of the EU. Specifically, some essential cost items were not recognized. It was necessary to co-finance the projects again.

Co-financing of the contracts remains a recurring problem because the Institute mainly deals with main activity, namely research, and it is non-profit. There is insufficient space for commercial

activity from which the co-financing could be paid. For this reason we will be forced to not to use this option in many cases although we have the expertise and we are able to submit and run the quality projects.

The impact of VAT has a recurring negative effect on the economy of the Institute.

The budget of CZK 307 312 thousand for 2015, was created balanced in accordance with Act No. 341/2005 Coll. on public research institutions. Total revenues amounted in 2015 to CZK 282 487 593.93 and costs reached CZK 281 191 898.87. Consequently, the total outcome of the Institute's activities was represented by the end-of-year result of CZK 1 295 695.06 in surplus. The proposal to transfer the whole positive outcome in 2014 in reserve fund was submitted to the relevant bodies of the Institute.

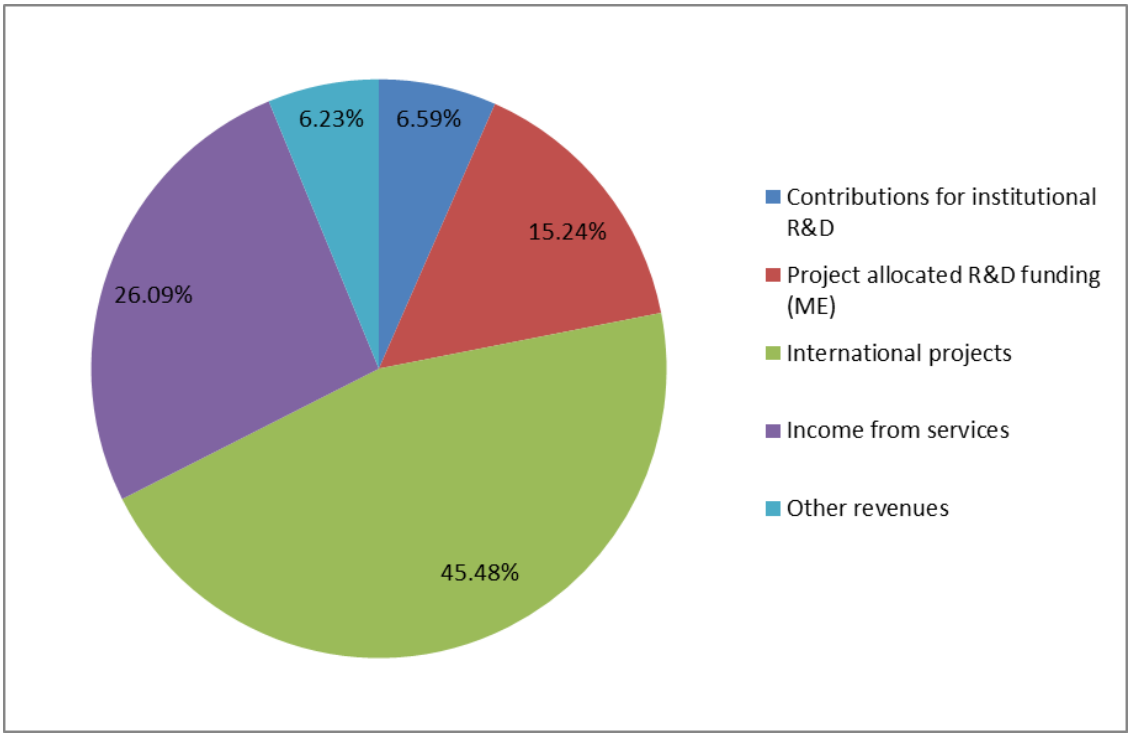

Fig. 1. Revenue structure

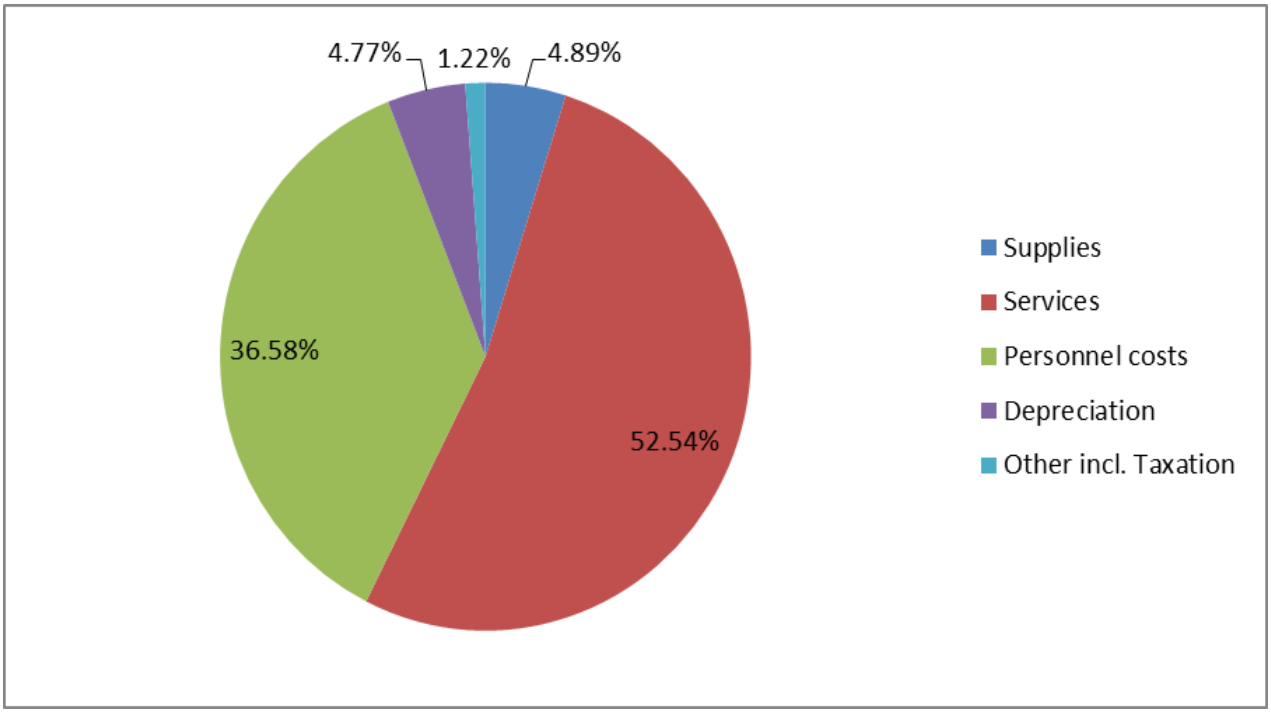

Fig. 2. Cost structure

5 Other Requested Information

5.1 Information on measures for elimination of imperfections of management and their fulfilment

No measures for 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 fulfilment of the purpose of the institution

No things important for fulfilment of the purpose of the institution come 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 in employment relationships

In 2015, there were no major organizational changes. In the Branch of hydraulics, hydrology and hydrogeology two departments were merged (Department of protection of groundwater and Department of hydrogeology and contaminated sites) into the new Department of hydrogeology.

The number of 211.30 employees (average registration recounted number) worked in TGM WRI, p.r.i., in 2015 (31th December 2015). The research and expert employees constituted 85% and operational employees constituted 15% of total employee number.

Table 1. Employees structure according to age and sex – physical state by 31st December 2015

age	men	women	total	%
21–30 years	18	16	34	14.29
31–40 years	31	26	57	23.96
41–50 years	27	28	55	23.10
51–60 years	17	38	55	23.10
61 years and more	23	14	37	15.55
total	**116**	**122**	**238**	**100**

The average age is 46.23 years, the men average age is 46.17 and women average is 46.30 years.

Table 2. Employees structure according to achieved education and sex – physical state by 31st December 2015

Education level	men	women	total	%
Basic school	0	4	4	1.68
Apprenticeship	5	3	8	3.36
Secondary technical	0	1	1	0.42
Completed secondary general	2	2	4	1.68
Completed secondary technical	20	39	59	24.79
Bachelor	2	2	4	1.68
Master	63	59	122	51.27
Doctoral	24	12	36	15.12
total	116	122	238	100

Table 3. Employees structure according to the length of employment and sex – physical state by 31st December 2015

Duration	men	women	total	%
up to 5 years	36	33	69	28.99
6–10 years	27	26	53	22.26
11–15 years	20	24	44	18.48
16–20 years	18	16	34	14.28
over 20 years	15	23	38	15.96
total	116	122	238	100

The project Professional practice for young people under 30 years of age in Prague finished in 2015. T. G. Masaryk Water Research Institute, p.r.i. supported in total eight jobs aimed to university graduates since 2014 when the project was launched. 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 delegate of Czechia in organization Global Water Partnership – Central and Eastern Europe since 2009.

5.6 Supposed development of the organization in 2016

It can be expected that also the 2016 year will be economically very challenging mainly from point of view of winning contracts of all kinds. 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 of 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 2015

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
Ensuring the quality of drinking water supplied to small municipalities from local sources	RNDr. J. V. Datel, Ph.D.	Technology Agency of the CR ALFA
Increasing the safety and reliability of culverts with regards to the transfer of flood flows	Ing. P. Balvín	Technology Agency of the CR ALFA
Compensation of negative climate change impacts on water supply and ecosystems using the localities for potential accumulation of surface water	doc. Ing. M. Hanel, Ph.D.	Technology Agency of the CR ALFA
Processing of methodologies concerning the minimum residual flows	Ing. P. Balvín	Ministry of the Environment
The update of vulnerable areas for Nitrate Directive (91/676/EEC)	Ing. A. Hrabánková	Ministry of the Environment
The evaluation of the effectiveness of the action programme (detailed monitoring of impact of implementation of Nitrate Directive on water quality 2015)	Ing. A. Hrabánková	Ministry of Agriculture
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
Precipitation extremes and climate change	doc. Ing. M. Hanel, Ph.D.	Ministry of the Interior
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

Protection of our Most Vulnerable Biotopes – Wetlands and Steppes	Mgr. P. Eckhardt	Norway Grants – Ministry of the Environment – Czech Union for Nature Conservation
Processing of supporting documents and drafts of national River basin plans of Elbe, Oder and Danube - part groundwater	RNDr. H. Prchalová	VRV, a.s.
Increasing water resources availability in selected regions of Karlovy Vary district	Ing. A. Beran	Ministry of Agriculture, programme KUS
General Plan of Water Management in CR	Ing. A. Vizina, Ph.D.	Mendel Univerzity, Brno
Homogenisation of time series	Ing. P. Balvín	BFG Koblenz
Sub-basin district plans of Upper Vltava, Lower Vltava and other Danube tributaries - 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 Labe and The Partial River Basin Management Plan of Lusetian Nisa and other Odra Tributaries – groundwater	RNDr. H. Prchalová	AgPOL, s.r.o.
Collaboration on a physical modeling research of the adjustment of the water duct Decin	Ing. P. Balvín	CTU, faculty of civil engeneering
SEA adaptation strategy	Ing. A. Vizina, Ph.D.	Integra-Consult-ing
Support of fulfillment of conditions to placement for the new nuclear facility of Temelín Nuclear Power Plant	RNDr. J. V. Datel, Ph.D.	Energoprůzkum
Review of monitoring for placement of the new nuclear facility of Dukovany Nuclear Power Plant, DP 1–DP 4, DP 6	doc. RNDr. Z. Hrkal, CSc.	Nuclear Research Institute Řež
Hydrological and hydrogeological survey in vicinity of the new nuclear facility of Dukovany Nuclear Power Plant, DP 5	RNDr. J. V. Datel, Ph.D.	Nuclear Research Institute Řež
Mathematical model of groundwater flow and of substances transport, Dukovany	RNDr. J. V. Datel, Ph.D.	Nuclear Research Institute Řež
Hydrological and hydrogeological survey in vicinity of the new nuclear facility of Dukovany Nuclear Power Plant, DP 7	Ing. A. Hrabánková	Nuclear Research Institute Řež

The evaluation of small hydropower plant hydraulic model in software HEC-RAS	Ing. A. Vizina, Ph.D.	KM-PRONA, a.s.
The data proccessing for feasibility study of water structure Pěčín	Ing. L. Kašpárek, CSc.	SWECO Hydroprojekt
Operation of the Czech Calibration Station for Current Meters	Ing. A. Trávníčková	Joint Contract
Reference Laboratory of Environment Components and Wastes		
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
New drugs – market analysis, epidemiology of use and identification of preventive and harm minimisation strategies	Ing. M. Kvíčalová	Charles University – Ministry of Agriculture
Investigation of the impact of the Temelín Power Plant accident on contamination of the Vltava and Elbe Rivers up to the gauge station Elbe at Hřensko (country boundary)	Ing. E. Hanslík, CSc.	Ministry of the Interior
Support to activities of the permanent and emergency component of nationwide Radiation Monitoring Network	Ing. E. Hanslík, CSc.	Ministry of the Environment and SONS
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
Content of radioactive substances in the Orlík Reservoir and its tributaries after commissioning of the Temelín Nuclear Power Plant – period 2015	Ing. E. Hanslík, CSc.	Vltava River Board, state enterprise
Determination of tritium in surface water influenced by waste water discharged from Temelín Nuclear Power Plant	Ing. B. Sedlářová	Povodí Vltavy, s. e.
Site remediation (removal of contamination)– Nuclear Research Institute Řež	M. Novák	Nuclear Research Institute Řež
The research of detection and determination methods of radioactive contamination	Ing. E. Hanslík, CSc.	National Radiation Protection Institute
Technical report for location of new nuclear source at Dukovany nuclear power plant	Ing. E. Hanslík, CSc.	Nuclear Research Institute Řež

The research of possibilities of operation and treatment efficiency optimization of wastewater from small municipalities using non-conventional wastewater treatment technologies	Ing. E. Mlejnská, Ing. M. Rozkošný, Ph.D.	Technology Agency of the CR
Determination of pesticides in crops hop	Ing. V. Očenášková	PP servis
Seminatural approaches to treatment of municipal wastewater	RNDr. B. Desortová, CSc.	A.R.C., spol. s r.o.
Setting up an organizational team for the national children competition – GWP	Ing. E. Mlejnská	GWP CEE
Consulting – chemistry	Ing. A. Petránová	Joint contract
Consulting – hydrobiology	RNDr. B. Desortová, CSc.	Joint contract
Consulting – radiology	Ing. B. Sedlářová	Joint contract
Consulting – microbiology	RNDr. D. Baudišová, Ph.D.	Joint contract
Branch of Water Protection and Informatics		
Development of Methodological, Planning and Monitoring Measures for Solving of the Fragmentation of the River Continuity in the Czech Republic	Mgr. A. Zbořil	VRV – Technology Agency of the CR ALFA
Water Recreation – Bathing in Bathing Sites and Other Freshwater Bodies	Ing. T. Fojtík	The National Institute of Public Health – Technology Agency of the CR OMEGA
Introduction of new market-based tools to increase the efficiency of the surface water allocation	Ing. L. Petružela, CSc.	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, CSc.	CULS – Technology Agency of the CR OMEGA
Analysis of water balance data of amount of surface water in the Vltava River catchment	Ing. P. Vyskoč	Povodí Vltavy, s. e.
Updating of water resource protection zones	Ing. H. Nováková, Ph.D.	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 the Czech-German Commission for Cross-Border Water	Ing. M. Kalinová	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
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. P. Vyskoč	Ministry of the Environment
The data support of the state administration in the field of water management and cartographic outputs	Mgr. Aleš Zbořil	Ministry of the Environment
Software tools and presentation of outputs	Ing. J. Picek	Ministry of the Interior
Branch of Water Technology		
Final treatment pools used with low intensity	Ing. F. Wanner, Ph.D.	Technology Agency of the CR
Harmonization of the Moldovan legislation in water management with EU legislation	Ing. J. Kučera	Czech Development Agency
Reporting under Article. 15 and Art. 17 of Council Directive no. 91/271 / EEC	Ing. J. Čapková	Ministry of the Environment
Activity of the Testing laboratory for water management facilities	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
Expert opinions of the branch 240	Ing. M. Váňa et al.	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

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
Flooded cultural and natural heritage of Southern Moravia	RNDr. H. Mlejnková, Ph.D.	Ministry of Culture
Complex planning, monitoring, information and educational tools for adaptation to the impacts of climate change, with the main emphasis on agriculture and forestry management in the landscape	Ing. K. Drbal, Ph.D.	Norway Grants – Ministry of the Environment – VUT
The expert support for the evaluation and mitigation of flood risks	Ing. K. 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
New approaches to optimization of integrated protection systems in the context of their economic sustainability	Ing. K. Drbal, Ph.D.	Ministry of Agriculture, programme KUS
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
Monitoring of long-term changes in biological diversity of running waters during climate change: design, realisation, and implementation in the ARROW public information system	Ing. D. Němejcová	Norway Grants – Ministry of the Environment
System of Water Management Infrastructure Monitoring and Maintenance	Mgr. P. Štěpánková, Ph.D.	Ministry of Agriculture, programme KUS
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.	Ministry of Agriculture, programme KUS

The programme of 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
Data processing for Innovation voucher JIC	Ing. M. Rozkošný, Ph.D.	Geosan, spol. s r.o.
Consulting activities – hydrobiology	RNDr. H. Mlejnková, Ph.D.	Joint contract
Ostrava Branch of the Institute		
Modernization of locks on the Elbe	Ing. P. Tušil, Ph.D., MBA	ŘVC ČR
Expert support to legislative regulations within the water management	Ing. P. Tušil, Ph.D., MBA	Ministry of the Environment
Expert support to monitoring and evaluation of groundwater state	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
A comprehensive data base of actual emissions into the aquatic environment in the Czech Republic	Ing. A. Kristová	Ministry of the Environment
Cooperation in transboundary waters with Poland	Ing. L. Trdlica	Ministry of the Environment
Methodical preparation of analysis of solid matrices from running water in laboratories of TGM WRI	Ing. P. Tušil, Ph.D., MBA	Ministry of the Environment
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
Assessment of the project with the Framework Directive	Ing. P. Tušil, Ph.D., MBA	Directorate of Waterways/ISDO
Discover the secrets of science	Ing. R. Kořínek, Ph.D.	Business School Ostrava plc.
Fire retardant in manufacturing and internal environment in the Czech Republic (subcontract)	Ing. T. Mičaník, Ph.D.	EH Services, a.s.
Centre for Waste Management		
Technical security of landfills	Ing. V. Hudáková	Ministry of the Environment
Identification and characterization of waste that will be forbidden to store	Ing. V. Hudáková	Ministry of the Environment
The current situation in the purchase of metal waste in CR	Ing. V. Hudáková	Ministry of the Environment
Expert activity	Ing. D. Sirotková	Joint contract

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
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
Procedures for compilation and verification of water footprint according to international standards	Ing. L. Ansorge	Ministry of Agriculture, programme KUS
Preparation of a Strategy to Mitigate the Effects of Fragmentation of River Networks in the Czech Republic	Ing. J. Musil, Ph.D.	Norway Grants – Ministry of the Environment – Nature Conservation Agency of the Czech Republic
Monitoring of NATURA 2000 sites as a tool for effective management and conservation of autochthonous crayfish	RNDr. J. Svobodová	Norway Grants – Ministry of the Environment
Chemical monitoring and biomonitoring of the river Horní Malše focused on freshwater pearl mussel demands	Ing. V. Kladivová	Norway Grants – Ministry of the Environment (small grant scheme)
Analysis of the current state of information system ARROW	Mgr. L. Opatřilová	Ministry of the Environment
Intercalibration for evaluation of biological components	Mgr. L. Opatřilová	Ministry of the Environment

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 Praha
Mapping F66 – *Rhodeus sericeus* and *Misgurnus fossilis*	Ing. J. Musil, Ph.D.	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	Dort Prachatice
Coexistence of man and freshwater pearl mussel in the Vlatava flood plain	Mgr. O. Simon	VRV, a.s.
The evaluation of municipal sources of pollution in the catchments of Lomnice, Skalice and Loděnice	Mgr. P. Rosendorf	Povodí Vltavy, s. e.
Hydrochemical sampling and analysis for feasibility study	Ing. V. Kladivová	Nature Conservation Agency of the Czech Republic
Detailed monitoring of chemistry in the Blanice national natural monument	Ing. V. Kladivová	Nature Conservation Agency of the Czech Republic
Water monitoring near the waste water treatment plants at Puklice and Chlístov municipalities	Ing. P. Kožený	Kraj Vysočina
Evaluation of impacts of waves caused by navigation on coastal habitats with focus on potential impacts of increased navigation by the realization of the navigation step Děčín	Mgr. L. Opatřilová	Directorate of Waterways
The workflow for designing revitalization measures on waterways	Ing. J. Musil, Ph.D.	Aquatis, a.s.
The of mapping of specially protected species and important European species of fish and Lampreys in small watercourses	Ing. J. Musil, Ph.D.	Nature Conservation Agency of the Czech Republic
The of mapping of specially protected species and important European species of fish and Lampreys in large watercourses	Ing. J. Musil, Ph.D.	Nature Conservation Agency of the Czech Republic
The of mapping of specially protected species and important European species of fish and Lampreys in standing water and in pools	Ing. J. Musil, Ph.D.	Nature Conservation Agency of the Czech Republic
Special monitoring of chemical properties	Mgr. M. Bílý, Ph.D.	Joint contract
Impact of pollution on *Bivalvia*	Mgr. O. Simon	Joint contract

ASLAB Centre for Assessing Proficiency of Laboratories		
Good Laboratory Practice	Ing. P. Finger	Ministry of the Environment
ASLAB Acrcreditation	Ing. R. Dvořák	Joint contract
Courses– Good Laboratory Practice	Ing. P. Finger	Joint contract
Branch of the economic, operation and technical activity		
Global Water Partnership – Central and Eastern Europe	K. Havlák	SHMI
Zdobnice Pěčín – the feasibility study of the construction of rerservoir	K. Havlák	SWECO Hydroprojekt

7 Publishing and Editorial Activities

ADÁMEK, Z., ROZKOŠNÝ, M., HLAVÁČ, D. a SEDLÁČEK, P. Odnos fosforu a nerozpuštěných látek v průběhu výlovu kaprových rybníků. In: *David, V. a Davidová, T. Rybníky – naše dědictví i bohatství pro budoucnost. Praha, 18. 6. 2015*. Praha: Česká technika – nakladatelství ČVUT, 2015, s. 90–98, ISBN 978-80-01-05765-0.

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ANSORGE, L., DLABAL, J., HANEL, M. aj. Scénáře potřeb vody pro období 2030–50. Sektory veřejných vodovodů a energetiky. Případová studie. Praha: VÚV TGM, 2015, 59 s., ISBN 978-80-87402-45-0 (brož.), ISBN 978-80-87402-46-7 (on-line).

ANSORGE, L. a ZEMAN, M. The operational water consumption of energy production: Czech Republic case study. In: *Říha, M. et al. 14th International Symposium Water Management and Hydraulic Engineering. Brno, 8. 9. 2015*. Brno: VUT, 2015, s. 317–328, ISSN 2410-5910.

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BERAN, A. a HANEL, M. Definování zranitelných oblastí z hlediska nedostatku vody na území České republiky. *Vodohospodářské technicko-ekonomické informace*, 2015, roč. 57, č. 4–5, s. 23–26, ISSN 0322-8916.

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BRÁZDIL, R., TRNKA, M., ŘEZNÍČKOVÁ, L. aj. Sucho v českých zemích: minulost, současnost a budoucnost. Brno: Centrum výzkumu globální změny Akademie věd České republiky, 2015, 402 s., ISBN 978-80-87902.

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FIALA, D. Detailní monitoring odnosu fosforu do VD Vranov. In: *Kosour, D. Vodní nádrže 2015. Brno, 6. 10. 2015*. Brno: Povodí Moravy, 2015, s. 68–72, ISBN 978-80-260-8726-7.

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