Mgr. Jan Grolich, Governor of the South Moravian Region, awards a silver commemorative medal to Dr. Ing. Antonín Tůma for his selfless commitment in managing the flood in September 2024

Interview with Dr. Ing. Antonín Tůma, Deputy General Director of the Morava Basin State Enterprise

For the February issue of VTEI, we interviewed a long-time employee of the Morava Basin State Enterprise, the director of the Basin administration, and since 2006 the deputy general director of this organization. A man for whom water management is not a job, but a mission. "Water is the carrier of not only life, but also information and energy. Something so simple, yet so extraordinary, irreplaceable…," says Dr. Ing. Antonín Tůma.

Dr. Tůma, you graduated from the Brno University of Technology, majoring in Water Management and Hydraulic Structures. Why did you choose this field?

The field of Water Management and Water Structures at the Brno University of Technology was a continuation of Water studies that I had started at the Secondary Technical School of Civil Engineering in Brno. It was decided by a personal interview with the then principal of the technical school, Heřman Šťastný. I applied for Civil Engineering and was not accepted due to the large number of applicants. I appealed, my appeal was granted and I was offered an interview with the school management. Although I had already been accepted, I took advantage of the offer of an interview and I will never forget it. The principal was interested in the reasons for my appeal, my interests, why I did not apply, for example, to Geodesy or Water Management Structures, which were offered to me. He was able to speak knowledgeably about all the fields, about their importance, necessity, and application in practice. He was not trying to influence me; he just expressed his opinion on these fields and told me what he would choose if he were me and why. He told me that I had been accepted to the Department of Civil Engineering and that I should

decide for myself and on the appointed date. And even though Water studies lasted a year longer, it was his words that water management was not a job but a mission that decided. So, I asked to be transferred to the Department of Water Management and his words about the mission still ring in my head; he was absolutely right.

You have been working for the Morava Basin State Enterprise for more than three decades. Can you remember your professional beginnings?

It is impossible to forget. I joined the Water Development Department and the interviews, as well as the first weeks and months still come back to me and are inspiring to me. Once again, luck played a role in the personalities who accompanied me throughout my professional life. In our very first interview, the head of the department, Ing. Pavel Rotschein was able to explain the mission that the principal of the industrial school had spoken about ten years before. He introduced me not only to all the department's agendas, but also to all the company's professional activities. I remember it like it was today. It was a time before the Velvet Revolution and he already said back then that water management is a lifelong job, that water will continue to be the most essential element in the future and the need to protect it will be increasingly crucial.

What ambitions did you have when you started working for the Morava Basin, and have these ambitions changed over time based on your experience?

I would not say ambitions. I was young, did not have much experience, but I knew that I wanted to stay in the field of water. I chose to work at the Morava Basin because of the complexity of the management of water resources, watercourses and, above all, the entire river basin; as I say, from Poland to Austria. The only thing that has changed is that water needs more care, it is becoming increasingly important, it is increasingly vulnerable. We have little of it, none flows into our country, and what we have we must share responsibly with the landscape; it needs it for its survival just as much as humans do. Climate change constantly brings new challenges, for example in the area of water quality. In the past, we set limits on the extent to which wastewater needs to be treated in order to establish an optimal equilibrium state; however, conditions in watercourses have changed. Climate change is increasing air and water temperatures, flows are decreasing, many watercourses – even significant ones – are becoming intermittent streams, and there is literally nothing to discharge into. For weeks, only treated, and often untreated, water flows in our streams. The result is surface water trophism, accompanied by fish deaths and accidents.

In the last few years, the Morava Basin State Enterprise has implemented a number of semi-natural restoration measures. For example, restoration of the Jihlávka stream in the village of Prostředkovice near Jihlava, the restoration of the Banínský stream near Svitavy that began last year, or the restoration of the Svratka near Jimramov. How do you personally perceive these measures?

I do not understand why non-governmental, ecological, and other organizations are fighting over the form of flood protection, as well as the fact that other entities and organizations are getting involved in this fight. There is nothing to argue about, nothing to measure. Semi-natural measures and technical flood protection measures cannot be compared. Measures in the landscape (infiltration, changes in landscape management and so on) are intended to prevent surface runoff and ensure that floods do not occur in the network of watercourses. If a flood comes, it means that all of the above could no longer function, and then we have large flows in watercourses, high levels, and we must either protect ourselves from the negative effects of this element or run away, move out. There is no other solution. We must realize that all property owners, both natural and legal persons, as well as towns and villages, are responsible for flood protection, according to the Government-approved *Flood Protection Strategy in the Czech Republic* from 2000. In order to reduce the burden on protected entities, the state has created a number of subsidy titles under the responsibility of the Ministry of Agriculture and the Ministry of the Environment in connection with this strategy. And the protected entity must prepare for the worst – that is, even for a period when the landscape is frozen, vegetation is not growing and the area is fully saturated. This is precisely where we can see that the two parties are waging an unnecessary fight, because the measures complement each other – where semi-natural measures with regard to the amount of precipitation end, technical measures begin; flood protection depends on both. It is necessary to realize why we are proposing these measures. If we are to protect ourselves from a flood caused by precipitation totalling 50 mm or even 100 mm, then we must have realistic measures that can accommodate this volume of water – the landscape, the valley floodplain without development – and at the same time prevent this mass from moving down the slope. Today, we are able to model and predict the situation well, including processes in watercourses and interaction with groundwater. To give an example, last September above Vranov, the landscape functioned well; it was not frozen and the area is partially forested, so the soil had the ability to infiltrate well and the excess water that the landscape did not retain was 126 million m^3. This volume was already in the watercourses and no measures other than technical ones could solve the problem. Part of it was discharged in advance before the rainfall, part was released through capacious dammed watercourses during the rainfall and the rest after the rainfall, so that villages and towns were not flooded. Thanks to the flow control at the Vranov reservoir, the Thaya was flowing at 220 m^3/s; without the reservoir it would have been 435 m^3/s. It was similar on the Svratka below the Vír reservoir. Due to the flow control, it was possible to discharge 40 m^3/s, without the reservoir it would have been 138 m^3/s – that is why the city of Brno was not under water. In both cases, however, the landscape retained the precipitation, capturing some of it, but only in the volume possible.

What other projects are you currently implementing and planning within the basin management?

Our priority is to mitigate both hydrological extremes, i.e. both the impacts of floods and increasing the security of raw water supplies for the water industry. The public is not aware of these impacts at all; people do not have basic information. More than half of the Czech population does not have access to quality drinking water and is dependent on drinking water from reservoirs – that is, surface water. How is it possible that there are people who fight against reservoirs? They are actually fighting against humans having the opportunity to drink water in the future. And not only humans, but all animals and plants. Groundwater supplies are decreasing, and their quality is threatened by all kinds of pollution. What about water? I will try to put it simply. Previously, the planet was able to manage the water cycle itself. It has lost this ability due to human intervention, and it is up to us to try to help this management. Extremes are getting worse, and we can mitigate them by participating in water management. In times of surplus, we will accumulate it and in times of shortage, we will use the accumulated water. We can only do management in reservoirs from which we are able to abstract water during a long-term drought, ensure the supply of raw water, improve minimum residual flows, for example for diluting wastewater, etc. To be specific: we are preparing the construction of the Vlachovice reservoir, which will be a source of drinking water for the Zlín region but can also provide other functions – protect against floods, improve ecological flows below the reservoir, and more.

As part of our efforts to mitigate the impacts of floods, our next major project is the preparation of the Skalička reservoir on the Bečva. At the moment, towns and villages on the Bečva have the opportunity to protect themselves

from a maximum of fifty-year water. This is due to the floodplain morphology and the size of floods on the Bečva. That is why the reservoir is important; it will help ensure or supplement protection up to the level of a hundred-year water. It is incomprehensible to me that the public, especially those who are environmentally focused, blocked the construction of a multi-purpose reservoir and pushed through a dry reservoir. Such a reservoir can capture flood, but it cannot manage water. In the future, we will increasingly lack water. We can expect the same amount of water from annual precipitation, but it will be unevenly distributed and we will share the water with nature. Nature is already consuming more and more of it to cope with climate change. We have greater evaporation, evapotranspiration, and only less than half of the water reaches the watercourse network. This is how it should be, because the landscape is able to manage the water – due to higher temperatures and a longer growing season, it will take in enough water to survive. Humans should do the same – they should not lose the opportunity to retain spring water and rainwater in a reservoir and use it for all the purposes described above in the summer, during drought. Flood protection is always a combination of a number of measures, from retaining water in the landscape to technical measures such as dam systems, controlled inundations, and the construction and operation of large reservoirs. The measures therefore complement each other; do not compete with each other but build on each other.

If I am not mistaken, it is mainly thanks to your efforts that the Soutok area is flooded in a controlled manner every spring.

Climate change impact is most evident in South Moravia in the area of the confluence of the Morava and the Dyje, which is called Soutok. The unevenness of precipitation and, above all, the decline in flow rates in watercourses due to high water consumption in the landscape in the dry months also cause a decline in groundwater levels. The crystalline rocks of the Vysočina cannot retain much water and do not release it into the basin below. The Quaternary of the Morava River suffers equally during times of low flow, and so the alluvial forests at the confluence suffer as well. I consider this to be the worst impact of climate change; the upper parts of the centuries-old oaks dry up and the entire area suffers. And so, based on the requirements of the Soutok administrator, Forests of the Czech Republic, we are trying to use the capabilities of the Nové Mlýny reservoir system, accumulate surface spring water in reservoirs and create an artificial flood, which will allow the alluvial forest to be flooded with increased flows and a system of canals. However, this can only be done when there is enough water. The Forests of the Czech Republic state enterprise responded to this fact and prepared the project titled "*Restoration of the natural water regime of the restored system in Soutok – Podluží SCI*", which will include not only the restoration of the entire historical system of canals and equipment, but also the construction of a reservoir on the Thaya, the aim of which will be the effective use of water for "flooding". I personally estimate that this measure will ensure approximately 80 percent water savings. I am talking about saving water that must flow through the Thaya in to be able to "flood". This water is not lost but flows via the Thaya to the neighbouring countries. However, thanks to the dam, "flooding" will be possible almost at any time and with less demand on flow rates, and the "saved" water can then be used, for example, in times of drought.

In September last year, floods hit the Czech Republic, largely in the area managed by the Morava Basin State Enterprise. Although forecasts indicated that floods would occur, the extent of the floods surprised everyone.

The scale really surprised us. No one expected that catastrophic floods like those in 1997 could be repeated so soon with this intensity and in the same place. It is becoming evident that flood extremes are deepening and that they can be expected with a much greater probability than statistics indicate. A five-hundred-year flood can thus occur much more often than once in five hundred years, but then the time for the next flood to arrive should be extended; these are statistics. However, I myself think that a lot has changed and that floods will occur more often, as will dry periods. We should be wise enough to realize this, learn to live with floods and droughts, prepare for them, and not fight them. We will not win over floods or droughts, we will not stop them, we can only reduce their impacts and in some cases even eliminate them.

From your perspective, how did these latest floods compare to previous ones and what additional experience did they bring you?

Last year's floods were significantly different from the floods of 1997 – not so much in their volume, but especially in the communication and coordination of individual components: the Reporting and Forecasting Service, responses of water managers to the control and transformation of floods by waterworks, rescue services, coordination between crisis teams, implementation of preventive measures, and evacuation of residents. This is called flood management; a process of effectively responding to a flood with the aim of minimizing its negative impacts.

Compared to other floods, all these measures were exceptional. Starting with the forecasts, which were not only accurate, but especially timely. Everyone could prepare for the floods well in advance, and where we had reservoirs available, we were able to pre-drain them sufficiently, literally create an artificial flood in the watercourses even before the rain started (but only up to the capacity of the riverbeds) and prepare sufficient space for the flood transformation in the reservoir. For this, all reservoirs have free retention space, but here, considering the size of the expected flood, it was necessary to free up the reservoir's storage space so that the extreme flood could be dampened as much as possible. However, if the flood had not occurred, it would have had an impact on drinking water supply – mainly reservoirs for water supply were pre-drained, especially Vír, Vranov and others. These reservoirs saved a number of towns and villages, especially on the Svratka and Thaya rivers. We gradually gain experience with all floods. After a flood, we have enough time for calculations and evaluations. During floods, dispatchers have to make decisions within a few seconds or minutes and consider an incredible amount of information. Every flood is different, so it is necessary to know the saturation of the area, which changes its finish and influences its transformation, to consider the culmination of tributaries, their time distribution, to exclude their confluence by controlling reservoirs, to know the capacities not only of watercourses with dam systems, but also inundation volumes, free spaces in water reservoirs, to address the impact of rainfall dilution effect during floods... It would be an endless list.

In September 2024, all this experience was put to good use and the floods in the Thaya-Svratka system were transformed into harmless flows. The capacities of the dammed watercourses were used to the maximum extent, water was pre-drained in a timely manner and with great precision before the rainfall, water was maintained in the riverbeds and active zones during the flood period by controlling, and reserves were even created in the event of repeated extreme rainfall. The lowest reservoirs – the Nové Mlýny reservoir system – were pre-drained in a timely manner – the upper reservoir even up to the inactive storage water level, in order to create a greater gradient for the drainage of the area in the basin above the reservoirs, which is always extremely and for a long time saturated by the passage of the flood. On the Morava, where there is a large absence of reservoirs, it was not possible to create retention and it was necessary to rely on flood control measures that were built after 1997. They all worked very well, as long as the flood in the area was not greater than the design flow for the built protection. The Branná, Krupá, Desná and the upper reaches of the Morava had to withstand up to a five-hundred-year flood and

larger; there, the dam systems were exceeded and overflowed. However, there was no break in dams, as the media mistakenly reported. The same applies to the Oder river basin area. It is necessary to realize that at the moment, the repair of the water management infrastructure damaged by the flood is our top priority, and I estimate, this will take more than ten years.

In the case of floods and droughts, water managers and the state often face criticism from the public that they are not doing enough to fight it. What do you think of this criticism and what message would you send to the public?

It is a misunderstanding of basic natural processes. People believe what they hear, what someone presents, without checking whether it is true. Then they evaluate our work, which they do not understand, subjectively. I have already mentioned this in my previous responses. People want sensations; for example, in the media, local citizens, who usually only have local experience, give their opinions to reporters about the course of the flood, and experts are not given space. People believe simple statements and do not try to ask themselves questions and use common sense to find answers. How much did it rain? How long did it rain? What would happen if those five hundred millimetres fell on my garden? Where would the water flow if it also flowed from the neighbours? How much would it be? etc. Then they would not believe that farmers or the head of the dispatch centre are to blame; this happens as well. People call, saying that we are to blame, that we let it in, that it is our water (even if there are no reservoirs there). What would I say to them? Educate yourselves, be interested, and feel free to call or write if something is unclear. But most importantly, trust the experts. They do this work so that water does not harm, so that there is enough of it not only for humans, but also for nature, and so that future generations have the same access to water as we do. There will be less and less of it, and we cannot do without it.

Raising awareness of your work is not just a matter of issuing press releases. For example, your colleague is behind the interesting project "*Water with a Brush and a Poem*", which seeks to promote the topic of water and water management among the children. Especially in terms of its reach, I personally think that a project like this not only makes your work and the work of your colleagues more visible, but that also other river basin managers should join in.

We commemorate water and its importance every year in March as part of World Water Day. My assistant Ivana Frýbortová has been a co-organizer of these celebrations within the Svratka River Basin Council for more than two decades and wanted to do more to raise awareness of the importance of water. It is surprising how little we know about water, how we take it for granted. That is why a competition was created for schools whose themes are intended to bring the importance of water closer not only to children but also to their parents. It is gratifying to see more and more schools interested in participating in this competition. It is obvious that water and its importance are not only the subject of the competition, but also of teaching. Water deserves more awareness, from preschools to primary schools, and later as well. Education in this area is insufficient, as evidenced by public opinion, survey results, as well as discussions on flood protection, especially in the Oder river basin, and on the protection of Opava and other cities.

What do you think should be the focus of attention in water management in the future?

Attention needs to be focused on sustainable management of limited water resources. I have described this in detail in previous answers. It is not and will not be just a question of quantity, but especially of quality, and it will become increasingly difficult to maintain a balanced state in the water cycle.

Tell our readers what you want to work on in the future.

I would be happy if I could "infect" as many people as possible with the love of water. Caring for water, in any profession, is not a job, but a mission. And it is the most beautiful mission – to preserve something so exceptional and beautiful in all its forms for future generations, for the functioning of the planet and all ecosystems. Water is the carrier of not only life, but also of information and energy. Something so simple, yet so extraordinary, irreplaceable…

Dr. Tůma, thank you very much for the time you have made for our interview.

Ing. Josef Nistler

Dr. Ing. Antonín Tůma

Dr. Ing. Antonín Tůma, born on December 11, 1963 in Třebíč, graduated from the Brno University of Technology, majoring in Water Management and Water Structures, then continued his doctoral studies with a specialization in Water Protection. He is a long-time employee of the Morava Basin State Enterprise and has been the deputy general director of this organization since 2006. He is a member of many expert organizations, such as the chairman of the Commission for the Dyje Sub-Basin Plan and the vice-chairman of the Crisis Technical Staff of the Morava River Basin. He is the Czech representative on the editorial board of the Slovak water management journal *Vodohospodársky spravodajca*, and the director of 11 completed international projects within the framework of cross-border cooperation with the Slovak Republic and Austria. He was the head of the delegation of water managers of the Czech Republic at the World Water Technology and Environmental Control (WATEC) Conference Israel in 2009. He participated in many important professional water management lectures and conferences in the Czech Republic and abroad as a chairman, lecturer, or expert guarantor. He has completed countless training courses in managerial communication and presentation skills; he is an examiner and a certified engineer.